UNITED STATES SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

Form 10-K

☑ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the fiscal year ended December 31, 2017

OR

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the transition period from to

Commission File No. 001-36276

Ultragenyx Pharmaceutical Inc.

(Exact name of registrant as specified in its charter)

Delaware	**27-2546083**
(State or other jurisdiction of incorporation or organization)	*(I.R.S. Employer Identification No.)*
60 Leveroni Court **Novato, California**	**94949**
(Address of principal executive offices)	*(Zip Code)*

(415) 483-8800
(Registrant's telephone number, including area code)

Securities registered pursuant to Section 12(b) of the Act:

Title of Each Class	Name of Each Exchange on Which Registered
Common Stock, $0.001 par value	**The Nasdaq Global Select Market**

Securities registered pursuant to Section 12(g) of the Act: None.

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. YES ☑ NO ☐

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. YES ☐ NO ☑

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. YES ☑ NO ☐

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Website, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). YES ☑ NO ☐

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§229.405 of this chapter) is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. ☑

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act. (Check one):

Large accelerated filer ☑ Accelerated filer ☐
Non- accelerated filer ☐ (Do not check if a smaller reporting company) Smaller reporting company ☐
Emerging growth company ☐

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). YES ☐ NO ☑

The aggregate market value of the voting and non-voting common equity held by non-affiliates of the Company as of June 30, 2017 was approximately $2.6 billion, based upon the closing price on The Nasdaq Global Select Market reported for such date. Shares of common stock held by each executive officer and director and by each person who is known to own 10% or more of the outstanding common stock have been excluded in that such persons may be deemed to be affiliates of the Company. This determination of affiliate status is not necessarily a conclusive determination for other purposes.

As of February 15, 2018, the Company had 49,605,852 shares of common stock issued and outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's definitive proxy statement relating to its 2018 Annual Meeting of Stockholders, to be held on or about June 19, 2018, are incorporated by reference into Part III of this Annual Report on Form 10-K where indicated. Such proxy statement will be filed with the U.S. Securities and Exchange Commission within 120 days after the end of the fiscal year to which this report relates.

Table of Contents

CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K, or Annual Report, contains forward-looking statements that involve risks and uncertainties. We make such forward-looking statements pursuant to the safe harbor provisions of the Private Securities Litigation Reform Act of 1995 and other federal securities laws. All statements other than statements of historical facts contained in this Annual Report are forward-looking statements. In some cases, you can identify forward-looking statements by words such as "anticipate," "believe," "contemplate," "continue," "could," "estimate," "expect," "intend," "may," "plan," "potential," "predict," "project," "seek," "should," "target," "will," "would," or the negative of these words, or other comparable terminology. These forward-looking statements include, but are not limited to, statements about:

- our commercialization, marketing, and manufacturing capabilities and strategy;
- our expectations regarding the timing of clinical study commencements and reporting results from same;
- the timing and likelihood of regulatory approvals for our product candidates;
- the anticipated indications for our product candidates, if approved;
- the potential market opportunities for commercializing our product and product candidates;
- our expectations regarding the potential market size and the size of the patient populations for our product and product candidates, if approved for commercial use;
- estimates of our expenses, future revenue, capital requirements, and our needs for additional financing;
- our ability to develop, acquire, and advance product candidates into, and successfully complete, clinical studies;
- the implementation of our business model and strategic plans for our business, product and product candidates and the integration and performance of any acquired businesses;
- the initiation, timing, progress, and results of ongoing and future preclinical and clinical studies, and our research and development programs;
- the scope of protection we are able to establish and maintain for intellectual property rights covering our product and product candidates;
- our ability to maintain and establish collaborations or strategic relationships or obtain additional funding;
- our ability to maintain and establish relationships with third parties, such as contract research organizations, suppliers, and distributors;
- our financial performance and the expansion of our organization;
- our ability to obtain supply of our product and product candidates;
- the scalability and commercial viability of our manufacturing methods and processes;
- developments and projections relating to our competitors and our industry; and
- other risks and uncertainties, including those listed under Part I, Item 1A. Risk Factors.

Any forward-looking statements in this Annual Report reflect our current views with respect to future events or to our future financial performance and involve known and unknown risks, uncertainties, and other factors that may cause our actual results, performance, or achievements to be materially different from any future results, performance, or achievements expressed or implied by these forward-looking statements. Factors that may cause actual results to differ materially from current expectations include, among other things, those discussed under Part I, Item 1A. Risk Factors and discussed elsewhere in this Annual Report. Given these uncertainties, you should not place undue reliance on these forward-looking statements. Except as required by law, we assume no obligation to update or revise these forward-looking statements for any reason, even if new information becomes available in the future.

This Annual Report also contains estimates, projections, and other information concerning our industry, our business, and the markets for certain diseases, including data regarding the estimated size of those markets, and the incidence and prevalence of certain medical conditions. Information that is based on estimates, forecasts, projections, market research, or similar methodologies is inherently subject to uncertainties and actual events or circumstances may differ materially from events and circumstances reflected in this information. Unless otherwise expressly stated, we obtained this industry, business, market, and other data from reports, research surveys, studies, and similar data prepared by market research firms and other third parties, industry, medical and general publications, government data, and similar sources.

As used in this Annual Report, "Ultragenyx," "we," "our," and similar terms include Ultragenyx Pharmaceutical Inc. and its subsidiaries, unless the context indicates otherwise.

PART I

Item 1. *Business*

Overview

We are a biopharmaceutical company focused on the identification, acquisition, development, and commercialization of novel products for the treatment of serious rare and ultra-rare diseases, with a focus on serious, debilitating genetic diseases. We target diseases for which the unmet medical need is high, the biology for treatment is clear, and for which there are no currently approved therapies. Since our inception in 2010, we have in-licensed potential treatments for multiple rare genetic disorders. Our strategy, which is predicated upon time- and cost-efficient drug development, allows us to pursue multiple programs in parallel with the goal of delivering safe and effective therapies to patients with the utmost urgency.

Our approved product and current product candidate pipeline have been either in-licensed from academic institutions or derived from partnerships with other pharmaceutical companies. Our strategy is to acquire and retain global commercialization rights to our products to maximize long-term value, where possible. We have built our own commercial organization, which is highly targeted due to the relatively small number of specialists who treat patients with rare and ultra-rare diseases.

The patients we seek to treat have diseases with limited or no treatment options, and we recognize that their lives and well-being are dependent upon our efforts to develop new therapies. For this reason, we are passionate about developing these therapies with the utmost urgency and care.

We were founded in April 2010 by our current President and Chief Executive Officer, Emil Kakkis, M.D., Ph.D. We have assembled an experienced team with extensive rare disease drug development and commercialization capabilities. Dr. Kakkis and the team at Ultragenyx have been previously involved at other companies in the development and/or commercialization of many therapies approved or in development for rare genetic diseases.

On November 7, 2017, we completed our acquisition of Dimension Therapeutics, Inc., a Delaware corporation, which became our wholly-owned subsidiary. Upon the closing of the acquisition, we paid aggregate consideration of approximately $152.3 million, not including related transaction fees and expenses, using available cash and investments. For additional information regarding the acquisition, see Note 3 to our consolidated financial statements.

Our Strategy

Our strategy is to identify, acquire, develop, and commercialize novel products for the treatment of rare and ultra-rare diseases in the United States, or U.S., the European Union, or EU, and select international markets, with the goal of becoming a leading rare disease biotechnology company. The critical components of our business strategy include the following:

- ***Focus on rare and ultra-rare diseases with significant unmet medical need and clear biology.*** There are numerous rare and ultra-rare genetic diseases that currently have no approved drug therapy and for which no therapies are currently in development. Patients suffering from these diseases often have a high unmet medical need with significant morbidity and/or mortality. We are focused on developing and commercializing therapies for multiple such indications with the utmost urgency. We also focus on diseases that have biology that is well understood. For example, Mepsevii™ is a replacement therapy for a single deficient enzyme and several of our product candidates are replacement therapies for a single deficient substrate in the body. We believe that developing drugs that directly impact known disease pathways will increase the probability of success of our development programs. Our four modalities of small molecules, biologics, mRNA and AAV gene therapy provide us with what we believe is an optimal set of options to treat metabolic genetic diseases by selecting the best treatment strategy available for each disease.
- ***Leverage our experience and relationships to in-license promising product candidates; retain global commercialization rights to product candidates.*** Our management team seeks to develop and maintain strong relationships with key opinion leaders in the genetic field and leverage our success in the development and commercialization of therapies for rare and ultra-rare genetic diseases. All of our current clinical product candidates are in-licensed from academic institutions or derived from partnerships with other pharmaceutical companies. We believe parties agree to license product candidates to us because they are confident in our team's drug development capabilities and our plans and execution thus far in bringing rare disease therapies to market. We intend to seek and retain global commercialization rights to our product and product candidates whenever possible to maximize the potential value of our product portfolio. Because we typically in-license product candidates that require translational or clinical research, at this time we do not intend to invest significant capital in basic research, which can be expensive and time-consuming.

- ***Focus on excellent, rapid, and efficient clinical and regulatory execution on multiple programs in parallel.*** We believe that building a successful and sustainable rare disease-focused company requires very specific expertise in the areas of patient identification, clinical study design and conduct, and regulatory strategy. We have assembled a team capable of managing global clinical development activities in an efficient manner and with multinational experience in obtaining regulatory approvals for rare disease products. Clinical development programs for rare and ultra-rare diseases can often be smaller in size than those for larger market indications. Development of multiple programs in rare diseases also generates organizational efficiencies and economies of scale. We also seek to manage our fixed cost structure by outsourcing most manufacturing of our product and product candidates. As a result of these efficiencies, we are able to feasibly develop multiple clinical-stage product candidates in parallel, resulting in a more diversified portfolio that provides multiple opportunities to create value.
- ***Establish global commercial organization.*** We have established our own unique commercial organization in major pharmaceutical markets and developed a network of third-party distributors in smaller markets and expect to expand these efforts. We believe our commercial organization is highly targeted, in part as a result of the relatively small number of specialists who typically treat patients with the diseases to be addressed by our product and product candidates.

Product - Mepsevii™

On November 15, 2017, the U.S. Food and Drug Administration, or FDA, approved our first product, Mepsevii (vestronidase alfa), the first medicine approved for the treatment of children and adults with MPS VII, also known as Sly syndrome. Mepsevii is available to patients in the U.S. In order to support patients, we launched UltraCare™, a comprehensive support service that provides ongoing support to patients and caregivers. UltraCare will help patients obtain coverage and assist with financial support for both medication and administration of medication. With this approval, the FDA issued a Rare Pediatric Disease Priority Review Voucher, or PRV, which confers priority review to a subsequent drug application that would not otherwise qualify for priority review. We completed the sale of the PRV in January 2018 for $130.0 million.

Mepsevii is an intravenous, or IV, enzyme replacement therapy for the treatment of MPS VII. MPS VII is caused by a deficiency of the lysosomal enzyme beta-glucuronidase, which is required for the breakdown of certain complex carbohydrates known as glycosaminoglycans, or GAGs. The inability to properly break down GAGs leads to their accumulation in many tissues, resulting in a serious multi-system disease. Mepsevii is designed to replace the deficient lysosomal enzyme beta-glucuronidase in MPS VII patients. Patients with MPS VII suffer from severe cellular and organ dysfunction that typically leads to death in the teens or early adulthood and may have abnormal coarsened facial features, enlargement of the liver and spleen, airway obstruction, lung disease, cardiovascular complications, joint stiffness, short stature, and a skeletal disease known as dysostosis multiplex. In addition, many patients experience progressive lung problems as a result of airway obstruction and mucous production, often leading to sleep apnea and pulmonary insufficiency, and eventually requiring tracheostomy. Mepsevii is the only FDA-approved drug therapy for MPS VII.

In Europe, the European Medicines Agency, or EMA, is currently reviewing the Marketing Authorization Application, or MAA, for vestronidase alfa, and an opinion from the Committee for Medicinal Products for Human Use, or CHMP, is expected in the first half of 2018. The EMA has agreed that approval under exceptional circumstances could be possible based upon a single positive placebo-controlled pivotal study in approximately 12 patients using urinary GAG levels as a surrogate primary endpoint, provided the data was strongly supportive of a favorable benefit/risk ratio and some evidence or trend in improvement in clinical endpoints was observed to support the primary endpoint. The EMA recognized that a statistically significant result on clinical endpoints was unlikely given the small number of patients expected to be enrolled in the study.

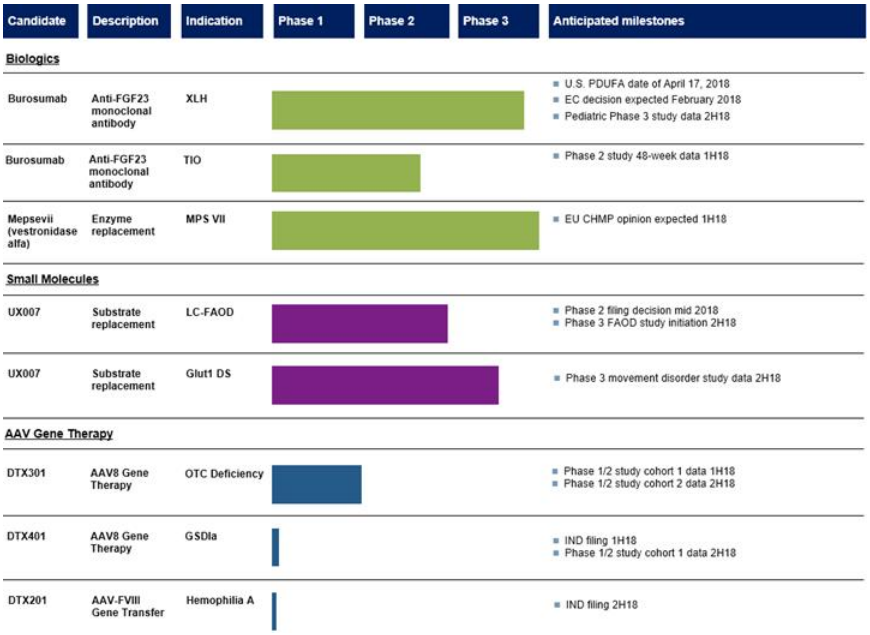
We are also supplying vestronidase alfa to investigators who are treating patients under emergency investigational new drug, or eIND, applications and other expanded access programs.

Please see "—License and Collaboration Agreements—Approved Product—Saint Louis University" for a description of our license agreement with Saint Louis University.

Clinical Product Candidates

Our current clinical-stage pipeline consists of three product categories: biologics, small-molecule substrate replacement therapies, and gene therapy. Enzymes are proteins that the body uses to process materials needed for normal cellular function, and substrates are the materials upon which enzymes act. When enzymes or substrates are missing, the body is unable to perform its normal cellular functions, often leading to significant clinical disease. Several of our therapies are intended to replace deficient enzymes or substrates. Gene therapy is a therapeutic approach in which an isolated gene sequence or segment of DNA is administered to a patient, most commonly for the purpose of treating a genetic disease that is caused by mutations. Gene therapy aims to address the disease-causing effects of absent or dysfunctional genes by delivering functional copies of the gene to the patient's cells, offering the potential for durable therapeutic benefit.

The following table summarizes our advanced product candidate pipeline:



Burosumab for the treatment of XLH

Burosumab is a fully human monoclonal antibody administered via subcutaneous injection that is designed to bind and reduce the biological activity of fibroblast growth factor 23, or FGF23, to increase abnormally low phosphate levels in patients with XLH. Patients with XLH have low serum phosphate levels due to excessive phosphate loss into the urine, which is directly caused by the effect on kidney function of excess FGF23 production in bone cells. Low phosphate levels lead to poor bone mineralization and a variety of clinical manifestations, including rickets leading to bowing and other skeletal deformities, short stature, bone pain and fractures, and muscle weakness. There is no approved drug therapy or treatment for the underlying cause of XLH. Most patients are managed using frequently dosed oral phosphate replacement and vitamin D therapy, which can lead to significant side effects. Oral phosphate/vitamin D replacement therapy requires extremely close monitoring due to the potential for excessive phosphate levels and secondary increases in calcium, which can result in severe damage to the kidneys from excess calcium phosphate deposits and other complications. Additionally, some patients are unable to tolerate the regimen due to the chalky stool that results from taking large amounts of oral phosphate or the high frequency of dosing required.

In April 2017, we announced positive 64-week data from a 52-patient pediatric Phase 2 randomized, multicenter, open-label, dose-finding study of burosumab for the treatment of XLH in children aged five to 12 years of age. Patients demonstrated increases in mean serum phosphorus, renal phosphate reabsorption (TmP/GFR) and serum 1,25 dihydroxy vitamin D levels through 64 weeks of treatment. Rickets severity was assessed using the RSS scoring system. There was a statistically significant improvement in rickets scores in all groups at 64 weeks, with the greatest improvements in patients with higher baseline rickets scores (RSS ≥1.5) who received bi-weekly dosing of burosumab. Overall, patients (n=52) had a 51% reduction in RSS score ($p < 0.0001$). Patients with higher baseline rickets scores (n=34) had a 59% reduction in RSS score ($p < 0.0001$). Patients who were dosed bi-weekly (n=26) had a 58% reduction in RSS score ($p < 0.0001$). Patients with higher baseline rickets scores who were dosed bi-weekly (n=17) had a 62% reduction in RSS score ($p < 0.0001$). The change in the severity of rickets was assessed by the RGI-C score. Data show significant improvement in rickets in all groups at 64 weeks. Overall, all patients (n=52) experienced a mean improvement in RGI-C score of

+1.57 (p< 0. 0001) and those patients with higher baseline rickets scores (n=34) experienced a mean improvement of +1.98 (p< 0.0001). Within the higher severity subset, 77% (26/34) experienced substantial healing (score ≥ 2). Overall, all patients who were dosed bi-weekly (n=26) experienced a mean improvement in RGI-C score of +1.62 (p< 0.0001). Patients with higher baseline rickets scores who were dosed bi-weekly (n=17) showed a mean improvement of +2.08 (p< 0.0001) (substantial healing), and 82% experienced substantial healing (score ≥ 2). Patients with higher baseline rickets scores showed more growth impairment (baseline height percentile= 5.84), and these patients demonstrated greater improvement in growth. Among all patients (n=52), growth velocity improved by a mean of +0.55 cm/year (p=0.0376), and there was 0.15 change in height z-score (p<0.0001). Patients with higher baseline rickets scores had a +0.86 cm/year improvement in growth velocity (p=0.0175) and a 0.17 change in height z-score (p=0.0016). Patients who were dosed bi-weekly (n=26) experienced a +0.73 cm/year change in growth velocity (p=0.0160) and a 0.18 change in height z-score (p=0.0002). Patients with higher baseline rickets scores who were dosed bi-weekly (n=17) had a +1.11 cm/year change in growth velocity (p=0.0076) and a 0.18 change in height z-score (p=0.0063). Approximately 65% of patients had injection site reactions, all of which were considered mild. There was one previously reported serious adverse event considered possibly treatment-related. This was a patient with fever and muscle pain who improved without complication and is still in the study. There have been no deaths or discontinuations from the study. No clinically meaningful changes were observed in mean serum calcium, urinary calcium and in serum intact parathyroid hormone. None of the patients had serum phosphorus levels above the upper limit of normal at any time point. No clinically significant changes were observed in renal ultrasounds pre- and post-treatment.

In September 2017 we announced 40-week data from the 64-week Phase 2 study in children less than five years old (mean age 2.9 years). Burosumab increased mean serum phosphorus levels by 1.2 mg/dL into the low normal range after one week of treatment and these levels were maintained through week 40 with 77% of children achieving normal serum phosphorus levels at week 40. Serum 1,25 dihydroxy vitamin D levels were also increased from baseline to week 40. Rickets severity was assessed using the RSS scoring system. The mean total RSS score improved significantly (59% reduction) at week 40 (p<0.0001). The change in rickets severity was also assessed at week 40 by the RGI-C score which showed substantial healing (RGIC score > 2) in all patients (p<0.0001). Burosumab treatment also resulted in significantly improved bowing as determined by RGI-C lower limb deformity (p<0.0001). Additionally, mean levels of alkaline phosphatase were significantly reduced (-39%, p<0.0001) in these patients at week 40. All patients experienced one or more adverse events. There was one serious adverse event of a tooth abscess that was considered unrelated to burosumab treatment. All other events were assessed as mild or moderate in severity except for a Grade 3 food allergy that was considered unrelated to burosumab treatment. Three patients had injection site reactions and four patients experienced hypersensitivity events that were all mild and considered unrelated to burosumab treatment. No clinically meaningful changes were observed in mean serum calcium, urinary calcium and in serum intact parathyroid hormone. There have been no events of hyperphosphatemia and there have been no deaths or discontinuations from the study.

In February 2018, we reported continued improvement in rickets and bowing in 64 week data from this Phase 2 study. This longer term data from this study demonstrated that treatment with burosumab was consistent with and further improved from what was seen at 40 weeks. These included sustained improvements in serum phosphorus levels, and a progressive reduction into the normal range of alkaline phosphatase. There were continued improvements in bowing and rickets scores at 64 weeks. The safety profile observed in this study was consistent with other burosumab studies.

In December 2017, we and our partners Kyowa Kirin International PLC, a wholly owned subsidiary of KHK, announced that the Committee for Medicinal Products for Human Use (CHMP), the European Medicines Agency's (EMA) scientific committee, adopted a Positive Opinion recommending the conditional marketing authorization of burosumab for the treatment of XLH with radiographic evidence of bone disease in children one year of age and older and adolescents with growing skeletons. The CHMP's recommendation has been referred to the European Commission (EC), which is expected to render its final decision in February of 2018.

We have an ongoing Phase 3 randomized open-label clinical study comparing the efficacy and safety of burosumab to oral phosphate and active vitamin D therapy in approximately 60 pediatric patients with XLH. The study is evaluating changes in rickets, growth velocity and height, pharmacodynamic assessments, walking ability, patient reported outcomes assessing pain, fatigue and physical function, and safety. We expect data from this study in the second half of 2018. This study will not be required to support a US approval and will serve as a confirmatory study in Europe.

We are also continuing to develop burosumab in adults with XLH. In April 2017, we announced positive 24-week data from the randomized, double-blind, placebo-controlled Phase 3 study of burosumab in adults with X-linked hypophosphatemia (XLH). The study enrolled 134 patients, randomized 1:1 to burosumab at a dose of 1 mg/kg or placebo every four weeks for 24 weeks. The study met the primary endpoint of increasing serum phosphorus levels as 94% of patients treated with burosumab (n=68) achieved serum phosphorus levels above the lower limit of normal and maintained levels in the low normal range through 24 weeks, compared to 8% in the placebo arm (n=66; p<0.0001). There were three pre-specified key secondary endpoints, including stiffness and physical function, both measured by the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC®), and pain measured by the Brief Pain Inventory Question 3 (BPI Q3; pain at its worst in the last 24 hours). At week 24, stiffness improved by a mean score of 7.87 points for patients treated with burosumab compared to a 0.25 point worsening among patients in the placebo group (mean difference of 8.12; p=0.0122). Physical function improved by 3.11 points for patients treated with burosumab compared to a 1.79 point worsening among patients in the placebo group (mean difference of 4.90 points; p=0.0478). Pain score improved by 0.79 for patients treated with burosumab compared to a 0.32 improvement among patients in the placebo group (mean score difference of 0.46 points;

p=0.0919). Results were directionally consistent towards improvement across all three key secondary endpoints. After pre-planned multiplicity adjustment, the improvement in stiffness among patients treated with burosumab remained statistically significant at the less than the 0.0167 threshold, while physical function and pain scores demonstrated strong trends.

In December 2017, we announced additional positive 48-week data from the study. From 24 to 48 weeks of treatment, 84% of patients who had received burosumab since the beginning of the study (n=68) achieved and maintained serum phosphorus levels above the lower limit of normal (2.5 mg/dL). 89% of patients who crossed over from placebo to burosumab after 24 weeks (n=66) achieved and maintained serum phosphorus levels above the lower limit of normal. Patients treated with burosumab showed continued improvement in stiffness and physical function as measured by WOMAC. For patients treated with burosumab, stiffness further improved from a mean change of 7.42 points at 24 weeks to 16.03 points at 48 weeks. Patients who crossed over from placebo to burosumab treatment had a mean change of 15.82 points from 24 to 48 weeks. Physical function also further improved from a mean change of 2.78 points at 24 weeks to 7.76 points at 48 weeks. For patients in the crossover group, physical function improved by a mean change of 8.18 points from 24 to 48 weeks. Burosumab was associated with a reduction in pain measured by BPI Q3, as well as a reduction in the use of pain medication. For patients treated with burosumab, pain scores further improved from a mean change of 0.81 points at 24 weeks to 1.09 points at 48 weeks. Patients who crossed over from placebo to burosumab treatment had a mean change of 1.18 points from 24 to 48 weeks. The patient frequency of reported opioid use decreased by 76% from 17 patients (25%) at baseline to four patients (6%) at week 48 in the burosumab group, and by 70% from 13 patients (20%) to four patients (6%) in the crossover group. The patient frequency of reported nonsteroidal anti-inflammatory drugs (NSAIDs) use decreased by 72% from 47 patients (69%) at baseline to 13 patients (19%) at week 48 in the burosumab group, and by 74% from 43 patients (65%) to 11 patients (17%) in the crossover group. Burosumab treatment resulted in increased healing of fractures (active fractures and pseudofractures) compared to placebo at week 24, and this improvement continued through 48 weeks. When evaluating follow-up X-rays in the 52% of patients with identified fractures or pseudofractures at baseline, the 43% rate of fracture healing observed at 24 weeks on burosumab increased to 63% at 48 weeks. In the crossover group which had an 8% rate of fracture healing at 24 weeks, the rate increased to 35% at week 48. The crossover patient group fracture healing result was consistent with the effect observed in the first 24 weeks of the burosumab group treatment.

There was no difference in the overall frequency of treatment emergent serious and non-serious adverse events, treatment related adverse events and serious adverse events between the group who received burosumab for the 48-week period compared to the group who received placebo for the 24-week double-blind period and then crossed over to burosumab. The safety profile at 48 weeks was generally similar to that observed at 24 weeks. The most common adverse events in patients during treatment with burosumab (>10%) were arthralgia (24%), nasopharyngitis (22%), headache (20%), back pain (16%), tooth abscess (13%), fatigue (13%), restless leg syndrome (11%), pain in extremity (11%), pain (11%), toothache (11%), vitamin D deficiency (10%), and musculoskeletal pain (10%). Eleven percent of patients who received burosumab experienced clinical symptoms compatible with hypersensitivity. There were 15 patients who experienced serious adverse events (SAEs) during treatment with burosumab, but none of these SAEs were considered treatment-related. No meaningful changes were observed in serum intact parathyroid hormone levels or ectopic mineralization as assessed by renal ultrasounds or echocardiograms. Of the 134 patients enrolled in the study, one patient in the burosumab arm discontinued treatment during the 24-week double-blind treatment period, as previously reported. During the open-label period, seven patients discontinued treatment. No discontinuations were related to adverse events or tolerability. There has been one non-treatment related death due to a car accident that was reported after the Week 48 data cutoff date.

In February 2018, we reported that bone biopsy data from adult patients in the bone quality study demonstrated continued improvement in osteomalacia. At 48 weeks, all ten patients with evaluable paired bone biopsies demonstrated meaningful improvements from baseline in mean osteoid volume/bone volume. The mean decrease from 26.1% to 11.2% among these patients represents a 57% improvement from baseline in mean osteoid volume/bone volume which is the gold standard for the evaluation of osteomalacia. The patients also demonstrated mean improvements of 32% and 26% in osteoid thickness and osteoid surface/bone surface parameters respectively. These patients also experienced a meaningful improvement in mineralization lag time. These results, including safety, are consistent with the data provided to the FDA in the first 6 of these 10 patients showing a substantial reduction in osteomalacia.

In October 2017, we announced that the FDA accepted the biologics license application, or BLA, for burosumab to treat pediatric and adult patients with XLH and has granted Priority Review status. The Prescription Drug User Fee Act, or PDUFA, action date for the BLA is April 17, 2018. The Agency has indicated that it is not currently planning to hold an advisory committee meeting to discuss the BLA. The FDA previously granted Fast Track Designation to the burosumab program for the treatment of XLH, and Breakthrough Therapy Designation for pediatric patients one year of age or older. The FDA also designated burosumab as a drug for a "rare pediatric disease," enabling issuance of a priority review voucher if burosumab is approved.

Burosumab for the treatment of tumor-induced osteomalacia, or TIO

We are also developing burosumab for the treatment of TIO. TIO results from typically benign tumors that produce excess levels of FGF23, which can lead to severe hypophosphatemia, osteomalacia, bone fractures, fatigue, bone and muscle pain, and muscle weakness. There are cases in which resection of the tumor is not feasible or recurrence of the tumor occurs after resection. In patients for whom the tumor is inoperable, the current standard of care consists of oral phosphate and/or vitamin D replacement. The efficacy of this treatment is often limited, as it does not treat the underlying disease and its benefits must be balanced with monitoring for potential risks such as nephrocalcinosis, hypercalciuria, and hyperparathyroidism.

In September 2017, interim data from the open-label Phase 2 study of burosumab in 17 adult patients with TIO was presented. In 16 patients with baseline and week 24 data, mean serum phosphorus, renal phosphate reabsorption (TmP/GFR) and serum 1,25 dihydroxy vitamin D levels increased after the first dose and over 24 weeks of treatment. The mean serum phosphorus level entered the normal range within two weeks of treatment, and was maintained in the low normal range through week 24 of treatment. At week 24 there was a statistically significant increase in mean percent change from baseline levels (51% and 38% respectively) of the bone turnover markers, Procollagen type 1 N-terminal propeptide (P1NP) and collagen type 1 cross-linked C-telopeptide of type I collagen (CTx). All patients had moderate to severe osteomalacia at baseline as assessed by histomorphometric indices of osteomalacia. Four patients who completed 48 weeks of treatment had bone biopsy data. In three of these patients burosumab treatment was associated with improvements in histomorphometric indices of osteomalacia. One patient did not receive burosumab consistently. Burosumab demonstrated a clinically meaningful improvement in patient reported outcomes. At 24 weeks, patients experienced a statistically significant reduction in all four fatigue parameters as assessed by the Brief Fatigue Inventory, or BFI. Burosumab also demonstrated a statistically significant increase in lower limb strength as seen with the increase in repetitions at 24 weeks in the Sit-to-Stand test ($p<0.01$). Adverse events occurred in all patients (n=16). Treatment-related adverse events were observed in seven patients (44%), and included, as previously disclosed, Vitamin D deficiency and rash, and dysgeusia, all mild in grade. Most adverse events were grade 1 or 2 and included two patients with injection site reactions and two patients with restless leg syndrome that were previously disclosed. Three patients had a serious adverse event (previously disclosed tumor progression, thoracic epidural tumor compression, and a mesenchymal tumor progression). None of the serious adverse events were considered treatment related and all of these patients had a history of tumor progression at baseline and one patient discontinued to treat their tumor progression. No clinically meaningful changes were observed in mean serum calcium, urinary calcium and in serum intact parathyroid hormone. We expect 48-week data from this study in the first half of 2018.

Please see "—License and Collaboration Agreements—Clinical Product Candidates—Kyowa Hakko Kirin" for a description of our collaboration and license agreement with KHK.

UX007 for the treatment of LC-FAOD

We are developing UX007 for oral administration intended as a substrate replacement therapy for patients with LC-FAOD. UX007 is a purified, pharmaceutical-grade form of triheptanoin, a specially designed synthetic triglyceride compound, created via a multi-step chemical process. Triheptanoin has been studied clinically for over a decade in more than a hundred human subjects affected by a variety of diseases. UX007 is a medium odd-chain triglyceride of seven-carbon fatty acids designed to provide substrate replacement for fatty acid metabolism and restore production of energy. Patients with LC-FAOD have a deficiency that impairs the ability to produce energy from fat, which can lead to depletion of glucose in the body, and severe liver, muscle, and heart disease, as well as death. There are currently no approved drugs or treatments specifically for LC-FAOD. The current standard of care for LC-FAOD includes diligent prevention of fasting combined with the use of low-fat/high-carbohydrate diets, carnitine supplementation in some cases, and medium even-chain triglyceride oil supplementation. Despite treatment with the current standard of care, many patients continue to suffer significant morbidity and mortality.

In November 2016, we reported positive 78-week data from the Phase 2 study in LC-FAOD patients. The study was single-arm open-label and evaluated 29 pediatric and adult patients across three main symptom groups (musculoskeletal, liver/hypoglycemia, and cardiac). Patients needed to have moderate to severe LC-FAOD with significant disease in at least one of these domains or a frequent medical events history in order to enroll. The study began with a four-week run-in period to assess baseline data while on the standard of care therapy including MCT oil, if applicable. Patients on MCT oil then discontinued it and UX007 was titrated to a target dose of 25-35% of total daily caloric intake. Patients were followed to evaluate the acute effects of UX007 treatment over 24 weeks on several endpoints, including cycle ergometry performance, 12-minute walk test, liver disease/hypoglycemia, cardiac disease, and quality of life. Patients who opted to continue were treated for a total of 78 weeks, and rates of major medical events, such as rhabdomyolysis, hypoglycemia and cardiac events, were monitored and compared to rates for the two years prior to treatment with UX007. The study evaluated the safety and tolerability of UX007. The data showed a 48.1% reduction in the mean annualized rate of MCEs (Major Clinical Events) and a 50.6% reduction in the median annualized rate of MCEs after 78 weeks of treatment, compared to the annualized rates in the 18 months prior to treatment with UX007. There was a 50.3% reduction in the mean annualized duration of all MCEs and a 76.7% reduction in the median annualized duration of MCEs following 78 weeks of UX007 treatment. The safety profile was consistent with what has been previously observed with UX007.

In January 2018, we announced an update to our development plan for UX007 in LC-FAOD. Following an end-of-phase 2 meeting, we are working to provide additional information to submit to FDA for consideration of an early filing based on the results from the Phase 2 study.

The clinical effect observed was considered important, but it was not clear if there were dietary or other changes in the regimen as each patient crossed over onto UX007 that might have accounted for the improvement. We are working to provide additional information to FDA to support that the improvement demonstrated was likely due to UX007 and not any other changes. After this information is submitted and evaluated by FDA, we plan to determine with the FDA whether an early submission could be pursued. We are simultaneously finalizing a full protocol for a Phase 3, randomized, controlled study examining major clinical events as the primary endpoint as discussed with the FDA. This study would provide additional information that would be important in utilization and reimbursement long-term for UX007. If the FDA agrees to an early submission based on the Phase 2 study, the Phase 3 study would serve as a post-approval commitment for label expansion. Alternatively, the Phase 3 study could serve as a registrational study if an early filing is not possible.

Please see "—License and Collaboration Agreements—Clinical Product Candidates—Baylor Research Institute" for a description of our license agreement with Baylor Research Institute.

UX007 for the treatment of Glut1 DS

We are also developing UX007 for patients with Glut1 DS. Glut1 DS is caused by a mutation affecting the gene that codes for Glut1, which is a protein that transports glucose from the blood into the brain. Because glucose is the primary source of energy for the brain, Glut1 DS results in a chronic state of brain energy deficiency and is characterized by seizures, developmental delay, and movement disorder. There are currently no approved drugs specific to Glut1 DS. The current standard of care for Glut1 DS is the ketogenic diet, an extreme high-fat (70-80% of daily calories as fat)/low-carbohydrate diet, which generates ketone bodies as an alternative energy source to glucose, and one or more antiepileptic drugs. The ketogenic diet can be effective in reducing seizures but compliance can be difficult, and the effectiveness of the diet in the treatment of developmental delay and movement disorders has not been confirmed. In addition, ketogenic diet can lead to side effects including renal stones. In general, Glut1 DS patients are considered relatively refractory to antiepileptic drugs with only approximately 8% achieving seizure control on antiepileptic drugs alone. There are currently no antiepileptic drugs approved specifically for patients with Glut1 DS.UX007 is intended as a substrate replacement therapy to provide an alternative source of energy to the brain in Glut1 DS patients.

In March 2017, we announced topline data from the Phase 2 global, randomized, double-blind, placebo-controlled, parallel-group clinical study of UX007 for the treatment of Glut1DS patients with seizures. The study enrolled 36 patients who were not fully compliant with ketogenic diet and continued to have seizures. Patients treated with UX007 (n=25) demonstrated a reduction of 13.4% in overall seizure frequency (p=0.41) relative to placebo (n=11), which did not meet the primary endpoint of reducing the frequency of total number of observable and absence seizures among patients treated from baseline to Week 8 with UX007 compared to placebo. Two of the 36 enrolled patients discontinued treatment during the eight-week placebo-controlled period, and 12 patients have discontinued during the extension period to date. Two patients discontinued due to adverse events, four patients due to tolerability reasons, and eight patients due to compliance or study burden issues. There were no deaths, and no treatment-related serious adverse events. During the placebo-controlled period, 18 patients (72%) in the UX007 arm had treatment-related adverse events (AEs) and five patients (45%) in the placebo arm had treatment-related AEs. Most AEs were mild-to-moderate GI events including vomiting, diarrhea, and abdominal pain.

In April 2017, we screened the first patient in the Phase 3 study of UX007 for the treatment of Glut1 DS patients with the movement disorder phenotype. The study is a randomized, double-blind, placebo-controlled, cross-over study designed to assess the efficacy and safety of UX007 in approximately 40 patients who are experiencing disabling paroxysmal movement disorders associated with Glut1 DS. Movement disorder events are defined as disabling if they affect or limit a patient's ability to perform activities of daily living. Eligible patients are randomized in a 1:1 ratio to one of two treatment sequences. Patients in the first group will begin a two-week titration period followed by an eight-week treatment period on UX007. Patients will then begin a 2-week washout period, followed by a 2-week titration period and 8-week period on placebo. Patients in the second group will follow the same schedule but will start with placebo and then cross over to UX007. The primary endpoint compares the frequency of disabling paroxysmal movement disorder events during the 8-week treatment period with UX007, to the frequency of disabling movement disorder events during the 8-week placebo treatment period as recorded by a daily electronic diary. Secondary endpoints include the duration of disabling paroxysmal movement disorder events; walking capacity and endurance measured by the 12-minute walk test; patient-reported health-related quality of life assessments of physical function, mobility, upper extremity function, fatigue and pain; cognitive function and safety. Following the 22-week blinded crossover study period, patients may roll into the open-label extension period to continue on UX007 treatment. We expect data from this study in the second half of 2018.

DTX301 for the treatment of OTC deficiency

We are developing DTX301 as an adeno-associated virus 8, orAAV8, gene therapy product candidate designed for patients with ornithine transcarbamylase, or OTC, deficiency. OTC is part of the urea cycle, an enzymatic pathway in the liver that converts excess nitrogen, in the form of ammonia, to urea for excretion. OTC deficiency is the most common urea cycle disorder and leads to

increased levels of ammonia. Patients with OTC deficiency suffer from acute hyperammonemic episodes that can lead to hospitalization, adverse cognitive and neurological effects, and death. We estimate that there are approximately 10,000 patients worldwide with OTC deficiency, of which we estimate approximately 80% are classified as late-onset, our target population. We initiated patient dosing in our Phase 1/2 open-label clinical trial of DTX301 in August 2017. DTX301 has received Orphan Drug Designation in both the United States and Europe and Fast Track Designation in the United States.

In January 2018, we announced positive interim safety and efficacy data from the first dose cohort of the Phase 1/2 study of DTX301 in OTC deficiency. All three patients in the first, lowest-dose cohort received a single DTX301 dose of 2.0 × 10^12 GC/kg. As of the December 22, 2017 data cutoff date, two of the three patients had been followed for at least 12 weeks, the pre-defined endpoint for efficacy evaluation, and the third patient had been followed for 6 weeks. As of the cutoff date, there were no infusion-related adverse events and no serious adverse events reported. All adverse events were Grade 1 or 2 and resolved. The only treatment-related adverse events were mild, clinically asymptomatic and manageable elevations in alanine aminotransferase (ALT) in two patients, peaking at 45 (Patient 1) and 118 IU/L (Patient 2). These ALT elevations were mild and similar to what has been observed in other programs using AAV gene therapy. Both patients completed a standard tapering course of corticosteroids to treat the ALT elevations, and as of the data cutoff date, their ALT levels were in the normal range (below 40 U/L). The third patient had ALTs that remained in the normal range through six weeks. The first patient's rate of ureagenesis was normalized and maintained over 12 weeks. Their rate of ureagenesis at baseline was 200 umol/kg/hr (67% of normal, defined as 300 umol/kg/hr). At 6 weeks, their rate of ureagenesis increased to 335 umol/kg/hr (67% increase from baseline, 112% of normal). At 12 weeks, their rate of ureagenesis was 261 umol/kg/hr (30% increase from baseline, 87% of normal). The second patient did not show a clinically meaningful change in rate of ureagenesis over the 12-week period. The third patient showed a modest increase in ureagenesis from baseline over the first six weeks of treatment. This patient has not yet reached the 12-week post-dosing point. Full 12-week data from the first cohort is expected in March 2018. We expect to be able to move to the higher-dose second cohort (6.0 x 10^12 GC/kg) pending the data monitoring committee's review of the 12-week safety data for all three patients in this cohort. Data from this second cohort should be available in the second half of 2018.

Please see "—License and Collaboration Agreements—Clinical Product Candidates—REGENXBIO Inc." for a description of our license agreement with REGENXBIO Inc.

Other Development

In August 2017, we announced that a Phase 3 study evaluating aceneuramic acid extended release, or Ace-ER, in patients with GNE Myopathy did not achieve its primary endpoint of demonstrating a statistically significant difference in the upper extremity muscle strength composite score compared to placebo. The study also did not meet its key secondary endpoints. Adverse events were generally balanced between Ace-ER and placebo and safety was consistent with previously released Ace-ER data. We are discontinuing further clinical development of Ace-ER.

Preclinical Pipeline

DTX401 for the treatment of GSDIa

DTX401 is our AAV8 gene therapy program for the treatment of patients with GSDIa, a disease that arises from a defect in G6Pase, an essential enzyme in glycogen and glucose metabolism. GSDIa is the most common glycogen storage disease and we estimate there are approximately 6,000 patients worldwide. We expect to submit an IND in the first half of 2018 and expect data from the first cohort of the Phase 1/2 study in the second half of 2018. DTX401 has been granted Orphan Drug Designation in the United States and Europe.

DTX201 for the treatment of Hemophilia A

DTX201 is our FVIII gene therapy program for the treatment of hemophilia A that we are developing in collaboration with Bayer Healthcare LLC, or Bayer. Hemophilia A is the most common form of hemophilia with approximately 144,000 patients worldwide. We expect to submit an IND for DTX201 in the second half of 2018.

rhPPCA (UX004) for the treatment of galactosialidosis

Recombinant human protective protein cathepsin-A, or rhPPCA, which we in-licensed from St. Jude Children's Research Hospital, or St. Jude, in September 2012, is in preclinical development as an enzyme replacement therapy for galactosialidosis, a rare lysosomal storage disease for which there are no currently approved drug therapies. Similar to MPS patients, patients with galactosialidosis present with both soft tissue storage in the liver, spleen, and other tissues, as well as connective tissue (bone and cartilage) related disease. As with MPS VII, an enzyme deficiency results in accumulation of substrates in the lysosomes, causing skeletal and organ dysfunction, and death. We are continuing preclinical development of rhPPCA. Please see "—License and Collaboration Agreements—Preclinical Product Candidates—St. Jude Children's Research Hospital" for a description of our license agreement with St. Jude.

UX068 for the treatment of creatine transporter deficiency (CTD)

UX068 is in preclinical development for the treatment of CTD, an X-linked recessive disorder due to mutations in the SLC6A8 gene. Patients with CTD can suffer from CNS deficits, seizures, progressive intellectual disability, autism, speech/language/gross motor delays, and muscle hypotonia and hypotrophy. CTD affects approximately 10,000 to 50,000 patients in developed world.

Collaboration with Arcturus Therapeutics, Inc. for mRNA therapeutics including UX053 for the treatment of glycogen storage disease type III (GSDIII)

We signed a research collaboration and license agreement with Arcturus Therapeutics, Inc. to develop mRNA therapeutics for select rare disease targets in October 2015. The Arcturus collaboration may help us address a wider range of rare diseases than possible with current approaches. As part of the collaboration, Arcturus will utilize its UNA Oligomer™ chemistry and LUNAR™ nanoparticle delivery platform to initially design and optimize mRNA therapeutics for two targets selected by us; we also have the option to add up to eight additional targets during the collaborative research period.

The collaboration includes preclinical candidate UX053 for the treatment of GSDIII, a disease caused by a glycogen debranching enzyme (AGL) deficiency that results in glycogen accumulation in the liver and muscle. GSDIII can cause hepatomegaly, hypoglycemia, hyperlipidemia, some progressive liver cirrhosis, and muscle disease later in life, and affects more than 10,000 patients worldwide.

Collaboration with Takeda Pharmaceutical Company Limited

We entered into a strategic partnership with Takeda Pharmaceutical Company Limited, or Takeda, to develop and commercialize therapies to treat rare genetic diseases in June 2016. As part of the collaboration, we received an exclusive license to one preclinical Takeda product candidate in a pre-determined field of use. We discontinued the development efforts on the pre-clinical compound in the pre-determined field of use. We have also established a five-year research collaboration with Takeda in which we will have the option to license up to five additional Takeda product candidates for rare diseases; accordingly, we continue to evaluate additional product candidates for potential addition to the collaboration. Please see "—License and Collaboration Agreements—Preclinical Product Candidates—Takeda Pharmaceutical Company Limited" for a description of our license agreement with Takeda.

Other preclinical programs

We continue to work on other compounds in various preclinical stages of development.

Competition

The commercialization of new drugs is competitive, and we may face worldwide competition from individual investigators, major pharmaceutical companies, specialty pharmaceutical companies, biotechnology companies, nutraceutical companies, and ultimately biosimilar and generic companies. Our competitors may develop or market therapies that are more effective, safer, or less costly than any that may be commercialized by us, or may obtain regulatory approval for their therapies more rapidly than we may obtain approval for ours.

The acquisition or licensing of pharmaceutical products is also very competitive, and a number of more established companies, which have acknowledged strategies to license or acquire products, may have competitive advantages as may other emerging companies taking similar or different approaches to product acquisitions. These established companies may have a competitive advantage over us due to their size, cash flows, and institutional experience.

With respect to burosumab, although we are not aware of any other products currently in clinical development for the treatment of XLH, it is possible that competitors may produce, develop, and commercialize therapeutics, or utilize other approaches such as gene therapy, to treat XLH. Most pediatric patients with XLH are managed using oral phosphate replacement and/or vitamin D therapy, which is relatively inexpensive and therefore may adversely affect our ability to commercialize burosumab, if approved, in some countries.

With respect to Mepsevii, we are not aware of any other compounds currently in clinical development for MPS VII, but it is possible that other companies may produce, develop, and commercialize compounds that might treat these diseases. Additionally, gene therapy and other therapeutic approaches may emerge for the treatment of lysosomal diseases. Bone marrow or stem cell transplants have also been used in MPS VII and in other lysosomal storage diseases and represent a potential competing therapy. Stem cell transplants have been effective in treating soft tissue storage and in having an impact on brain disease, but have not to date proven effective in treating bone and connective tissue disease. Typically, enzyme replacement therapy has had an impact on bone and connective tissue disease in other disorders when patients were treated early.

With respect to UX007/triheptanoin, there are currently no approved drugs or treatments for patients with LC-FAOD or Glut1 DS. LC-FAOD is commonly treated with diet therapy and MCT oil, and UX007 would compete with MCT oil. Glut1 DS is commonly treated with ketogenic diet and antiepileptic drugs. UX007 may compete with these approaches. Although we believe that UX007 should be considered a drug and will be regulated that way, it is possible that other companies or individuals may attempt to produce triheptanoin for use in LC-FAOD, Glut1 DS, and other patients by attempting to sell the product via a nutritional supplement or medical food pathway. Investigators are testing triheptanoin in clinical studies across multiple indications, including LC-FAOD and Glut1 DS. For example, B. Braun Medical Inc., or B. Braun, has applied for and received orphan drug designation for triheptanoin for the treatment of certain types of LC-FAOD in Europe; however, we are not aware of any ongoing clinical development activities by B. Braun. It is also possible that other companies may produce, develop, and commercialize other medium odd-chain fatty acids, or completely different compounds, to treat LC-FAOD and Glut1 DS. Other companies may also utilize other approaches, such as gene therapy, to treat LC-FAOD and Glut1 DS.

With respect to DTX301, the current treatments for patients with OTC deficiency are nitrogen scavenging drugs and severe limitations in dietary protein. Drug therapy includes sodium phenylbutyrate (Buphenyl) and glycerol phenylbutyrate (Ravicti), both nitrogen scavengers that help eliminate excess nitrogen, in the form of ammonia, by facilitating its excretion. During a metabolic crisis, patients routinely receive carbohydrate and lipid rich nutrition, including overnight feeding through a nasogastric tube, to limit bodily protein breakdown and ammonia production. In acute cases, ammonia must be removed by dialysis or hemofiltration. Liver transplant may also be a solution for OTC deficiency.

Many of our competitors have substantially greater financial, technical, and human resources than we have. Additional mergers and acquisitions in the pharmaceutical industry may result in even more resources being concentrated in our competitors. Competition may increase further as a result of advances made in the commercial applicability of technologies and greater availability of capital for investment in these fields. Our success will be based in part on our ability to build and actively manage a portfolio of drugs that addresses unmet medical needs and creates value in patient therapy.

License and Collaboration Agreements

Our product and current product candidate pipeline have been either in-licensed from academic institutions or derived from partnerships with other pharmaceutical companies. Following is a description of our significant license and collaboration agreements.

Approved Product

Saint Louis University

In November 2010, we entered into a license agreement with Saint Louis University, or SLU, wherein SLU granted us certain exclusive rights to intellectual property related to GUS. Under the terms of the license agreement, SLU granted us an exclusive worldwide license to make, have made, use, import, offer for sale, and sell therapeutics related to SLU's beta-glucuronidase product, such as our rhGUS product candidate, for use in the treatment of human diseases. Under this agreement, we agreed to use best efforts to develop and commercialize a licensed product as soon as practicable consistent with sound and reasonable business practices and judgment.

Under the license agreement, upon reaching a certain level of worldwide sales of the product, we will pay to SLU a low single-digit royalty on net sales of the licensed products in any country or region, subject to certain potential deductions. Our obligation to pay royalties to SLU continues on a country-by-country basis until the expiration of the last-to-expire licensed patent covering the product in such country or, in the United States, Japan, and the EU, until the later expiration of any orphan drug exclusivity. We may terminate the agreement for convenience at any time and SLU may terminate the agreement for our material breach, bankruptcy, or challenge of the licensed patents or technology, and SLU may terminate the agreement or render our license non-exclusive if we fail to meet our diligence obligations. Unless terminated as set forth above, this license agreement continues in full force and effect until the latest of expiration of the last patent based on technology licensed under the agreement, at which point our license becomes fully paid.

Clinical Product Candidates

Kyowa Hakko Kirin

In August 2013, we entered into a collaboration and license agreement with KHK. Under the terms of this collaboration and license agreement, as amended, we and KHK will collaborate on the development and commercialization of certain products containing burosumab in the field of orphan diseases in the United States and Canada, or the "profit-share territory", and in the European Union and Switzerland, or the European territory, and we will have the right to develop and commercialize such products in the field of orphan diseases in Mexico and Central and South America, or Latin America. In the field of orphan diseases, and except for ongoing studies being conducted by KHK, we will be the lead party for development activities in the profit-share territory and in the European territory until the applicable transition date; we will also be the lead party for core development activities conducted in Japan and Korea for which the core development plan is limited to clinical trials mutually agreed to by us and KHK. We will share the costs for development activities in the profit share territory and European territory conducted pursuant to the development plan before the applicable transition date equally with KHK and KHK shall be responsible for 100% of the costs for development activities in Japan and Korea. On the applicable transition date in the profit-share territory and the European territory, KHK will become the lead party and be responsible for the costs of the development activities. However, we will continue to share the costs of the studies commenced prior to the applicable transition date equally with KHK. We have the primary responsibility for conducting certain research and development activities. We are obligated to provide assistance in accordance with the agreed upon development plan as well as participate on various committees. If burosumab is approved, we and KHK will share commercial responsibilities and profits in the profit share territory until the applicable transition date, KHK will commercialize burosumab in the European territory, and we will develop and commercialize burosumab in Latin America. KHK will manufacture and supply burosumab for clinical use globally and will manufacture and supply burosumab for commercial use in the profit share territory and Latin America.

In the profit share territory, KHK will book sales of products and we will have the sole right to promote the products for a specified period of time, with KHK increasingly participating in the promotion of the products until five years from commercial launch, after which KHK will have the sole right to promote the products, subject to a limited promotion right retained by us. In the European territory, KHK will book sales of products and have the sole right to promote and sell the products. In Latin America, we will book sales of products and have the sole right to promote and sell the products.

KHK will supply all quantities of product for clinical studies. KHK will also supply all quantities of product for commercial sales in the profit-share territory and in Latin America. The supply price to us for commercial sales in the profit-share territory and in Latin America will be determined based on a fixed double-digit percentage of net sales.

The remaining profit or loss from commercializing products in the profit-share territory, until the applicable transition date, will be shared between us and KHK on a 50/50 basis. Thereafter, we will be entitled to receive a tiered double-digit revenue share in the mid-to-high 20% range in the profit share territory, intended to approximate the profit share. We will also be entitled to receive a royalty of up to 10% on net sales in the European territory. In Latin America, we will pay to KHK a low single-digit royalty on net sales. Our and KHK's obligations to pay royalties will continue on a country-by-country basis for so long as we or KHK, as applicable, are selling products in such country.

In May 2017, we signed an agreement with a wholly-owned subsidiary of KHK pursuant to which we were granted the right to commercialize burosumab in Turkey. KHK's subsidiary has the option to assume responsibility for commercialization efforts from us, after a certain minimum period.

The collaboration and license agreement will continue for as long as products in the field of orphan diseases are sold in the profit-share territory, European territory, Turkey, or Latin America, unless the agreement is terminated in accordance with its terms.

KHK may terminate the agreement in certain countries or territories based upon our failure to meet certain milestones. Specifically, if we do not obtain U.S. or European marketing approval of burosumab for the treatment of XLH by a certain date, or make a first commercial sale, on a country-by-country basis, in Latin America by certain deadlines, KHK may terminate the agreement only with respect to the applicable territory or country in which the milestone was not timely met. In certain circumstances, we have the right to obtain an extension of the applicable deadline by making a payment to KHK in the low single-digit to low double-digit millions of dollars, depending on the milestone. Also, in the event of the occurrence of certain excusable delays, the deadline for meeting the applicable milestone above is extended to account for the period of the delay. Furthermore, either party may terminate the agreement for the material breach or bankruptcy of the other party. In any event of termination by KHK, unless such termination is the result of KHK's termination for certain types of breach of the agreement by us, we may receive low single-digit to low double-digit royalties on net post-termination sales by KHK in one or more countries or territories, the amount of which varies depending on the timing of, and reason for, such termination. In any event of termination, our rights to burosumab under the agreement and our obligations to share development costs will cease, and the program will revert to KHK, worldwide if the agreement is terminated as a whole or solely in the terminated countries if the agreement is terminated solely with respect to certain countries.

Baylor Research Institute

In September 2012, we entered into a license agreement with Baylor Research Institute, or BRI, under which we exclusively licensed certain intellectual property related to triheptanoin. The license includes patents, patent applications, know-how, and intellectual property related to the composition and formulation of triheptanoin as well as its use in treating a number of orphan diseases, including LC-FAOD. The license grant includes the sole right to develop, manufacture, and commercialize licensed products for all human and animal uses. Under the license agreement, we are obligated to use commercially reasonable efforts to develop and commercialize licensed products in select orphan indications. If we fail to meet our diligence obligations with respect to a specified orphan indication or set of orphan indications, BRI may convert our license to a non-exclusive license with respect to such orphan indication or set of orphan indications until we receive regulatory approval for licensed products in the applicable orphan indication or set of orphan indications. We are also obligated to pay a mid-single digit royalty on net sales to BRI, subject to certain reductions and offsets. Our obligation to pay royalties to BRI continues on a licensed product-by-licensed product and country-by-country basis until the later of the expiration of the first regulatory exclusivity granted with respect to such product in such country or the expiration of the last-to-expire licensed patent claiming such product in such country, in each case in connection with approval in such country for LC-FAOD or an orphan disease covered by our license from BRI. We may make future payments of up to $10.5 million contingent upon attainment of certain development milestones and $7.5 million if certain sales milestones are achieved. We may terminate the agreement for convenience at any time and either we or BRI may terminate the agreement for the material breach or bankruptcy of the other party. If we terminate for BRI's breach or bankruptcy, our license from BRI will remain in effect, subject to our continued payment of reduced milestones and royalties. Unless terminated by its terms, this license agreement continues in full force and effect, on a product-by-product and country-by-country basis, until our royalty obligations expire, at which point our license from BRI with respect to such product in such country becomes irrevocable, perpetual, fully paid and royalty-free.

REGENXBIO Inc.

In October 2013, we entered into an exclusive license agreement with REGENXBIO Inc., or REGENX, under which we are developing products to treat hemophilia B, hemophilia A, OTC deficiency and GSD1a. Under the 2013 license agreement, REGENX granted us an exclusive worldwide license to make, have made, use, import, sell, and offer for sale licensed products with respect to such disease indications, subject to certain exclusions. We do not have the right to control prosecution of the in-licensed patent applications, and our rights to enforce the in-licensed patents are subject to certain limitations. Under the 2013 license agreement, we pay or will pay REGENX an annual maintenance fee and certain milestone fees per disease indication, low to mid single-digit royalty percentages on net sales of licensed products, and milestone and sublicense fees, if any, owed by REGENX to its licensors as a result of our activities under the 2013 license agreement. We are required to develop licensed products in accordance with certain milestones. In the event that we fail to meet a particular milestone within established deadlines, we can extend the relevant deadline by providing a separate payment to REGENX. The 2013 license agreement will expire upon the expiration, lapse, abandonment, or invalidation of the last claim of the licensed intellectual property to expire, lapse, or become abandoned or unenforceable in all the countries of the world. Upon expiration, our know-how license will become non-exclusive, perpetual, irrevocable and royalty-free with respect to licensed know-how that REGENX owns in the field and will continue with respect to all of REGENX's other know-how in the field under certain of its licenses for so long as its rights from those licensors continue. Subject to certain obligations to Bayer, we may terminate the 2013 license agreement upon prior written notice or for a material breach. REGENX may terminate the license agreement if we or our controlling affiliate become insolvent, are late in paying money due, commence certain actions relating to the licensed patents or materially breach the agreement. If the 2013 license agreement is terminated with respect to an indication, we grant certain rights to REGENX, including transferring ownership of any applicable regulatory approvals and granting an exclusive license under certain of our intellectual property for use with respect to products covered by the intellectual property we had licensed from REGENX in that indication.

In March 2015, we entered into an option and license agreement with REGENX under which we are developing product candidates to treat PKU, citrullinemia type 1 and Wilson disease and have an option for another disease indication. The 2015 option and license agreement grants us an exclusive worldwide license to make, have made, use, import, sell, and offer for sale licensed products with respect to such disease indications, subject to certain exclusions. The exercise of our remaining option is subject to availability. We do not have the right to control prosecution of the in-licensed patent applications, and our rights to enforce the in-licensed patents are subject to certain limitations. Under the 2015 option and license agreement, we pay or will pay REGENX an annual maintenance fee and certain milestone fees per disease indication, mid to high single-digit royalty percentages on net sales of licensed products, and mid-single to low double-digit percentages of any sublicense fees we receive from sublicenses for the licensed intellectual property rights. We are obligated to pay REGENX an upfront fee if we exercise our remaining option. We are required to develop licensed products in accordance with certain milestones. In the event that we fail to meet a particular milestone within established deadlines, we can extend the relevant deadline by providing a separate payment to REGENX. The 2015 option and license agreement will expire upon the expiration of the royalty obligations with respect to all licensed products for all licensed indications under all licenses granted under all exercised commercial options. Our remaining option terminates in 2019, unless we extend the date by paying an additional fee. Upon expiration, our know-how license will become non-exclusive, perpetual, irrevocable and royalty-free with respect to licensed know-how that REGENX owns in the field and will continue with respect to all of REGENX's other know-how in the field under certain of its licenses for so long as its rights from those licensors continue. We may terminate the 2015 option and license agreement upon prior written notice or for a material breach. REGENX may terminate the 2015 option and license agreement if we or our controlling affiliate become insolvent, are late in paying money due, commence certain actions relating to the licensed patents or materially breach the agreement. If the 2015 option and license agreement is terminated with respect to an indication, we grant certain rights to REGENX, including transferring ownership of any applicable regulatory approvals and granting an exclusive license under certain of our intellectual property for use with respect to products covered by the intellectual property we had licensed from REGENX in that indication.

Preclinical Product Candidates

St. Jude Children's Research Hospital

In September 2012, we entered into a license agreement with St. Jude wherein St. Jude granted us certain exclusive rights to intellectual property related to rhPPCA. Under the terms of the license agreement, St. Jude granted us an exclusive license under certain know-how to research, develop, make, use, offer to sell, import, and otherwise commercialize and exploit certain PPCA protein products to treat, prevent, and/or diagnose galactosialidosis and other monogenetic diseases. We agreed to make commercially reasonable efforts to develop and commercialize at least one licensed product.

Under the license agreement, we will pay to St. Jude a royalty of less than 1% on net sales of these products for so long as such products retain orphan drug exclusivity, on a country-by-country basis. We may terminate the agreement for convenience at any time and St. Jude may terminate the agreement for our material breach of the agreement. Unless terminated by its terms, this license agreement continues in full force and effect, until our royalty obligations expire, at which point our license becomes irrevocable, perpetual, fully paid, and royalty-free.

Takeda Pharmaceutical Company Limited

In June 2016, we entered into a collaboration and license agreement with Takeda. Under the terms of the license agreement, we obtained, among other things, an exclusive license for a pre-clinical compound from Takeda in a pre-determined field of use, which includes an option to an additional field of use for this product. We are responsible for the development costs for the pre-clinical compound pursuant to an initial development plan.

As part of the agreement, we established a five-year research collaboration with Takeda whereby the parties may mutually agree to add additional option products candidates to the collaboration, in which case we will bear the cost of the development activities, with certain exceptions, and terms to be negotiated

We also granted Takeda an exclusive option for Asian rights, for a limited period, to any licensed products and any additional products resulting from the collaboration, as well as an option to exclusively license one of our products for development and commercialization in Japan. If Takeda exercises any of its option rights to license a product pursuant to the agreement, Takeda will pay for the development costs within the licensed territory, will share in a portion of the global development costs, and will make a milestone payment upon regulatory approval. Takeda will also owe royalties on net sales in the licensed territory for any licensed product, depending on the development stage when the product is licensed as well as sales levels. The royalties related to the option to license our product, as well as the additional product are subject to future good faith negotiations at the time that the option is exercised.

We discontinued the development efforts on the pre-clinical compound in the pre-determined field of use. We continue to evaluate additional product candidates for potential addition to the collaboration.

Bayer

In June 2014, we entered into an agreement with Bayer to research, develop and commercialize AAV gene therapy products for treatment of hemophilia A. Under this agreement, we granted Bayer an exclusive license to develop and commercialize one or more novel gene therapies for hemophilia A. We are responsible for the development of DTX201 through a proof-of-concept clinical trial, with reimbursement from Bayer for project costs. Bayer is responsible operationally, including for conducting the proof-of-concept clinical trial, and will incur the costs of the conduct of the trial. Upon the successful demonstration of clinical proof of concept, Bayer agreed to use commercially reasonable efforts to manage and fund any subsequent clinical trials and commercialization of gene therapy products for treatment of hemophilia A. Bayer will have worldwide rights to commercialize the potential future product.

Under the agreement, Bayer paid us an upfront cash payment and will pay us development and commercialization milestone payments, and tiered royalties based on product sales. The agreement expires on a licensed treatment-by-licensed treatment and country-by-country basis until the later of ten years from the date of first commercial sale or when patent claims have expired, lapsed, been abandoned, or been invalidated in such country. Either party may terminate the agreement for an uncured material breach by the other party. Bayer may terminate the agreement upon prior notice to us, either in its entirety or with respect to certain territories subject to the agreement. Bayer may also terminate the agreement upon notice of a product's failure to meet certain criteria or after the successful completion of certain Phase I trials in the event Bayer makes a good faith determination that there is a material safety issue with respect to such product. Either party may terminate the agreement upon bankruptcy or insolvency of the other party, and we may terminate the agreement if Bayer institutes certain actions. Under certain termination circumstances, we would have worldwide rights to the terminated program(s).

University of Pennsylvania

In January 2015, we entered into an agreement with the University of Pennsylvania to sponsor certain research of Dr. Wilson at University of Pennsylvania School of Medicine related to liver gene therapy and hemophilia. Under the agreement, the University of Pennsylvania granted us an option to obtain a worldwide, non-exclusive or exclusive, royalty-bearing license, with the right to sublicense, under certain patent rights conceived, created or reduced to practice in the conduct of the research. We are required to reimburse the University of Pennsylvania for filing, prosecuting and maintaining such patent rights unless and until we decline to exercise our option. The University is required to provide us with task-based, scientific reports of progress and results of the research, and granted us a royalty-free, nontransferable, non-exclusive right to copy and distribute any research reports furnished to us for any reasonable purpose, provided the results are not made publicly available until certain conditions are met, and the right to use, disclose and otherwise exploit the research results for any reasonable purpose, subject to similar restrictions on our public disclosure of the research results.

This agreement expired on December 31, 2017, but ongoing mutual commitments extend into 2018. The agreement may be extended further, or renewed, by mutual agreement. If extended or renewed, then either party may terminate the agreement if Dr. Wilson becomes unavailable and an acceptable substitute is not found within a certain period of time, or if we fail to mutually agree on an acceptable work plan and budget for the sponsored research. We may also terminate the sponsored research agreement upon written notice, as long as we have met all of our payment and performance obligations. Either party may terminate this agreement for an uncured material breach. In the event of termination, we shall pay University of Pennsylvania the amount needed to cover costs through the effective termination date as well as allowable commitments extending beyond the termination date (up to one-fourth of the total budget).

In May 2016, we entered into a research, collaboration and license agreement with the University of Pennsylvania under which we are collaborating on the pre-clinical development of gene therapy products for the treatment of citrullinemia type I, phenylketonuria, and Wilson disease, each, a Subfield. Under the agreement, we were granted an exclusive, worldwide, royalty-bearing right and license to certain patent rights arising out of the research program, and a non-exclusive, worldwide, royalty-bearing right and license to certain University of Pennsylvania intellectual property, in each case to research, develop, make, have made, use, sell, offer for sale, commercialize and import licensed products in each Subfield for the term of the agreement. We will fund the cost of the research program and will be responsible for clinical development, manufacturing and commercialization of each Subfield. In addition, we will be required to make milestone payments (up to a maximum of $5 million per Subfield) if certain development milestones are achieved over time, and to pay low to mid single-digit royalties on net sales of each Subfield's licensed products. We will also make milestone payments per approved product if certain commercial milestones are achieved.

Patents and Proprietary Rights

The proprietary nature of, and protection for, our product, product candidates, processes, and know-how are important to our business. Our success depends in part on our ability to protect the proprietary nature of our product, product candidates, technology, and know-how, to operate without infringing on the proprietary rights of others, and to prevent others from infringing our proprietary rights. We seek patent protection in the United States and internationally for our product, product candidates, and other technology. Our policy is to patent or in-license the technology, inventions and improvements that we consider important to the development of our business. In addition to patent protection, we intend to use other means to protect our proprietary rights, including pursuing marketing or data exclusivity periods, orphan drug status, and similar rights that are available under regulatory provisions in certain countries, including the United States, Europe, Japan, and China. See "Government Regulation—U.S. Government Regulation — Orphan Designation and Exclusivity," "Government Regulation—U.S. Government Regulation — Pediatric Studies and Exclusivity," "Government Regulation—U.S. Government Regulation — Patent Term Restoration," "Government Regulation—U.S. Government Regulation — Biosimilars and Exclusivity," "Government Regulation—U.S. Government Regulation — Abbreviated New Drug Applications for Generic Drugs and New Chemical Entity Exclusivity," and "Government Regulation—European Union Regulation — Orphan Designation and Exclusivity" below for additional information.

We also rely on trade secrets, know-how, and continuing innovation to develop and maintain our competitive position. We cannot be certain that patents will be granted with respect to any of our pending patent applications or with respect to any patent applications filed by us in the future, nor can we be sure that any of our existing patents or any patents granted to us in the future will be commercially useful in protecting our technology.

We seek regulatory approval for our product candidates in disease areas with high unmet medical need, significant market potential, and where we expect to have a proprietary position through patents covering various aspects of our product candidates, such as composition, dosage, formulation, use, and manufacturing process, among others. Our success depends in part on an intellectual property portfolio that supports our future revenue streams and erects barriers to our competitors. We are maintaining and building our patent portfolio by filing new patent applications, prosecuting existing applications, and licensing and acquiring new patents and patent applications.

Despite these measures, any of our intellectual property and proprietary rights could be challenged, invalidated, circumvented, infringed or misappropriated, or such intellectual property and proprietary rights may not be sufficient to achieve or maintain market exclusivity or otherwise to provide competitive advantages. For more information, please see "Risks Related to Our Intellectual Property."

We own or license a number of patents in the U.S. and foreign countries that cover our product, product candidates, or methods of their use. With respect to our owned or in-licensed issued patents in the U.S. and Europe, we may be entitled to obtain a patent term extension to extend the patent expiration date. For example, in the U.S., we can apply for a patent term extension of up to five years for one of the patents covering a product once the product is approved by the FDA, although the restoration period may not exceed 14 years following FDA approval of the product candidate. The exact duration of the extension depends on the time we spend in clinical studies as well as getting marketing approval from the FDA. The exclusivity positions for our commercial product, Mepsevii, and our clinical-stage product candidates as of December 31, 2017 are summarized below.

Mepsevii (Vestronidase Alfa) Exclusivity

We own three issued U.S. patents, one pending U.S. patent application, and corresponding foreign patent applications relating to the vestronidase alfa composition of matter and its use in the treatment of lysosomal storage disorders such as MPS VII. The patents in the U.S. expire in 2035. Any patents issuing from the pending application in the U.S. and the corresponding foreign pending patent applications would be projected to also expire in 2035. Mepsevii is additionally protected in the U.S. by regulatory data exclusivity until 2029 and by orphan drug exclusivity for treating MPS VII until 2024. Outside the U.S., we intend to pursue marketing and orphan drug exclusivity periods that are available under regulatory provisions in certain countries. In Europe, vestronidase alfa has received orphan drug designation for the treatment of MPS VII.

Burosumab Exclusivity

We have in-licensed rights from Kyowa Hakko Kirin Co., Ltd., or KHK, to patents and patent applications relating to burosumab and its use for the treatment of XLH and various other hypophosphatemic conditions. Pursuant to this license, we have rights to a number of issued patents and pending applications, including four U.S. patents and one pending U.S. application, as well as patents and applications in other jurisdictions covering generic and specific antibodies against FGF23 as well as their use for the treatment of XLH and related conditions. The patent terms for the issued patents in the U.S. are from 2022 to 2029 (without patent term extension), while the issued patents outside the U.S. expire between 2021 and 2028 (without patent extension). We also jointly own with KHK a pending application in the U.S. and corresponding foreign patent applications relating to dosing regimens for administration of anti-FGF23 antibodies, including burosumab. Any patents issuing from these jointly-owned applications would be projected to expire in 2035. We intend to pursue marketing and orphan drug exclusivity periods that are available to us under regulatory provisions in certain countries. Burosumab has received orphan drug designation in the U.S. and Europe for the treatment of XLH.

UX007 Exclusivity

We are the licensee or owner of patents and patent applications relating to UX007 and its use for a number of diseases including FAOD and Glut1 DS. We have an exclusive license from Baylor Research Institute, or BRI, to issued U.S. patents and pending U.S. patent applications, as well as corresponding foreign patents and applications, relating to the UX007 composition and its uses. In the U.S., the in-licensed BRI patent portfolio includes issued patents with claims covering the UX007 composition that expire between 2020 and 2025 (without patent term extension). The in-licensed BRI portfolio additionally includes an issued U.S. patent with claims covering the use of UX007 for the treatment of FAOD that expires in 2020 (without patent term extension) and an issued U.S. patent with claims covering the use of UX007 for the treatment of various movement disorders associated with Glut1 DS that expires in 2033 (without patent term extension). Outside the U.S., the in-licensed BRI portfolio includes issued patents with claims covering the use of UX007 for the treatment of FAOD that expire in 2020 and pending patent applications with claims covering the use of UX007 for the treatment of Glut1 DS that would expire in 2033 if issued. We also own a pending U.S. patent application and corresponding foreign patent applications relating to our pharmaceutical-grade UX007 composition. Any patents issuing from these owned applications would be projected to expire in 2034. We intend to pursue marketing and orphan drug exclusivity periods that are available under regulatory provisions in certain countries. UX007 has received orphan designation in the U.S. for FAOD and in Europe for various subtypes of FAOD, while UX007 for the treatment of Glut1 DS has received orphan drug designation in the U.S. and Europe.

DTX301 Exclusivity

We have in-licensed patents and patent applications owned by the University of Pennsylvania relating to various adeno-associated viruses and vectors utilizing the capsids of those viruses. These patents and patent applications are licensed or sublicensed to REGENXBIO and sublicensed to us. Our product candidate DTX301 utilizes an AAV8 capsid and a codon-optimized version of the OTC gene. The in-licensed patents relevant to the AAV8 capsid expire between 2022 and 2024 in the U.S., and 2022 elsewhere. Our in-license also includes a pending application in the U.S. and corresponding foreign patent applications directed to the codon-optimized version of the OTC gene used in DTX301. Any patents issuing from these applications relating to the codon-optimized OTC gene would be projected to expire in 2035. We intend to pursue marketing and orphan drug exclusivity periods that are available under regulatory provisions in certain countries. DTX301 for the treatment of OTC deficiency has received orphan drug designation in the U.S. and Europe.

Trademarks

We have registered trademarks covering the Ultragenyx word mark in the U.S. and multiple other jurisdictions. In addition, we have a registered trademark in the U.S. covering a stylized design of our Ultragenyx Pharmaceutical logo. We also have pending trademark applications in the U.S. and multiple other jurisdictions relating to our Mepsevii brand name for vestronidase alfa.

Other

We rely upon unpatented trade secrets, know-how, and continuing technological innovation to develop and maintain our competitive position. We seek to protect our ownership of know-how and trade secrets through an active program of legal mechanisms including assignments, confidentiality agreements, material transfer agreements, research collaborations, and licenses.

Manufacturing

We currently contract with third parties for the manufacturing and testing of our product and product candidates for use in preclinical, clinical, and commercial applications and intend to do so in the future. We do not own or operate manufacturing facilities for the cGMP production of clinical or commercial quantities of our product candidates. We do, however, have process and analytical development capabilities focused on the gene therapy technologies. The use of contracted manufacturing and reliance on collaboration partners is relatively cost-efficient and has minimized the need for our direct investment in manufacturing facilities and additional staff early in development. Although we rely on contract manufacturers, we have personnel with extensive manufacturing experience to oversee our contract manufacturers. All of our third-party manufacturers will be subject to periodic audits to confirm compliance with applicable regulations and must pass inspection before we can manufacture our drugs for commercial sales.

To date, our third-party manufacturers have met our manufacturing requirements. To meet our projected needs for commercial manufacturing, third parties with whom we currently work might need to increase their scale of production or we will need to secure alternate suppliers. We believe that there are alternate sources of supply that can satisfy our clinical and commercial requirements, although we cannot be certain that identifying and establishing relationships with such sources, if necessary, would not result in significant delay or material additional costs.

Product

The Mepsevii drug substance and drug product are manufactured by Rentschler Biopharma SE, or Rentschler, under non-exclusive commercial supply and services agreements effective December 2017 and January 2018, respectively. The drug substance agreement has an initial term of five years, which will be automatically extended for another five years following the initial term, and will continue in full force and effect for its term unless earlier terminated. Following the initial term, we and Rentschler can withdraw from the agreement without cause upon prior notice for specified periods. In addition, either party may terminate the agreement if the other party breaches a material provision of the agreement and such breach remains uncured for a specified period following receipt by the breaching party of written notice of such breach. The drug product agreement expires on December 31, 2025 and will continue in full force and effect for its term unless earlier terminated. Either party may terminate the agreements with immediate effect if the other party violates or breaches certain obligations set forth in the agreement, undergoes a material change in control, or infringes its intellectual property rights. We can also terminate the agreements if Rentschler loses the right to operate under the agreement. Either party can also terminate the agreements if Rentschler is unable to deliver its agreed upon services for a certain period in the case of a force majeure event. The cell line to produce Mepsevii is specific for this product and is in our control and stored in multiple secure locations. All other raw materials are commercially available. Under the drug product agreement, the last product will be produced no later than June 30, 2019, unless this date is extended in accordance with the agreement. We intend to transfer the drug product manufacturing to a new site as the Rentschler drug product manufacturing in Laupheim, Germany is being discontinued.

Product Candidates

Burosumab

The drug substance and drug product for burosumab are made by KHK in Japan under the collaboration and license agreement with KHK. The cell line to produce burosumab is specific for this product and is in KHK's control. All other raw materials are commercially available.

UX007

The pharmaceutical-grade drug substance for UX007 is manufactured by IOI Oleo GmbH, or IOI Oleo, in Germany under an exclusive worldwide supply agreement, subject to certain limitations, executed in 2012 with an initial term of three years. The agreement automatically renews for two-year periods at the end of each then current term unless either party notifies the other party of its intention not to renew in writing at least three calendar months before the expiration of the then current term. Additionally, if a party materially breaches an obligation under the agreement and does not cure such breach within 60 days of receiving notice of the breach from the non-breaching party, the non-breaching party may terminate the agreement immediately upon written notice to the breaching party. Multiple parties have manufactured the UX007 drug product for us, which is not considered a very specialized task.

DTX301

The drug substance and drug product for DTX301, our AAV product candidate, are manufactured on a non-exclusive basis by a contract manufacturing organization, or CMO, pursuant to cGMP requirements. Since the beginning of 2015, this CMO has successfully completed two cGMP drug substance batches and two drug product batches of DTX301.

DTX 301 is currently manufactured using HEK293 adherent mammalian cells. Adherent and suspension HEK293 cells are straightforward to grow and transfect readily, and as a result, are widely used in the biotechnology industry to produce therapeutic proteins and viral vectors for gene therapy on a small scale. Vectors produced using HEK293 cells have been, or are being, used safely in multiple clinical trials, including trials conducted in the United States and European Union by other biopharmaceutical companies and academic government institutions. A key advantage of the HEK293 cell manufacturing system is flexibility and the relative speed with which AAV vectors can be manufactured for early Phase 1/2 clinical trials, allowing the establishment of early indications of therapeutic benefit in patients. As we advance and scale up our processes for Phase 3 clinical and commercial scale manufacturing, we intend to transition from the HEK293 cell manufacturing scale used for our DTX301 Phase 1/2 programs to a cell-based suspension bioreactor format.

Commercialization and Product Support

We have built our own commercial organizations in North America, Europe and Latin America to effectively support the commercialization of our product and product candidates and we expect to expand these efforts. We may elect to utilize strategic partners, distributors, or contract organizations to assist in the commercialization of our products. The commercial infrastructure for rare disease products typically consists of a targeted, specialty field organization that calls on a limited and focused group of physicians supported by field management, UltraCare liaisons (our commercial field force), internal support, and distribution support. One challenge, unique to commercializing therapies for rare diseases, is the difficulty in identifying eligible patients due to the very small and sometimes heterogeneous disease populations. Our management team will focus on maximizing patient identification for both clinical development and commercialization purposes in rare diseases.

Additional capabilities important to the rare disease marketplace include the management of key accounts such as managed care organizations, group-purchasing organizations, specialty pharmacies, and government accounts. To develop the appropriate commercial infrastructure, we will have to invest significant amounts of financial and management resources, some of which will be committed prior to regulatory approval of the products that they are intended to support.

We continue to build a medical affairs organization and multiple capabilities across North America, Europe and Latin America to meet the scientific needs of the healthcare providers and patients in the rare disease community, focusing on providing accurate and balanced disease state and product information across our portfolio for appropriate management of patients with rare disorders.

Medical affairs is comprised of the following capabilities in support of our mission: medical information, patient advocacy, patient diagnosis, medical scientific liaisons, research and educational grants. Medical affairs will engage as early as Phase I and will continue work throughout the lifecycle of each product and product candidate as dictated by the specific scientific needs in each therapeutic area.

Government Regulation

Government authorities in the United States (including federal, state, and local authorities) and in other countries, extensively regulate, among other things, the manufacturing, research and clinical development, marketing, labeling and packaging, storage, distribution, post-approval monitoring and reporting, advertising and promotion, pricing, and export and import of pharmaceutical products, such as those we are developing. We must obtain the requisite approvals from regulatory authorities in the United States and foreign countries prior to the commencement of clinical studies or marketing of the product in those countries. Accordingly, our operations are and will be subject to a variety of regulations and other requirements, which vary from country to country. The process of obtaining regulatory approvals and the subsequent compliance with appropriate federal, state, local, and foreign statutes and regulations require the expenditure of substantial time and financial resources.

Global Regulation of Clinical Studies

Clinical studies involve the administration of an investigational medicinal product to human subjects under the supervision of qualified investigators in accordance with protocols, GCP, the ethical principles that have their origin in the Declaration of Helsinki and applicable regulatory requirements. A protocol for each clinical study and any subsequent protocol amendments are typically submitted to the FDA or other applicable regulatory authorities as part of an IND or clinical trial application, or CTA. Additionally, approval must also be obtained from each clinical study site's institutional review board, or IRB, or Ethics Committee, or EC, before the studies may be initiated, and the IRB or EC must monitor the study until completed. There are also requirements governing the reporting of ongoing clinical studies and clinical study results to public registries.

The clinical investigation of a drug is generally divided into three or four phases. Although the phases are usually conducted sequentially, they may overlap or be combined.

- *Phase 1.* The drug is initially introduced into healthy human subjects or patients with the target disease or condition. These studies are designed to evaluate the safety, dosage tolerance, pharmacokinetics and pharmacologic actions of the investigational new drug in humans, and if possible, to gain early evidence on effectiveness.
- *Phase 2.* The drug is administered to a limited patient population to evaluate dosage tolerance and optimal dosage, identify possible adverse side effects and safety risks, and preliminarily evaluate efficacy.
- *Phase 3.* The drug is administered to an expanded patient population, generally at geographically dispersed clinical study sites to generate enough data to statistically evaluate dosage, clinical effectiveness and safety, to establish the overall benefit-risk relationship of the investigational new drug product, and to provide an adequate basis for product approval.
- *Phase 4.* In some cases, additional studies and patient follow-up are conducted to gain experience from the treatment of patients in the intended therapeutic indication. Regulatory authorities may condition approval of a marketing application for a product candidate on the sponsor's agreement to conduct additional clinical studies after approval. In other cases, a sponsor may voluntarily conduct additional clinical studies after approval to gain more information about the drug. Such post-approval studies are typically referred to as Phase 4 clinical studies.

A pivotal study is a clinical study that adequately meets regulatory authority requirements for the evaluation of a drug candidate's efficacy and safety such that it can be used to justify the approval of the product. Generally, pivotal studies are Phase 3 studies, but regulatory authorities may accept results from Phase 2 studies if the study design provides a well-controlled and reliable assessment of clinical benefit, particularly in situations where there is an unmet medical need and the results are sufficiently robust.

U.S. Government Regulation

In the United States, the FDA regulates drugs under the Federal Food, Drug, and Cosmetic Act, or FDCA, and its implementing regulations, and biologics under the FDCA and the Public Health Service Act, or PHSA, and its implementing regulations. FDA approval is required before any new drug or dosage form, including a new use of a previously approved drug, can be marketed in the United States. Drugs and biologics are also subject to other federal, state, and local statutes and regulations.

The process required by the FDA before product candidates may be marketed or sold in the United States generally involves the following:

- completion of extensive preclinical laboratory tests and preclinical animal studies performed in accordance with the Good Laboratory Practices, or GLP, regulations;
- submission to the FDA of an IND, which must become effective before human clinical studies may begin and must be updated annually;
- conducting adequate and well-controlled human clinical studies to establish the safety and efficacy of the product candidate for each proposed indication under an active IND and approved by an independent IRB representing each clinical site;
- preparation of and submission to the FDA of a new drug application, or NDA, or BLA, after completion of all pivotal clinical studies;
- potential review of the product application by an FDA advisory committee, where appropriate and if applicable;
- satisfactory completion of an FDA pre-approval inspection of the manufacturing facilities where the proposed drug substance and drug product are produced to assess compliance with Good Manufacturing Practices, or GMP;
- FDA inspection of one or more clinical sites to assure compliance with Good Clinical Practices, or GCP; and
- FDA review and approval of an NDA or BLA.

Submission of an NDA or BLA to the FDA

Assuming successful completion of all required testing in accordance with all applicable regulatory requirements, detailed investigational new drug product information is submitted to the FDA in the form of an NDA or BLA requesting approval to market the product for one or more indications. Under federal law, the submission of most NDAs and BLAs is subject to a significant application user fee, unless waived.

Once an NDA or BLA has been submitted, the FDA's goal is to review the application within ten months after it accepts the application for filing, or, if the application relates to an unmet medical need in the treatment of a serious or life-threatening condition, six months after the FDA accepts the application for filing. The review process can be significantly extended by FDA requests for additional information or clarification.

The FDA's Decision on an NDA or BLA

The FDA may issue an approval letter or a Complete Response Letter. An approval letter authorizes commercial marketing of the drug with specific prescribing information for specific indications. As a condition of NDA or BLA approval, the FDA may impose additional requirements, such as post-marketing studies and/or a risk evaluation and mitigation strategy (REMS) to help ensure that the benefits of the drug outweigh the potential risks. A REMS can include medication guides, communication plans for healthcare professionals, and elements to assure safe use. A Complete Response Letter indicates that the review cycle of the application is complete and the application is not ready for approval. A Complete Response Letter may require additional clinical data and/or an additional pivotal Phase 3 clinical study(ies), and/or other significant, expensive and time-consuming requirements related to clinical studies, preclinical studies or manufacturing.

Expedited Review and Accelerated Approval Programs

A sponsor may seek approval of its product candidate under programs designed to accelerate FDA's review and approval of NDAs and BLAs. For example, Fast Track Designation may be granted to a drug intended for treatment of a serious or life-threatening disease or condition and data demonstrate its potential to address unmet medical needs for the disease or condition. The key benefits of fast track designation are the eligibility for priority review, rolling review (submission of portions of an application before the complete marketing application is submitted), and accelerated approval, if relevant criteria are met. The FDA may grant the NDA or BLA a priority review designation, which sets the target date for FDA action on the application at six months after the FDA accepts the application for filing. Priority review is granted where there is evidence that the proposed product would be a significant improvement in the safety or effectiveness of the treatment, diagnosis, or prevention of a serious condition. Priority review designation does not change the scientific/medical standard for approval or the quality of evidence necessary to support approval.

The FDA may approve an NDA or BLA under the accelerated approval program if the drug treats a serious condition, provides a meaningful advantage over available therapies, and demonstrates an effect on either (1) a surrogate endpoint that is reasonably likely to predict clinical benefit, or (2) on a clinical endpoint that can be measured earlier than irreversible morbidity or mortality, that is reasonably likely to predict an effect on irreversible morbidity or mortality or other clinical benefit, taking into account the severity, rarity, or prevalence of the condition and the availability or lack of alternative treatments. Post-marketing studies or completion of ongoing studies after marketing approval are generally required to verify the drug's clinical benefit in relationship to the surrogate endpoint or ultimate outcome in relationship to the clinical benefit.

In addition, the Food and Drug Administration Safety and Innovation Act, or FDASIA, established the new Breakthrough Therapy designation. A sponsor may seek FDA designation of its product candidate as a breakthrough therapy if the drug is intended, alone or in combination with one or more other drugs, to treat a serious or life-threatening disease or condition and preliminary clinical evidence indicates that the drug may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints, such as substantial treatment effects observed early in clinical development. If a drug is designated as breakthrough therapy, FDA will provide more intensive guidance on the drug development program and expedite its review.

Orphan Designation and Exclusivity

The FDA may grant orphan drug designation to drugs intended to treat a rare disease or condition that affects fewer than 200,000 individuals in the United States, or if it affects more than 200,000 individuals in the United States and there is no reasonable expectation that the cost of developing and making the drug for this type of disease or condition will be recovered from sales in the United States.

Orphan drug designation entitles a party to financial incentives such as opportunities for grant funding towards clinical study costs, tax advantages, and user-fee waivers. Orphan drug designation does not convey any advantage in, or shorten the duration of, the regulatory review and approval process. In addition, the first NDA or BLA applicant to receive orphan drug designation for a particular drug is entitled to orphan drug exclusivity, which means the FDA may not approve any other application to market the same drug for the same indication for a period of seven years in the United States, except in limited circumstances. Orphan drug exclusivity does not prevent the FDA from approving a different drug for the same disease or condition, or the same drug for a different disease or condition.

Pediatric Studies and Exclusivity

NDAs and BLAs must contain data to assess the safety and effectiveness of an investigational new drug product for the claimed indications in all relevant pediatric populations in order to support dosing and administration for each pediatric subpopulation for which the drug is safe and effective. The FDA may, on its own initiative or at the request of the applicant, grant deferrals for submission of some or all pediatric data until after approval of the product for use in adults or full or partial waivers if certain criteria are met. Discussions about pediatric development plans can be discussed with the FDA at any time, but usually occur any time between the end-of-Phase II meeting and submission of the NDA or BLA. Unless otherwise required by regulation, the requirements for pediatric data do not apply to any drug for an indication for which orphan designation has been granted.

Pediatric exclusivity is another type of non-patent exclusivity in the United States that may be granted if certain FDA requirements are met, such as FDA's determination that information relating to the use of a new drug in the pediatric population may produce health benefits, and the applicant agrees to perform and report on FDA-requested studies within a certain time frame. Pediatric exclusivity adds a period of six months of exclusivity to the end of all existing marketing exclusivity and patents held by the sponsor for that active moiety. This is not a patent term extension, but it effectively extends the regulatory period during which the FDA cannot accept or approve another application relying on the NDA or BLA sponsor's data.

Biosimilars and Exclusivity

The Patient Protection and Affordable Care Act of 2010, or Affordable Care Act, includes a subtitle called the Biologics Price Competition and Innovation Act of 2009, or BPCI Act, which created an abbreviated approval pathway for biological products shown to be similar to, or interchangeable with, an FDA-licensed reference biological product.

A reference biologic is granted twelve years of exclusivity from the time of first licensure of the reference product. The first biologic product submitted under the abbreviated approval pathway that is determined to be interchangeable with the reference product has exclusivity against other biologics submitting under the abbreviated approval pathway for the lesser of (i) one year after the first commercial marketing, (ii) eighteen months after approval if there is no legal challenge, (iii) eighteen months after the resolution in the applicant's favor of a lawsuit challenging the biologics' patents if an application has been submitted, or (iv) 42 months after the application has been approved if a lawsuit is ongoing within the 42-month period.

Abbreviated New Drug Applications for Generic Drugs and New Chemical Entity Exclusivity

The Hatch-Waxman Amendments authorized the FDA to approve generic drugs that are bioequivalent (i.e. identical) to previously approved branded drugs. To obtain approval of a generic drug, an applicant must submit an abbreviated new drug application, or ANDA, to the FDA. In support of such applications, a generic manufacturer may rely on the preclinical and clinical testing conducted for a drug product previously approved under an NDA, known as the reference listed drug, or RLD.

Specifically, in order for an ANDA to be approved, the FDA must find that the generic version is bioequivalent to the RLD with respect to the active ingredients, the route of administration, the dosage form, quality and performance characteristics, the strength of the drug, and intended use.

The FDCA provides a period of five years of non-patent exclusivity for a new drug containing a new chemical entity. In cases where such exclusivity has been granted, an ANDA may not be filed with the FDA until the expiration of five years unless the submission is accompanied by a Paragraph IV certification, in which case the applicant may submit its application four years following the original product approval. The FDCA also provides for a period of three years of exclusivity if an NDA or supplement includes reports of one or more new clinical investigations, other than bioavailability or bioequivalence studies, that were conducted by or for the applicant and are essential to the approval of the application. This three-year exclusivity period often protects changes to a previously approved drug product, such as a new dosage form, route of administration, combination or indication.

When an ANDA applicant files its application with the FDA, it must certify, among other things, that the new product will not infringe the already approved product's listed patents or that such patents are invalid or unenforceable, which is called a Paragraph IV certification. If the applicant does not challenge the listed patents or indicates that it is not seeking approval of a patented method of use, the ANDA application will not be approved until all the listed patents claiming the referenced product have expired. If the ANDA applicant has provided a Paragraph IV certification to the FDA, the applicant must also send notice of the Paragraph IV certification to the NDA and patent holders once the ANDA has been accepted for filing by the FDA. The NDA and patent holders may then initiate a patent infringement lawsuit in response to the notice of the Paragraph IV certification. The filing of a patent infringement lawsuit within 45 days after the receipt of a Paragraph IV certification automatically prevents the FDA from approving the ANDA until the earlier of 30 months after the receipt of the Paragraph IV notice, expiration of the patent, or a decision in the infringement case that is favorable to the ANDA applicant.

Patent Term Restoration

Some of our U.S. patents may be eligible for limited patent term extension under the Drug Price Competition and Patent Term Restoration Act of 1984, commonly referred to as the Hatch-Waxman Amendments. The Hatch-Waxman Amendments permit a patent restoration term of up to five years as compensation for patent term lost during product development and the FDA regulatory review process. However, patent term restoration cannot extend the remaining term of a patent beyond a total of 14 years from the product's approval date. The patent term restoration period is generally one-half the time between the effective date of an IND and the submission date of an NDA or BLA, plus the time between the submission date and the approval of that application. Only one patent applicable to an approved product is eligible for the extension and the application for the extension must be submitted prior to the expiration of the patent. The U.S. Patent and Trademark Office, or USPTO, in consultation with the FDA, reviews and approves the application for any patent term extension or restoration. Thus, for each approved product, we may apply for restoration of patent term for one of our related owned or licensed patents to add patent life beyond the original expiration date, depending on the expected length of the clinical studies and other factors involved in the filing of the relevant NDA or BLA.

European Union Regulation

In the EU, to obtain regulatory approval of an investigational medicinal product, we must submit an MAA. The content of the MAA is similar to that of an NDA or BLA filed in the United States, with the exception of, among other things, country-specific document requirements.

Authorization Procedures

Medicines can be authorized by using the centralized authorization procedure or national authorization procedures. The centralized authorization procedure results in a single marketing authorization issued by the EMA that is valid across the European Economic Area, or EEA, which is comprised of the 28 member states of the EU plus Norway, Iceland, and Lichtenstein. The centralized procedure is compulsory for human medicines that are derived from biotechnology processes, such as genetic engineering; contain a new active substance indicated for the treatment of certain diseases, such as HIV/AIDS, cancer, diabetes, neurodegenerative disorders or autoimmune diseases and other immune dysfunctions; and officially designated orphan medicines. Medicines that fall outside the mandatory scope of the centralized procedure have three routes to authorization: (i) they can be authorized under the centralized procedure if they concern a significant therapeutic, scientific or technical innovation, or if their authorization would be in the interest of public health; (ii) they can be authorized under a decentralized procedure where an applicant applies for simultaneous authorization in more than one EU country; or (iii) they can be authorized in a EU member state in accordance with that state's national procedures and then be authorized in other EU countries by a procedure whereby the countries concerned agree to recognize the validity of the original, national marketing authorization (mutual recognition procedure).

A Pediatric Investigation Plan, or PIP, and/or a request for waiver or deferral, is required for submission prior to submitting a marketing authorization application. A PIP describes, among other things, proposed pediatric studies and their timing relative to clinical studies in adults and an MAA must comply with the PIP to be validated.

MAA Review and Approval Timeframe and Accelerated Assessment

Under the centralized procedure in the EU, the maximum timeframe for the evaluation of a marketing authorization application that has been validated is 210 days, excluding time taken by an applicant to respond to questions. A favorable opinion on the application by the CHMP will typically result in the granting of the marketing authorization within 67 days of receipt of the opinion. Generally, the entire review process takes approximately one year. Accelerated evaluation might be granted by the CHMP in exceptional cases, when a medicinal product is expected to be of a major public health interest, particularly from the point of view of therapeutic innovation. In this circumstance, EMA ensures that the opinion of the CHMP is given within 150 days, excluding time taken by an applicant to respond to questions.

Exceptional Circumstances/Conditional Approval

Orphan drugs or drugs with unmet medical needs may be eligible for EU approval under exceptional circumstances or with conditional approval. Approval under exceptional circumstances is applicable to orphan products and is used when an applicant is unable to provide comprehensive data on the efficacy and safety under normal conditions of use because the indication for which the product is intended is encountered so rarely that the applicant cannot reasonably be expected to provide comprehensive evidence, when the present state of scientific knowledge does not allow comprehensive information to be provided, or when it is medically unethical to collect such information. Conditional marketing authorization is applicable to orphan medicinal products, medicinal products for seriously debilitating or life-threatening diseases, or medicinal products to be used in emergency situations in response to recognized public threats. Conditional marketing authorization can be granted on the basis of less complete data than is normally required in order to meet unmet medical needs and in the interest of public health, provided the risk-benefit balance is positive, it is likely that the applicant will be able to provide the comprehensive clinical data, and unmet medical needs will be fulfilled. Conditional marketing authorization is subject to certain specific obligations to be reviewed annually.

PRIME Program

PRIME is a program launched by the EMA to enhance support for the development of medicines that target an unmet medical need. The program focuses on medicines that may offer a major therapeutic advantage over existing treatments, or benefit patients without treatment options. These medicines are considered priority medicines by EMA. To be accepted for PRIME, a medicine has to show its potential to benefit patients with unmet medical needs based on early clinical data. Through PRIME, the EMA offers early and proactive support to medicine developers to optimize development plans and the generation of robust data on a medicine's benefits and risks and enables accelerated assessment of medicines applications.

Orphan Designation and Exclusivity

As in the United States, we may apply for designation of a product as an orphan drug for the treatment of a specific indication in the EU before the application for marketing authorization is made. The EMA's Committee for Orphan Medicinal Products, or COMP, grants orphan drug designation to promote the development of products that are intended for the diagnosis, prevention or treatment of life-threatening or chronically debilitating conditions affecting not more than 5 in 10,000 persons in the EU Community and for which no satisfactory method of diagnosis, prevention, or treatment has been authorized (or the product would be a significant benefit to those affected). Additionally, designation is granted for products intended for the diagnosis, prevention, or treatment of a life-threatening, seriously debilitating or serious and chronic condition when, without incentives, it is unlikely that sales of the drug in the EU would be sufficient to justify the necessary investment in developing the medicinal product. Orphan drug designation entitles a party to financial incentives such as reduction of fees or fee waivers and 10 years of market exclusivity is granted following medicinal product approval. This period may be reduced to six years if the orphan drug designation criteria are no longer met, including where it is shown that the product is sufficiently profitable not to justify maintenance of market exclusivity. Orphan drug designation does not convey any advantage in, or shorten the duration of, the regulatory review and approval process.

New Chemical Entity Exclusivity

In the EU, new chemical entities, sometimes referred to as new active substances, qualify for eight years of data exclusivity upon marketing authorization and an additional two years of market exclusivity. This data exclusivity, if granted, prevents regulatory authorities in the EU from referencing the innovator's data to assess a generic (abbreviated) application for eight years, after which generic marketing authorization can be submitted, and the innovator's data may be referenced, but not approved for two years. The overall ten-year period will be extended to a maximum of eleven years if, during the first eight of those ten years, the marketing authorization holder obtains an authorization for one or more new therapeutic indications which, during the scientific evaluation prior to their authorization, are held to bring a significant clinical benefit in comparison with existing therapies.

Post-Approval Requirements

Drugs manufactured or distributed pursuant to regulatory approvals are subject to pervasive and continuing regulation by the regulatory authorities, including, among other things, requirements relating to formal commitments for post approval clinical trials and studies, manufacturing, recordkeeping, periodic reporting, product sampling and distribution, marketing, labeling, advertising and promotion and reporting of adverse experiences with the product. After approval, most changes to the approved product, such as adding new indications or other labeling claims are subject to prior regulatory authority review and approval.

Drug manufacturers are subject to periodic unannounced inspections by regulatory authorities and country or state agencies for compliance with GMP and other requirements. Changes to the manufacturing process are strictly regulated, and, depending on the significance of the change, may require prior regulatory approval before being implemented. Regulations also require investigation and correction of any deviations from GMP and impose reporting and documentation requirements upon us and any third-party manufacturers that we may decide to use. Accordingly, manufacturers must continue to expend time, money and effort in the area of production and quality control to maintain compliance with GMP and other aspects of regulatory compliance.

Pharmaceutical Coverage, Pricing and Reimbursement

In the United States and markets in other countries, sales of any products for which we receive regulatory approval for commercial sale will depend in part on the availability of coverage and reimbursement from third-party payors. Third-party payors include government authorities, managed care providers, private health insurers and other organizations. The process for determining whether a payor will provide coverage for a drug product may be separate from the process for setting the reimbursement rate that the payor will pay for the drug product. Third-party payors may limit coverage to specific drug products on an approved list, or formulary, which might not include all of the approved drugs for a particular indication. Moreover, a payor's decision to provide coverage for a drug product does not imply that an adequate reimbursement rate will be approved. Adequate third-party reimbursement may not be available to enable us to maintain price levels sufficient to realize an appropriate return on our investment in product development.

In the European Community, governments influence the price of pharmaceutical products through their pricing and reimbursement rules and control of national health care systems that fund a large part of the cost of those products to consumers. Some jurisdictions operate positive and negative list systems under which products may only be marketed once a reimbursement price has been agreed to by the government. Other member states allow companies to fix their own prices for medicines, but monitor and control company profits. In addition, in some countries, cross-border imports from low-priced markets exert a commercial pressure on pricing within a country.

Other Healthcare Laws and Compliance Requirements

If we obtain regulatory approval for any of our product candidates, we may be subject to various laws targeting, among other things, fraud and abuse in the healthcare industry. These laws may impact, among other things, our proposed sales, marketing, and education programs. The laws that may affect our ability to operate include:

- the federal Anti-Kickback Statute, which prohibits, among other things, persons from knowingly and willfully soliciting, receiving, offering or paying remuneration, directly or indirectly, to induce, or in return for, the purchase or recommendation of an item or service reimbursable under a federal healthcare program, such as the Medicare and Medicaid programs;
- federal civil and criminal false claims laws and civil monetary penalty laws, which prohibit, among other things, individuals or entities from knowingly presenting, or causing to be presented, claims for payment from Medicare, Medicaid, or other third-party payers that are false or fraudulent;
- the federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, as amended, which prohibits executing a scheme to defraud any healthcare benefit program and making false statements relating to healthcare matters and imposes certain requirements relating to the privacy, security and transmission of individually identifiable health information;
- the EU General Data Protection Regulation (GDPR), replacing the EU Data Protection Directive (95/46/EC), effective May 25, 2018, which seeks to harmonize data privacy laws across Europe to ensure data subjects' fundamental right to privacy in the EU in the digital age by imposing requirements and limitations relating to the processing, storage, purpose of collection, accuracy, security and transmission of personal data and the notification of regulation authorities about data breaches, accompanied by a strong sanctioning mechanism;
- the 21st Century Cures Act, or the Cures Act, signed into law in December 2016, which introduced a wide range of reforms, such as broadening the types of data required to support drug approval, extending protections for generic competition, accelerating approval of breakthrough therapies, expanding the orphan drug product program, requiring disclosures about compassionate care programs, and clarifying how manufacturers communicate about their products;
- the federal transparency laws, including the federal Physician Payment Sunshine Act, that requires drug manufacturers to disclose payments and other transfers of value provided to physicians and teaching hospitals; and

- state and foreign law equivalents of each of the above federal laws, such as transparency laws, anti-kickback and false claims laws which may apply to items or services reimbursed by any third-party payer, including commercial insurers, and privacy and security of health information laws.

Additional Regulation

The U.S. Foreign Corrupt Practices Act or FCPA, to which we are subject, prohibits corporations and individuals from engaging in certain activities to obtain or retain business or to influence a person working in an official capacity. It is illegal to pay, offer to pay or authorize the payment of anything of value to any foreign government official, government staff member, political party or political candidate in an attempt to obtain or retain business or to otherwise influence a person working in an official capacity. Similar laws exist in other countries, such as the United Kingdom, that restrict improper payments to public and private parties. Many countries have laws prohibiting these types of payments within the respective country. In addition to these anti-corruption laws, we are subject to import and export control laws, tariffs, trade barriers, economic sanctions and regulatory limitations on our ability to operate in certain foreign markets.

In addition, federal, state and foreign government bodies and agencies have adopted, are considering adopting, or may adopt laws and regulations regarding the collection, use, storage and disclosure of personally identifiable information or other information treated as confidential obtained from consumers and individuals.

We are also subject to regulation under the Occupational Safety and Health Act, the Environmental Protection Act, the Toxic Substances Control Act, the Resource Conservation and Recovery Act and other present and potential federal, state or local regulations. These and other laws govern our use, handling and disposal of various biological and chemical substances used in, and waste generated by, our operations.

Employees

As of December 31, 2017, we had 520 full-time employees. None of our employees is represented by labor unions or covered by collective bargaining agreements. We consider our relationship with our employees to be good.

Research and Development

We recognized $231.6 million, $183.2 million, and $114.7 million in research and development expense in the years ended December 31, 2017, 2016, and 2015, respectively.

Financial Information about Segments

We operate in a single accounting segment — the identification, acquisition, development and commercialization of novel products for the treatment of rare and ultra-rare diseases. Please refer to Note 1, “Organization and Basis of Presentation,” of the notes to our consolidated financial statements. For the years ended December 31, 2017, 2016 and 2015, our revenues were $2.6 million, $0.1 million and $0, respectively, and we incurred net losses of $302.1 million, $245.9 million and $145.6 million, respectively. As of December 31, 2017, 2016 and 2015, our total assets were $490.8 million, $540.6 million and $559.6 million, respectively.

Please refer to the discussion of risks related to our foreign operations in the section entitled “Item 1A. Risk Factors.”

General Information

We were incorporated in California in April 2010 and reincorporated in Delaware in June 2011. Our principal executive offices are located at 60 Leveroni Court, Novato, California 94949. Our telephone number is (415) 483-8800 and our e-mail address is *info@ultragenyx.com*. Our Internet website address is *www.ultragenyx.com.* No portion of our website is incorporated by reference into this Annual Report.

You are advised to read this Annual Report in conjunction with other reports and documents that we file from time to time with the Securities and Exchange Commission, or SEC. In particular, please read our definitive proxy statements, our Quarterly Reports on Form 10-Q and any Current Reports on Form 8-K that we may file from time to time. You may obtain copies of these reports after the date of this Annual Report directly from us or from the SEC at the SEC’s Public Reference Room at 100 F Street, N.E. Washington, D.C. 20549. In addition, the SEC maintains information for electronic filers (including Ultragenyx) at its website at *www.sec.gov*. The public may obtain information regarding the operation of the Public Reference Room by calling the SEC at 1-800-SEC-0330. We make our periodic and current reports available on our internet website, free of charge, as soon as reasonably practicable after such material is electronically filed with, or furnished to, the SEC.

Item 1A. ***Risk Factors***

Investing in our common stock involves a high degree of risk. You should carefully consider the following risks, together with all the other information in this Annual Report, including our financial statements and notes thereto, before deciding to invest in our common stock. If any of the following risks actually materialize, our operating results, financial condition, and liquidity could be materially adversely affected. As a result, the trading price of our common stock could decline and you could lose part or all of your investment.

Risks Related to Our Financial Condition and Capital Requirements

We have a limited operating history on which to assess our business, have incurred significant losses since our inception, and anticipate that, excluding non-recurring events, we will continue to incur significant losses for the foreseeable future.

We are a biopharmaceutical company with a limited operating history. We have incurred net losses in each year since our inception in April 2010, including net losses of $302.1 million, $245.9 million, and $145.6 million for the years ended December 31, 2017, 2016, and 2015, respectively.

Biopharmaceutical product development is a highly speculative undertaking and involves a substantial degree of risk. We have devoted substantially all of our financial resources to identifying, acquiring, and developing our product and product candidates, including conducting clinical studies, developing manufacturing processes, manufacturing product candidates for clinical studies, and providing general and administrative support for these operations. To date, we have financed our operations primarily through the sale of equity securities. The amount of our future net losses will depend, in part, on non-recurring events, the rate of our future expenditures and our ability to obtain funding through equity or debt financings, strategic collaborations, or grants. Our future revenue will depend upon the size of any markets in which our product is approved and any of our product candidates may receive approval, and our ability to achieve sufficient market acceptance, pricing, reimbursement, and adequate market share for our product and product candidates in those markets. However, even if we obtain adequate market share for our product and product candidates, because the potential markets in which our product and product candidates may ultimately receive regulatory approval are very small, and our expenses may be greater than expected, we may never become profitable despite obtaining such market share and acceptance of our product and product candidates that may receive approval.

We expect to continue to incur significant expenses and increasing operating losses for the foreseeable future, excluding non-recurring events. We anticipate that our expenses will increase substantially if and as we:

- continue our research and nonclinical and clinical development of our product candidates;
- expand the scope of our current clinical studies for our product candidates;
- advance our programs into more expensive clinical studies;
- initiate additional nonclinical, clinical, or other studies for our product candidates;
- pursue preclinical and clinical development for additional indications for existing product candidates;
- change or add additional manufacturers or suppliers;
- seek regulatory and marketing approvals for our product candidates that successfully complete clinical studies;
- establish Medical Affairs field teams to initiate relevant disease education;
- establish a marketing and distribution infrastructure and field force to commercialize our product and any product candidates for which we may obtain marketing approval;
- continue to establish our international subsidiaries;
- continue to operate as a public company and comply with legal, accounting and other regulatory requirements;
- seek to identify, assess, license, acquire, and/or develop other product candidates, technologies, and/or businesses;
- make milestone or other payments under any license or other agreements;
- seek to maintain, protect, and expand our intellectual property portfolio;
- seek to attract and retain skilled personnel;
- create additional infrastructure, including facilities and systems, to support the growth of our operations, our product development, and our planned future commercialization efforts; and
- experience any delays or encounter issues with any of the above, including, but not limited to, failed studies, complex results, safety issues, inspection outcomes, or other regulatory challenges that require longer follow-up of existing studies, additional major studies, or additional supportive studies in order to pursue marketing approval.

Further, the net losses we incur may fluctuate significantly from quarter to quarter and year to year, such that a period-to-period comparison of our results of operations may not be a good indication of our future performance.

We have not generated any significant revenue from product sales and we may never be profitable.

We have one product approved for commercialization but have not generated any significant revenue from product sales. Our ability to generate significant revenue and achieve profitability depends on our ability, alone or with strategic collaboration partners, to successfully commercialize our product and to complete the development of, and obtain the regulatory and marketing approvals necessary to commercialize, one or more of our product candidates. We do not anticipate generating significant revenue from product sales in the near future. Our ability to generate substantial future revenue from product sales, including named patient sales, and to potentially be profitable depends heavily on our success in many areas, including but not limited to:

- completing research and nonclinical and clinical development of our product candidates;
- obtaining regulatory and marketing approvals for product candidates for which we complete clinical studies;
- developing a sustainable and scalable manufacturing process for our product and any approved product candidates and establishing and maintaining supply and manufacturing relationships with third parties that can conduct the processes and provide adequate (in amount and quality) product supply to support clinical development and the market demand for our product and product candidates, if approved;
- launching and commercializing our product and product candidates for which we obtain regulatory and marketing approval, either directly or with a collaborator or distributor;
- obtaining market acceptance of our product and product candidates as viable treatment options;
- obtaining adequate reimbursement and pricing for our product and product candidates;
- our ability to sell our product and product candidates on a named patient basis or through an equivalent mechanism and the amount of revenue generated from such sales;
- addressing any competing technological and market developments;
- identifying, assessing, licensing, acquiring, and/or developing new product candidates, technologies, and/or businesses;
- negotiating favorable terms in any collaboration, licensing, or other arrangements into which we may enter, any amendments thereto or extensions thereof;
- maintaining, protecting, and expanding our portfolio of intellectual property rights, including patents, trade secrets, and know-how; and
- attracting, hiring, and retaining qualified personnel.

We anticipate incurring significant costs associated with commercializing our product and any approved product candidate. Our expenses could increase beyond expectations if we are required by the FDA, the EMA, or other regulatory agencies, domestic or foreign, to change our manufacturing processes or assays, or to perform clinical, nonclinical, or other types of studies in addition to those that we currently anticipate. In cases where we are successful in obtaining regulatory approvals to market one or more of our product candidates, our revenue will be dependent, in part, upon the size of the markets in the territories for which we gain regulatory approval, the accepted price for the product, the approved indication(s), the ability to obtain reimbursement at any price, and whether we own the commercial rights for that territory. If the number of our addressable rare disease patients is not as significant as we estimate, the indication approved by regulatory authorities is narrower than we expect, or the reasonably accepted population for treatment is narrowed by competition, physician choice, or treatment guidelines, we may not generate significant revenue from sales of our products, even if approved. For example, the development of burosumab and UX007 is an important part of our current business strategy; if we are unable to obtain regulatory approval for the target product profile, our business may suffer.

We expect we will need to raise additional capital to fund our activities. This additional financing may not be available on acceptable terms, or at all. Failure to obtain this necessary capital when needed may force us to delay, limit, or terminate our product development efforts or other activities.

As we continue to advance our product candidates through preclinical and clinical development and increase our commercialization efforts, we expect our expenses to increase substantially in connection with our ongoing activities.

As of December 31, 2017, our available cash, cash equivalents, and investments were $244.5 million. We will likely require additional capital to commercialize our product and to obtain regulatory approval for, and to commercialize, all of our product candidates. In addition, our operating plans may change as a result of many factors that may currently be unknown to us, and we may need to seek additional funds sooner than planned. Our future funding requirements will depend on many factors, including but not limited to:

- the scope, rate of progress, results, and cost of our clinical studies, nonclinical testing, and other related activities;
- the cost of manufacturing clinical supplies, and establishing commercial supplies, of our product candidates and any products that we may develop;

- the number and characteristics of the product candidates that we pursue;
- the cost, timing, and outcomes of regulatory approvals;
- the cost and timing of establishing and operating our international subsidiaries;
- the cost and timing of establishing field forces, marketing, and distribution capabilities;
- the cost and timing of other activities needed to commercialize our products; and
- the terms and timing of any collaborative, licensing, acquisition, and other arrangements that we may establish, including any required milestone, royalty, and reimbursements or other payments thereunder.

Any additional fundraising efforts may divert our management's attention from their day-to-day activities, which may adversely affect our ability to develop and commercialize our product candidates. In addition, we cannot guarantee that future financing will be available in sufficient amounts or on terms acceptable to us, if at all. Moreover, the terms of any financing may adversely affect the holdings or the rights of our stockholders and the issuance of additional securities, whether equity or debt, by us, or the possibility of such issuance, may cause the market price of our shares to decline. The sale of additional equity or convertible securities would dilute all of our stockholders. If we incur debt, it could result in increased fixed payment obligations and we may be required to agree to certain restrictive covenants, such as limitations on our ability to incur additional debt, limitations on our ability to acquire, sell, or license intellectual property rights, and other operating restrictions that could adversely impact our ability to conduct our business. If we are granted priority review vouchers in connection with regulatory approvals for our product candidates, we may be unable to sell the vouchers or, if we do sell the vouchers, we may have to sell them on unfavorable terms and at prices that are lower than expected. Regulatory authorities may also cease granting such vouchers in the future. We could also be required to seek funds through collaborative partnerships, strategic alliances, and licensing or other arrangements and we may be required to relinquish rights to some of our technologies or product candidates, future revenue streams, research programs, and other product candidates or otherwise agree to terms unfavorable to us, any of which may have a material adverse effect on our business, operating results, and prospects. Even if we believe we have sufficient funds for our current or future operating plans, we may seek additional capital if market conditions are favorable or if we have specific strategic considerations.

If we are unable to obtain funding on a timely basis or at all, we may be required to significantly curtail, delay, or discontinue one or more of our research or development programs or the commercialization of our product and any approved product candidates or be unable to expand our operations or otherwise capitalize on our business opportunities, as desired, which could materially affect our business, financial condition, and results of operations.

Risks Related to the Discovery and Development of Our Product Candidates

Clinical drug development involves a lengthy and expensive process with uncertain outcomes and the potential for substantial delays, and the results of earlier studies may not be predictive of future study results.

Before obtaining marketing approval from regulatory authorities for the sale of our product candidates, we must conduct extensive clinical studies to demonstrate the safety and efficacy of the product candidates in humans. Clinical testing is expensive, time consuming, and uncertain as to outcome. We cannot guarantee that any clinical studies will be conducted as planned or completed on schedule, if at all. A failure of one or more clinical studies can occur at any stage of testing, and our future clinical studies may not be successful. Product candidates that have shown promising results in early-stage clinical studies may still suffer significant setbacks in subsequent clinical studies. The safety or efficacy results generated to date in clinical studies for burosumab and UX007 do not ensure that later clinical studies will demonstrate similar results. For example, our Phase 3 study that evaluated Ace-ER in patients with GNE myopathy did not achieve its primary or secondary endpoints and efficacy results from our Phase 2 study of UX007 in Glut1 DS patients with seizures did not meet the primary endpoint. Results from investigator-sponsored studies or compassionate-use studies may not be confirmed in company-sponsored studies or may negatively impact the prospects for our programs. Additionally, given the nature of the rare diseases we are seeking to treat, we often have to devise newly-defined endpoints to be tested in our studies, which can lead to some subjectivity in interpreting study results and could result in regulatory agencies not agreeing with the validity of our endpoints, or our interpretation of the clinical data, and therefore denying approval. For example, for our Glut1 DS Phase 3 clinical trial, we have proposed utilizing a patient diary to track movement disorder events. Based on FDA feedback expressing concern about the clinical meaningfulness of all such events tracked, we modified the clinical endpoint. Even so, there is no guarantee that these modifications to the endpoint will be acceptable to the FDA. Given the illness of the subjects in our studies and the nature of their rare diseases, we may also be required or choose to conduct certain studies on an open-label basis. Additionally, we have in the past, and may in the future elect to review interim clinical data at multiple time points during the studies, which could introduce bias into the study results and potentially result in denial of approval.

In the biopharmaceutical industry, there is a high failure rate for drugs and biologics proceeding through clinical studies, and product candidates in later stages of clinical studies may fail to show the desired safety and efficacy despite having progressed through nonclinical studies and initial clinical studies. A number of companies in the biopharmaceutical industry have suffered significant setbacks in advanced clinical studies due to lack of efficacy or adverse safety profiles, notwithstanding promising results in earlier studies.

Scenarios that may prevent successful or timely completion of clinical development include but are not limited to:

- delays or failures in generating sufficient preclinical, toxicology, or other *in vivo* or *in vitro* data to support the initiation or continuation of human clinical studies or filings for regulatory approval;
- failure to demonstrate a starting dose for our product candidates in the clinic that might be reasonably expected to result in a clinical benefit;
- delays or failures in reaching a consensus with regulatory agencies on study design;
- delays in reaching agreement on acceptable terms with contract research organizations, or CROs, clinical study sites, and other clinical trial-related vendors;
- failure or delays in obtaining required regulatory agency approval and/or IRB or EC approval at each clinical study site or in certain countries;
- failure to correctly design clinical studies which may result in those studies failing to meet their endpoints;
- changes in clinical study design or development strategy resulting in delays related to obtaining approvals from IRBs or ECs and/or regulatory agencies to proceed with clinical studies;
- imposition of a clinical hold by regulatory agencies after review of an IND application or amendment, another equivalent application or amendment, or an inspection of our clinical study operations or study sites;
- delays in recruiting suitable patients to participate in our clinical studies;
- difficulty collaborating with patient groups and investigators;
- failure by our CROs, other third parties, or us to adhere to clinical study requirements;
- failure to perform in accordance with the FDA's and/or ICH's good clinical practices requirements or applicable regulatory guidelines in other countries;
- delays in patients' completion of studies or their returns for post-treatment follow-up;
- patients dropping out of a study;
- adverse events associated with the product candidate occurring that are viewed to outweigh its potential benefits;
- changes in regulatory requirements and guidance that require amending or submitting new clinical protocols;
- greater than anticipated costs associated with clinical studies of our drug candidates;
- clinical studies of our drug candidates producing negative or inconclusive results, which may result in us deciding, or regulators requiring us, to conduct additional clinical or nonclinical studies or to abandon drug development programs;
- competing clinical studies of potential alternative product candidates or investigator-sponsored studies of our product candidates; and
- delays in manufacturing, testing, releasing, validating, or importing/exporting sufficient stable quantities of our product candidates for use in clinical studies or the inability to do any of the foregoing.

Any inability to successfully complete nonclinical and clinical development could result in additional costs to us or negatively impact our ability to generate revenue. In addition, if we make manufacturing or formulation changes to our product candidates, we may need to conduct additional studies to bridge our modified product candidates to earlier versions. Clinical study delays could also shorten any periods during which our products have commercial exclusivity and may allow our competitors to bring products to market before we do, which could negatively impact our ability to obtain orphan exclusivity and to successfully commercialize our product candidates and may harm our business and results of operations.

If we do not achieve our projected development goals in the timeframes we announce and expect, the commercialization of our products may be delayed and the credibility of our management may be adversely affected and, as a result, our stock price may decline.

For planning purposes, we estimate the timing of the accomplishment of various scientific, clinical, regulatory, and other product development goals, which we sometimes refer to as milestones. These milestones may include the commencement or completion of scientific studies and clinical trials, the submission of regulatory filings, and the potential approval of such regulatory filings. We periodically make public announcements about the expected timing of some of these milestones. All of these milestones are based on a variety of assumptions, but the actual timing of these milestones can vary dramatically from our estimates. If we do not meet these publicly announced milestones, the commercialization of our products may be delayed and the credibility of our management may be adversely affected and, as a result, our stock price may decline.

We are heavily dependent on the success of our product candidates, some of which are in the early stages of clinical development, which is a lengthy and expensive process with uncertain outcomes and the potential for substantial delays. We cannot give any assurance that any of our product candidates will receive regulatory approval, which is necessary before they can be commercialized.

Before obtaining marketing approval from regulatory authorities for the sale of our product candidates, we must conduct extensive clinical studies to demonstrate the safety and efficacy of the product candidates in humans. To date, we have focused substantially all of our efforts and financial resources on identifying, acquiring, and developing our product candidates, including conducting clinical studies and providing general and administrative support for these operations. We cannot be certain that any clinical studies will be conducted as planned or completed on schedule, if at all. Our inability to successfully complete nonclinical and clinical development could result in additional costs to us and negatively impact our ability to generate revenue. Our future success is dependent on our ability to successfully develop, obtain regulatory approval for, and then successfully commercialize our product candidates. We currently generate no significant revenue from sales of drugs, and we may never be able to develop or successfully commercialize an additional marketable drug.

Each of our product candidates is in development and will require additional clinical development; management of nonclinical, clinical, and manufacturing activities; regulatory approval; obtaining adequate manufacturing supply; building a commercial organization; significant marketing efforts; and reimbursement before we generate any significant revenue from commercial product sales, if ever. For burosumab, we filed for conditional marketing authorization in the EU in late 2016 based on Phase 1/2 and Phase 2 data, and we filed a BLA in the US in August 2017 based on Phase 2 data for the XLH pediatric indication and Phase 3 data for the adult XLH indication. For Mepsevii, which was approved in the US in November 2017, we filed a MAA in the EU, which was accepted for review in the first half of 2017, based on Phase 3 data. There can be no assurance that we will be able to secure approval with the current filings, for the specified indications, or within projected time periods. For example, in November 2016, we withdrew our first filing application for regulatory approval that sought conditional marketing authorization in the EU for Ace-ER, and in August 2017 we discontinued further clinical development of Ace-ER. Even if we obtain regulatory approval, it may be withdrawn under certain circumstances. In addition, confirmatory clinical studies could be required for a conditional marketing authorization and could fail to demonstrate sufficient safety and efficacy to obtain full approval.

Some of our product candidates are in the early-stage translational research phases of development. Such early-stage programs will require substantial investment to reach clinical studies and regulatory approval, and their risk of failure is high. For example, our collaboration with Arcturus focuses on an advanced but less established technology platform that will require significant effort and investment. A failure in that collaboration or our other early-stage programs may negatively affect our operational results.

We generally plan to seek regulatory approval to commercialize our product candidates in the United States, the EU, and in additional foreign countries where we have commercial rights. To obtain regulatory approval in other countries, we must comply with numerous and varying regulatory requirements of such other countries regarding safety, efficacy, chemistry, manufacturing, and controls, clinical studies, commercial sales, pricing, and distribution of our product candidates. Even if we are successful in obtaining approval in one jurisdiction, we cannot ensure that we will obtain approval in any other jurisdiction. If we are unable to obtain approval for our product candidates in multiple jurisdictions, our revenue and results of operations could be negatively affected.

We cannot be certain that any of our product candidates will be successful in clinical studies or receive regulatory approval. Further, our product candidates may not receive regulatory approval even if they are successful in clinical studies. If we do not receive regulatory approvals for our product candidates, we may not be able to continue our operations.

We may find it difficult to enroll patients in our clinical studies given the limited number of patients who have the diseases for which our product candidates are being studied. Difficulty in enrolling patients could delay or prevent clinical studies of our product candidates.

Identifying and qualifying patients to participate in clinical studies of our product candidates is critical to our success. The timing of our clinical studies depends in part on the speed at which we can recruit patients to participate in testing our product candidates, and we may experience delays in our clinical studies if we encounter difficulties in enrollment.

Each of the conditions for which we plan to evaluate our current product candidates is a rare genetic disease. Accordingly, there are limited patient pools from which to draw for clinical studies. For our current product candidates:

- we estimate that several thousand patients in the United States suffer from XLH, for which burosumab is being studied;
- we estimate that several hundred patients in the United States suffer from TIO, for which burosumab is being studied;
- we estimate that several thousand patients in the United States suffer from LC-FAOD, for which UX007 is being studied;
- we estimate that several thousand patients in the United States suffer from Glut1 DS, for which UX007 is being studied; and
- we estimate that approximately 8,000 patients in the developed world suffer from late-onset OTC deficiency, for which DTX301 is being studied, and these all may not be treatable if they are immune to the virus.

In addition to the rarity of these diseases, the eligibility criteria of our clinical studies will further limit the pool of available study participants as we will require patients to have specific characteristics that we can measure or to assure their disease is either severe enough or not too advanced to include them in a study. For example, enrolling patients in the UX007 Glut1 DS Phase 3 movement disorder study could face delays if a higher than expected number of patients that we identify for the study are on the ketogenic diet. Additionally, the process of finding and diagnosing patients may prove costly, especially since the rare diseases we are studying are commonly under diagnosed. We also may not be able to identify, recruit, and enroll a sufficient number of patients to complete our clinical studies because of the perceived risks and benefits of the product candidate under study, the proximity and availability of clinical study sites for prospective patients, and the patient referral practices of physicians. The availability and efficacy of competing therapies and clinical studies can also adversely impact enrollment. If patients are unwilling to participate in our studies for any reason, the timeline for recruiting patients, conducting studies, and obtaining regulatory approval of potential products may be delayed, the commercial prospects of our product candidates will be harmed, and our ability to generate product revenue from any of these product candidates could be delayed or prevented. In addition, any delays in completing our clinical studies will increase our costs, slow down our product candidate development and approval process, and jeopardize our ability to commence product sales and generate revenue. Any of these occurrences may harm our business, financial condition, and prospects significantly. In addition, many of the factors that cause, or lead to, a delay in the commencement or completion of clinical studies may also ultimately lead to the denial of regulatory approval of our product candidates.

The regulatory approval processes of the FDA and comparable foreign authorities are lengthy, time consuming, and inherently unpredictable. Even if we achieve positive results in our pre-clinical and clinical studies, if we are ultimately unable to obtain timely regulatory approval for our product candidates, our business will be substantially harmed.

Our future success is dependent on our ability to successfully commercialize our product and develop, obtain regulatory approval for, and then successfully commercialize one or more product candidates. We are not permitted to market or promote any of our product candidates before we receive regulatory approval from the FDA or comparable foreign regulatory authorities. We have only obtained regulatory approval for one product, and it is possible that none of our existing product candidates or any product candidates we may seek to develop in the future will ever obtain regulatory approval.

To obtain regulatory approval in the United States and other jurisdictions, we must comply with numerous and varying requirements regarding safety, efficacy, chemistry, manufacturing and controls, clinical studies (including good clinical practices), commercial sales, pricing, and distribution of our product candidates. Even if we are successful in obtaining approval in one jurisdiction, we cannot ensure that we will obtain approval in any other jurisdictions. In addition, approval policies, regulations, positions of the regulatory agencies on study design and/or endpoints, or the type and amount of clinical data necessary to gain approval may change during the course of a product candidate's clinical development, which may cause delays in the approval or the decision not to approve an application. Communications with the regulatory agencies during the approval process are also unpredictable; favorable communications early in the process do not ensure that approval will be obtained and unfavorable communications early on do not guarantee that approval will not be obtained. If we are unable to obtain approval for our product candidates in multiple jurisdictions, our revenue and results of operations could be negatively affected. Applications for our product candidates could fail to receive regulatory approval, or could be delayed in receiving regulatory approval, for many reasons, including but not limited to the following:

- the FDA or comparable foreign regulatory authorities may disagree with the design, implementation, or conduct of our clinical studies;
- the FDA or other comparable foreign regulatory authorities may change their guidance or requirements for a development program for a product candidate;
- the population studied in the clinical program may not be sufficiently broad or representative to assure efficacy and safety in the full population for which we seek approval;
- the FDA or comparable foreign regulatory authorities may disagree with our interpretation of data from nonclinical studies or clinical studies;
- the data collected from clinical studies of our product candidates may not be sufficient to support the submission of an NDA, or biologics license application, or BLA, or other submission or to obtain regulatory approval in the United States or elsewhere;
- we may be unable to demonstrate to the FDA or comparable foreign regulatory authorities that a product candidate's risk-benefit ratio for its proposed indication is acceptable;
- the FDA or comparable foreign regulatory authorities may fail to approve the manufacturing processes, test procedures and specifications, or facilities of third-party manufacturers with which we contract for clinical and commercial supplies;
- failure of our nonclinical or clinical development to comply with an agreed upon Pediatric Investigational Plan (PIP), which details the designs and completion timelines for nonclinical and clinical studies and is a condition of marketing authorization in the EU; and

- the approval policies or regulations of the FDA or comparable foreign regulatory authorities may significantly change in a manner rendering our clinical data insufficient for approval.

Furthermore, the disease states we are evaluating often will not have clear regulatory paths for approval and/or do not have validated outcome measures. In these circumstances, we work closely with the regulatory authorities to define the approval path and may have to qualify outcome measures as part of our development programs. For example, for patients with XLH there is no available regulatory precedent describing requirements for obtaining approval to treat this disease, and there are no validated patient-reported outcome measures that are specific to this disease. Additionally, many of the disease states we are targeting are highly heterogeneous in nature, which may impact our ability to determine the treatment benefit of our potential therapies. For example, patients with FAOD and Glut1 DS have a highly heterogeneous disease course, which may impact our ability to determine the true treatment benefit of our product candidates in these patients.

This lengthy and uncertain approval process, as well as the unpredictability of the clinical and nonclinical studies, may result in our failure to obtain regulatory approval to market any of our product candidates, or delayed regulatory approval, which would significantly harm our business, results of operations, and prospects.

FDA, the U.S. National Institutes of Health, or NIH, Health Canada, and the EMA have demonstrated caution in their regulation of gene therapy treatments, and ethical and legal concerns about gene therapy and genetic testing may result in additional regulations or restrictions on the development and commercialization of our gene therapy product candidates, which may be difficult to predict.

The clinical trial requirements of FDA, the NIH, Health Canada, the EMA and other regulatory authorities and the criteria these regulators use to determine the safety and efficacy of a product candidate vary substantially according to the type, complexity, novelty and intended use and market of the product candidate. The regulatory approval process for novel product candidates such as our gene therapy product candidates can be more expensive and take longer than for other, better known or more extensively studied product candidates. Only one AAV gene therapy product, Glybera from uniQure N.V., or uniQure, has received marketing authorization from the European Commission and one AAV gene therapy product, LUXTURNA™ (voretigene neparvovec) from Spark Therapeutics, has been approved in the United States. Different or additional preclinical studies or clinical trials may be required to support regulatory approval in each respective jurisdiction.

Additionally, FDA, the NIH, Health Canada, and the EMA have each expressed interest in further regulating biotechnology, including gene therapy and genetic testing. For example, the EMA advocates a risk-based approach to the development of a gene therapy product. Agencies at both the federal and state level in the United States, as well as U.S. congressional committees and foreign governments, have also expressed interest in further regulating the biotechnology industry. Such action may delay or prevent commercialization of some or all of our product candidates. For example, in 1999, a patient suffering from OTC deficiency died during a gene therapy clinical trial that utilized an adenovirus vector. It was discovered that adenoviruses could generate an extreme immune system reaction that can be life-threatening. Thereafter, in January 2000, FDA halted that trial and began investigating 69 other gene therapy trials underway in the United States. Eventually, 28 trials were reviewed, with 13 requiring remedial action. Subsequently, in 2003, FDA suspended 27 additional gene therapy trials involving several hundred patients after learning that a child treated in France had developed leukemia.

Regulatory requirements in the United States and abroad governing gene therapy products have changed frequently and may continue to change in the future. FDA has established the Office of Cellular, Tissue and Gene Therapies within its Center for Biologics Evaluation and Research to consolidate the review of gene therapy and related products, and has established the Cellular, Tissue and Gene Therapies Advisory Committee to advise this review. Prior to submitting an IND, our human gene therapy clinical trials are subject to review by the NIH Office of Biotechnology Activities', or OBA's, Recombinant DNA Advisory Committee, or the RAC. As of April 2016, the updated NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules, including gene therapy, provide the opportunity for one or more oversight bodies (institutional review board, or IRB, or the institutional biosafety committee, or IBC) to request a public RAC review based on their own review of the protocol and NIH requirements. Regardless of the request for public review, NIH RAC members make their own assessment as to whether the protocol would significantly benefit from a public RAC review. The RAC's recommendations are shared with FDA and the oversight bodies. The RAC can delay the initiation of a clinical trial, even if FDA has reviewed the trial design and details and has not objected to its initiation or has notified the sponsor that the study may begin. Conversely, FDA can put an IND on a clinical hold even if the RAC has provided a favorable review or has recommended against an in-depth, public review. Moreover, under guidelines published by the NIH, patient enrollment in our gene therapy clinical trials cannot begin until, among other things, the investigator for that clinical trial has received a letter from the OBA indicating that the protocol registration process has been completed. Upon receipt of the letter from OBA confirming completion of protocol registration the investigator may obtain final approval from the oversight bodies and patient enrollment may begin if all other applicable regulatory authorizations have been obtained.

If there is a public RAC review, the receipt of the final recommendation letter concludes the protocol registration process and then oversight body, or bodies, approval can be issued. While the RAC completed its initial public review for DTX301 and DTX201, approving the protocols and issuing written recommendations, the RAC will continue to review DTX301 and DTX201, and may recommend additional public reviews in the future with respect to DTX301, DTX201, or any of our other product candidates. In

addition, adverse developments in clinical trials of gene therapy products conducted by others may cause FDA or other oversight bodies to change the requirements for approval of any of our product candidates. Similarly, the EMA governs the development of gene therapies in the EU and may issue new guidelines concerning the development and marketing authorization for gene therapy products and require that we comply with these new guidelines.

These regulatory review committees and advisory groups and the new guidelines they promulgate may lengthen the regulatory review process, require us to perform additional studies or trials, increase our development costs, lead to changes in regulatory positions and interpretations, delay or prevent approval and commercialization of our product candidates or lead to significant post- approval limitations or restrictions. As we advance our product candidates, we will be required to consult with these regulatory and advisory groups and comply with applicable guidelines. If we fail to do so, we may be required to delay or discontinue development of such product candidates. These additional processes may result in a review and approval process that is longer than we otherwise would have expected. Delays as a result of an increased or lengthier regulatory approval process or further restrictions on the development of our product candidates can be costly and could negatively impact our or our collaborators' ability to complete clinical trials and commercialize our current and future product candidates in a timely manner, if at all.

Our product candidates may cause undesirable side effects or have other properties that could delay or prevent their regulatory approval, limit the commercial profile of an approved label, or result in significant negative consequences following marketing approval, if any.

Undesirable side effects caused by our product candidates could cause us or regulatory authorities to interrupt, delay, or halt clinical studies or further development, and could result in a more restrictive label, the delay or denial of regulatory approval by the FDA or other comparable foreign authorities, or a Risk Evaluation and Mitigation Strategy, or REMS, plan, which could include a medication guide outlining the risks of such side effects for distribution to patients, restricted distribution, a communication plan for healthcare providers, and/or other elements to assure safe use. Some of our product candidates are in the early stages of development and the safety profile has not been established. For example, in completed Phase 2 study, LC-FAOD patients treated with UX007 experienced treatment-related adverse events, the most common of which were diarrhea, abdominal/gastrointestinal pain and vomiting. There were no deaths, but there was one treatment-related serious adverse event of moderate gastroenteritis with vomiting. In a completed Phase 2 seizure study, Glut1 DS patients with seizures treated with UX007 experienced treatment-related adverse events, the most common of which were vomiting, diarrhea, and abdominal pain. There were no deaths, and no treatment-related serious adverse events. Gene therapy product candidates using AAV vectors, like DTX301, have been associated with immunologic reaction to the capsid protein or gene at early time points after administration. For example, in our recently discontinued Phase 1/2 clinical trial of DTX101 in hemophilia B, we observed elevated laboratory alanine transaminase levels, or ALTs. In previous clinical trials involving AAV viral vectors for gene therapy, some subjects experienced adverse events, including the development of a T-cell mediated immune response against the vector capsid proteins. In addition, theoretical side effects of AAV vectors include replication and spread of the virus to other parts of the body and insertional oncogenesis, which is the process whereby the insertion of a gene near a gene that is important in cell growth or division results in uncontrolled cell division, which could potentially enhance the risk of malignant transformation or cancer. Potential procedure-related events are similar to those associated with standard coronary diagnostic procedures, and may include vascular injury (e.g., damage to the femoral, radial or brachial arteries at the site of vascular access, or damage to the coronary arteries) or myocardial injury. Future product candidates may also cause these or similar side effects as development proceeds. Results of our studies or investigator-sponsored trials could reveal a high and unacceptable severity and prevalence of these or other side effects. In such an event, our studies could be suspended or terminated, and the FDA or comparable foreign regulatory authorities could order us to cease further development of or deny or withdraw approval of our product candidates for any or all targeted indications.

Drug-related side effects could affect patient recruitment and the ability of enrolled patients to complete a study. Such side effects could also result in potential product liability claims. We currently carry product liability insurance in the amount of $10.0 million per incident and $10.0 million in the aggregate, and we are required to maintain product liability insurance pursuant to certain of our agreements. We believe our product liability insurance coverage is sufficient in light of our current clinical programs; however, we may not be able to maintain insurance coverage at a reasonable cost or in sufficient amounts to protect us against losses due to liability, or losses may exceed the amount of insurance that we carry. A product liability claim or series of claims brought against us could cause our stock price to decline and, if judgments exceed our insurance coverage, could adversely affect our results of operations and business. In addition, regardless of merit or eventual outcome, product liability claims may result in impairment of our business reputation, withdrawal of clinical study participants, costs due to related litigation, distraction of management's attention from our primary business, initiation of investigations by regulators, substantial monetary awards to patients or other claimants, the inability to commercialize our product candidates, and decreased demand for our product candidates, if approved for commercial sale.

Additionally, even though we received regulatory approval for Mepsevii and even if our product candidates receive marketing approval in the future, if we or others later identify undesirable side effects caused by such products, a number of potentially significant negative consequences could result, including but not limited to:

- regulatory authorities may withdraw approvals of such product;
- regulatory authorities may require additional warnings on the product's label or restrict the product's approved use;

- we may be required to create a REMS plan;
- patients and physicians may elect not to use our products, or reimbursement authorities may elect not to reimburse for them; and
- our reputation may suffer.

Any of these events could prevent us from achieving or maintaining market acceptance of the particular product candidate, if approved, and could significantly harm our business, results of operations, and prospects.

If preclinical studies for DTX401 for GSDIa, DTX201 for hemophilia A, DTX701 for Wilson disease, DTX501 for PKU, and DTX601 for citrullinemia type I, or all of our future product candidates do not result in the determination of a minimally effective dose range, we may not obtain the regulatory approvals required to initiate clinical testing.

As with any systemically delivered adeno-associated virus, or AAV, gene therapy, it is important that we accurately determine a minimally effective dose in order to successfully execute our clinical trial. Exposure to the AAV virus has been shown to induce the production of neutralizing antibodies, which can reduce or eliminate the therapeutic effect of subsequently administered intravenous AAV therapies such as our product candidates. Because of the potential for immune response producing neutralizing antibodies making patients ineligible for a second dose of that vector, clinical trials are required to determine the minimum effective dose and the maximum safe dose. If our preclinical studies fail to demonstrate a starting dose in the clinic that might be reasonably expected to result in a clinical benefit, regulatory agencies may not approve the start of our clinical trials. In addition, even if we start our clinical program, we may not be able to recruit patients who will seek assurance of a clinical benefit following administration of our therapy.

Even if we obtain regulatory approval for our product candidates, our products will remain subject to regulatory scrutiny.

Our product and any product candidates that are approved will be subject to ongoing regulatory requirements for manufacturing, labeling, packaging, storage, distribution, advertising, promotion, sampling, record-keeping, conduct of post-marketing studies, and submission of safety, efficacy, and other post-market information, including both federal and state requirements in the United States and requirements of comparable foreign regulatory authorities.

Manufacturers and manufacturers' facilities are required to comply with extensive FDA, and comparable foreign regulatory authority, requirements, including ensuring that quality control and manufacturing procedures conform to Good Manufacturing Practices (GMP) regulations. As such, we and our contract manufacturers will be subject to continual review and inspection to assess compliance with GMP and adherence to commitments made in any NDA, BLA, MAA, or other comparable application for approval in another jurisdiction. Accordingly, we and others with whom we work must continue to expend time, money, and effort in all areas of regulatory compliance, including manufacturing, production, and quality control.

Any regulatory approvals that we receive for our product candidates may be subject to limitations on the approved indicated uses for which the product may be marketed or other conditions of approval, or contain requirements for potentially costly post-marketing testing, including Phase IV clinical studies, and surveillance to monitor the safety and efficacy of the product candidate. We could also be asked to conduct post-marketing clinical studies to verify the safety and efficacy of our products in general or in specific patient subsets. If original marketing approval was obtained via the accelerated approval or conditional marketing authorization pathways, we would be required to conduct a successful post-marketing clinical study to confirm clinical benefit for our products. An unsuccessful post-marketing study or failure to complete such a study could result in the withdrawal of marketing approval. We will be required to report certain adverse events and manufacturing problems, if any, to the FDA and comparable foreign regulatory authorities. Any new legislation addressing drug safety issues could result in delays in product development or commercialization, or increased costs to assure compliance. We will have to comply with requirements concerning advertising and promotion for our products. Promotional communications with respect to prescription drugs are subject to a variety of legal and regulatory restrictions and must be consistent with the information in the product's approved label. As such, we may promote our products only for indications or uses for which they have approval. The holder of an approved NDA, BLA, MAA, or other comparable application must submit new or supplemental applications and obtain approval for certain changes to the approved product, product labeling, or manufacturing process.

If we fail to comply with applicable regulatory requirements, or there are safety or efficacy problems with a product, a regulatory agency or enforcement authority may, among other things:

- issue warning or notice of violation letters;
- impose civil or criminal penalties;
- suspend or withdraw regulatory approval;
- suspend any of our ongoing clinical studies;
- refuse to approve pending applications or supplements to approved applications submitted by us;
- impose restrictions on our operations, including closing our contract manufacturers' facilities;

- seize or detain products, or require a product recall; or
- require entry into a consent decree.

Any government investigation of alleged violations of law could require us to expend significant time and resources in response, and could generate negative publicity. Any failure to comply with ongoing regulatory requirements may significantly and adversely affect our ability to commercialize and generate revenue from our products. If regulatory sanctions are applied or if regulatory approval is withdrawn, the value of our company and our operating results will be adversely affected.

Our gene therapy approach utilizes vectors derived from viruses, which may be perceived as unsafe or may result in unforeseen adverse events. Negative public opinion and increased regulatory scrutiny of gene therapy may damage public perception of the safety of our product candidates and adversely affect our ability to conduct our business or obtain regulatory approvals for our product candidates.

Gene therapy remains a novel technology. Public perception may be influenced by claims that gene therapy is unsafe, and gene therapy may not gain the acceptance of the public or the medical community. For example, earlier gene therapy trials led to several well- publicized adverse events, including cases of leukemia and death seen in other trials using other vectors. The risk of cancer remains a concern for gene therapy and we cannot assure you that it will not occur in any of our planned or future clinical studies. In addition, there is the potential risk of delayed adverse events following exposure to gene therapy products due to persistent biological activity of the genetic material or other components of products used to carry the genetic material. Serious adverse events in our clinical trials, or other clinical trials involving gene therapy products, particularly AAV gene therapy products such as candidates based on the same capsid serotypes as our product candidates, or occurring during use of our competitors' products, even if not ultimately attributable to the relevant product candidates, and the resulting publicity, could result in increased government regulation, unfavorable public perception, potential regulatory delays in the testing or approval of our gene therapy product candidates, stricter labeling requirements for those gene therapy product candidates that are approved and a decrease in demand for any such gene therapy product candidates, all of which would have an adverse effect on our business, financial condition, results of operations and prospects.

Our transition from HEK293 to a HeLa platform may require additional toxicology and comparability studies for gene therapy product candidates, which may result in delays to the approval process for our current or future programs and increased costs resulting from additional preclinical trials.

We have conducted some of our preclinical evaluations with viral vectors produced on adherent and suspension platforms utilizing human embryonic kidney 293, or HEK293, and HeLa cells, the latter an immortal cell line used in scientific research. HeLa is the oldest and most commonly used human cell line. We are conducting our Phase 1/2 trial of DTX301, and plan to conduct our Phase 1/2 trials of DTX401, and potentially other programs using viral vectors produced on the HEK293 platform. We plan to conduct our Phase 1/2 trial of DTX201 using viral vectors produced on the HeLa platform. For Phase 3 studies and commercial production of each of our gene therapy product candidates, we plan to use HeLa. Even if we successfully complete our planned preclinical studies and clinical trials using vectors produced on our adherent and suspension HEK293 and HeLa platforms, FDA or other regulatory authorities may require additional toxicology and/or a clinical bridge study, or comparability study, the latter showing comparability of vectors produced on the HeLa platform prior to commencing Phase 3 trials of DTX301, DTX401, DTX701, DTX501, and DTX601 delaying the development process. For example, while FDA has agreed to our plan, other regulators may require additional assessments of HeLa material during the manufacturing of our products as well as additional animal studies. In addition, if we make manufacturing or formulation changes to our product candidates in the future, we may need to conduct additional preclinical studies to bridge our modified product candidates to earlier versions.

If we are unable to identify, source, and develop effective predictive biomarkers, or our collaborators are unable to successfully develop and commercialize companion diagnostics for our product candidates, or experience significant delays in doing so, we may not realize the full commercial potential of our product candidates.

We currently anticipate that we will need companion diagnostics to determine whether or not we can dose a particular patient with each of our products. We expect to use predictive biomarkers to identify the right patients for certain of our product candidates. For example, to evaluate therapeutic response of DTX301, we plan to measure ammonia levels and other biomarkers, including ^{13}C-acetate, which are established measures of OTC deficiency disease status and ureagenesis. We cannot assure you that ^{13}C-acetate or any other future potential biomarker will in fact prove predictive, be reliably sourced, or be accepted by the FDA or other regulatory authorities. In addition, our success may depend, in part, on the development and commercialization of companion diagnostics. We also expect the FDA will require the development and regulatory approval of a companion diagnostic assay as a condition to approval of DTX301. There has been limited success to date industrywide in developing and commercializing these types of companion diagnostics. Development and manufacturing of companion diagnostics is complex and there are limited manufacturers with the necessary expertise and capability. Even if we are able to find a qualified collaborator, it may not be able to manufacture the companion diagnostics at a cost or in quantities or on timelines necessary for use with our product candidates. To be successful, we need to address a number of scientific, technical and logistical challenges. We have not yet initiated development and commercialization of companion diagnostics. We have little experience in the development and commercialization of diagnostics and

may not be successful in developing and commercializing appropriate diagnostics to pair with any of our product candidates that receive marketing approval. University of Pennsylvania School of Medicine currently conducts some of our clinical assays pursuant to a sponsored research agreement, one of which is required for our ongoing Phase 1/2 clinical trial. We intend to enter into agreements with third parties for the automation, characterization and validation, of our companion diagnostic and the manufacture of its critical reagents. However, we may be unable to enter into any such agreement on favorable terms, or at all.

Companion diagnostics are subject to regulation by FDA and similar regulatory authorities outside the United States as medical devices and require regulatory clearance or approval prior to commercialization. In the United States, companion diagnostics are cleared or approved through FDA's 510(k) premarket notification or premarket approval, or PMA, process. Changes in marketing approval policies during the development period, changes in or the enactment of additional statutes or regulations, or changes in regulatory review for each submitted 510(k) premarket notification, PMA or equivalent application types in jurisdictions outside the United States, may cause delays in the approval, clearance or rejection of an application. Given our limited experience in developing and commercializing diagnostics, we expect to rely in part or in whole on third parties for companion diagnostic design and commercialization. We and our collaborators may encounter difficulties in developing and obtaining approval or clearance for the companion diagnostics, including issues relating to selectivity/specificity, analytical validation, reproducibility, or clinical validation. Any delay or failure by us or our collaborators to develop or obtain regulatory approval of the companion diagnostics could delay or prevent approval of our product candidates.

Risks Related to our Reliance on Third Parties

We rely on third parties to conduct our nonclinical and clinical studies and perform other tasks for us. If these third parties do not successfully carry out their contractual duties, meet expected deadlines, or comply with regulatory requirements, we may be exposed to sub-optimal quality and reputational harm, we may not be able to obtain regulatory approval for or commercialize our product candidates, and our business could be substantially harmed.

We have relied upon and plan to continue to rely upon third parties, including CROs, collaborative partners, and independent investigators to analyze, collect, monitor, and manage data for our ongoing nonclinical and clinical programs. We rely on third parties for execution of our nonclinical and clinical studies, and for estimates regarding costs and efforts completed, and we control only certain aspects of their activities. For example, we will rely on our partner Arcturus for the design and optimization of initial product candidates under our messenger RNA collaboration. Nevertheless, we are responsible for ensuring that each of our studies is conducted in accordance with the applicable protocol, legal, regulatory, and scientific standards, and our reliance on the CROs and other third parties does not relieve us of our regulatory responsibilities. We and our CROs and other vendors and partners are required to comply with GMP, GCP, and GLP, which are regulations and guidelines enforced by the FDA, the Competent Authorities of the Member States of the European Economic Area, and comparable foreign regulatory authorities for all of our product candidates in development. Regulatory authorities enforce these regulations through periodic inspections of study sponsors, principal investigators, study sites, and other contractors. If we or any of our CROs or other vendors and partners, including the sites at which clinical studies are conducted, fail to comply with applicable regulations, the data generated in our nonclinical and clinical studies may be deemed unreliable and the FDA, EMA, or comparable foreign regulatory authorities may deny approval and/or require us to perform additional nonclinical and clinical studies before approving our marketing applications, which would delay the approval process. We cannot make assurances that upon inspection by a given regulatory authority, such regulatory authority will determine that any of our clinical studies comply with GCP regulations or that nonclinical studies comply with GLP regulations. In addition, our clinical studies must be conducted with products produced under GMP regulations. If the regulatory authorities determine that we have failed to comply with GLP, GMP, or GCP regulations, they may deny approval of our product candidates and/or we may be required to repeat clinical or nonclinical studies, which would delay the regulatory approval process.

Our CROs and other vendors and partners are not our employees, and except for remedies available to us under our agreements with such third parties, we cannot control whether or not they devote sufficient time and resources to our on-going nonclinical and clinical programs. If our vendors and partners do not successfully carry out their contractual duties or obligations or meet expected deadlines, if they need to be replaced, or if the quality or accuracy of the data they obtain is compromised due to the failure to adhere to our protocols, regulatory requirements, or for other reasons, our clinical studies may be extended, delayed, or terminated, and we may not be able to obtain regulatory approval for or successfully commercialize our product candidates. CROs and other vendors and partners may also generate higher costs than anticipated as a result of changes in scope of work or otherwise. As a result, our results of operations and the commercial prospects for our product candidates would be harmed, our costs could increase, and our ability to generate revenue could be delayed.

If any of our relationships with these third parties terminate, we may not be able to enter into arrangements with alternative vendors or do so on commercially reasonable terms. Switching or adding additional vendors involves additional cost and requires management time and focus. In addition, there is a natural transition period when a new vendor commences work. As a result, delays may occur, which can materially impact our ability to meet our desired clinical development timelines. Though we carefully manage our relationships with our vendors and partners, there can be no assurance that we will not encounter similar challenges or delays in the future or that these delays or challenges will not have a material adverse impact on our business, financial condition, and business prospects.

We also rely on third parties in other ways, including efforts to support patient identification, to assist our finance and legal departments, and to provide other resources for our business. Use of these third parties could expose us to sub-optimal quality, missed deadlines, and non-compliance with applicable laws, all of which could result in reputational harm to us and negatively affect our business.

We are dependent on KHK for the clinical and commercial supply of burosumab for all major markets and for the development and commercialization of burosumab in certain major markets, and KHK's failure to provide an adequate supply of burosumab or to commercialize burosumab in those markets could result in a material adverse effect on our business and operating results.

Under our agreement with KHK, KHK has the sole right to commercialize burosumab in Europe and, at a specified time, in the United States, Canada, and Turkey, subject to a limited promotion right we retained. Our development partnership with KHK may not be successful, and we may not realize the expected benefits from such partnership, due to a number of important factors, including but not limited to the following:

- KHK has no obligation under our agreement to use diligent efforts to commercialize burosumab in Europe. The timing and amount of any royalty payments we may receive under our agreement will depend on, among other things, the efforts, allocation of resources, and successful commercialization of burosumab by KHK in Europe. Additionally, if KHK were to decide not to commercialize burosumab in Europe, and we nevertheless wished to commercialize burosumab in Europe, we would need to renegotiate with KHK certain terms of our agreement, which we may be unable to do on reasonable terms in a timely manner, or at all;
- the timing and amount of any royalty payments we may receive under our agreement with KHK will depend on, among other things, the efforts, allocation of resources, and successful commercialization of burosumab by KHK in the United States and Canada under our agreement;
- KHK may change the focus of its commercialization efforts or pursue higher-priority programs;
- KHK may make decisions regarding the indications for our product candidates in countries where it has the sole right to commercialize the product candidates that limit commercialization efforts in those countries or in countries where we have the right to commercialize our product candidates;
- KHK may make decisions regarding market access and pricing in countries where it has the sole right to commercialize our product candidates which can negatively impact our commercialization efforts in countries where we have the right to commercialize our product candidates;
- KHK may fail to manufacture or supply sufficient drug product of burosumab in compliance with applicable laws and regulations or otherwise for our development and clinical use, which could result in program delays;
- KHK may fail to manufacture or supply sufficient drug product of burosumab in compliance with applicable laws and regulations or otherwise for our commercial use, if approved, which could result in lost revenue;
- KHK may elect to develop and commercialize burosumab indications with a larger market than XLH and at a lower price, thereby reducing the profit margin on sales of burosumab for any orphan indications, including XLH;
- if KHK were to breach or terminate the agreement with us, we would no longer have any rights to develop or commercialize burosumab or such rights would be limited to non-terminated countries;
- KHK may terminate its agreement with us, adversely affecting our potential revenue from licensed products; and
- the timing and amounts of expense reimbursement that we may receive are uncertain, and the total expenses for which we are obligated to reimburse KHK may be greater than anticipated.

We rely on third parties to manufacture our product and most of our product candidates. Our business could be harmed if those third parties fail to provide us with sufficient quantities of drug product, or fail to do so at acceptable quality levels or prices.

We have limited infrastructure or capability internally to manufacture our product and product candidates, and we lack the resources and the capability to manufacture most of our product candidates on a clinical or commercial scale. We rely on our manufacturers to purchase from third-party suppliers the materials necessary to produce our product candidates for our clinical studies. There are a limited number of suppliers for raw materials that we use to manufacture our drugs, placebos, or active controls, and there may be a need to identify alternate suppliers to prevent a possible disruption of the manufacture of the materials necessary to produce our product and our product candidates for our clinical studies, and, if approved, ultimately for commercial sale. We do not have any control over the process or timing of the acquisition of these raw materials by our manufacturers. Although we generally do not begin a clinical study unless we believe we have a sufficient supply of a product candidate to complete such study, any significant delay or discontinuity in the supply of a product candidate, or the raw material components thereof, for an ongoing clinical study due to, among other things, the failure of a manufacturer to provide a drug substance or drug product of sufficient quantity or quality, or the need to replace a third-party manufacturer could considerably delay completion of our clinical studies, product testing, and potential regulatory approval of our product candidates, and could also impair named patient sale supply of our product candidates, which could harm our business and results of operations.

We expect our manufacturing strategy will involve the use of one or more CMOs as well as establishing our own capabilities and infrastructure, including at our Woburn, MA facility where we will support continued innovation in vector optimization and development of manufacturing processes required for IND-enabling studies and the reliable production of high quality AAV vectors at commercial scale. We expect that development of our own process development facility will provide us with enhanced control of material supply for both clinical trials and the commercial market, enable the more rapid implementation of process changes, and allow for better long-term margins. However, we have no experience as a company in developing a manufacturing facility and may never be successful in developing our own manufacturing facility or capability. Additionally, given that cGMP gene therapy manufacturing is a nascent industry, there are a small number of CMOs with the experience necessary to manufacture our gene therapy product candidates and we may have difficulty finding or maintaining relationships with such CMOs or hiring experts for internal manufacturing and accordingly, our production capacity may be limited. We may establish multiple manufacturing facilities as we expand our commercial footprint to multiple geographies, which may lead to regulatory delays or prove costly. Even if we are successful, our manufacturing capabilities could be affected by cost-overruns, unexpected delays, equipment failures, lack of capacity, labor shortages, natural disasters, power failures and numerous other factors that could prevent us from realizing the intended benefits of our manufacturing strategy and have a material adverse effect on our business.

Gene therapy products and product candidates are novel, complex, expensive and difficult to manufacture. We could experience manufacturing problems that result in delays in our gene therapy development or commercialization programs or otherwise harm our business.

The manufacturing process used to produce our gene therapy product candidates is complex, novel and has not been validated for commercial use. Several factors could cause production interruptions, including equipment malfunctions, regulatory inspections, facility contamination, raw material shortages or contamination, natural disasters, disruption in utility services, human error or disruptions in the operations of our suppliers.

Our gene therapy product candidates require processing steps that are more complex than those required for most small molecule drugs. Moreover, unlike small molecules, the physical and chemical properties of a biologic such as our gene therapy ones generally cannot be fully characterized. As a result, assays of the finished product candidate may not be sufficient to ensure that the product candidate is consistent from lot to lot or will perform in the intended manner. Accordingly, we employ multiple steps to control the manufacturing process to assure that the process works reproducibly and the product candidate is made strictly and consistently in compliance with the process. Problems with the manufacturing process, even minor deviations from the normal process, could result in product defects or manufacturing failures that result in lot failures, noncompliance with regulatory requirements, product recalls, product liability claims or insufficient inventory. We may encounter problems achieving adequate quantities and quality of clinical-grade materials that meet FDA, the EMA or other applicable standards or specifications with consistent and acceptable production yields and costs.

In addition, FDA, the EMA and other foreign regulatory authorities may require us to submit samples of any lot of any approved product together with the protocols showing the results of applicable tests at any time. Under some circumstances, FDA, the EMA or other foreign regulatory authorities may require that we not distribute a lot until the agency authorizes its release. Slight deviations in the manufacturing process, including those affecting quality attributes and stability, may result in unacceptable changes in the product that could result in lot failures or product recalls. Lot failures or product recalls could cause us to delay product launches or clinical trials, which could be costly to us and otherwise harm our business, financial condition, results of operations and prospects.

We also may encounter problems hiring and retaining the experienced scientific, quality-control and manufacturing personnel needed to operate our gene therapy manufacturing processes, which could result in delays in production or difficulties in maintaining compliance with applicable regulatory requirements. We also may not be able to complete scaling up of our facility in Woburn, MA,

and this facility may not enable the expansion of our internal manufacturing process discovery and development to the extent we anticipate, or at all.

We are subject to a multitude of manufacturing risks, any of which could substantially increase our costs and limit the supply of our product candidates.

The process of manufacturing our product and product candidates is complex, highly regulated, and subject to several risks, including but not limited to those listed below.

- The process of manufacturing our product and product candidates is extremely susceptible to product loss due to contamination, equipment failure or improper installation or operation of equipment, or vendor or operator error. Even minor deviations from normal manufacturing processes for our product and any of our product candidates could result in reduced production yields, product defects, and other supply disruptions. If microbial, viral, or other contaminations are discovered in our product and product candidates or in the manufacturing facilities in which our product and product candidates are made, such manufacturing facilities may need to be closed for an extended period of time to investigate and remedy the contamination.
- The manufacturing facilities in which our product and product candidates are made could be adversely affected by equipment failures, labor shortages, raw material shortages, natural disasters, power failures, and numerous other factors.

Any adverse developments affecting manufacturing operations for our product and product candidates may result in shipment delays, inventory shortages, lot failures, withdrawals or recalls, or other interruptions in the supply of our product and product candidates. Due to their stage of development, small volume requirements, and infrequency of batch production runs, we carry limited amounts of safety stock for our product and product candidates. We may also have to take inventory write-offs and incur other charges and expenses for product and product candidates that fail to meet specifications, undertake costly remediation efforts, or seek more costly manufacturing alternatives.

The drug substance and drug product for our product and most of our product candidates are currently acquired from single-source suppliers. The loss of these suppliers, or their failure to supply us with the necessary drug substance or drug product, could materially and adversely affect our business.

We acquire most of the drug substances and drug products for our product and product candidates from single sources. The drug substance and drug product for burosumab are made by KHK pursuant to our license and collaboration agreement with KHK. The drug substance and drug product for Mepsevii are manufactured by Rentschler under a commercial supply and services agreement and accompanying purchase orders. The pharmaceutical-grade drug substance for UX007 is manufactured by IOI Oleo pursuant to our supply agreement with IOI Oleo, and the drug product for UX007 is prepared by Haupt Pharma AG and CPM pursuant to purchase orders. For DTX301, a CMO manufactures clinical materials pursuant to cGMP requirements. We have not currently secured any other suppliers for the drug substance or drug product of our product and product candidates and, although we believe that there are alternate sources of supply that could satisfy our clinical and commercial requirements, we cannot provide assurance that identifying alternate sources and establishing relationships with such sources would not result in significant delay in the commercialization of our product or the development of our product candidates. Additionally, we may not be able to enter into supply arrangements with alternative suppliers on commercially reasonable terms or at all. A delay in the commercialization of our product or the development of our product candidates or having to enter into a new agreement with a different third-party on less favorable terms than we have with our current suppliers could have a material adverse impact upon on our business.

We and our collaborators and contract manufacturers are subject to significant regulation with respect to manufacturing our product candidates. The manufacturing facilities on which we rely may not continue to meet regulatory requirements or may not be able to meet supply demands.

All entities involved in the preparation of therapeutics for clinical studies or commercial sale, including our existing contract manufacturers and collaboration partners for our product candidates, are subject to extensive regulation. Components of a finished therapeutic product approved for commercial sale or used in clinical studies must be manufactured in accordance with GMP. These regulations govern manufacturing processes and procedures (including record keeping) and the implementation and operation of quality systems to control and assure the quality of investigational products and products approved for sale. Poor control of production processes can lead to the introduction of contaminants or to inadvertent changes in the properties or stability of our product candidates that may not be detectable in final product testing. We, our collaborators, or our contract manufacturers must supply all necessary documentation in support of an NDA, BLA, MAA, or other application for regulatory approval, on a timely basis and must adhere to GLP, GMP, and similar regulations enforced by the FDA and other regulatory agencies through their facilities inspection programs. Some of our contract manufacturers have never produced a commercially approved pharmaceutical product and therefore have not obtained the requisite regulatory authority approvals to do so. The facilities and quality systems of some or all of our collaborators and third-party contractors must pass a pre-approval inspection for compliance with the applicable regulations as a condition of regulatory approval of our product candidates or any of our other potential products. In addition, the regulatory authorities may, at any time, audit or inspect a manufacturing facility involved with the preparation of our product candidates or our other potential products or the associated quality systems for compliance with the regulations applicable to the activities being conducted. Although we oversee the contract manufacturers, we cannot control the manufacturing process of, and are substantially dependent on, our contract manufacturing partners for compliance with the regulatory requirements. If these facilities cannot schedule manufacturing to meet inspectional demands or do not pass a pre-approval plant inspection, regulatory approval of the products may not be granted or may be substantially delayed until any violations are corrected to the satisfaction of the regulatory authority, if ever.

The regulatory authorities also may, at any time following approval of a product for sale, audit the manufacturing facilities of our collaborators and third-party contractors. If any such inspection or audit identifies a failure to comply with applicable regulations or if a violation of our product specifications or applicable regulations occurs independent of such an inspection or audit, we or the relevant regulatory authority may require remedial measures that may be costly and/or time consuming for us or a third-party to implement, and that may include the temporary or permanent suspension of a clinical study or commercial sales or the temporary or permanent closure of a facility. Any such remedial measures imposed upon us or third parties with whom we contract could materially harm our business.

If we, our collaborators, or any of our third-party manufacturers fail to maintain regulatory compliance, the FDA or other applicable regulatory authority can impose regulatory sanctions including, among other things, refusal to approve a pending application for a new drug product or biologic product, withdrawal of an approval, or suspension of production. As a result, our business, financial condition, and results of operations may be materially harmed.

Additionally, if supply from one approved manufacturer is interrupted, an alternative manufacturer would need to be qualified through an NDA or BLA supplement or MAA variation, or equivalent foreign regulatory filing, which could result in further delay. The regulatory agencies may also require additional studies if a new manufacturer is relied upon for commercial production. Switching manufacturers may involve substantial costs and is likely to result in a delay in our desired clinical and commercial timelines.

These factors could cause us to incur higher costs and could cause the delay or termination of clinical studies, regulatory submissions, required approvals, or commercialization of our product candidates. Furthermore, if our suppliers fail to meet contractual requirements and we are unable to secure one or more replacement suppliers capable of production at a substantially equivalent cost, our clinical studies may be delayed or we could lose potential revenue.

The actions of distributors could affect our ability to sell or market products profitably. Fluctuations in buying or distribution patterns by such distributors could adversely affect our revenues, financial condition, or results of operations

We intend to rely on commercial distributors for a considerable portion of our product sales and we expect such sales to be concentrated within a small number of distributors. The financial failure of any of these distributors could adversely affect our revenues, financial condition or results of operations. Our revenues, financial condition or results of operations may also be affected by fluctuations in distributor buying or distribution patterns. These fluctuations may result from seasonality, pricing, wholesaler inventory objectives, or other factors.

Our reliance on third parties requires us to share our trade secrets, which increases the possibility that a competitor will discover them or that our trade secrets will be misappropriated or disclosed.

Because we rely on third parties in connection with the development and manufacture of our product candidates and will likely rely on third parties in connection with the commercialization of our approved products, we must, at times, share trade secrets with them. We seek to protect our proprietary technology in part by entering into confidentiality agreements and, if applicable, material transfer agreements, collaborative research agreements, consulting agreements, letters of engagement, or other similar agreements with our collaborators, advisors, employees, and consultants prior to beginning research or disclosing proprietary information. These agreements typically limit the rights of the third parties to use or disclose our confidential information, such as trade secrets. Despite the contractual provisions employed when working with third parties, the need to share trade secrets and other confidential information increases the risk that such trade secrets become known by our competitors, are inadvertently incorporated into the technology of others, or are disclosed or used in violation of these agreements. Given that our proprietary position is based, in part, on our know-how and trade secrets, a competitor's discovery of our trade secrets or other unauthorized use or disclosure would impair our competitive position and may have a material adverse effect on our business.

Risks Related to Commercialization of Our Product Candidates

If the market opportunities for our product candidates are smaller than we believe they are, our revenue may be adversely affected, and our business may suffer. Because the target patient populations of our product candidates are small, and the addressable patient population potentially even smaller, we must be able to successfully identify patients and acquire a significant market share to achieve profitability and growth.

We focus our research and product development on treatments for rare and ultra-rare genetic diseases. Given the small number of patients who have the diseases that we are targeting, it is critical to our ability to grow and become profitable that we continue to successfully identify patients with these rare and ultra-rare genetic diseases. Some of our current clinical programs may be most appropriate for patients with more severe forms of their disease. For instance, our Phase 2 study of UX007 in LC-FAOD enrolled patients with more severe disease. In addition, while adults make up the majority of the XLH patients, they often have less severe disease that may reduce the penetration of burosumab in the adult population relative to the pediatric population. Given the overall rarity of the diseases we target, it is difficult to project the prevalence of the more severe forms, or the other subsets of patients that may be most suitable to address with our product candidates, which may further limit the addressable patient population to a small subset. Our projections of both the number of people who have these diseases, as well as the subset of people with these diseases who have the potential to benefit from treatment with our product candidates, are based on our beliefs and estimates. These estimates have been derived from a variety of sources, including the scientific literature, surveys of clinics, patient foundations, or market research, and may prove to be incorrect. Further, new studies may change the estimated incidence or prevalence of these diseases. The number of patients may turn out to be lower than expected. The effort to identify patients with diseases we seek to treat is in early stages, and we cannot accurately predict the number of patients for whom treatment might be possible. Additionally, the potentially addressable patient population for each of our product candidates may be limited or may not be amenable to treatment with our product candidates, and new patients may become increasingly difficult to identify or access, which would adversely affect our results of operations and our business. Further, even if we obtain significant market share for our product candidates, because the potential target populations are very small we may never become or remain profitable nor generate sufficient revenue growth to sustain our business.

We intend to rely on third-party manufacturers to produce our product candidates. Additionally, these manufacturers do not have experience producing our product candidates at commercial levels and may not achieve the necessary regulatory approvals or produce our product candidates at the cost, quality, quantities, locations, and timing needed to support profitable commercialization.

We have not yet secured manufacturing capabilities for commercial quantities of our product candidates. Although we intend to rely on third-party manufacturers for commercialization, we have only entered into agreements with such manufacturers to support our clinical studies. We may be unable to negotiate binding agreements with the manufacturers to support our commercialization activities on commercially reasonable terms.

Manufacturers may not have the experience or ability to produce our product candidates at commercial levels. We may run into technical or scientific issues related to manufacturing or development that we may be unable to resolve in a timely manner or with available funds. We also have not completed all of the characterization and validation activities necessary for commercialization and regulatory approvals. If our manufacturing partners are not able to conduct all such necessary activities in accordance with applicable regulations, our commercialization efforts will be harmed.

Even if our third-party product manufacturers develop an acceptable manufacturing process, if such third-party manufacturers are unable to produce the necessary quantities of our product candidates, are unable to comply with GMP or other pertinent regulatory requirements, or are unable to produce our product candidates within our planned timeframe and cost parameters, the development and sales of our products, if approved, may be materially harmed.

Additionally, the cost to us for the supply of our product and product candidates manufactured by such third parties may be high and could limit our profitability, even if our third-party product manufacturers develop acceptable manufacturing processes that provide the necessary quantities of our product and product candidates in a compliant and timely manner. Furthermore, KHK is our sole supplier of commercial quantities of burosumab. The supply price to us for commercial sales of burosumab, which will be determined on a fixed double-digit percentage of net sales, will be higher than the typical cost of goods sold by companies focused on rare diseases.

We face intense competition and rapid technological change and the possibility that our competitors may develop therapies that are similar, more advanced, or more effective than ours, which may adversely affect our financial condition and our ability to successfully commercialize our product candidates.

The biotechnology and pharmaceutical industries are intensely competitive and subject to rapid and significant technological change. We are currently aware of various existing therapies that may compete with our product candidates. For example, XLH is currently treated with oral phosphate and vitamin D therapy, which may compete with burosumab. Furthermore, B. Braun Medical Inc., or B. Braun, has received orphan drug designation for triheptanoin in Europe for certain LC-FAOD indications and we do not know if B. Braun is planning to initiate clinical development. Triheptanoin is also available in food-grade form, which may compete with our pharmaceutical-grade product. Investigator-sponsored trials evaluating triheptanoin in multiple indications are ongoing. LC-FAOD is currently treated with diet therapy and medium-chain triglyceride oil, which may compete with UX007. Glut1 DS is currently treated primarily with the ketogenic diet and anti-epileptic drugs, which may also compete with UX007. OTC deficiency is currently treated with nitrogen scavenging drugs and severe limitations in dietary protein, which may compete with DTX301. Gene therapy, gene correction, RNA-based therapies, and other approaches may also emerge for the treatment of any of the disease areas in which we focus.

We have competitors both in the United States and internationally, including major multinational pharmaceutical companies, specialty pharmaceutical companies, biotechnology companies, startups, academic research institutions, government agencies, and public and private research institutions. Many of our competitors have substantially greater financial, technical, and other resources, such as larger research and development staff and experienced marketing and manufacturing organizations. Additional mergers and acquisitions in the biotechnology and pharmaceutical industries may result in even more resources being concentrated in our competitors. As a result, these companies may obtain regulatory approval more rapidly than we are able to and may be more effective in selling and marketing their products as well. Smaller or early-stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large, established companies. Competition may increase further as a result of advances in the commercial applicability of technologies and greater availability of capital for investment in these industries. Our competitors may succeed in developing, acquiring, or licensing on an exclusive basis, products that are more effective or less costly than any product candidate that we may develop, or achieve earlier patent protection, regulatory approval, product commercialization, and market penetration than we do. Additionally, technologies developed by our competitors may render our potential product candidates uneconomical or obsolete, and we may not be successful in marketing our product candidates against competitors.

We continue to build and evolve an integrated commercial organization. If we are unable to expand our existing commercial infrastructure or enter into agreements with third parties to market and sell our product candidates, as needed, we may be unable to generate significant revenue.

In preparation to successfully commercialize Mepsevii as well as any additional products that may result from our development programs, we have begun to build commercial infrastructure in the United States, Europe and Latin America. This infrastructure consists of both office based as well as field teams with technical expertise, and will be expanded as we approach the potential approval dates of additional products that result from our development programs. This will be expensive and time consuming. Any failure or delay in the expansion of this infrastructure may adversely impact the commercialization of our approved products.

Although our employees may promoted other similar products in the past while employed at other companies, we, as a company, have limited, recent experience selling and marketing our product. Further, given our limited experience in marketing and selling biopharmaceutical products, our initial estimate of the size of the required field force may be materially more or less than the size of the field force actually required to effectively commercialize our product candidates. As such, we may be required to hire large teams to adequately support the commercialization of our product candidates or we may incur excess costs as a result of hiring more commercial personnel than necessary. With respect to certain geographical markets, we may enter into collaborations with other entities to utilize their local marketing and distribution capabilities, but we may be unable to enter into such agreements on favorable terms, if at all. If our future collaborators do not commit sufficient resources to commercialize our future products, if any, and we are unable to develop the necessary marketing capabilities on our own, we will be unable to generate sufficient product revenue to sustain our business. We may be competing with companies that currently have extensive and well-funded marketing and sales operations. Without an internal team or the support of a third-party to perform key commercial functions, we may be unable to compete successfully against these more established companies.

The commercial success of any current or future product candidate will depend upon the degree of market acceptance by physicians, patients, third-party payors, and others in the medical community.

Even with the requisite approvals from the FDA and comparable foreign regulatory authorities, the commercial success of our product candidates will depend in part on the medical community, patients, and payors accepting our product candidates as medically useful, cost-effective, and safe. Any product that we bring to the market may not gain market acceptance by physicians, patients, payors, and others in the medical community. The degree of market acceptance of any of our product candidates, if approved for commercial sale, will depend on a number of factors, including:

- the efficacy of the product as demonstrated in clinical studies and potential advantages over competing treatments;
- the prevalence and severity of any side effects, including any limitations or warnings contained in a product's approved labeling;
- the clinical indications for which approval is granted;
- relative convenience and ease of administration;
- the cost of treatment, particularly in relation to competing treatments;
- the willingness of the target patient population to try new therapies and of physicians to prescribe these therapies;
- the effectiveness of our field forces and marketing efforts;
- the strength of marketing and distribution support and timing of market introduction of competitive products;
- publicity concerning our products or competing products and treatments; and
- sufficient third-party insurance coverage and reimbursement.

Even if a potential product displays a favorable efficacy and safety profile in nonclinical and clinical studies, market acceptance of the product will not be fully known until after it is launched. Our efforts to educate the medical community and payors on the benefits of the product candidates may require significant resources and may never be successful. If our product candidates are approved but fail to achieve an adequate level of acceptance by physicians, patients, payors, and others in the medical community, we will not be able to generate sufficient revenue to become or remain profitable.

The insurance coverage and reimbursement status of newly approved products is uncertain. Failure to obtain or maintain adequate coverage and reimbursement for new or current products could limit our ability to market those products and decrease our ability to generate revenue.

Our target patient populations are small, and accordingly the pricing, coverage, and reimbursement of our product candidates, if approved, must be adequate to support our commercial infrastructure. Our per-patient prices must be sufficient to recover our development and manufacturing costs and potentially achieve profitability. We expect the cost of a single administration of gene therapy products, such as those we are developing, to be substantial, when and if they achieve regulatory approval. Accordingly, the availability and adequacy of coverage and reimbursement by governmental and private payors are essential for most patients to afford expensive treatments such as ours, assuming approval. Sales of our product candidates will depend substantially, both domestically and abroad, on the extent to which the costs of our product candidates will be paid for by health maintenance, managed care, pharmacy benefit, and similar healthcare management organizations, or reimbursed by government authorities, private health insurers, and other payors. If coverage and reimbursement are not available, are available only to limited levels, or are not available on a timely basis, we may not be able to successfully commercialize our product candidates. Even if coverage is provided, the approved reimbursement amount may not be high enough to allow us to establish or maintain pricing sufficient to sustain our overall enterprise.

There is significant uncertainty related to the insurance coverage and reimbursement of newly approved products. In the United States, the Centers for Medicare & Medicaid Services, or CMS, an agency within the U.S. Department of Health and Human Services, decides whether and to what extent a new drug will be covered and reimbursed under Medicare. Private payors tend to follow the coverage reimbursement policies established by CMS to a substantial degree. It is difficult to predict what CMS or private payors will decide with respect to reimbursement for products such as ours, especially our gene therapy product candidates as there is a limited body of established practices and precedents for gene therapy products.

Outside the United States, international operations are generally subject to extensive governmental price controls and other market regulations, and we believe the increasing emphasis on cost-containment initiatives in Europe, Canada, and other countries will put pressure on the pricing and usage of our product candidates. In many countries, the prices of medical products are subject to varying price control mechanisms as part of national health systems. Other countries allow companies to fix their own prices for medicinal products, but monitor and control company profits. Additional foreign price controls or other changes in pricing regulation could restrict the amount that we are able to charge for our product candidates. Accordingly, in markets outside the United States, the reimbursement for our products may be reduced compared with the United States and may be insufficient to generate commercially reasonable revenue and profits.

Moreover, increasing efforts by governmental and third-party payors in the United States and abroad to cap or reduce healthcare costs may cause such organizations to limit both coverage and the level of reimbursement for new products approved and, as a result, they may not cover or provide adequate payment for our product candidates. We expect to experience pricing pressures in connection with the sale of any of our product candidates due to the trend toward managed healthcare, the increasing influence of health maintenance organizations, and additional legislative changes. For example, recently, several states in the U.S. have introduced legislation to require pharmaceutical companies to disclose their costs to justify the prices of their products, and an "Affordable Drug Pricing Task-Force" has been formed in the U.S. House of Representatives with the goal of combating the increased costs of prescription drugs. The downward pressure on healthcare costs in general, and with respect to prescription drugs, surgical procedures, and other treatments in particular, has become very intense. As a result, increasingly high barriers are being erected to the entry of new products.

Risks Related to Our Intellectual Property

If we are unable to obtain and maintain effective patent rights for our product, product candidates, or any future product candidates, we may not be able to compete effectively in our markets.

We rely upon a combination of patents, trade secret protection, and confidentiality agreements to protect the intellectual property related to our technologies, our product, and our product candidates. Our success depends in large part on our and our licensors' ability to obtain and maintain patent and other intellectual property protection in the United States and in other countries with respect to our proprietary technology, our product, and our product candidates.

We have sought to protect our proprietary position by filing patent applications in the United States and abroad related to our novel technologies and products that are important to our business. This process is expensive and time consuming, and we may not be able to file and prosecute all necessary or desirable patent applications at a reasonable cost or in a timely manner. It is also possible that we will fail to identify patentable aspects of our research and development output before it is too late to obtain patent protection.

The patent position of biotechnology and pharmaceutical companies generally is highly uncertain and involves complex legal and factual questions for which legal principles remain unsolved. The patent applications that we own or in-license may fail to result in issued patents with claims that cover our product or product candidates in the United States or in other foreign countries. There is no assurance that all potentially relevant prior art relating to our patents and patent applications has been found, which can invalidate a patent or prevent a patent from issuing from a pending patent application. Even if patents do successfully issue, and even if such patents cover our product or product candidates, third parties may challenge their validity, enforceability, or scope, which may result in such patents being narrowed, found unenforceable, or invalidated. For instance, in June 2017, a third party filed an opposition with the European Patent Office challenging the validity of a European patent owned by the University of Pennsylvania and sub-licensed to us from REGENXBIO relating to the AAV8 capsid used in our DTX301 product candidate. This opposition is in its very early stages and we are unable to estimate the timing or outcome of this matter. Furthermore, even if the patents and patent applications we own or in-license are unchallenged, they may not adequately protect our intellectual property, provide exclusivity for our product or product candidates, or prevent others from designing around our claims. Any of these outcomes could impair our ability to prevent competition from third parties, which may have an adverse impact on our business.

We, independently or together with our licensors, have filed several patent applications covering various aspects of our product or product candidates. We cannot offer any assurances about which, if any, patents will issue, the breadth of any such patent or whether any issued patents will be found invalid and unenforceable or will be threatened by third parties. Any successful opposition to these patents or any other patents owned by or licensed to us after patent issuance could deprive us of rights necessary for the successful commercialization of any product candidates that we may develop. Further, if we encounter delays in regulatory approvals, the period of time during which we could market a product candidate under patent protection could be reduced.

Although we have a number of patents or applications covering methods of use and certain compositions of matter, we do not have complete patent protection for our product and product candidates in all territories. For example, there are no issued patents covering the burosumab composition of matter in Latin America where we have rights to commercialize the compound. Therefore, a competitor could develop the same antibody or a similar antibody as well as other approaches that target FGF23 for potential commercialization in Latin America, subject to any intellectual property rights or regulatory exclusivities awarded to us. If we cannot obtain and maintain effective patent rights for our product or product candidates, we may not be able to compete effectively and our business and results of operations would be harmed.

We may not have sufficient patent terms to effectively protect our products and business.

Patents have a limited lifespan. In the United States, the natural expiration of a patent is generally 20 years after it is filed. Although various extensions may be available, the life of a patent, and the protection it affords, is limited. Even if patents covering our product candidates are obtained, once the patent life has expired for a product, we may be open to competition from generic medications.

While patent term extensions under the Hatch-Waxman Act in the United States and under supplementary protection certificates in Europe may be available to extend the patent exclusivity term for burosumab, vestronidase alfa, UX007, and DTX301, we cannot provide any assurances that any such patent term extension will be obtained and, if so, for how long. In addition, upon issuance in the United States, any patent term can be adjusted based on certain delays caused by the applicant(s) or the United States Patent and Trademark Office (USPTO). For example, a patent term can be reduced based on certain delays caused by the patent applicant during patent prosecution. If we do not have sufficient patent terms or regulatory exclusivity to protect our products, our business and results of operations will be adversely affected.

Patent policy and rule changes could increase the uncertainties and costs surrounding the prosecution of our patent applications and the enforcement or defense of our issued patents.

Changes in either the patent laws or interpretation of the patent laws in the United States and other countries may diminish the value of our patents or narrow the scope of our patent protection. The laws of foreign countries may not protect our rights to the same extent as the laws of the United States. Publications of discoveries in the scientific literature often lag behind the actual discoveries, and patent applications in the United States and other jurisdictions are typically not published until 18 months after filing, or in some cases not at all. We therefore cannot be certain that we or our licensors were the first to make the invention claimed in our owned and licensed patents or pending applications, or that we or our licensor were the first to file for patent protection of such inventions. Assuming the other requirements for patentability are met, in the United States prior to March 15, 2013, the first to make the claimed invention is entitled to the patent, while outside the United States, the first to file a patent application is entitled to the patent. After March 15, 2013, under the Leahy-Smith America Invents Act, or the Leahy-Smith Act, enacted on September 16, 2011, the United States has moved to a first to file system. The Leahy-Smith Act also includes a number of significant changes that affect the way patent applications will be prosecuted and may also affect patent litigation. The effects of these changes are currently unclear as the courts have only begun to address these provisions. In general, the Leahy-Smith Act and its implementation could increase the uncertainties and costs surrounding the prosecution of our patent applications and the enforcement or defense of our issued patents, all of which could have a material adverse effect on our business and financial condition.

The U.S. Supreme Court has ruled on several patent cases in recent years, either narrowing the scope of protection available in certain circumstances or weakening the rights of patent owners in certain situations. For example, in *Association for Molecular Pathology v. Myriad Genetics, Inc.*, the Supreme Court ruled that a "naturally occurring DNA segment is a product of nature and not patent eligible merely because it has been isolated," invalidating Myriad Genetics' patents on the BRCA1 and BRCA2 genes. Certain claims of our licensed U.S. patents covering DTX301 relate to isolated AAV8 vectors, capsid proteins, or nucleic acids. To the extent that such claims are deemed to be directed to natural products, or to lack an inventive concept above and beyond an isolated natural product, a court may decide the claims are invalid under *Myriad*. Additionally, there have been recent proposals for additional changes to the patent laws of the United States and other countries that, if adopted, could impact our ability to obtain patent protection for our proprietary technology or our ability to enforce our proprietary technology. Depending on future actions by the U.S. Congress, the U.S. courts, the USPTO and the relevant law-making bodies in other countries, the laws and regulations governing patents could change in unpredictable ways that would weaken our ability to obtain new patents or to enforce our existing patents and patents that we might obtain in the future.

If we are unable to maintain effective proprietary rights for our product, product candidates, or any future product candidates, we may not be able to compete effectively in our markets.

In addition to the protection afforded by patents, we rely on trade secret protection and confidentiality agreements to protect proprietary know-how that is not patentable or that we elect not to patent, processes for which patents are difficult to enforce and any other elements of our product or product candidate discovery and development processes that involve proprietary know-how, information, or technology that is not covered by patents. However, trade secrets can be difficult to protect. We seek to protect our proprietary technology and processes, in part, by entering into confidentiality agreements with our employees, consultants, scientific advisors, and contractors. We also seek to preserve the integrity and confidentiality of our data and trade secrets by maintaining physical security of our premises and physical and electronic security of our information technology systems. While we have confidence in these individuals, organizations and systems, agreements or security measures may be breached, and we may not have adequate remedies for any breach. In addition, our trade secrets may otherwise become known or be independently discovered by competitors.

Although we expect all of our employees and consultants to assign their inventions to us, and all of our employees, consultants, advisors, and any third parties who have access to our proprietary know-how, information, or technology to enter into confidentiality agreements, we cannot provide any assurances that all such agreements have been duly executed or that our trade secrets and other confidential proprietary information will not be disclosed or that competitors will not otherwise gain access to our trade secrets or independently develop substantially equivalent information and techniques. Misappropriation or unauthorized disclosure of our trade secrets could impair our competitive position and may have a material adverse effect on our business. Additionally, if the steps taken to maintain our trade secrets are deemed inadequate, we may have insufficient recourse against third parties for misappropriating the trade secret.

Claims of intellectual property infringement may prevent or delay our development and commercialization efforts.

Our commercial success depends in part on our avoiding infringement of the patents and proprietary rights of others. There have been many lawsuits and other proceedings involving patent and other intellectual property rights in the biotechnology and pharmaceutical industries, including patent infringement lawsuits, interferences, oppositions, and reexamination proceedings before the USPTO and corresponding foreign patent offices. Numerous U.S. and foreign issued patents and pending patent applications, which are owned by other parties, exist in the fields in which we are developing product candidates. As the biotechnology and pharmaceutical industries expand and more patents are issued, the risk increases that our product or product candidates may be subject to claims of infringement of the patent rights of these other parties.

Other parties may assert that we are employing their proprietary technology without authorization. There may be patents or patent applications with claims to materials, formulations, methods of manufacture, or methods for treatment related to the use or manufacture of our product or product candidates. We have conducted freedom to operate analyses with respect only to our product and certain of our product candidates, and therefore we do not know whether there are any patents of other parties that would impair our ability to commercialize all of our product candidates. We also cannot guarantee that any of our analyses are complete and thorough, nor can we be sure that we have identified each and every patent and pending application in the United States and abroad that is relevant or necessary to the commercialization of our product or product candidates. Because patent applications can take many years to issue, there may be currently pending patent applications that may later result in issued patents that our product or product candidates may infringe.

We are aware of three third-party patent families that include issued U.S. patents with claims that, if valid and enforceable, could be construed to cover DTX301, if and when approved, or methods of its manufacture. We are also aware of an additional three third-party patent families that include issued European claims that, if valid and enforceable, could be construed to cover certain methods that may be used in the manufacture of DTX301. In addition, other parties may obtain patents in the future and claim that use of our technologies infringes upon these patents. If any of these patents were held by a court of competent jurisdiction to cover aspects of our formulations, the manufacturing process of our product or any of our product candidates, methods of use, any molecules formed during the manufacturing process or any final product itself, the holders of any such patents may be able to block our ability to commercialize our product or a product candidate unless we obtained a license under the applicable patents, or until such patents expire or are finally determined to be invalid or unenforceable. Such a license may not be available on commercially reasonable terms or at all.

Parties making claims against us may obtain injunctive or other equitable relief, which could effectively block our ability to continue commercialization of our product, or block our ability to develop and commercialize one or more of our product candidates. Defense of these claims, regardless of their merit, would involve substantial litigation expense and would be a substantial diversion of employee resources from our business. In the event of a successful claim of infringement against us, we may have to pay substantial damages, including treble damages and attorneys' fees for willful infringement, pay royalties, redesign our infringing products, or obtain one or more licenses from third parties, which may be impossible or require substantial time and monetary expenditure.

We may not be successful in obtaining or maintaining necessary rights to our product candidates through acquisitions and in-licenses.

We currently have rights to the intellectual property, through licenses from third parties and under patents that we own, to develop our product candidates. Because our programs may require the use of proprietary rights held by third parties, the growth of our business will likely depend in part on our ability to acquire, in-license, or use these proprietary rights. For example, our product candidates may require specific formulations to work effectively and efficiently and the rights to these formulations may be held by others. We may be unable to acquire or in-license any compositions, methods of use, processes, or other third-party intellectual property rights from third parties that we identify as necessary for our product candidates. The licensing and acquisition of third-party intellectual property rights is a competitive area, and a number of more established companies are also pursuing strategies to license or acquire third-party intellectual property rights that we may consider attractive. These established companies may have a competitive advantage over us due to their size, cash resources, and greater clinical development and commercialization capabilities. In addition, companies that perceive us to be a competitor may be unwilling to assign or license rights to us. We also may be unable to license or acquire third-party intellectual property rights on terms that would allow us to make an appropriate return on our investment.

We sometimes collaborate with U.S. and foreign academic institutions to accelerate our preclinical research or development under written agreements with these institutions. Typically, these institutions provide us an option to negotiate a license to any of the institution's rights in technology resulting from the collaboration. Regardless of such option, we may be unable to negotiate a license within the specified timeframe or under terms that are acceptable to us. If we are unable to do so, the institution may offer the intellectual property rights to other parties, potentially blocking our ability to pursue our program.

If we are unable to successfully obtain rights to required third-party intellectual property rights or maintain the existing intellectual property rights we have, we may have to abandon development of that program and our business and financial condition could suffer.

We may face competition from biosimilars, which may have a material adverse impact on the future commercial prospects of burosumab, vestronidase alfa, and DTX301.

Even if we are successful in achieving regulatory approval to commercialize a product candidate faster than our competitors, we may face competition from biosimilars with respect to burosumab, vestronidase alfa, and DTX301. In the United States, the Biologics Price Competition and Innovation Act of 2009, or BPCI Act, was included in the Affordable Care Act and created an abbreviated approval pathway for biological products that are demonstrated to be "highly similar," or biosimilar, to or "interchangeable" with an FDA-approved biological product. The BPCI Act prohibits the FDA from approving a biosimilar or interchangeable product that references a brand biological product until 12 years after the licensure of the reference product, but permits submission of an application for a biosimilar or interchangeable product to the FDA four years after the reference product was first licensed. The BPCI Act does not prevent another company from developing a product that is highly similar to the innovative product, generating its own data, and seeking approval. The BPCI Act is complex and is only beginning to be interpreted and implemented by the FDA. Moreover, it is not known whether the BPCI Act will survive in whole or in part if the Affordable Care Act is repealed. As a result, its ultimate impact, implementation, meaning, and long-term existence are subject to uncertainty. Elimination or modification of the BPCI Act, or changes to the FDA's interpretation or implementation of the BPCI Act, could have a material adverse effect on the future commercial prospects for burosumab, vestronidase alfa, and DTX301.

In Europe, the European Commission has granted marketing authorizations for several biosimilars pursuant to a set of general and product class-specific guidelines for biosimilar approvals issued over the past few years. In Europe, a competitor may reference data supporting approval of an innovative biological product, but will not be able to get on the market until 10 years after the time of approval of the innovative product. This 10-year marketing exclusivity period will be extended to 11 years if, during the first eight of those 10 years, the marketing authorization holder obtains an approval for one or more new therapeutic indications that bring significant clinical benefits compared with existing therapies. In addition, companies may be developing biosimilars in other countries that could compete with our products.

If competitors are able to obtain marketing approval for biosimilars referencing our products, our products may become subject to competition from such biosimilars, with the attendant competitive pressure and consequences.

Additional competitors could enter the market with generic versions of our small-molecule product candidates, which may result in a material decline in sales of UX007 or future small-molecule product candidates.

Under the Hatch-Waxman Act, a pharmaceutical manufacturer may file an abbreviated new drug application, or ANDA, seeking approval of a generic copy of an approved innovator product. Under the Hatch-Waxman Act, a manufacturer may also submit an NDA under section 505(b)(2) that references the FDA's finding of safety and effectiveness of a previously approved drug. A 505(b)(2) NDA product may be for a new or improved version of the original innovator product. Innovative small molecule drugs may be eligible for certain periods of regulatory exclusivity (e.g., five years for new chemical entities, three years for changes to an approved drug requiring a new clinical study, and seven years for orphan drugs), which preclude FDA approval (or in some circumstances, FDA filing and review of) an ANDA or 505(b)(2) NDA relying on the FDA's finding of safety and effectiveness for the innovative drug. In addition to the benefits of regulatory exclusivity, an innovator NDA holder may have patents claiming the active ingredient, product formulation or an approved use of the drug, which would be listed with the product in the "Orange Book." If there are patents listed in the Orange Book, a generic applicant that seeks to market its product before expiration of the patents must include in the ANDA or 505(b)(2) what is known as a "Paragraph IV certification," challenging the validity or enforceability of, or claiming non-infringement of, the listed patent or patents. Notice of the certification must be given to the innovator, too, and if within 45 days of receiving notice the innovator sues to protect its patents, approval of the ANDA is stayed for 30 months, or as lengthened or shortened by the court.

Accordingly, if UX007 is approved, competitors could file ANDAs for generic versions of UX007, or 505(b)(2) NDAs that reference UX007. If there are patents listed for UX007 in the Orange Book, those ANDAs and 505(b)(2) NDAs would be required to include a certification as to each listed patent indicating whether the ANDA applicant does or does not intend to challenge the patent. We cannot predict whether any patents issuing from our pending patent applications will be eligible for listing in the Orange Book, how any generic competitor would address such patents, whether we would sue on any such patents, or the outcome of any such suit.

We may not be successful in securing or maintaining proprietary patent protection for products and technologies we develop or license. Moreover, if any patents that are granted and listed in the Orange Book are successfully challenged by way of a Paragraph IV certification and subsequent litigation, the affected product could more immediately face generic competition and its sales would likely decline materially. Should sales decline, we may have to write off a portion or all of the intangible assets associated with the affected product and our results of operations and cash flows could be materially and adversely affected.

The patent protection and patent prosecution for some of our product candidates is dependent on third parties.

While we normally seek and gain the right to fully prosecute the patents relating to our product candidates, there may be times when patents relating to our product candidates are controlled by our licensors. This is the case with our agreement with KHK, who is primarily responsible for the prosecution of patents and patent applications licensed to us under the collaboration agreement.

In addition, we have in-licensed patents and patent applications owned by the University of Pennsylvania, relating to the AAV8 vector used in DTX301. These patents and patent applications are licensed or sublicensed by REGENXBIO and sublicensed to us. We do not have the right to control the prosecution of these patent applications, or the maintenance of any of these patents. In addition, under our agreement with REGENXBIO, we do not have the first right to enforce the licensed patents, and our enforcement rights are subject to certain limitations that may adversely impact our ability to use the licensed patents to exclude others from commercializing competitive products. Moreover, REGENXBIO and the University of Pennsylvania may have interests which differ from ours in determining whether and the manner in which to enforce such patents.

If KHK, the University of Pennsylvania, or any of our future licensing partners fail to appropriately prosecute, maintain, and enforce patent protection for the patents covering any of our product candidates, our ability to develop and commercialize those product candidates may be adversely affected and we may not be able to prevent competitors from making, using, and selling competing products. In addition, even where we now have the right to control patent prosecution of patents and patent applications we have licensed from third parties, we may still be adversely affected or prejudiced by actions or inactions of our licensors and their counsel that took place prior to us assuming control over patent prosecution.

If we fail to comply with our obligations in the agreements under which we license intellectual property and other rights from third parties or otherwise experience disruptions to our business relationships with our licensors, we could lose license rights that are important to our business.

We are a party to a number of intellectual property license agreements that are important to our business and expect to enter into additional license agreements in the future. Our existing license agreements impose, and we expect that future license agreements will impose, various diligence, milestone payment, royalty, and other obligations on us. If we fail to comply with our obligations under these agreements, or we are subject to a bankruptcy, we may be required to make certain payments to the licensor, we may lose the exclusivity of our license, or the licensor may have the right to terminate the license, in which event we would not be able to develop or market products covered by the license. Additionally, the milestone and other payments associated with these licenses will make it less profitable for us to develop our drug candidates. See "Business—License and Collaboration Agreements" in this Annual Report for a description of our license agreements with KHK, Baylor Research Institute, Saint Louis University, Bayer, REGENXBIO, and the University of Pennsylvania, which include descriptions of the termination provisions of these agreements.

In certain cases, we control the prosecution of patents resulting from licensed technology. In the event we breach any of our obligations related to such prosecution, we may incur significant liability to our licensing partners. Licensing of intellectual property is of critical importance to our business and involves complex legal, business, and scientific issues. Disputes may arise regarding intellectual property subject to a licensing agreement, including but not limited to:

- the scope of rights granted under the license agreement and other interpretation-related issues;
- the extent to which our technology and processes infringe on intellectual property of the licensor that is not subject to the licensing agreement;
- the sublicensing of patent and other rights;
- our diligence obligations under the license agreement and what activities satisfy those diligence obligations;
- the ownership of inventions and know-how resulting from the joint creation or use of intellectual property by our licensors and us and our collaborators; and
- the priority of invention of patented technology.

If disputes over intellectual property and other rights that we have licensed prevent or impair our ability to maintain our current licensing arrangements on acceptable terms, we may be unable to successfully develop and commercialize the affected product candidates.

Although we are not currently involved in any intellectual property litigation, we may be involved in lawsuits to protect or enforce our patents or the patents of our licensors, which could be expensive, time consuming, and unsuccessful.

Competitors may infringe our patents or the patents of our licensors. Although we are not currently involved in any intellectual property litigation, if we or one of our licensing partners were to initiate legal proceedings against a third party to enforce a patent covering our product or one of our product candidates, the defendant could counterclaim that the patent covering our product candidate is invalid and/or unenforceable. In patent litigation in the United States, defendant counterclaims alleging invalidity and/or unenforceability are commonplace. Grounds for a validity challenge could be an alleged failure to meet any of several statutory requirements, including lack of novelty, obviousness, or non-enablement. Grounds for an unenforceability assertion could be an allegation that someone connected with prosecution of the patent withheld relevant information from the USPTO, or made a misleading statement, during prosecution. The outcome following legal assertions of invalidity and unenforceability is unpredictable.

Interference proceedings or derivation proceedings now available under the Leahy-Smith Act provoked by third parties or brought by us or declared or instituted by the USPTO may be necessary to determine the priority of inventions with respect to our patents or patent applications or those of our licensors. An unfavorable outcome could require us to cease using the related technology or to attempt to license rights to it from the prevailing party. Our business could be harmed if the prevailing party does not offer us a license on commercially reasonable terms. In addition, the validity of our patents could be challenged in the USPTO by one of the new post grant proceedings (i.e., inter partes review or post grant review) now available under the Leahy-Smith Act. Our defense of litigation, interference proceedings, or post grant proceedings under the Leahy-Smith Act may fail and, even if successful, may result in substantial costs and distract our management and other employees. In addition, the uncertainties associated with litigation could have a material adverse effect on our ability to raise sufficient capital to continue our clinical studies, continue our research programs, license necessary technology from third parties, or enter into development partnerships that would help us bring our product candidates to market.

Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation, there is a risk that some of our confidential information could be compromised by disclosure during this type of litigation. There could also be public announcements of the results of hearings, motions, or other interim proceedings or developments. If securities analysts or investors perceive these results to be negative, it could have a material adverse effect on the price of our common stock.

We may be subject to claims that our employees, consultants, or independent contractors have wrongfully used or disclosed confidential information of third parties or that our employees have wrongfully used or disclosed alleged trade secrets of their former employers.

We employ certain individuals who were previously employed at universities or other biotechnology or pharmaceutical companies, including our competitors or potential competitors. Although we try to ensure that our employees, consultants, and independent contractors do not use the proprietary information or know-how of others in their work for us, and we are not currently subject to any claims that our employees, consultants, or independent contractors have wrongfully used or disclosed confidential information of third parties, we may in the future be subject to such claims. Litigation may be necessary to defend against these claims. If we fail in defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights or personnel, which could adversely impact our business. Even if we are successful in defending against such claims, litigation could result in substantial costs and distract management and other employees.

We may be subject to claims challenging the inventorship of our patents and other intellectual property.

Although we are not currently experiencing any claims challenging the inventorship of our patents or ownership of our intellectual property, we may in the future be subject to claims that former employees, collaborators, or other third parties have an interest in our patents or other intellectual property as an inventor or co-inventor. For example, we may have inventorship disputes arise from conflicting obligations of consultants or others who are involved in developing our product candidates. Litigation may be necessary to defend against these and other claims challenging inventorship. If we fail to successfully defend against such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights, such as exclusive ownership of, or right to use, valuable intellectual property. Such an outcome could have a material adverse effect on our business. Even if we are successful in defending against such claims, litigation could result in substantial costs and distract management and other employees.

Changes in U.S. patent law could diminish the value of patents in general, thereby impairing our ability to protect our products.

As is the case with other biotechnology and pharmaceutical companies, our success is heavily dependent on intellectual property, particularly patents. Obtaining and enforcing patents in the biotechnology and pharmaceutical industries involves both technological and legal complexity. Therefore, obtaining and enforcing such patents is costly, time consuming, and inherently uncertain. In addition, the United States has recently enacted and is currently implementing wide-ranging patent reform legislation. Recent U.S. Supreme Court rulings have narrowed the scope of patent protection available in certain circumstances and weakened the rights of patent owners in certain situations. In addition to increasing uncertainty about our ability to obtain patents in the future, this combination of events has created uncertainty with respect to the value of patents, once obtained. Depending on future actions by the U.S. Congress, the federal courts, and the USPTO, the laws and regulations governing patents could change in unpredictable ways that would weaken our ability to obtain new patents or to enforce our existing patents and patents that we might obtain in the future.

We may not be able to protect our intellectual property rights throughout the world.

Filing, prosecuting, and defending patents on our product or product candidates in all countries throughout the world would be prohibitively expensive, and our intellectual property rights in some countries outside the United States can be less extensive than those in the United States. In addition, the laws of some foreign countries do not protect intellectual property rights to the same extent as federal and state laws in the United States. Further, licensing partners such as KHK may not prosecute patents in certain jurisdictions in which we may obtain commercial rights, thereby precluding the possibility of later obtaining patent protection in these countries. Consequently, we may not be able to prevent third parties from practicing our inventions in all countries outside the United States, or from selling or importing products made using our inventions in and into the United States or other jurisdictions. Competitors may use our technologies in jurisdictions where we have not obtained patent protection to develop their own products and may also export infringing products to territories where we have patent protection, but enforcement is not as strong as that in the United States. These products may compete with our products, and our patents or other intellectual property rights may not be effective or sufficient to prevent them from competing.

Many companies have encountered significant problems in protecting and defending intellectual property rights in foreign jurisdictions. The legal systems of certain countries, particularly certain developing countries, do not favor the enforcement of patents, trade secrets, and other intellectual property protection, particularly those relating to biotechnology products, which could make it difficult for us to stop the infringement of our patents or marketing of competing products in violation of our proprietary rights generally. Proceedings to enforce our patent rights in foreign jurisdictions, whether or not successful, could result in substantial costs and divert our efforts and attention from other aspects of our business, could put our patents at risk of being invalidated or interpreted narrowly, could put our patent applications at risk of not issuing, and could provoke third parties to assert claims against us. We may not prevail in any lawsuits that we initiate and the damages or other remedies awarded, if any, may not be commercially meaningful. Accordingly, our efforts to enforce our intellectual property rights around the world may be inadequate to obtain a significant commercial advantage from the intellectual property that we develop or license.

Risks Related to Our Business Operations

Our future success depends in part on our ability to retain our Founder, President, and Chief Executive Officer and to attract, retain, and motivate other qualified personnel.

We are dependent on Emil D. Kakkis, M.D., Ph.D., our Founder, President, and Chief Executive Officer, the loss of whose services may adversely impact the achievement of our objectives. Dr. Kakkis could leave our employment at any time, as he is an “at will” employee. Recruiting and retaining other qualified employees, consultants, and advisors for our business, including scientific and technical personnel, will also be critical to our success. There is currently a shortage of skilled personnel in our industry, which is likely to continue. As a result, competition for skilled personnel is intense and the turnover rate can be high. We may not be able to attract and retain personnel on acceptable terms given the competition among numerous pharmaceutical and biotechnology companies for individuals with similar skill sets. In addition, failure to succeed in preclinical or clinical studies may make it more challenging to recruit and retain qualified personnel. The inability to recruit and retain qualified personnel, or the loss of the services of Dr. Kakkis, may impede the progress of our research, development, and commercialization objectives.

If we fail to obtain or maintain orphan drug exclusivity for our products, our competitors may sell products to treat the same conditions and our revenue will be reduced.

Our business strategy focuses on the development of drugs that are eligible for FDA and EU orphan drug designation. In the United States, orphan drug designation entitles a party to financial incentives such as opportunities for grant funding towards clinical study costs, tax advantages, and user-fee waivers. In addition, if a product receives the first FDA approval for the indication for which it has orphan designation, the product is entitled to orphan drug exclusivity, which means the FDA may not approve any other application to market the same drug for the same indication for a period of seven years, except in limited circumstances, such as a showing of clinical superiority over the product with orphan exclusivity or where the manufacturer is unable to assure sufficient product quantity. In the EU, orphan drug designation entitles a party to financial incentives such as reduction of fees or fee waivers and ten years of market exclusivity following drug or biological product approval. This period may be reduced to six years if the orphan drug designation criteria are no longer met, including where it is shown that the product is sufficiently profitable not to justify maintenance of market exclusivity.

Because the extent and scope of patent protection for our products may in some cases be limited, orphan drug designation is especially important for our products for which orphan drug designation may be available. For eligible drugs, we plan to rely on the exclusivity period under the Orphan Drug Act to maintain a competitive position. If we do not obtain orphan drug exclusivity for our drug products and biologic products that do not have broad patent protection, our competitors may then sell the same drug to treat the same condition sooner than if we had obtained orphan drug exclusivity, and our revenue will be reduced.

Even though we have orphan drug designation for UX007 for the treatment of fatty acid oxidation disorders in the United States and for various subtypes of FAOD in Europe, as well as for UX007 for the treatment of Glut1 DS, burosumab, Mepsevii, and DTX301 in the United States and Europe, we may not be the first to obtain marketing approval for any particular orphan indication due to the uncertainties associated with developing pharmaceutical products. Further, even if we obtain orphan drug exclusivity for a product, that exclusivity may not effectively protect the product from competition because different drugs with different active moieties can be approved for the same condition or the same drug can be approved for a different indication unless there are other exclusivities such as new chemical entity exclusivity preventing such approval. Even after an orphan drug is approved, the FDA or EMA can subsequently approve the same drug with the same active moiety for the same condition if the FDA or EMA concludes that the later drug is safer, more effective, or makes a major contribution to patient care. Orphan drug designation neither shortens the development time or regulatory review time of a drug nor gives the drug any advantage in the regulatory review or approval process.

We will need to expand our organization and we may experience difficulties in managing this growth, which could disrupt our operations.

As our development and commercialization plans and strategies develop, we expect to need additional managerial, operational, field forces, marketing, financial, legal, and other resources. Our management may need to divert a disproportionate amount of its attention away from our day-to-day activities and devote a substantial amount of time to managing these growth activities. We may not be able to effectively manage the expansion of our operations, which may result in weaknesses in our infrastructure, operational mistakes, loss of business opportunities, loss of employees, and reduced productivity among remaining employees. Our expected growth could require significant capital expenditures and may divert financial resources from other projects, such as the development of additional product candidates. If our management is unable to effectively manage our growth, our expenses may increase more than expected, our ability to generate and/or grow revenue could be reduced, and we may not be able to implement our business strategy. Our future financial performance and our ability to commercialize product candidates and compete effectively will depend, in part, on our ability to effectively manage any future growth.

Our operating results would be adversely impacted if our intangible assets become impaired.

As a result of the accounting for our acquisition of Dimension Therapeutics, Inc. (Dimension) in November 2017, we have recorded on our balance sheet intangible assets for in-process research and development (“IPR&D”) of $129.0 million and an acquired contract asset of $12.5 million as of December 31, 2017. We test the intangible assets for impairment annually during the fourth quarter and more frequently if events or changes in circumstances indicate that it is more likely than not that the asset is impaired. If the associated research and development effort is abandoned, the related assets will be written-off and we will record a noncash impairment loss on our statement of operations. We have not recorded any impairments since inception.

We may not be successful in our efforts to identify, license, discover, develop, or commercialize additional product candidates.

Although a substantial amount of our effort will focus on the continued clinical testing, potential approval, and commercialization of our existing product candidates, the success of our business also depends upon our ability to identify, license, discover, develop, or commercialize additional product candidates. Research programs to identify and develop new product candidates, such as those under our collaboration with Arcturus, require substantial technical, financial, and human resources. We may focus our efforts and resources on potential programs or product candidates that ultimately prove to be unsuccessful. Our research programs or licensing efforts may fail to yield additional product candidates for clinical development and commercialization for a number of reasons, including but not limited to the following:

- our research or business development methodology or search criteria and process may be unsuccessful in identifying potential product candidates;
- we may not be able or willing to assemble sufficient technical, financial or human resources to acquire or discover additional product candidates;
- we may face competition in obtaining and/or developing additional product candidates;
- our product candidates may not succeed in research, discovery, preclinical or clinical testing;
- our potential product candidates may be shown to have harmful side effects or may have other characteristics that may make the products unmarketable or unlikely to receive marketing approval;
- competitors may develop alternatives that render our product candidates obsolete or less attractive;
- product candidates we develop may be covered by third parties’ patents or other exclusive rights;
- the market for a product candidate may change during our program so that such a product may become unreasonable to continue to develop;

- a product candidate may not be capable of being produced in commercial quantities at an acceptable cost or at all; and
- a product candidate may not be accepted as safe and effective by regulatory authorities, patients, the medical community, or payors.

If any of these events occur, we may be forced to abandon our development efforts for a program or programs, or we may not be able to identify, license, discover, develop, or commercialize additional product candidates, which would have a material adverse effect on our business and could potentially cause us to cease operations.

If we are unable to maintain and further develop effective internal control over financial reporting, investors may lose confidence in the accuracy and completeness of our financial reports and the market price of our stock may decrease.

The Sarbanes-Oxley Act requires, among other things, that we maintain effective internal controls for financial reporting and disclosure controls and procedures. In particular, we are required to perform system and process evaluation and testing of our internal controls over financial reporting to allow management to report on the effectiveness of our internal controls over financial reporting, as required by Section 404(a) of the Sarbanes-Oxley Act. We are also subject to the compliance requirements of Section 404(b) of the Sarbanes-Oxley Act, which results in us incurring substantial expenses and expending significant management efforts. We currently do not have an internal audit group. We may need to hire additional accounting and financial staff with appropriate public company experience and technical accounting knowledge. If we are not able to comply with the requirements of Section 404(b) or if we or our independent registered public accounting firm identify deficiencies in our internal controls over financial reporting that are deemed to be material weaknesses, investors may lose confidence in the accuracy and completeness of our financial reports, the market price of our stock could decline and we could be subject to sanctions or investigations by Nasdaq, the SEC, or other regulatory authorities, which would require additional financial and management resources.

Changes to healthcare and FDA laws, regulations, and policies may have a material adverse effect on our business and results of operations.

United States

In the United States, there have been and continue to be a number of legislative initiatives to contain healthcare costs and to modify the regulation of drug and biologic products. For example, the Affordable Care Act, as amended, substantially changed the way health care is financed by both governmental and private insurers, and significantly impacts the U.S. pharmaceutical industry. The Affordable Care Act, among other things, subjects biologic products to potential competition by lower-cost biosimilars, addresses a new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for drugs that are inhaled, infused, instilled, implanted, or injected, increases the minimum Medicaid rebates owed by manufacturers under the Medicaid Drug Rebate Program and extends the rebate program to individuals enrolled in Medicaid managed care organizations, and establishes annual fees and taxes on manufacturers of certain branded prescription drugs. Implementation of the Affordable Care Act remains ongoing, and there remains uncertainty as to how the law's various provisions will ultimately affect the industry and whether the law will remain in place.

Other legislative changes have been adopted in the United States, including the Cures Act and the Budget Control Act of 2011, or the Budget Act, signed into law on August 2, 2011. The Cures Act introduces a wide range of reforms and the Budget Act, among other things, required reductions in federal spending, which eventually triggered Medicare sequestration—the requirement to reduce Medicare payments to providers up to 2% per fiscal year. In 2013, the 2% Medicare payment reductions were applied to fee-for-service claims with dates of service or dates of discharge on or after April 1, 2013. Sequestration was initially set to expire in fiscal year 2021 but has been extended to 2025.

We expect that additional state and federal healthcare reform measures and regulations will be adopted in the future, including proposals to reduce the exclusivity protections provided to already approved biological products and to provide biosimilar and interchangeable biologic products an easier path to approval. Any of these measures and regulations could limit the amounts that federal and state governments will pay for healthcare products and services, result in reduced demand for our product candidates or additional pricing pressures and affect our product development, testing, marketing approvals and post-market activities.

European Union

In the EU, the European Commission has adopted detailed rules for the safety features appearing on the packaging of medicinal products for human use. The regulations set forth the rules for the features appearing on the packaging of these medicinal products, including, inter alia, the characteristics and technical specifications of the unique identifier that enables the authenticity of medicinal products to be verified and individual packs to be identified, the modalities for the verification of the safety features, and the list of medicinal products and product categories subject and not subject to prescription which shall not bear and bear (respectively) safety features.

The European Commission has also launched a series of public consultations that are aimed at the adoption of notices and guidelines which will serve the interpretation of currently applicable regulations and directives. For example, between August 2015 and December 2016, the European Commission launched public consultations which concerned good manufacturing practices, clinical trials for human medicinal products, and orphan medicinal products. The purpose of the consultation on orphan medicinal products (which will be replaced with a Notice) is to streamline the regulatory framework and to adapt the applicable regulations to technical progress. The consultation focuses on a variety of elements of Regulation (EC) No 141/2000, which include the encouragement of development of orphan medicinal products for communicable diseases and the simplification of the procedure for the reassessment of orphan criteria when two authorization application procedures are pending in parallel for two orphan medicinal products.

We may be subject, directly or indirectly, to federal and state healthcare fraud and abuse laws, false claims laws, and health information privacy and security laws. If we are unable to comply, or have not fully complied, with such laws, we could face substantial penalties.

If we obtain FDA approval for any of our product candidates and begin commercializing those products in the United States, our operations may be directly, or indirectly through our customers, subject to various federal and state fraud and abuse laws, including, without limitation, the federal Anti-Kickback Statute, the federal False Claims Act, and physician sunshine laws and regulations. These laws may impact, among other things, our proposed field marketing and education programs. In addition, we may be subject to patient privacy regulation by both the federal government and the states in which we conduct our business. The laws that may affect our ability to operate are described under "Business—Government Regulation" in this Annual Report. Because of the breadth of these laws and the narrowness of the statutory exceptions and safe harbors available, it is possible that some of our business activities could be subject to challenge under one or more of such laws. If our operations are found to be in violation of any of the laws described above or any other governmental regulations that apply to us, we may be subject to penalties, including civil and criminal penalties, damages, fines, exclusion from participation in government health care programs, such as Medicare and Medicaid, imprisonment, and the curtailment or restructuring of our operations, any of which could adversely affect our ability to operate our business and our results of operations.

International expansion of our business exposes us to business, regulatory, political, operational, financial, and economic risks associated with doing business outside of the United States.

We currently have limited international operations, but our business strategy incorporates significant international expansion, particularly in anticipation of approval of our product candidates. We currently conduct physician and patient association outreach activities, as well as clinical studies, outside of the United States and plan to maintain field forces representatives internationally in the future. Doing business internationally involves a number of risks, including but not limited to:

- multiple, conflicting, and changing laws and regulations such as privacy and data regulations, transparency regulations, tax laws, export and import restrictions, employment laws, regulatory requirements, and other governmental approvals, permits, and licenses;
- introduction of new health authority requirements and/or changes in health authority expectations;
- failure by us to obtain and maintain regulatory approvals for the use of our products in various countries;
- additional potentially relevant third-party patent rights;
- complexities and difficulties in obtaining protection for, and enforcing, our intellectual property;
- difficulties in staffing and managing foreign operations;
- complexities associated with managing multiple payor reimbursement regimes, government payors, or patient self-pay systems;
- limits in our ability to penetrate international markets;
- financial risks, such as longer payment cycles, difficulty collecting accounts receivable, the impact of local and regional financial crises on demand and payment for our products, and exposure to foreign currency exchange rate fluctuations;
- natural disasters and political and economic instability, including wars, terrorism, political unrest, outbreak of disease, boycotts, curtailment of trade, and other business restrictions;
- certain expenses including, among others, expenses for travel, translation, and insurance;
- regulatory and compliance risks that relate to maintaining accurate information and control over commercial operations and activities that may fall within the purview of the U.S. Foreign Corrupt Practices Act, or FCPA, its books and records provisions, or its anti-bribery provisions, including those under the U.K. Bribery Act and similar foreign laws and regulations; and
- regulatory and compliance risks relating to doing business with any entity that is subject to sanctions administered by the Office of Foreign Assets Control of the U.S. Department of the Treasury.

Any of these factors could significantly harm our future international expansion and operations and, consequently, our results of operations.

We may incur additional tax liabilities related to our operations.

We have a multinational tax structure and are subject to income tax in the United States and various foreign jurisdictions. Our effective tax rate is influenced by many factors including changes in our operating structure, changes in the mix of our earnings among countries, our allocation of profits and losses among our subsidiaries, our intercompany transfer pricing agreements and rules relating to transfer pricing, the availability of U.S. research and development tax credits, and future changes in tax laws and regulations in the U.S. and foreign countries. Significant judgment is required in determining our tax liabilities including management's judgment for uncertain tax positions. The Internal Revenue Service, other domestic taxing authorities, or foreign taxing authorities may disagree with our interpretation of tax laws as applied to our operations. Our reported effective tax rate and after-tax cash flows may be materially and adversely affected by tax assessments in excess of amounts accrued for our financial statements. This could materially increase our future effective tax rate thereby reducing net income and adversely impacting our results of operations for future periods.

Failure to comply with laws and regulations could harm our business and our reputation.

Our business is subject to regulation by various federal, state, local and foreign governmental agencies, including agencies responsible for monitoring and enforcing employment and labor laws, workplace safety, and tax laws and regulations. In certain jurisdictions, these regulatory requirements may be more stringent than those in the United States, and in other circumstances these requirements may be more stringent in the United States. Noncompliance with applicable regulations or requirements could subject us to investigations, sanctions, mandatory recalls, enforcement actions, disgorgement of profits, fines, damages, civil and criminal penalties, or injunctions. If any governmental sanctions, fines or penalties are imposed, or if we do not prevail in any possible civil or criminal litigation, our business, operating results, financial condition and our reputation could be harmed. In addition, responding to any action will likely result in a significant diversion of management's attention and resources and an increase in professional fees. Enforcement actions and sanctions could further harm our business, operating results, financial condition, and our reputation.

In particular, our research and development activities and our and our third-party manufacturers' and suppliers' activities involve the controlled storage, use, and disposal of hazardous materials, including the components of our product candidates, such as viruses, and other hazardous compounds, which subjects us to laws and regulations governing such activities. In some cases, these hazardous materials and various wastes resulting from their use are stored at our or our manufacturers' facilities pending their use and disposal. We cannot eliminate the risk of contamination, which could cause an interruption of our commercialization efforts, research and development efforts, and business operations or environmental damage that could result in costly clean-up and liabilities under applicable laws and regulations governing the use, storage, handling, and disposal of these materials and specified waste products. We cannot guarantee that the safety procedures utilized by us and our third-party manufacturers for handling and disposing of these materials comply with the standards prescribed by these laws and regulations, or eliminate the risk of accidental contamination or injury from these materials. In such an event, we may be held liable for any resulting damages—and such liability could exceed our resources—and state or federal or other applicable authorities may curtail our use of certain materials and/or interrupt our business operations. Furthermore, environmental laws and regulations are complex, change frequently, and have tended to become more stringent. We cannot predict the impact of such changes and cannot be certain of our future compliance. We do not currently carry biological or hazardous waste insurance coverage.

Risks generally associated with a company-wide implementation of an enterprise resource planning (ERP) system may adversely affect our business and results of operations or the effectiveness of our internal controls over financial reporting.

We are in the process of implementing a company-wide ERP system to upgrade certain existing business, operational, and financial processes. Our ERP implementation is a complex and time-consuming project that we expect will require multiple years to complete. Our results of operations could be adversely affected if we experience time delays or cost overruns during the ERP implementation process, or if the ERP system or associated process changes do not give rise to the benefits that we expect. This project has required and may continue to require investment of capital and human resources, the re-engineering of processes of our business, and the attention of many employees who would otherwise be focused on other aspects of our business. Any deficiencies in the design and implementation of the new ERP system could result in potentially much higher costs than we had incurred and could adversely affect our ability to develop and launch solutions, provide services, fulfill contractual obligations, file reports with the SEC in a timely manner, operate our business or otherwise affect our controls environment. Any of these consequences could have an adverse effect on our results of operations and financial condition.

Our business and operations may be materially adversely affected in the event of computer system failures or security breaches.

Despite the implementation of security measures, our internal computer systems, and those of our CROs and other third parties on which we rely, are vulnerable to damage from computer viruses, unauthorized access, cyber-attacks, natural disasters, fire, terrorism, war, and telecommunication and electrical failures. If such an event were to occur and interrupt our operations, it could result in a material disruption of our drug development programs. For example, the loss of clinical trial data from ongoing or planned clinical trials could result in delays in our regulatory approval efforts and significantly increase our costs to recover or reproduce the data. To the extent that any disruption or security breach results in a loss of or damage to our data or applications, loss of trade secrets or inappropriate disclosure of confidential or proprietary information, including protected health information or personal data of employees or former employees, access to our clinical data, or disruption of the manufacturing process, we could incur liability and the further development of our drug candidates could be delayed. We may also be vulnerable to cyber-attacks by hackers or other malfeasance. This type of breach of our cybersecurity may compromise our confidential information and/or our financial information and adversely affect our business or result in legal proceedings.

We or the third parties upon whom we depend may be adversely affected by earthquakes or other natural disasters and our business continuity and disaster recovery plans may not adequately protect us from a serious disaster.

Our corporate headquarters and one of our laboratories are located in the San Francisco Bay Area, and our collaboration partner for burosumab, KHK, is located in Japan, which have both in the past experienced severe earthquakes and other natural disasters. We do not carry earthquake insurance. Earthquakes or other natural disasters could severely disrupt our operations or those of our collaborators, and have a material adverse effect on our business, results of operations, financial condition, and prospects. If a natural disaster, power outage, or other event occurred that prevented us from using all or a significant portion of our headquarters, that damaged critical infrastructure (such as the manufacturing facilities of our third-party contract manufacturers) or that otherwise disrupted operations, it may be difficult or, in certain cases, impossible for us to continue our business for a substantial period of time. The disaster recovery and business continuity plans we have in place currently are limited and are unlikely to prove adequate in the event of a serious disaster or similar event. We may incur substantial expenses as a result of the limited nature of our disaster recovery and business continuity plans, which, particularly when taken together with our lack of earthquake insurance, could have a material adverse effect on our business.

We may acquire other companies or products or engage in strategic transactions, which could divert our management's attention and cause us to incur various costs and expenses.

We may acquire or invest in businesses or products that we believe could complement or expand our business or otherwise offer growth opportunities. For example, we acquired Dimension in November 2017. The pursuit of potential acquisitions or investments may divert the attention of management and may cause us to incur various costs and expenses in identifying, investigating, and pursuing them, whether or not they are consummated. We may not be able to identify desirable acquisitions or investments or be successful in entering into an agreement for such transactions.

In addition, we may receive inquiries relating to potential strategic transactions, including collaborations, licenses, and acquisitions. Such potential transactions may divert the attention of management and may cause us to incur various costs and expenses in investigating and evaluating such transactions, whether or not they are consummated.

Litigation may substantially increase our costs and harm our business.

We may become party to lawsuits in the future, including, without limitation, actions and proceedings in the ordinary course of business relating to our stockholders, intellectual property, and employment matters, which will cause us to incur legal fees and other costs related thereto, including potential expenses for the reimbursement of legal fees of officers and directors under indemnification obligations. The expense of defending against such litigation may be significant and there can be no assurance that we will be successful in any defense. Further, the amount of time that may be required to resolve such lawsuits is unpredictable, and these actions may divert management's attention from the day-to-day operations of our business, which could adversely affect our business, results of operations, and cash flows. Litigation is subject to inherent uncertainties, and an adverse result in such matters that may arise from time to time could have a material adverse effect on our business, results of operations, and financial condition.

Risks Related to Ownership of Our Common Stock

The market price of our common stock may be highly volatile.

The market price of our common stock has been, and is likely to continue to be, volatile, including for reasons unrelated to changes in our business. Our stock price could be subject to wide fluctuations in response to a variety of factors, including but not limited to the following:

- adverse results or delays in preclinical or clinical studies;
- any inability to obtain additional funding;

- any delay in filing an IND, NDA, BLA, MAA, or other regulatory submission for any of our product candidates and any adverse development or perceived adverse development with respect to the applicable regulatory agency's review of that IND, NDA, BLA, MAA, or other regulatory submission;
- the perception of limited market sizes or pricing for our product and product candidates;
- decisions by our collaboration partners with respect to the indications for our product candidates in countries where they have the right to commercialize the product candidates;
- decisions by our collaboration partners regarding market access and pricing in countries where they have the right to commercialize our product candidates;
- failure to successfully develop and commercialize our product candidates;
- the level of any revenue we receive from named patient sales;
- post-marketing safety issues;
- failure to maintain our existing strategic collaborations or enter into new collaborations;
- failure by us or our licensors and strategic collaboration partners to prosecute, maintain, or enforce our intellectual property rights;
- changes in laws or regulations applicable to our products;
- any inability to obtain adequate product supply for our product and product candidates or the inability to do so at acceptable prices;
- adverse regulatory decisions;
- introduction of new products, services, or technologies by our competitors;
- failure to meet or exceed financial projections we may provide to the public;
- failure to meet or exceed the financial projections of the investment community;
- the perception of the pharmaceutical industry by the public, legislatures, regulators, and the investment community;
- the perception of the pharmaceutical industry's approach to drug pricing;
- announcements of significant acquisitions, strategic partnerships, joint ventures, or capital commitments by us, our strategic collaboration partners, or our competitors;
- the integration and performance of any businesses we acquire;
- disputes or other developments relating to proprietary rights, including patents, litigation matters, and our ability to obtain patent protection for our technologies;
- additions or departures of key scientific or management personnel;
- significant lawsuits, including patent or stockholder litigation;
- securities or industry analysts' reports regarding our stock, or their failure to issue such reports;
- changes in the market valuations of similar companies;
- general market or macroeconomic conditions;
- sales of our common stock by us or our stockholders in the future; and
- trading volume of our common stock.

In addition, biotechnology and biopharmaceutical companies in particular have experienced extreme price and volume fluctuations that have often been unrelated or disproportionate to the operating performance of these companies. Broad market and industry factors may negatively affect the market price of our common stock, regardless of our actual operating performance.

Future sales and issuances of our common stock or rights to purchase common stock, including pursuant to our equity incentive plans, could result in additional dilution of the percentage ownership of our stockholders and could cause our stock price to fall.

We will need additional capital in the future to continue our planned operations. To the extent we raise additional capital by issuing equity securities, our stockholders may experience substantial dilution. We may sell common stock, convertible securities, or other equity securities in one or more transactions at prices and in a manner we determine from time to time. If we sell common stock, convertible securities, or other equity securities in more than one transaction, investors may be materially diluted by subsequent sales. These sales may also result in material dilution to our existing stockholders, and new investors could gain rights superior to our existing stockholders.

Pursuant to our 2014 Incentive Plan, or the 2014 Plan, our management is authorized to grant stock options and other equity-based awards to our employees, directors, and consultants. At December 31, 2017, 1,070,108 shares were available for future grants under the 2014 Plan. The number of shares available for future grant under the 2014 Plan will automatically increase on January 1 of each year by the lesser of 2,500,000 shares or 4% of all shares of our capital stock outstanding as of December 31 of the prior calendar year, subject to the ability of our compensation committee to take action to reduce the size of the increase in any given year.

Pursuant to our 2014 Employee Stock Purchase Plan, or 2014 ESPP, eligible employees can acquire shares of our common stock at a discount to the prevailing market price. At December 31, 2017, 1,782,441 shares were available for issuance under the 2014 ESPP. The number of shares available for issuance under the 2014 ESPP will automatically increase on January 1 of each year by the lesser of 1,200,000 shares or 1% of all shares of our capital stock outstanding as of December 31 of the prior calendar year, subject to the ability of our compensation committee to take action to reduce the size of the increase in any given year.

Currently we plan to register the increased number of shares available under the 2014 Plan and the 2014 ESPP each year. If our board of directors elects to increase the number of shares available for future grant under the 2014 Plan or the 2014 ESPP, our stockholders may experience additional dilution, which could cause our stock price to fall.

Our ability to use our net operating loss carryforwards and certain other tax attributes may be limited.

We have incurred substantial losses during our history and do not expect to become profitable in the near future nor may we ever achieve profitability. To the extent that we continue to generate taxable losses, unused taxable losses will, subject to certain limitations, carry forward to offset future taxable income, if any, until such unused losses expire. Under Sections 382 and 383 of the Internal Revenue Code of 1986, as amended, or the IRC, if a corporation undergoes an "ownership change," generally defined as a greater than 50% change (by value) in its equity ownership over a three-year period, the corporation's ability to use its pre-change net operating loss carryforwards, or NOL carryforwards, and other pre-change tax attributes (such as research tax credits) to offset its post-change income may be limited. An analysis to determine limitations upon our NOL carryforwards and other pre-change tax attributes for ownership changes that have occurred previously has been performed, resulting in a permanent decrease of federal and state NOL carryforwards in the amount of $7.2 million and a permanent decrease in federal research tax credit carryforwards in the amount of $0.2 million. As a result of these decreases and others that may occur as a result of future ownership changes, our ability to use our pre-change NOL carryforwards and other tax attribute carryforwards to offset U.S. federal taxable income and tax liabilities is limited and may become subject to even greater limitations, which could potentially accelerate or permanently increase future federal tax liabilities for us. In addition, there may be periods during which the use of state income tax NOL carryforwards and other state tax attribute carryforwards (such as state research tax credits) are suspended or otherwise limited, which could potentially accelerate or permanently increase future state tax liabilities for us.

The recently enacted comprehensive tax reform legislation could adversely affect our business and financial condition.

On December 22, 2017, the U.S. government enacted comprehensive tax legislation commonly referred to as the Tax Cuts and Jobs Act (Tax Act). The Tax Act makes broad and complex changes to the U.S. tax code, including, but not limited to, (1) reducing the U.S. federal corporate tax rate from 35% to 21%; (2) requiring companies to pay a one-time transition tax on certain unrepatriated earnings of foreign subsidiaries; (3) generally eliminating U.S. federal income taxes on dividends from foreign subsidiaries; (4) requiring a current inclusion in U.S. federal taxable income of certain earnings of controlled foreign corporations; (5) eliminating the corporate alternative minimum tax (AMT) and changing how existing AMT credits can be realized; (6) creating the base erosion anti-abuse tax (BEAT), a new minimum tax; (7) creating a new limitation on deductible interest expense; and (8) changing rules related to uses and limitations of net operating loss carryforwards created in tax years beginning after December 31, 2017. Notwithstanding the reduction in the corporate income tax rate, the overall impact of the new federal tax law is uncertain and our business and financial condition could be adversely affected. In addition, it is uncertain if and to what extent various states will conform to the newly enacted federal tax law. The determination of the benefit from (provision for) income taxes requires complex estimations, significant judgments and significant knowledge and experience concerning the applicable tax laws. Given that we are still in the transition period for the accounting for income tax effects of the Tax Act, the current assessment on deferred tax assets (liabilities) is based on the currently available information and guidance. If in the future any element of the tax reform changes the related accounting guidance for income tax, it could affect our income tax position and we may need to adjust the benefit from (provision for) income taxes accordingly.

We do not intend to pay dividends on our common stock so any returns will be limited to the value of our stock.

We have never declared or paid any cash dividends on our common stock. We currently intend to retain all available funds and any future earnings, if any, for the development, operation, and expansion of our business and do not anticipate declaring or paying any cash dividends for the foreseeable future. Any return to stockholders will therefore be limited to the appreciation of their stock.

Provisions in our amended and restated certificate of incorporation and by-laws, as well as provisions of Delaware law, could make it more difficult for a third-party to acquire us or increase the cost of acquiring us, even if doing so would benefit our stockholders, or remove our current management.

Our amended and restated certificate of incorporation, amended and restated by-laws, and Delaware law contain provisions that may have the effect of delaying or preventing a change in control of us or changes in our management. Our amended and restated certificate of incorporation and by-laws include provisions that:

- authorize "blank check" preferred stock, which could be issued by our board of directors without stockholder approval and may contain voting, liquidation, dividend, and other rights superior to our common stock;
- create a classified board of directors whose members serve staggered three-year terms;
- specify that special meetings of our stockholders can be called only by our board of directors or the chairperson of our board of directors;
- prohibit stockholder action by written consent;
- establish an advance notice procedure for stockholder approvals to be brought before an annual meeting of our stockholders, including proposed nominations of persons for election to our board of directors;
- provide that our directors may be removed only for cause;
- provide that vacancies on our board of directors may be filled only by a resolution adopted by the board of directors;
- expressly authorize our board of directors to modify, alter or repeal our amended and restated by-laws; and
- require holders of 75% of our outstanding common stock to amend specified provisions of our amended and restated certificate of incorporation and amended and restated by-laws.

These provisions, alone or together, could delay, deter, or prevent hostile takeovers and changes in control or changes in our management.

In addition, because we are incorporated in Delaware, we are governed by the provisions of Section 203 of the Delaware General Corporation Law, which limits the ability of stockholders owning in excess of 15% of our outstanding voting stock to merge or combine with us. Further, no stockholder is permitted to cumulate votes at any election of directors because this right is not included in our amended and restated certificate of incorporation.

Any provision of our amended and restated certificate of incorporation or amended and restated by-laws or Delaware law that has the effect of delaying or deterring a change in control could limit the opportunity for our stockholders to receive a premium for their shares of our common stock, and could also affect the price that some investors are willing to pay for our common stock.

Our amended and restated certificate of incorporation provides that the Court of Chancery of the State of Delaware is the sole and exclusive forum for substantially all disputes between us and our stockholders, which could limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or our directors, officers or employees.

Our amended and restated certificate of incorporation provides that the Court of Chancery of the State of Delaware is the sole and exclusive forum for (1) any derivative action or proceeding brought on our behalf, (2) any action asserting a claim of breach of fiduciary duty owed by any of our directors, officers, or other employees to us or to our stockholders, (3) any action asserting a claim against us arising under the Delaware General Corporation Law or under our amended and restated certificate of incorporation or bylaws, or (4) any action against us asserting a claim governed by the internal affairs doctrine. The choice of forum provision may limit a stockholder's ability to bring a claim in a judicial forum that it finds favorable for disputes with us or our directors, officers, or other employees, which may discourage such lawsuits against us and our directors, officers, and other employees. Alternatively, if a court were to find the choice of forum provision contained in our amended and restated certificate of incorporation to be inapplicable or unenforceable in an action, we may incur additional costs associated with resolving such action in other jurisdictions, which could harm our business, operating results and financial condition.

Item 1B. ***Unresolved Staff Comments***

None.

Item 2. ***Properties***

Our primary operations are conducted at the leased facilities described below.

We lease approximately 129,500 square feet of office space in Novato, California used primarily for corporate, clinical, regulatory, quality, manufacturing administration, and commercial functions. The leases for approximately 74,000 square feet will expire in April 2019, the lease for approximately 42,500 square feet will expire in December 2020, and the lease for approximately 13,000 will expire in April 2022.

We also lease approximately 63,000 square feet of office space in Brisbane, California. The rental term for this space will expire in June 2026.

We also lease approximately 15,000 square feet of office and laboratory space in Cambridge, Massachusetts. This lease will expire in January 2020.

We also lease approximately 17,600 square feet of laboratory and office space in Woburn, Massachusetts. This lease will expire in March 2021.

We believe our facilities are adequate and suitable for our current needs, and that we will be able to obtain new or additional leased space in the future when necessary.

Item 3. ***Legal Proceedings***

We are not currently a party to any material legal proceedings. We may, however, in the ordinary course of business face various claims brought by third parties and we may, from time to time, make claims or take legal actions to assert our rights, including intellectual property rights as well as claims relating to employment matters and the safety or efficacy of our products. Any of these claims could subject us to costly litigation and, while we generally believe that we have adequate insurance to cover many different types of liabilities, our insurance carriers may deny coverage, may be inadequately capitalized to pay on valid claims, or our policy limits may be inadequate to fully satisfy any damage awards or settlements. If this were to happen, the payment of any such awards could have a material adverse effect on our consolidated operations, cash flows and financial position. Additionally, any such claims, whether or not successful, could damage our reputation and business.

Item 4. ***Mine Safety Disclosures***

Not applicable.

PART II

Item 5. ***Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities***

Our common stock has been traded on The Nasdaq Global Select Market since January 31, 2014 under the symbol "RARE". The following tables set forth, for the periods indicated, the intraday high and low sales prices of our common stock as reported by Nasdaq.

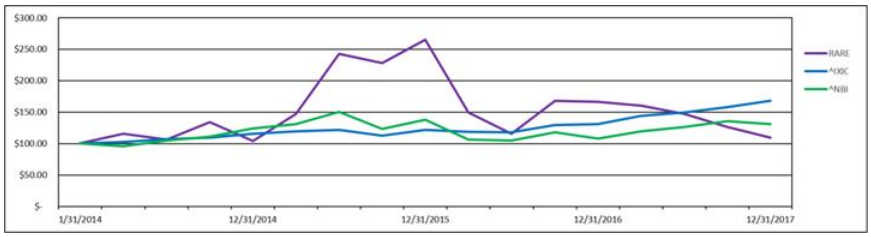
	Fiscal 2016	
	High	Low
First Quarter	$ 110.06	$ 49.00
Second Quarter	$ 78.13	$ 46.52
Third Quarter	$ 81.40	$ 48.33
Fourth Quarter	$ 86.77	$ 52.60

	Fiscal 2017	
	High	Low
First Quarter	$ 91.35	$ 65.55
Second Quarter	$ 68.46	$ 51.67
Third Quarter	$ 71.99	$ 49.57
Fourth Quarter	$ 58.00	$ 43.14

As of February 15, 2018, we had 4 holders of record of our common stock. Certain shares are held in "street" name and, accordingly, the number of beneficial owners of such shares is not known or included in the foregoing number.

STOCK PRICE PERFORMANCE GRAPH

The following stock performance graph compares our total stock return with the total return for (i) the Nasdaq Composite Index and the (ii) the Nasdaq Biotechnology Index for the period from January 31, 2014 (the date our common stock commenced trading on the Nasdaq Global Market) through December 31, 2017. The figures represented below assume an investment of $100 in our common stock at the closing price of $42.25 on January 31, 2014 and in the Nasdaq Composite Index and the Nasdaq Biotechnology Index on January 31, 2014 and the reinvestment of dividends into shares of common stock. The comparisons in the table are required by the SEC and are not intended to forecast or be indicative of possible future performance of our common stock. This graph shall not be deemed "soliciting material" or be deemed "filed" for purposes of Section 18 of the Securities Exchange Act of 1934, as amended, or the Exchange Act, or otherwise subject to the liabilities under that section, and shall not be deemed to be incorporated by reference into any of our filings under the Securities Act of 1933, as amended, or the Securities Act, whether made before or after the date hereof and irrespective of any general incorporation language in any such filing.



$100 investment in stock or index	Ticker	January 31, 2014	December 31, 2014	December 31, 2015	December 31, 2016	December 31, 2017
Ultragenyx Pharmaceutical Inc.	RARE	$ 100.00	$ 103.86	$ 265.51	$ 166.41	$ 109.78
Nasdaq Composite Index	^IXIC	$ 100.00	$ 115.40	$ 122.02	$ 131.17	$ 168.22
Nasdaq Biotechnology Index	^NBI	$ 100.00	$ 123.70	$ 137.83	$ 107.94	$ 130.67

Dividend Policy

We have never declared or paid cash dividends on our common stock. We currently intend to retain all available funds and any future earnings, if any, to fund the development, operation, and expansion of our business, and we do not anticipate paying any cash dividends on our common stock in the foreseeable future. Any future determination to pay dividends will be made at the discretion of our board of directors or any authorized committee thereof.

Unregistered Sales of Equity Securities

None

Issuer's Purchases of Equity Securities

None

Item 6. ***Selected Financial Data***

The information set forth below for the five years ended December 31, 2017 is not necessarily indicative of the results that may be expected in the future and interim results are not necessarily indicative of results to be expected for the full year. You should read the selected historical financial data below in conjunction with the section titled "Management's Discussion and Analysis of Financial Condition and Results of Operations" and the consolidated financial statements and related notes included elsewhere in this Annual Report.

	Year Ended December 31,				
	2017	2016	2015	2014	2013
	(in thousands, except share and per share amounts)				
Consolidated Statements of Operations Data:					
Revenues:					
Collaboration and license	$ 2,136	$ —	$ —	$ —	$ —
Product sales	476	133	—	—	—
Total revenues	2,612	133	—	—	—
Operating expenses:					
Cost of sales	1	—	—	—	—
Research and development	231,644	183,204	114,737	45,967	27,829
Selling, general and administrative	99,909	64,936	33,001	10,811	4,451
Total operating expenses	331,554	248,140	147,738	56,778	32,280
Loss from operations	(328,942)	(248,007)	(147,738)	(56,778)	(32,280)
Interest income	4,074	3,789	2,320	608	216
Other income (expense)	6,530	(1,621)	(200)	(3,632)	(3,006)
Loss before income taxes	$ (318,338)	$ (245,839)	$ (145,618)	$ (59,802)	$ (35,070)
Benefit from (provision for) income taxes	16,199	(35)	—	—	—
Net loss	$ (302,139)	$ (245,874)	$ (145,618)	$ (59,802)	$ (35,070)
Net loss attributable to common stockholders[1]	$ (302,139)	$ (245,874)	$ (145,618)	$ (64,610)	$ (50,289)
Net loss per share attributable to common stockholders, basic and diluted[1]	$ (7.12)	$ (6.21)	$ (3.96)	$ (2.25)	$ (14.87)
Shares used to compute net loss per share attributable to common stockholders, basic and diluted[1]	42,453,135	39,586,908	36,782,603	28,755,758	3,382,489

(1) See Notes 2 and 13 to our audited consolidated financial statements of this Annual Report for an explanation of the calculations of basic and diluted net loss per share attributable to common stockholders.

	As of December 31,				
	2017	2016	2015	2014	2013
	(in thousands)				
Consolidated Balance Sheets Data:					
Cash, cash equivalents and investments	$ 244,468	$ 498,111	$ 536,256	$ 187,487	$ 53,377
Working capital	198,569	341,436	422,289	180,899	49,304
Total assets	490,753	540,626	559,569	197,967	59,649
Convertible preferred stock warrant liability	—	—	—	—	3,419
Convertible preferred stock	—	—	—	—	124,930
Total stockholders' equity (deficit)	383,454	473,974	531,090	184,945	(74,821)

Item 7. ***Management's Discussion and Analysis of Financial Condition and Results of Operations***

MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

You should read the following discussion and analysis of our financial condition and results of operations together with the section of this Annual Report entitled "Selected Financial Data" and our consolidated financial statements and related notes included elsewhere in this Annual Report.

Overview

We are a biopharmaceutical company focused on the identification, acquisition, development, and commercialization of novel products for the treatment of serious rare and ultra-rare diseases, with a focus on serious, debilitating genetic diseases. We target diseases for which the unmet medical need is high, the biology for treatment is clear, and for which there are no currently approved therapies. Since our inception in 2010, we have in-licensed potential treatments for multiple rare genetic disorders. Our strategy, which is predicated upon time- and cost-efficient drug development, allows us to pursue multiple programs in parallel with the goal of delivering safe and effective therapies to patients with the utmost urgency.

Our current approved therapy and clinical-stage pipeline consist of three product categories: biologics, small-molecule substrate replacement therapies, and gene therapy product candidates. Enzymes are proteins that the body uses to process materials needed for normal cellular function, and substrates are the materials upon which enzymes act. When enzymes or substrates are missing, the body is unable to perform its normal cellular functions, often leading to significant clinical disease. Several of our therapies are intended to replace deficient enzymes or substrates. Gene therapy is a therapeutic approach in which an isolated gene sequence or segment of DNA is administered to a patient, most commonly for the purpose of treating a genetic disease that is caused by mutations. Gene therapy aims to address the disease-causing effects of absent or dysfunctional genes by delivering functional copies of the gene to the patient's cells, offering the potential for durable therapeutic benefit.

Our first product, Mepsevii (vestronidase alfa), is approved by the FDA for the treatment of children and adults with Mucopolysaccharidosis VII.

- On November 15, 2017, the U.S. FDA approved Mepsevii, the first medicine approved for the treatment of children and adults with Mucopolysaccharidosis VII, also known as MPSVII or Sly syndrome. Mepsevii is an intravenous, or IV, enzyme replacement therapy for the treatment of MPS VII, a rare lysosomal storage disease that often leads to multi-organ dysfunction, pervasive skeletal disease, and death. In Europe, the EMA is currently reviewing the MAA, and an opinion from the CHMP is expected in the first half of 2018.

Our biologics pipeline includes burosumab in clinical development for the treatment of two diseases:

- Burosumab (KRN23 or UX023) is an antibody targeting fibroblast growth factor 23, or FGF23, in development for the treatment of X-linked hypophosphatemia, or XLH, a rare genetic disease that impairs bone growth. We are developing burosumab pursuant to our collaboration with Kyowa Hakko Kirin Co., Ltd., or KHK. We announced positive 64-week data from a Phase 2 study in pediatric patients ages five through 12 in April 2017, and in February 2018 we announced 64-week Phase 2 study in children less than five years old. We have an ongoing Phase 3 pediatric study with data expected in the second half of 2018. We also announced positive 48-week data from a Phase 3 study in adult XLH patients in December 2017, and positive 48-week bone biopsy data from a separate bone quality study in February 2018. In the U.S., the Prescription Drug User Fee Act (PDUFA) goal date for the BLA for burosumab for the treatment of adult and pediatric patients is April 17, 2018. In Europe, the Committee for Medicinal Products for Human Use, or CHMP, adopted a Positive Opinion recommending the conditional marketing authorization of burosumab for the treatment of XLH with radiographic evidence of bone disease in children one year of age and older and adolescents with growing skeletons. The CHMP's recommendation has been referred to the European Commission (EC), which is expected to render its final decision in February 2018. A filing for adults in Europe is planned after a decision is first reached on the pediatric indication.
- Burosumab is also being developed for the treatment of tumor-induced osteomalacia, or TIO. TIO results from typically benign tumors that produce excess levels of FGF23, which can lead to severe hypophosphatemia, osteomalacia, fractures, fatigue, bone and muscle pain, and muscle weakness. We announced positive interim data from the Phase 2 study of burosumab in TIO in September 2017, and we expect 48-week data from this study in the first half of 2018.

Our substrate replacement therapy pipeline includes UX007 in clinical development for the treatment of two diseases:

- UX007 is a synthetic triglyceride with a specifically designed chemical composition being studied in an open-label Phase 2 study for the treatment of long-chain fatty acid oxidation disorders, or LC-FAOD. LC-FAOD is a set of rare metabolic diseases that prevents the conversion of fat into energy and can cause low blood sugar, muscle rupture, and heart and liver disease. We reported positive 78-week data from the Phase 2 study in LC-FAOD patients. Following an end-of-phase 2 meeting with the FDA, we are submitting additional information and will work with FDA to determine whether an early submission based on the Phase 2 data could be pursued, and we expect to come to a decision on an early submission in mid-

2018. We are simultaneously finalizing a full protocol for a Phase 3, randomized, controlled study examining major clinical events as the primary endpoint as discussed with the FDA, and plan to initiate this Phase 3 study in the second half of 2018.

- UX007 is also being studied for the treatment of glucose transporter type-1 deficiency syndrome, or Glut1 DS, a rare metabolic disease of brain energy deficiency that is characterized by seizures, developmental delay, and movement disorder. Topline data from the Phase 2 seizure study, which we announced in the first quarter of 2017, indicated that the study did not meet the primary endpoint of reducing the frequency of the total number of observable and absence seizures among patients treated from baseline to Week 8 with UX007 compared to placebo. We are enrolling patients in the 3 study in movement disorders, and expect to announce data from this study in the second half of 2018. If positive, the movement disorder study could serve as the basis for regulatory submissions.

Our gene therapy pipeline includes DTX301 in clinical development for the treatment of OTC deficiency:

- DTX301 is an adeno-associated virus (AAV8) gene therapy product candidate designed for the treatment of patients with OTC deficiency, the most common urea cycle disorder. In January 2018, we announced positive interim safety and efficacy results from the first dose cohort of the Phase 1/2 open-label clinical trial of DTX301. Full 12-week data from the first cohort is expected in March 2018. We expect to be able to move to the higher-dose second cohort pending the data monitoring committee's review of the 12-week safety data for all three patients in cohort 1, and data from the second cohort should be available in the second half of 2018.

Financial Operations Overview

We are a biopharmaceutical company with a limited operating history. To date, we have invested substantially all of our efforts and financial resources in identifying, acquiring, and developing our product and product candidates, including conducting clinical studies and providing general and administrative support for these operations. To date, we have funded our operations primarily from the sale of equity securities.

We have never been profitable and have incurred net losses in each year since inception. Our net losses were $302.1 million, $245.9 million and $145.6 million for the years ended December 31, 2017, 2016 and 2015. Substantially all of our net losses have resulted from costs incurred in connection with our research and development programs and from selling, general and administrative costs associated with our operations.

Revenue

On November 15, 2017, the U.S. FDA approved Mepsevii for the treatment of children and adults with MPS VII. For the year ended December 31, 2017, we recorded $0.5 million in product sales from the sales of Mepsevii, which includes named patient sales, and $2.1 million in collaboration and license revenue from providing certain research and development services under our collaboration and license arrangement with Bayer. For the year ended December 31, 2016, we recorded named patient sales of $0.1 million as product sales.

Research and Development Expenses

Research and development expenses consist primarily of costs incurred for the development of our product candidates, which include:

- expenses incurred under agreements with clinical study sites that conduct research and development activities on our behalf;
- expenses incurred under license agreements with third parties;
- employee and consultant-related expenses, which include salaries, benefits, travel, and stock-based compensation;
- laboratory and vendor expenses related to the execution of preclinical, non-clinical, and clinical studies;
- the cost of acquiring, developing, and manufacturing clinical study materials; and
- facilities, depreciation, and other expenses, which include direct and allocated expenses for rent and maintenance of facilities, insurance, and other supply costs.

We expense all research and development costs in the periods in which they are incurred. Costs for certain development activities are recognized based on an evaluation of the progress to completion of specific tasks using information and data provided to us by our vendors and clinical sites. Nonrefundable advance payments for goods or services to be received in future periods for use in research and development activities are deferred and capitalized. The capitalized amounts are then expensed as the related goods are delivered and the services are performed.

The largest component of our total operating expenses has historically been our investment in research and development activities, including the clinical development of our product candidates. We allocate research and development salaries, benefits, stock-based compensation, and indirect costs to our product candidates on a program-specific basis, and we include these costs in the program-specific expenses. We expect our research and development expenses will increase in absolute dollars in future periods as we continue to invest in research and development activities related to developing our product candidates, and as programs advance into later stages of development and we enter into larger clinical studies. The process of conducting the necessary clinical research to obtain FDA approval is costly and time consuming and the successful development of our product candidates is highly uncertain. As a result, we are unable to determine the duration and completion costs of our research and development projects or when and to what extent, if any, we will generate revenue from the commercialization and sale of any of our product candidates.

Selling, General and Administrative Expenses

Selling, general and administrative expenses consist primarily of personnel costs, allocated facilities costs, and other expenses for outside professional services, including legal, human resources, audit, and accounting services and acquisition related costs. Personnel costs consist of salaries, benefits, and stock-based compensation. We expect that our selling, general and administrative expenses will increase in the future to support continued research and development activities, preparation for commercialization of our product and product candidates, and as a result of operating as a public company, including expenses related to compliance with the rules and regulations of the SEC and those of any national securities exchange on which our securities are traded, additional insurance expenses, investor relations activities, and other administration and professional services.

Interest Income

Interest income consists of interest earned on our cash, cash equivalents, and investments.

Other Income (Expense)

Other income (expense) primarily consists of foreign currency exchange gains and losses. Our foreign currency exchange gains and losses relate to transactions and asset and liability balances denominated in currencies other than the U.S. dollar.

Income Tax Benefit (Provision)

We recorded $47.4 million in non-current deferred tax liability resulting from the acquisition of Dimension Therapeutics, Inc. (Dimension), reflecting the tax impact of the difference between the book basis and tax basis of acquired in process research and development (IPR&D) assets. Subsequently, as a result of the reduction of the US corporate tax rate from 34% to 21% in December 2017, we recorded an income tax benefit of $16.2 million and reduced the deferred tax liability accordingly.

Critical Accounting Policies and Significant Judgments and Estimates

Our management's discussion and analysis of our financial condition and results of operations is based on our consolidated financial statements, which have been prepared in accordance with GAAP. The preparation of these consolidated financial statements requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the date of the financial statements, as well as the reported expenses incurred during the reporting periods. Our estimates are based on our historical experience and on various other factors that we believe are reasonable under the circumstances, the results of which form the basis for making judgments about the carrying value of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions. We periodically review our estimates as a result of changes in circumstances, facts and experience. The effects of material revisions in estimates are reflected in the financial statements prospectively from the date of the change in estimate. Our significant accounting policies are more fully described in Note 2 to our financial statements included elsewhere in this Annual Report.

We define our critical accounting policies as those accounting principles generally accepted in the United States of America that require us to make subjective estimates and judgments about matters that are uncertain and are likely to have a material impact on our financial condition and results of operations as well as the specific manner in which we apply those principles. We believe the critical accounting policies used in the preparation of our financial statements that require significant estimates and judgments are as follows:

Valuation of Goodwill and Acquired Intangible Assets

We have recorded goodwill and acquired intangible assets related to our acquisition of Dimension. When identifiable intangible assets, including IPR&D, are acquired, we determine the fair values of the assets as of the acquisition date. An income approach is used in these valuations and the models require the use of significant estimates and assumptions including but not limited to:

- timing and costs to complete the in-process projects;
- timing and probability of success of clinical events or regulatory approvals;
- estimated future cash flows from product sales resulting from completed products and in-process projects; and
- discount rates commensurate with the stage of development of the projects and uncertainties in the economic estimates used in the projections.

Intangible assets with definite useful lives are amortized over their estimated useful lives or other systematic basis and reviewed for impairment if certain events occur.

Intangible assets related to IPR&D projects are considered to be indefinite-lived until the completion or abandonment of the associated research and development efforts. During the period the assets are considered indefinite-lived, they will not be amortized but will be tested for impairment. Impairment testing is performed at least annually or when a triggering event occurs that could indicate a potential impairment. If and when development is complete, which generally occurs when regulatory approval to market a product is obtained, the associated assets are deemed finite-lived and are amortized over a period that best reflects the economic benefits provided by these assets.

If projects are not successfully developed, our sales and profitability may be adversely affected in future periods. Additionally, the value of the acquired intangible assets, including IPR&D, may become impaired if the underlying projects do not progress as we initially estimated. We believe that the assumptions used in developing our estimates of intangible asset values were reasonable at the time of the acquisition. However, the underlying assumptions used to estimate expected project sales, development costs, profitability, or the events associated with such projects, such as clinical results, may not occur as we estimated at the acquisition date.

Goodwill represents the excess of purchase price over fair value of net assets acquired in a business combination and is not amortized. Goodwill is subject to impairment testing at least annually or when a triggering event occurs that could indicate a potential impairment.

Accrued Research and Development, and Research and Development Expenses

As part of the process of preparing consolidated financial statements, we are required to estimate and accrue expenses, the largest of which is related to accrued research and development expenses. This process involves reviewing contracts and purchase orders, identifying services that have been performed on our behalf, and estimating the level of service performed and the associated cost incurred for the service when we have not yet been invoiced or otherwise notified of the actual costs.

We record accruals for estimated costs of research, preclinical and clinical studies, and manufacturing development. These costs are a significant component of our research and development expenses. A substantial portion of our ongoing research and development activities is conducted by third-party service providers. We accrue the costs incurred under our agreements with these third parties based on actual work completed in accordance with agreements established with these third parties. We determine the actual costs through discussions with internal personnel and external service providers as to the progress or stage of completion of the services and the agreed-upon fee to be paid for such services. We make significant judgments and estimates in determining the accrual balance in each reporting period. As actual costs become known, we adjust our accruals. Although we do not expect our estimates to be materially different from amounts actually incurred, our understanding of the status and timing of services performed relative to the actual status and timing of services performed may vary and could result in us reporting amounts that are too high or too low in any particular period. Our accrual is dependent, in part, upon the receipt of timely and accurate reporting from clinical research organizations and other third-party vendors.

Research and development costs are expensed as incurred and consist of salaries and benefits, stock-based compensation, lab supplies, materials and facility costs, as well as fees paid to other nonemployees and entities that conduct certain research and development activities on our behalf. Amounts incurred in connection with collaboration and license agreements are also included in research and development expense. Payments made prior to the receipt of goods or services to be used in research and development are capitalized until the goods or services are received.

To date, there have been no material differences from our accrued estimated expenses to the actual clinical trial expenses; however, due to the nature of estimates, we cannot assure you that we will not make changes to our estimates in the future as we become aware of additional information about the status or conduct of our clinical studies and other research activities.

Revenue Recognition

Collaboration and License Revenue

We have certain collaboration and license arrangements in the scope of ASC 808, *Collaborative Agreements*. Funding received related to research and development services and pre-commercialization costs of such agreements is classified as a reduction of research and development expenses and selling, general and administrative expenses, respectively, in the consolidated statement of operations because the provision of such services for collaborative partners is not considered to be part of the our ongoing major or central operations.

We also receive royalty revenues under certain of our license or collaboration agreements in exchange for license of intellectual property. If we do not have any future performance obligations under these license or collaborations agreements, revenue is recorded as sales occur as part of collaboration and license revenue.

We have certain collaboration and license arrangements in the scope of ASC 606, *Revenue from Contract with Customers*. The terms of these agreements may contain multiple performance obligations, which may include licenses and research and development activities. Prior to recognizing revenue, we make estimates of the transaction price, including variable consideration that is subject to a constraint. Amounts of variable consideration are included in the transaction price to the extent that it is probable that a significant reversal in the amount of cumulative revenue recognized will not occur and when the uncertainty associated with the variable consideration is subsequently resolved. Variable consideration may include nonrefundable upfront license fees, payments for research and development activities, reimbursement of certain third-party costs, payments based upon the achievement of specified milestones, and royalty payments based on product sales derived from the collaboration. If there are multiple distinct performance obligations, we allocate the transaction price to each distinct performance obligation based on its relative standalone selling price. The standalone selling price is generally determined based on the prices charged to customers or using expected cost plus margin. We recognize license and collaboration revenue for these arrangements by measuring the progress toward complete satisfaction of the performance obligations using an input measure.

Product sales

We sell Mepsevii through a limited number of distributors. Revenue from product sales is recognized at the point in time when the delivery is made and when title and risk of loss transfers to these distributors. We also recognize revenue from sales of Mepsevii on a “named patient” basis, which are allowed in certain countries prior to the commercial approval of the product in the territory. Prior to recognizing revenue, we make estimates of the transaction price, including variable consideration that is subject to a constraint. Amounts of variable consideration are included in the transaction price to the extent that it is probable that a significant reversal in the amount of cumulative revenue recognized will not occur when the uncertainty associated with the variable consideration is subsequently resolved. We estimate reserves for rebates payable under government mandated programs, chargebacks, distribution fees, estimated product returns and other deductions and record as a reduction of revenue at the time product revenues are recorded.

Inventories Produced in Preparation for Product Launches

We expense costs associated with the manufacture of our products prior to regulatory approval. Typically, capitalization of such inventory begins when we have received the regulatory approval of the product. Prior to the approval of Mepsevii by the FDA in November 2017, manufacturing and related costs were expensed; accordingly, these costs were not capitalized and as a result are not reflected in the costs of sales during the current period. If manufacturing and related costs were capitalized prior to the approval period, we expect that cost of sales for the year ended December 31, 2017 would have been approximately $39,000 for our commercial product sales. We expect cost of sales to increase in relation to product revenues as we deplete these previously expensed inventories and in turn, the inventory cost of Mepsevii will increase as we produce and then sell Mepsevii that has an inventory cost that reflects the full cost of manufacturing similar biologic products.

Stock-Based Compensation

Stock-based compensation costs related to equity awards granted to employees are measured at the date of grant based on the estimated fair value of the award, net of estimated forfeitures. We estimate the grant date fair value of options, and the resulting stock-based compensation expense, using the Black-Scholes option-pricing model. The grant date fair value of the stock-based awards is recognized on a straight-line basis over the requisite service period, which is generally the vesting period of the respective awards. We expect to continue to grant stock options in the future, and to the extent that we do, our actual stock-based compensation will likely increase. The Black-Scholes option-pricing model requires the use of highly subjective assumptions which determine the estimated fair value of stock-based awards. These assumptions include:

- *Expected term* — The expected term represents the period that the stock-based awards are expected to be outstanding and is determined using the simplified method (based on the midpoint between the vesting date and the end of the contractual term).

- *Expected Volatility*—As we do not have sufficient historical stock price information to meet the expected life of the stock-based awards, our approach to estimating expected volatility is to phase in our own common stock trading history and supplement the remaining historical information with a blended volatility from the trading history from the common stock of the set of comparable publicly traded biopharmaceutical companies. When selecting comparable publicly traded biopharmaceutical companies on which to base the expected stock price volatility, we selected companies with comparable characteristics to us, including enterprise value, risk profiles, position within the industry, and with historical share price information sufficient to meet the expected life of the stock-based awards. The historical volatility data was computed using the daily closing prices for the selected companies' shares during the equivalent period of the calculated expected term of the stock-based awards. The average volatility for comparable publicly traded biopharmaceutical companies over a period equal to the expected term of the stock option grants is used to supplement our historical volatility. We will continue to apply this process until a sufficient amount of historical information regarding the volatility of our own stock price becomes available.
- *Risk-free interest rate* — The risk-free interest rate is based on the U.S. Treasury zero coupon issues in effect at the time of grant for periods corresponding with the expected term of option.
- *Expected dividend* — We have never paid dividends on our common stock and have no plans to pay dividends on our common stock. Therefore, we used an expected dividend yield of zero.

In addition to the assumptions used in the Black-Scholes option-pricing model, we also estimate a forfeiture rate to calculate the stock-based compensation for our awards. We will continue to use judgment in evaluating the expected volatility, expected terms, and forfeiture rates utilized for our stock-based compensation calculations on a prospective basis and will revise in subsequent periods, if actual forfeitures differ from those estimates.

For restricted stock units (RSUs) and performance stock units (PSUs), the fair value is based on the market value of our common stock on the date of grant. Stock-based compensation expense for RSUs is recognized on a straight-line basis over the requisite service period. As PSUs are subject to vest only if certain specified criteria are achieved and the employees' continued service with us after achievement, compensation expense for PSUs is recognized on a straight-line basis between the period from the date on which the likelihood of the PSUs being earned is deemed probable and the expected vest date.

For the years ended December 31, 2017, 2016 and 2015 stock-based compensation expense was $68.0 million, $48.3 million and $24.9 million, respectively. As of December 31, 2017, we had $165.3 million of total unrecognized stock-based compensation costs, net of estimated forfeitures, which we expect to recognize over a weighted-average period of 2.52 years.

Income Taxes

We use the liability method of accounting for income taxes. Under this method, deferred tax assets and liabilities are determined based on the differences between the financial reporting and the tax bases of assets and liabilities and are measured using the enacted tax rates and laws that will be in effect when the differences are expected to reverse. We assess the likelihood that the resulting deferred tax assets will be realized. A valuation allowance is provided when it is more likely than not that some portion or all of a deferred tax asset will not be realized.

In conjunction with the Dimension acquisition, we recorded a deferred tax liability reflecting the tax impact of the difference between the book basis and tax basis of acquired IPR&D. Such deferred income tax liability was not used to offset deferred tax assets when analyzing our valuation allowance as the acquired IPR&D is considered to have an indefinite life until we complete or abandon development of the acquired IPR&D.

We recognize benefits of uncertain tax positions if it is more likely than not that such positions will be sustained upon examination based solely on their technical merits, as the largest amount of benefit that is more likely than not to be realized upon the ultimate settlement. Our policy is to recognize interest and penalties related to the underpayment of income taxes as a component of income tax expense or benefit. To date, there have been no interest or penalties charged in relation to the unrecognized tax benefits.

As of December 31, 2017, our total deferred tax assets were $304.2 million, excluding the deferred tax liability generated from Dimension acquisition. Due to our lack of earnings history and uncertainties surrounding our ability to generate future taxable income, the net deferred tax assets have been fully offset by a valuation allowance. The deferred tax assets were primarily comprised of federal and state tax net operating losses and tax credit carryforwards. Utilization of the net operating loss and tax credit carryforwards may be subject to an annual limitation due to historical or future ownership percentage change rules provided by the Internal Revenue Code of 1986, and similar state provisions. The annual limitation may result in the expiration of certain net operating loss and tax credit carryforwards before their utilization.

Results of Operations

Comparison of Years Ended December 31, 2017 and 2016

Revenues (dollars in thousands)

	Year Ended December 31,		Dollar	%
	2017	2016	Change	Change
Revenues:				
Collaboration and license	$ 2,136	$ —	$ 2,136	*
Product sales	476	133	343	258%
Total revenues	$ 2,612	$ 133	$ 2,479	*

*not meaningful

We recognized revenue of $2.1 million in collaboration and license revenue for our research arrangement with Bayer and $0.5 million in product sales of Mepsevii for the year ended December 31, 2017 compared to $0.1 million in product sales for the year ended December 31, 2016. The increase in collaboration and license revenue is due to our acquisition of Dimension, and the increase in product sales is due to the approval of Mepsevii in November 2017.We expect our revenues to increase in the future as we meet milestones under our arrangement with Bayer and reflect product sales for full fiscal periods.

Research and Development Expenses (dollars in thousands)

	Year Ended December 31,		Dollar	%
	2017	2016	Change	Change
Development candidate:				
burosumab	$ 42,847	$ 34,723	$ 8,124	23%
vestronidase alfa	33,472	29,707	3,765	13%
UX007	38,335	34,478	3,857	11%
Ace-ER	34,630	32,532	2,098	6%
DTX301	472	—	472	*
Other research costs and preclinical costs	81,888	51,764	30,124	58%
Total research and development expenses	$ 231,644	$ 183,204	$ 48,440	26%

Research and development expenses increased $48.4 million for the year ended December 31, 2017 compared to the same period in 2016. The increase in research and development expenses is primarily due to:

- for burosumab, an increase of $8.1 million related to the continued development of our clinical program, the enrollment of our Phase 3 adult and pediatric studies, regulatory filing preparation costs, patient identification efforts, and other development planning activities, net of KHK reimbursement;
- for vestronidase alfa, an increase of $3.8 million related to regulatory filing preparation costs and the timing of manufacturing-related costs;
- for UX007, an increase of $3.9 million primarily related to the initiation of our Phase 3 movement disorder study and support of investigator-sponsored studies across multiple diseases;
- for Ace-ER, an increase of $2.1 million primarily related to our Phase 3 and extension studies and one-time manufacturing-related expenses incurred as a result of our decision to terminate the program;
- for DTX301, an increase of expense of $0.5 million, related to the conduct of the Phase 1/2 study, as the program costs are reflected only after the acquisition of Dimension, and are primarily Phase 1 study costs; and
- an increase of $30.1 million in other research and development costs including expenses in support of our clinical product candidate pipeline, expenses related to our existing research stage programs and research programs added with the Dimension acquisition, research collaborations, and certain cost allocations.

We expect our research and development expenses to increase in the future as we advance our product candidates through clinical development. The timing and amount of expenses incurred will depend largely upon the outcomes of current or future clinical studies for our product candidates as well as the related regulatory requirements, manufacturing costs and any costs associated with the advancement of our preclinical programs.

Selling, General and Administrative Expenses (dollars in thousands)

	Year Ended December 31,		Dollar	%
	2017	2016	Change	Change
Selling, general and administrative	$ 99,909	$ 64,936	$ 34,973	54%

Selling, general and administrative expenses increased $35.0 million for the year ended December 31, 2017 compared to the same period in 2016. The increase in selling, general and administrative expenses was primarily due to increases in personnel costs resulting from an increase in the number of employees in support of our activities, stock-based compensation, acquisition-related costs, and commercial planning costs.

We expect selling, general and administrative expenses to increase to support our organizational growth and for our expected staged build out of our commercial organization over the next several years related to our approved product and multiple late-stage product candidates.

Interest Income (dollars in thousands)

	Year Ended December 31,		Dollar	%
	2017	2016	Change	Change
Interest income	$ 4,074	$ 3,789	$ 285	8%

Interest income increased $0.3 million for the year ended December 31, 2017 compared to the same period in 2016, primarily due to an increase in yields on our investment portfolio.

Other Income (Expense) (dollars in thousands)

	Year Ended December 31,		Dollar	%
	2017	2016	Change	Change
Other income (expense)	$ 6,530	$ (1,621)	$ 8,151	-503%

Other income (expense) increased $8.2 million for the year ended December 31, 2017 compared to the same period in 2016. Other income (expense) primarily consists of gains (losses) resulting from the remeasurement of transactions denominated in foreign currencies. Our primary exposure to currency risk is related to intercompany balances with our foreign subsidiaries, resulting in the foreign currency gains and losses generated on the remeasurement of our intercompany balances with our foreign subsidiaries, which are reported in other income (expense). For the year ended December 31, 2017, we recorded a remeasurement gain of $10.0 million on intercompany balances which was offset by the transfer of foreign currency translation adjustment balance of $3.5 million as a result of the liquidation of a foreign entity due to the termination of the Ace-ER program. We expect other income to increase in the first quarter of 2018 as a result of the sale of our PRV to Novartis Pharma AG in January 2018.

Benefit from (provision for) income taxes

We recorded $47.4 million in non-current deferred tax liability resulting from the acquisition of Dimension, reflecting the tax impact of the difference between the book basis and tax basis of IPR&D assets. We recorded an income tax benefit of $16.2 million for the year ended December 31, 2017 due to the reduction of the US corporate tax rate from 34% to 21% and reduced the deferred tax liability accordingly. We also recorded nominal amounts in income tax provision for US states and certain foreign taxes.

Comparison of Years Ended December 31, 2016 and 2015

Revenue

We recognized revenue for $0.1 million of named patient sales of vestronidase alfa in Europe for the year ended December 31, 2016. We did not recognize any revenue for the year ended December 31, 2015.

Research and Development Expenses (dollars in thousands)

	Year Ended December 31,		Dollar	%
	2016	2015	Change	Change
Development candidate:				
burosumab	$ 34,723	$ 12,886	$ 21,837	169%
vestronidase alfa	29,707	18,989	10,718	56%
UX007	34,478	19,952	14,526	73%
Ace-ER	32,532	24,164	8,368	35%
Other research costs and preclinical costs	51,764	38,746	13,018	34%
Total research and development expenses	$ 183,204	$ 114,737	$ 68,467	60%

Research and development expenses increased $68.5 million for the year ended December 31, 2016 compared to the same period in 2015. The increase in research and development expenses is primarily due to:

- for burosumab, an increase of $21.8 million related to the continued development of the XLH clinical program, including the enrollment of our Phase 3 adult study, the initiation of our Phase 3 pediatric study, the execution of our MAA filing, as well as continued clinical development and other regulatory activities for both the XLH and TIO clinical programs, net of KHK reimbursement;
- for vestronidase alfa, an increase of $10.7 million related to our Phase 3 and Under 5 studies in addition to increases in manufacturing-related and quality activities;
- for UX007, an increase of $14.5 million related to clinical manufacturing, the continued development of our clinical Phase 2 program for LC-FAOD, study start-up activities for our Phase 3 clinical study for Glut1 DS, as well as patient identification efforts and support of investigator-sponsored studies across multiple diseases;
- for Ace-ER, an increase of $8.4 million related to the enrollment of our Phase 3 study, and manufacturing, quality, patient identification, and regulatory activities for this program;
- an increase of $13.0 million in other research and development costs including expenses in support of our clinical product candidate pipeline, expenses related to our research stage programs and research collaborations, and certain cost allocations, including stock compensation.

General and Administrative Expenses (dollars in thousands)

	Year Ended December 31,		Dollar	%
	2016	2015	Change	Change
General and administrative	$ 64,936	$ 33,001	$ 31,935	97%

General and administrative expenses increased $31.9 million for the year ended December 31, 2016 compared to the same period in 2015. The increase in general and administrative expenses was primarily due to increases in commercial planning costs, professional services costs, stock-based compensation, and personnel costs resulting from an increase in the number of employees in support of our activities

Interest Income (dollars in thousands)

	Year Ended December 31,		Dollar	%
	2016	2015	Change	Change
Interest income	$ 3,789	$ 2,320	$ 1,469	63%

Interest income increased $1.5 million for the year ended December 31, 2016 compared to the same period in 2015, primarily due to funds invested from our common stock offerings and increased yield on our investment portfolio.

Other Income (Expense) (dollars in thousands)

	Year Ended December 31,		Dollar	%
	2016	2015	Change	Change
Other income (expense)	$ (1,621)	$ (200)	$ (1,421)	711%

Other income (expense) decreased $1.4 million for the year ended December 31, 2016 compared to the same period in 2015. This was primarily due to the fluctuations of the volume of transactions and the foreign exchange rates used in the remeasurement of transactions denominated in foreign currencies.

Liquidity and Capital Resources

We have funded our operations primarily with net proceeds from our equity financings and equity sales in connection with a collaboration and license agreement. On July 1, 2016, we entered into an At-The-Market, or ATM, sales agreement with Cowen and Company, LLC, or Cowen, under which we may offer and sell from time to time common stock having aggregate gross proceeds of up to $150.0 million. During the year ended December 31, 2017, the proceeds from the offering were approximately $67.6 million, after commissions and other offering costs. On July 27, 2017, we entered into another ATM sales agreement with Cowen and during the year ended December 31, 2017, the proceeds from the offering were approximately $64.3 million, after commissions and other offering costs.

As of December 31, 2017, we had $244.5 million in available cash, cash equivalents, and investments. Our cash, cash equivalents and investments are held in a variety of deposit accounts, interest-bearing accounts, corporate bond securities, U.S government securities and money market funds. Cash in excess of immediate requirements is invested with a view toward liquidity and capital preservation, and we seek to minimize the potential effects of concentration and credit risk.

The following table summarizes our cash flows for the periods indicated (in thousands):

	Year Ended December 31,		
	2017	2016	2015
Cash used in operating activities	$ (253,843)	$ (160,975)	$ (105,977)
Cash provided by (used in) investing activities	56,416	89,915	(292,351)
Cash provided by financing activities	136,267	138,676	467,573
Effect of exchange rate changes on cash	528	(65)	—
Net increase (decrease) in cash and cash equivalents	$ (60,632)	$ 67,551	$ 69,245

Cash Used in Operating Activities

Our primary use of cash is to fund operating expenses, which consist primarily of research and development expenditures. Due to our significant research and development expenditures, we have generated significant operating losses since our inception. Cash used to fund operating expenses is affected by the timing of when we pay these expenses, as reflected in the change in our outstanding accounts payable and accrued expenses.

Cash used in operating activities for the year ended December 31, 2017 was $253.8 million and reflected a net loss of $302.1 million, offset by non-cash charges of $68.0 million for stock-based compensation, $1.7 million for the amortization of premium paid on purchased investments, $5.8 million for depreciation and amortization and a decrease of $7.0 million for foreign currency remeasurement gain due to an increase in foreign entity transactions and fluctuations in the foreign exchange rate during the period. Cash used in operating activities also reflected a $3.3 million decrease in prepaid expenses and other current assets primarily due to an increase in accounts receivables under a collaboration agreement and other miscellaneous prepayments, a $4.6 million decrease in accrued expenses and other liabilities due to decrease in liabilities for Ace-ER related vendors and a reduction of the repayment liability for the Takeda collaboration agreement, and a $16.2 million decrease in deferred tax liabilities recorded in conjunction with the Dimension acquisition which were then revalued as a result of the reduction of the US corporate tax rate in December 2017 from 34% to 21%. These decreases were offset by a $0.5 million increase in non-current assets and a $3.5 million increase in accounts payable primarily due to increased spend and the timing of payments.

Cash used in operating activities for the year ended December 31, 2016 was $161.0 million and reflected a net loss of $245.9 million, offset by non-cash charges of $48.3 million for stock-based compensation, $4.8 million for the amortization of premium paid on purchased investments, $3.4 million for depreciation and amortization, $1.3 million for a foreign currency remeasurement loss due to an increase in foreign entity transactions and fluctuations in the foreign exchange rate during the period, and $0.7 million for the estimated fair value of a license fee in conjunction with the Takeda collaboration agreement. Cash used in operating activities also reflected a $7.1 million increase in prepaid expenses and other current assets primarily due to an increase in prepaid manufacturing and an increase in receivables related to a tenant improvement allowance, and a $1.2 million increase in non-current assets as result of an increase in upfront payments to contract research organizations and in clinical study costs. These increases were offset by a $32.2 million increase in accrued expenses and other liabilities as a result of an accrual for a liability under a collaboration agreement, increase in clinical study, manufacturing, and related costs as we continued to increase our research and development activities and employee compensation in bonuses and vacation due to higher headcount, and a $2.5 million increase in accounts payable primarily due to increased spend and the timing of payments.

Cash used in operating activities for the year ended December 31, 2015 was $106.0 million and reflected a net loss of $145.6 million, offset by non-cash charges of $5.6 million for the amortization of premium paid on purchased investments, $1.4 million for depreciation and amortization, and $24.9 million for stock-based compensation. Cash used in operating activities also reflected a $7.1 million increase in prepaid expenses and other current assets primarily due to an increase in CRO prepaid clinical costs, an increase in KHK receivable and an increase in interest receivable, and a $2.0 million decrease in accounts payable primarily due to the timing of payments. These increases were offset by a $0.2 million decrease in non-current assets as result of a decrease in manufacturing prepaid expenses and a $16.7 million increase in accrued expenses and other liabilities as a result of an increase in clinical study, manufacturing, related costs as we continued to increase our research and development activities and employee bonuses.

Cash Provided by (Used in) Investing Activities

Cash provided by investing activities for the year ended December 31, 2017 was $56.4 million and related to proceeds from maturities of investments of $273.6 million and the sale of investments of $157.9 million, and a decrease of $0.9 million in restricted cash related to line of credit reductions under our current lease agreements, offset by $142.8 million of cash used for the Dimension acquisition, purchases of property and equipment of $2.8 million, and purchases of investments of $230.5 million.

Cash provided by investing activities for the year ended December 31, 2016 was $89.9 million and related to purchases of investments of $442.5 million, purchases of property and equipment of $10.2 million and an increase of $1.2 million in restricted cash for the expansion of the space under our current lease, offset by proceeds from maturities of investments of $403.2 million and the sale of investments of $140.6 million.

Cash used in investing activities for the year ended December 31, 2015 was $292.4 million and related to purchases of investments of $624.2 million, purchases of property and equipment of $5.0 million and an increase of $1.5 million in restricted cash for the expansion of the space under our current lease, offset by proceeds from maturities of investments of $249.0 million and the sale of investments of $89.3 million.

Cash Flows Provided by Financing Activities

Cash provided by financing activities for the year ended December 31, 2017 was $136.3 million and was comprised of $132.0 million from the sale of common stock from our ATM offering and $9.3 million in net proceeds from the issuance of common stock upon the exercise of stock options and the vesting of restricted stock units, offset by payment of notes payable of $4.9 million.

Cash provided by financing activities for the year ended December 31, 2016 was $138.7 million and was comprised of $79.5 million from the sale of common stock from our ATM offering, $51.4 million from the sale of common stock to Takeda, and $7.8 million in net proceeds from the issuance of common stock upon the exercise of stock options and the vesting of restricted stock units.

Cash provided by financing activities for the year ended December 31, 2015 was $467.6 million and was comprised of $461.1 million from our underwritten public offerings and $6.5 million in net proceeds from the issuance of common stock upon the exercise of stock options and warrants and the vesting of restricted stock units.

Funding Requirements

In January 2018, we had $11.8 million in proceeds, net of commissions and other offering costs, from the offering related to the ATM sales agreement with Cowen. In January 2018, we completed the sale of our rare pediatric disease PRV for $130.0 million which we received in November 2017 from the FDA in connection with the approval of Mepsevii. Lastly, in January 2018, we also completed an underwritten public offering in which we sold 5,043,860 shares of common stock and received net proceeds of approximately $271.0 million.

We anticipate, excluding non-recurring items, that we will continue to generate annual losses for the foreseeable future, and we expect the losses to increase as we continue the development of, and seek regulatory approvals for, our product candidates, and begin to commercialize our approved product. Due to certain non-recurring or infrequent items like the sale of the PRV, we may have lower levels of losses or income in the near term in quarterly periods that may not be indicative of future periods or trends. We will likely require additional capital to fund our operations, complete our ongoing and planned clinical studies and commercialize our product, and funding may not be available to us on acceptable terms or at all.

If we are unable to raise additional capital in sufficient amounts or on terms acceptable to us, we may be required to delay, limit, reduce the scope of, or terminate one or more of our clinical studies, research and development programs, future commercialization efforts, or grant rights to develop and market product candidates that we would otherwise prefer to develop and market ourselves.

Our future funding requirements will depend on many factors, including the following:

- the scope, rate of progress, results and cost of our clinical studies, nonclinical testing, and other related activities;
- the cost of manufacturing clinical supplies, and establishing commercial supplies, of our product candidates and any products that we may develop;

- the number and characteristics of product candidates that we pursue;
- the cost, timing, and outcomes of regulatory approvals;
- the cost and timing of establishing our commercial infrastructure, and distribution capabilities; and
- the terms and timing of any collaborative, licensing, and other arrangements that we may establish, including any required upfront milestone and royalty payments thereunder.

We expect to satisfy future cash needs through existing capital balances and through some combination of public or private equity offerings, debt financings, collaborations, strategic alliances, licensing arrangements, and other marketing and distribution arrangements. Please see "Risk Factors—Risks Related to Our Financial Condition and Capital Requirements."

Contractual Obligations

We have contractual obligations from our operating leases, manufacturing and service contracts, licenses, royalties, development and collaboration arrangements, and other research and development activities. The following table summarizes our significant binding contractual obligations at December 31, 2017 (in thousands):

	Payments due by period				
	Less than 1 year	1 to 3 years	3 to 5 years	More than 5 years	Total
Operating leases	$ 6,210	$ 9,020	$ 4,890	$ 9,033	$ 29,153
Manufacturing and service contracts	7,542	1,286	$ -	$ —	$ 8,828
Total	$ 13,752	$ 10,306	$ 4,890	$ 9,033	$ 37,981

The terms of certain of our license and collaboration agreements require us to pay potential future milestone payments based on product development success. The above table excludes milestone or contractual payment obligations as the amount and timing of such obligations are unknown or uncertain, which potential obligations are further described in Note 12 to the accompanying Consolidated Financial Statements.

Recent Accounting Pronouncements

In February 2016, the FASB issued ASU No. 2016-02, *Leases (Topic 842)*, which requires an entity that is a lessee to record a right of use asset and a corresponding lease liability on the balance sheet for all leases with terms longer than 12 months. This guidance also requires disclosures about the amount, timing, and uncertainty of cash flows arising from leases. This guidance is effective for annual reporting periods beginning after December 15, 2018, and interim periods within those annual periods, using a modified retrospective approach, and early adoption is permitted. We are evaluating the effect that this guidance will have on our consolidated financial statements and related disclosures.

In October 2016, the FASB issued ASU 2016-16, *Income Taxes - Intra-Entity Transfers of Assets Other Than Inventory*, which requires entities to recognize the income tax consequences of an intra-entity transfer of an asset other than inventory when the transfer occurs. The standard is effective for fiscal years beginning after December 15, 2017, including interim periods within those fiscal years. Early adoption is permitted as of the beginning of a fiscal year. The new standard must be adopted using a modified retrospective transition method which is a cumulative-effective adjustment to retained earnings as of the beginning of the first effective reporting period. We are evaluating the effect that this guidance will have on our consolidated financial statements and related disclosures; however we expect the impact to be immaterial.

In November 2016, the FASB issued ASU 2016-18, *Statement of Cash Flows (Topic 230): Restricted Cash*, which requires restricted cash to be presented with cash and cash equivalents on the statement of cash flows and disclosure of how the statement of cash flows reconciles to the balance sheet if restricted cash is shown separately from cash and cash equivalents on the balance sheet. The guidance is effective for interim and annual periods beginning after December 15, 2017, and early adoption is permitted. We are evaluating the effect that this guidance will have on our statement of cash flows and related disclosures; however we expect the impact to be immaterial.

In January 2017, the FASB issued ASU 2017-04, *Intangibles – Goodwill and Other (Topic 350): Simplifying the Test for Goodwill Impairment*, which will eliminate the requirement to calculate the implied fair value of goodwill, commonly referred to as "Step 2" in the current goodwill impairment test. An entity will still have the option to perform the qualitative assessment for a reporting unit to determine if the quantitative impairment test is necessary. This guidance will be effective for annual and interim impairment tests performed in annual reporting periods beginning after December 15, 2020, and early adoption is permitted for annual or interim impairment tests performed after January 1, 2017. We are evaluating the effect that this guidance will have on our consolidated financial statements and related disclosures.

Off-Balance Sheet Arrangements

Since our inception in April 2010, we have not engaged in any off-balance sheet arrangements, as defined in the rules and regulations of the SEC.

Item 7A. ***Quantitative and Qualitative Disclosures About Market Risk***

Our exposure to market risk for changes in interest rates relates primarily to interest earned on our cash equivalents and investments. The primary objective of our investment activities is to preserve our capital to fund operations. A secondary objective is to maximize income from our investments without assuming significant risk. Our investment policy provides for investments in low-risk, investment-grade debt instruments. As of December 31, 2017, we had cash, cash equivalents, and investments totaling $244.5 million which includes bank deposits, money market funds, U.S. government treasury and agency securities, and investment-grade corporate bond securities which are subject to default, changes in credit rating, and changes in market value. The securities in our investment portfolio are classified as available for sale and are subject to interest rate risk and will decrease in value if market interest rates increase. A hypothetical 100 basis point change in interest rates during any of the periods presented would not have had a material impact on our consolidated financial statements. To date, we have not experienced a loss of principal on any of our investments.

We face foreign exchange risk as a result of entering into transactions denominated in currencies other than U.S. dollars. Due to the uncertain timing of expected payments in foreign currencies, we do not utilize any forward exchange contracts. All foreign transactions settle on the applicable spot exchange basis at the time such payments are made. An adverse movement in foreign exchange rates could have a material effect on payments made to foreign suppliers and for license agreements. Our primary exposure to currency risk is related to intercompany balances with our foreign subsidiaries, resulting in the foreign currency gains and losses generated on the remeasurement of our intercompany balances with our foreign subsidiaries, which are reported in other income (expense). The intercompany amounts are largely offset by the translation gains (losses) reported in other comprehensive income (loss), resulting in immaterial impact on stockholders' equity. A hypothetical 10% change in foreign exchange rates during any of the periods presented would not have had a material impact on our consolidated financial statements.

Item 8. ***Financial Statements and Supplementary Data***

Our financial statements are annexed to this Annual Report beginning on page F-1 and are incorporated by reference into this Item 8.

Item 9. ***Changes in and Disagreements with Accountants on Accounting and Financial Disclosure***

None.

Item 9A. ***Controls and Procedures***

Evaluation of Disclosure Controls and Procedures

We carried out an evaluation, under the supervision and with the participation of our management, including our Chief Executive Officer and our Chief Financial Officer, of the effectiveness of our "disclosure controls and procedures" as of the end of the period covered by this Annual Report, pursuant to Rules 13a-15(b) and 15d-15(b) under the Exchange Act. In connection with that evaluation, our Chief Executive Officer and our Chief Financial Officer concluded that our disclosure controls and procedures were effective and designed to provide reasonable assurance that the information required to be disclosed is recorded, processed, summarized and reported within the time periods specified in the SEC rules and forms as of December 31, 2017. For the purpose of this review, disclosure controls and procedures means controls and procedures designed to ensure that information required to be disclosed by us in the reports that we file or submit is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms. These disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by us in the reports that we file or submit is accumulated and communicated to management, including our principal executive officer and principal financial officer, as appropriate to allow timely decisions regarding required disclosure. In designing and evaluating the disclosure controls and procedures, our management recognized that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving the desired control objectives, and our management necessarily was required to apply its judgment in evaluating the cost-benefit relationship of possible controls and procedures.

Management's Annual Report on Internal Control Over Financial Reporting

Management is responsible for establishing and maintaining adequate internal control over financial reporting as defined in Rules 13a-15(f) and 15d-15(f) of the Exchange Act. Our management used the Committee of Sponsoring Organizations of the Treadway Commission Internal Control - *Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission* (2013 framework), or the COSO framework, to evaluate the effectiveness of internal control over financial reporting. Management believes that the COSO framework is a suitable framework for its evaluation of financial reporting because it is free from bias, permits reasonably consistent qualitative and quantitative measurements of our internal control over financial reporting, is sufficiently complete so that those relevant factors that would alter a conclusion about the effectiveness of our internal control over financial reporting are not omitted and is relevant to an evaluation of internal control over financial reporting.

Management has assessed the effectiveness of our internal control over financial reporting as of December 31, 2017 and has concluded that such internal control over financial reporting is effective.

Management's assessment of internal control over financial reporting as of December 31, 2017 excluded Dimension's internal control over financial reporting because we acquired Dimension in a purchase business combination in November 2017. This exclusion is in accordance with the general guidance issued by the Staff of the SEC that an assessment of a recent business combination may be omitted from management's report on internal control over financial reporting in the first year of consolidation.

Our independent registered public accounting firm, Ernst & Young LLP, has audited the financial statements included in this Annual Report and has issued a report on the effectiveness of our internal control over financial reporting. The report of Ernst & Young LLP is included below.

Changes in Internal Control over Financial Reporting

As discussed above, on November 7, 2017, we completed our acquisition of Dimension and Dimension became our wholly owned subsidiary. As a result of the Dimension acquisition, the internal control over financial reporting utilized by us prior to the acquisition became the internal control over financial reporting of Dimension, and we are currently in the process of evaluating and integrating Dimension's historical internal control over financial reporting with ours.

Other than continuing changes to our internal control processes resulting from the Dimension acquisition as discussed above, there have been no changes in our internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) during our fourth quarter ended December 31, 2017, that have materially affected, or are reasonably likely to materially affect our internal control over financial reporting.

Report of Independent Registered Public Accounting Firm

To the Stockholders and the Board of Directors of Ultragenyx Pharmaceutical Inc.:

Opinion on Internal Control over Financial Reporting

We have audited Ultragenyx Pharmaceutical, Inc.'s internal control over financial reporting as of December 31, 2017, based on criteria established in *Internal Control—Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission* (2013 framework) (the COSO criteria). In our opinion, Ultragenyx Pharmaceutical Inc. (the "Company") maintained, in all material respects, effective internal control over financial reporting as of December 31, 2017, based on the COSO criteria.

As indicated in the accompanying Management's Annual Report on Internal Control Over Financial Reporting, management's assessment of and conclusion on the effectiveness of internal control over financial reporting did not include the internal controls of Dimension Therapeutics, Inc., which is included in the 2017 consolidated financial statements of the Company and constituted 8% and 8% of total and net assets, respectively, as of December 31, 2017 and 81% and 2% of revenues and net income, respectively, for the year then ended. Our audit of internal control over financial reporting of the Company also did not include an evaluation of the internal control over financial reporting of Dimension Therapeutics, Inc.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets of the Company as of December 31, 2017 and 2016, the related consolidated statements of operations, comprehensive loss, stockholders' equity, and cash flows, for each of the three years in the period ended December 31, 2017 and related notes and our report dated February 21, 2018 expressed an unqualified opinion thereon.

Basis for Opinion

The Company's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting included in the accompanying Management's Annual Report on Internal Control over Financial Reporting. Our responsibility is to express an opinion on the Company's internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control Over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ Ernst & Young LLP

San Jose, California
February 21, 2018

Item 9B. Other Information

None.

PART III

Item 10. ***Directors, Executive Officers and Corporate Governance***

The information required by this Item is incorporated herein by reference to information in the proxy statement for our 2018 Annual Meeting of Stockholders, which we will file with the SEC within 120 days of the end of the fiscal year to which this Annual Report relates (the "2018 Proxy Statement"), including under the headings "Proposal No. 1—Election of Class II Directors," "Executive Officers," "Section 16(a) Beneficial Ownership Reporting Compliance," "Corporate Governance—Code of Business Conduct and Ethics," "Proposal No. 1—Election of Class II Directors—Nomination of Directors" and "Board of Directors and Committees." We have adopted a code of ethics that applies to all of our directors, officers and employees, including our principal executive, principal financial and principal accounting officers, or persons performing similar functions, or Code of Ethics. Our Code of Ethics is posted on our corporate governance website located at *www.ultragenyx.com*. We intend to disclose future amendments to certain provisions of the Code of Ethics, and waivers of the Code of Ethics granted to executive officers and directors, on the website within four business days following the date of the amendment or waiver.

Item 11. ***Executive Compensation***

The information required by this Item is incorporated herein by reference to information in the 2018 Proxy Statement, including under the headings "Executive Compensation," "Director Compensation," "Board of Directors and Committees—Compensation Committee Interlocks and Insider Participation," "Executive Compensation—Risk Management and Mitigation," and "Executive Compensation—Compensation Committee Report."

Item 12. ***Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters***

The information required by this Item is incorporated herein by reference to information in the 2018 Proxy Statement, including under the headings "Security Ownership of Certain Beneficial Owners and Management" and "Equity Compensation Plan Information."

Item 13. ***Certain Relationships and Related Transactions, and Director Independence***

The information required by this Item is incorporated herein by reference to information in the 2018 Proxy Statement, including under the headings "Certain Relationships and Related-Person Transactions," "Corporate Governance," and "Board of Directors and Committees."

Item 14. ***Principal Accountant Fees and Services***

The information required by this Item is incorporated herein by reference to information in the 2018 Proxy Statement, including under the heading "Proposal No. 2—Ratification of the Selection of Independent Registered Public Accounting Firm."

PART IV

Item 15. ***Exhibits and Financial Statement Schedules***

(a) The following documents are filed as part of this Annual Report.

(1) Consolidated Financial Statements

Consolidated Financial Statements—See Index to Consolidated Financial Statements at page F-1 of this Annual Report.

(2) Consolidated Financial Statement Schedules

Consolidated Financial statement schedules have been omitted in this Annual Report because they are not applicable, not required under the instructions, or the information requested is set forth in the consolidated financial statements or related notes thereto.

(b) Exhibits

Exhibit Number	Exhibit Description	Incorporated by Reference			Filed Herewith
		Form	Date	Number	
2.1	Agreement and Plan of Merger, dated October 2, 2017, among Ultragenyx Pharmaceutical Inc., Mystic River Merger Sub and Dimension Therapeutics, Inc.	8-K	10/2/2017	2.1	
2.2	Asset Purchase Agreement, dated December 14, 2017, among Ultragenyx Pharmaceutical Inc., Ultragenyx International UX003 Ltd. and Novartis Pharma AG				X
3.1	Amended and Restated Certificate of Incorporation	8-K	2/5/2014	3.1	
3.2	Amended and Restated Bylaws	8-K	2/5/2014	3.2	
4.1	Reference is made to Exhibits 3.1 and 3.2				
4.2	Form of Common Stock Certificate	S-1	11/8/2013	4.2	
4.3	Warrant, dated as of June 30, 2010, issued to Emil D. Kakkis, M.D., Ph.D.	S-1	11/8/2013	4.3	
4.4	Warrant, dated as of June 14, 2011, issued to Emil D. Kakkis, M.D., Ph.D.	S-1	11/8/2013	4.6	
4.5	Warrant, dated as of June 14, 2011, issued to Emil D. Kakkis, M.D., Ph.D.	S-1	11/8/2013	4.7	
10.1†	Collaboration and License Agreement, dated as of August 29, 2013, between Ultragenyx Pharmaceutical Inc. and Kyowa Hakko Kirin Co., Ltd.	S-1/A	12/23/2013	10.1	
10.2	Amendment No. 1 to Collaboration and License Agreement, dated as of August 24, 2015, between Ultragenyx Pharmaceutical Inc. and Kyowa Hakko Kirin Co., Ltd.	10-Q	11/10/2015	10.2	
10.3	Amendment No. 2 to Collaboration and License Agreement, effective as of November 28, 2016, between Ultragenyx Pharmaceutical Inc. and Kyowa Hakko Kirin Co., Ltd.				X
10.4*	Amendment No. 3 to Collaboration and License Agreement, effective September 29, 2017, between Ultragenyx Pharmaceutical Inc. and Kyowa Hakko Kirin Co., Ltd.				X
10.5*	Amendment No. 4 to Collaboration and License Agreement, effective as of January 29, 2018, between Ultragenyx Pharmaceutical Inc. and Kyowa Hakko Kirin Co., Ltd.				X

Exhibit Number	Exhibit Description	Incorporated by Reference			Filed Herewith
		Form	Date	Number	
10.6†	License Agreement, dated as of September 20, 2012, between Ultragenyx Pharmaceutical Inc. and Baylor Research Institute	S-1/A	12/23/2013	10.3	
10.7†	Amendment to the License Agreement, dated as of March 22, 2013, between Ultragenyx Pharmaceutical Inc. and Baylor Research Institute	S-1	11/8/2013	10.4	
10.8†	License Agreement, dated as of September 1, 2012, between Ultragenyx Pharmaceutical Inc. and St. Jude Children's Research Hospital	S-1/A	12/23/2013	10.7	
10.9	First Amendment to License Agreement, dated as of March 1, 2014, between Ultragenyx Pharmaceutical Inc. and St. Jude Children's Research Hospital	10-Q	8/11/2014	10.1	
10.10†	Exclusive License Agreement, dated as of November 22, 2010, between Ultragenyx Pharmaceutical Inc. and Saint Louis University	S-1/A	12/23/2013	10.8	
10.11	Supply Agreement, dated as of November 19, 2012, between Ultragenyx Pharmaceutical Inc. and CREMER OLEO GmbH & Co KG				X
10.12†	License and Collaboration Agreement, dated June 6, 2016, by and between Ultragenyx Pharmaceutical Inc. and Takeda Pharmaceutical Company Limited	10-Q/A	12/12/2016	10.1	
10.13†	License Agreement, dated October 30, 2013, by and between Dimension Therapeutics, Inc. and REGENXBIO Inc. (f/k/a ReGenX Biosciences, LLC), as amended				X
10.14†	Option and License Agreement, dated March 10, 2015, by and between Dimension Therapeutics, Inc. and REGENXBIO Inc.				X
10.15†	Collaboration and License Agreement, dated June 18, 2014, by and between Dimension Therapeutics, Inc. and Bayer HealthCare LLC				X
10.16†	Research, Collaboration and License Agreement, dated as of May 5, 2016, by and between Dimension Therapeutics, Inc. and The Trustees of the University of Pennsylvania, as amended				X
10.17*	3rd Amendment to Research, Collaboration and License Agreement, entered into as of October 30, 2017, by and between Dimension Therapeutics, Inc. and The Trustees of the University of Pennsylvania				X
10.18*	Commercial Supply and Services Agreement – Drug Substance, effective December 7, 2017, between Ultragenyx Europe Gmbh and Rentschler Biopharma SE				X
10.19*	Commercial Supply and Services Agreement – Drug Product, effective January 31, 2018, between Ultragenyx Europe Gmbh and Rentschler Biopharma SE				X

Exhibit Number	Exhibit Description	Incorporated by Reference			Filed Herewith
		Form	Date	Number	
10.20	Sales Agreement, dated July 27, 2017, between Ultragenyx Pharmaceutical Inc. and Cowen and Company, LLC	10-Q	7/28/2017	1.1	
10.21#	2011 Equity Incentive Plan (including forms of Stock Option Grant Notice and Stock Option Agreement thereunder)	S-1	11/8/2013	10.11	
10.22#	Amendment to the 2011 Equity Incentive Plan	S-1	11/8/2013	10.12	
10.23#	2014 Incentive Plan (as amended)	10-K	2/17/2017	10.20	
10.24#	Form of Incentive Stock Option Agreement	S-1/A	1/17/2014	10.14	
10.25#	Form of Non Statutory Stock Option Agreement (Employees)	S-1/A	1/17/2014	10.15	
10.26#	Form of Non Statutory Stock Option Agreement (Employees)(ex-U.S.)	10-Q	5/10/2016	10.3	
10.27#	Form of Non-Statutory Stock Option Agreement (Directors)	S-1/A	1/17/2014	10.16	
10.28#	Form of Restricted Stock Unit Agreement (Employees)	10-Q	5/10/2016	10.1	
10.29#	Form of Restricted Stock Unit Agreement (Employees)(ex-U.S.)	10-Q	5/10/2016	10.2	
10.30#	Form of Restricted Stock Unit Agreement (Directors)	S-1/A	1/17/2014	10.18	
10.31#	Form of Performance Stock Unit Agreement (Current Employees)				X
10.32#	Form of Performance Stock Unit Agreement (New Employees)				X
10.33#	2014 Employee Stock Purchase Plan (as amended)	10-K	2/17/2017	10.28	
10.34#	Corporate Bonus Plan	S-1/A	1/17/2014	10.27	
10.35#	Executive Employment Agreement, dated as of June 15, 2011, between Ultragenyx Pharmaceutical Inc. and Emil D. Kakkis, M.D., Ph.D.	S-1	11/8/2013	10.18	
10.36#	Amendment No. 1 to Executive Employment Agreement, dated August 8, 2014, by and between Ultragenyx Pharmaceutical Inc. and Emil D. Kakkis, M.D., Ph.D.	10-Q	8/11/2014	10.2	
10.37#	Offer Letter, dated as of October 31, 2011, between Ultragenyx Pharmaceutical Inc. and Thomas Kassberg	S-1	11/8/2013	10.19	
10.38#	Amendment No. 1 to Offer of Employment, dated as of August 8, 2014, by and between Ultragenyx Pharmaceutical Inc. and Thomas Kassberg	10-Q	8/11/2014	10.3	
10.39#	Offer Letter, dated as of March 12, 2012, between Ultragenyx Pharmaceutical Inc. and Shalini Sharp	S-1	11/8/2013	10.20	
10.40#	Amendment No. 1 to Offer of Employment, dated as of August 8, 2014, by and between Ultragenyx Pharmaceutical Inc. and Shalini Sharp	10-Q	8/11/2014	10.4	
10.41#	Offer Letter, dated as of April 26, 2016, between Ultragenyx Pharmaceutical Inc. and Karah Parschauer	10-Q	8/9/2016	10.3	

Exhibit Number	Exhibit Description	Incorporated by Reference			Filed Herewith
		Form	Date	Number	
10.42#	Offer Letter, dated as of February 20, 2015, between Ultragenyx Pharmaceutical Inc. and Dennis Huang	10-K	2/17/2017	10.36	
10.43#	Offer Letter, dated as of June 11, 2015, between Ultragenyx Pharmaceutical Inc. and John R. Pinion II	10-K	2/17/2017	10.37	
10.44#	Offer Letter, dated as of August 27, 2015, between Ultragenyx Pharmaceutical Inc. and Jayson Dallas, M.D.	10-K	2/17/2017	10.38	
10.45#	Addendum No. 1 to Offer of Employment, dated as August 3, 2015, by and between Ultragenyx Pharmaceutical Inc. and Jayson Dallas, M.D.	10-K	2/17/2017	10.39	
10.46#	Offer Letter, dated as of January 15, 2018, between Ultragenyx Pharmaceutical Inc. and Camille Bedrosian, M.D.				X
10.47#	Form of Indemnification Agreement	10-K	3/24/2014	10.23	
10.48	Standard Lease, dated as of July 5, 2011, between Ultragenyx Pharmaceutical Inc. and Condiotti Enterprises, Inc.	S-1	11/8/2013	10.22	
10.49	Addendum One to Standard Lease, dated as of July 5, 2011, between Ultragenyx Pharmaceutical Inc. and Condiotti Enterprises, Inc.	10-K	2/26/2016	10.34	
10.50	Addendum Two to Standard Lease, dated as of March 7, 2012, between Ultragenyx Pharmaceutical Inc. and Condiotti Enterprises, Inc.	10-K	2/26/2016	10.35	
10.51	Addendum #3 to Standard Lease, effective as of February 12, 2014, by and between Ultragenyx Pharmaceutical Inc. and Condiotti Enterprises, Inc.	8-K	2/25/2014	10.1	
10.52	Addendum #4 to Standard Lease, effective as of March 9, 2015, by and between Ultragenyx Pharmaceutical Inc. and Condiotti Enterprises, Inc.	8-K	3/13/2015	10.1	
10.53	Addendum #5 to Standard Lease, effective as of April 7, 2015, by and between Ultragenyx Pharmaceutical Inc. and Condiotti Enterprises, Inc.	10-K	2/26/2016	10.38	
10.54	License and Services Agreement, dated as of September 24, 2010, between Ultragenyx Pharmaceutical Inc. and The Buck Institute for Research on Aging	S-1	11/8/2013	10.23	
10.55	Amendment No. 1 to License and Services Agreement, dated as of September 4, 2012, between Ultragenyx Pharmaceutical Inc. and The Buck Institute for Research on Aging	S-1	11/8/2013	10.24	
10.56	Amendment No. 2 to License and Services Agreement, effective as of September 15, 2014, by and between Ultragenyx Pharmaceutical Inc. and The Buck Institute for Research on Aging	10-Q	11/10/2014	10.1	

Exhibit Number	Exhibit Description	Incorporated by Reference			Filed Herewith
		Form	Date	Number	
10.57	Amendment No. 3 to License and Services Agreement, effective September 21, 2015, between Ultragenyx Pharmaceutical Inc. and The Buck Institute for Research on Aging	10-Q	11/10/2015	10.3	
10.58	Amendment No. 4 to License and Services Agreement, effective September 28, 2016, between Ultragenyx Pharmaceutical Inc. and The Buck Institute for Research on Aging	10-K	2/17/2017	10.51	
10.59	Lease Agreement between Marina Boulevard Property, LLC and Ultragenyx Pharmaceutical Inc., dated as of December 8, 2015	10-K	2/26/2016	10.43	
10.60	Standard Lease, dated December 17, 2015, between Ultragenyx Pharmaceutical Inc. and Condiotti Enterprises, Inc.				X
10.61	Addendum 1 to Standard Lease, dated December 17, 2015, between Ultragenyx Pharmaceutical Inc. and Condiotti Enterprises, Inc.				X
10.62	Addendum 2 to Standard Lease, dated March 14, 2016, between Ultragenyx Pharmaceutical Inc. and Condiotti Enterprises, Inc.				X
10.63	Addendum 3 to Standard Lease, dated September 22, 2017, between Ultragenyx Pharmaceutical Inc. and Condiotti Enterprises, Inc.				X
10.64	Indenture of Lease between Dimension Therapeutics, Inc. and Rivertech Associates II, LLC, dated March 11, 2014, as amended				X
10.65	Second Lease Amendment to the Lease between Dimension Therapeutics, Inc. and Rivertech Associates II, LLC, dated April 28, 2017				X
10.66	Lease Agreement, by and between Dimension Therapeutics, Inc. and ARE-MA Region No. 20, LLC, dated November 2, 2015, and Consent to Assignment to Ultragenyx Pharmaceutical Inc.				X
21.1	Subsidiaries of Ultragenyx Pharmaceutical Inc.				X
23.1	Consent of Independent Registered Public Accounting Firm				X
24.1	Power of Attorney (included on the signature page of this report)				
31.1	Certification of Chief Executive Officer of Ultragenyx Pharmaceutical Inc., as required by Rule 13a-14(a) or Rule 15d-14(a) of the Exchange Act as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002				X

Exhibit Number	Exhibit Description	Incorporated by Reference			Filed Herewith
		Form	Date	Number	
31.2	Certification of Chief Financial Officer of Ultragenyx Pharmaceutical Inc., as required by Rule 13a-14(a) or Rule 15d-14(a) of the Exchange Act as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002				X
32.1§	Certification by the Chief Executive Officer and Chief Financial Officer, as required by Rule 13a-14(b) or Rule 15d-14(b) and Section 1350 of Chapter 36 of Title 18 of the United States Code (18 U.S.C. §1350)				X
101.INS	XBRL Instance Document				X
101.SCH	XBRL Taxonomy Extension Schema Document				X
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document				X
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document				X
101.LAB	XBRL Taxonomy Extension Labels Linkbase Document				X
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document				X

† Confidential treatment has been granted with respect to certain portions (indicated by asterisks) of this exhibit. Omitted portions have been filed separately with the SEC.

* Portions of this exhibit (indicated by asterisks) have been omitted pursuant to a request for confidential treatment. Omitted portions have been filed separately with the SEC

# Indicates management contract or compensatory plan.

§ The certification attached as Exhibit 32.1 that accompanies this Annual Report is not deemed filed with the SEC and is not to be incorporated by reference into any filing of Ultragenyx Pharmaceutical Inc. under the Securities Act or the Exchange Act, whether made before or after the date of this Annual Report, irrespective of any general incorporation language contained in such filing.

Item 16. ***Form 10-K Summary***

None.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

ULTRAGENYX PHARMACEUTICAL INC.

By: /s/ Emil D. Kakkis
Emil D. Kakkis, M.D., Ph.D.
President and Chief Executive Officer

Date: February 21, 2018

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints Emil D. Kakkis, M.D., Ph.D. and Shalini Sharp, and each of them, as his or her true and lawful attorneys-in-fact and agents, with full power of substitution for him or her, and in his or her name in any and all capacities, to sign any and all amendments to this Annual Report, and to file the same, with exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done therewith, as fully to all intents and purposes as he or she might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents, and any of them, his or her substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

Signature	Title	Date
/s/ Emil D. Kakkis Emil D. Kakkis, M.D., Ph.D.	President and Chief Executive Officer and Director (Principal Executive Officer)	February 21, 2018
/s/ Shalini Sharp Shalini Sharp	Executive Vice President and Chief Financial Officer (Principal Financial Officer)	February 21, 2018
/s/ Theodore A. Huizenga Theodore A. Huizenga	Vice President, Corporate Controller (Principal Accounting Officer)	February 21, 2018
/s/ Daniel G. Welch Daniel G. Welch.	Chairman of the Board	February 21, 2018
/s/ William Aliski William Aliski	Director	February 21, 2018
/s/ Deborah Dunsire Deborah Dunsire, M.D.	Director	February 21, 2018
/s/ Lars Ekman Lars Ekman, M.D., Ph.D.	Director	February 21, 2018
/s/ Matthew K. Fust Matthew K. Fust	Director	February 21, 2018
/s/ Michael Narachi Michael Narachi	Director	February 21, 2018
/s/ Clay B. Siegall Clay B. Siegall, Ph.D.	Director	February 21, 2018

Ultragenyx Pharmaceutical Inc.

INDEX TO FINANCIAL STATEMENTS

Report of Independent Registered Public Accounting Firm

To the Stockholders and the Board of Directors of Ultragenyx Pharmaceutical Inc.:

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Ultragenyx Pharmaceutical Inc. (the "Company") as of December 31, 2017 and 2016, the related consolidated statements of operations, comprehensive loss, stockholders' equity, and cash flows, for each of the three years in the period ended December 31, 2017, and the related notes (collectively referred to as the "financial statements"). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2017 and 2016, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2017, in conformity with US generally accepted accounting principles.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company's internal control over financial reporting as of December 31, 2017, based on criteria established in *Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission* (2013 Framework) and our report dated February 21, 2018 expressed an unqualified opinion thereon.

Basis for Opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the US federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures include examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ Ernst & Young LLP

We have served as the Company's auditor since 2010.

San Jose, California
February 21, 2018

ULTRAGENYX PHARMACEUTICAL INC.
CONSOLIDATED BALANCE SHEETS
(In thousands, except share and per share amounts)

	December 31,	
	2017	**2016**
Assets		
Current assets:		
Cash and cash equivalents	$ 100,488	$ 161,120
Short-term investments	134,005	219,028
Accounts receivable	5,172	—
Inventory	757	—
Restricted cash	461	1,411
Prepaid expenses and other current assets	28,700	20,136
Total current assets	269,583	401,695
Property and equipment, net	21,837	17,055
Restricted cash	2,092	2,076
Long-term investments	9,975	117,963
Intangible assets, net	141,545	—
Goodwill	44,406	—
Other assets	1,315	1,837
Total assets	$ 490,753	$ 540,626
Liabilities and Stockholders' Equity		
Current liabilities:		
Accounts payable	$ 8,886	$ 5,364
Accrued liabilities	61,427	54,554
Deferred rent—current portion	701	341
Total current liabilities	71,014	60,259
Deferred tax liabilities	31,166	—
Other liabilities	5,119	6,393
Total liabilities	107,299	66,652
Commitments and contingencies (Note 12)		
Stockholders' equity:		
Preferred stock, par value of $0.001 per share—25,000,000 shares authorized; nil outstanding as of December 31, 2017 and 2016	—	—
Common stock, par value of $0.001 per share—250,000,000 shares authorized; 44,167,071 and 41,240,230 shares issued and outstanding as of December 31, 2017 and 2016, respectively	44	41
Additional paid-in capital	1,221,762	1,003,561
Accumulated other comprehensive income (loss)	(5,680)	905
Accumulated deficit	(832,672)	(530,533)
Total stockholders' equity	383,454	473,974
Total liabilities and stockholders' equity	$ 490,753	$ 540,626

See accompanying notes.

ULTRAGENYX PHARMACEUTICAL INC.

CONSOLIDATED STATEMENTS OF OPERATIONS

(In thousands, except share and per share amounts)

	Year Ended December 31,		
	2017	**2016**	**2015**
Revenues:			
Collaboration and license	$ 2,136	$ —	$ —
Product sales	476	133	—
Total revenues	2,612	133	—
Operating expenses:			
Cost of sales	1	—	—
Research and development	231,644	183,204	114,737
Selling, general and administrative	99,909	64,936	33,001
Total operating expenses	331,554	248,140	147,738
Loss from operations	(328,942)	(248,007)	(147,738)
Interest income	4,074	3,789	2,320
Other income (expense)	6,530	(1,621)	(200)
Loss before income taxes	(318,338)	(245,839)	(145,618)
Benefit from (provision for) income taxes	16,199	(35)	—
Net loss	$ (302,139)	$ (245,874)	$ (145,618)
Net loss per share, basic and diluted	$ (7.12)	$ (6.21)	$ (3.96)
Shares used in computing net loss per share, basic and diluted	42,453,135	39,586,908	36,782,603

See accompanying notes.

ULTRAGENYX PHARMACEUTICAL INC.

CONSOLIDATED STATEMENTS OF COMPREHENSIVE LOSS

(In thousands)

	Year Ended December 31,		
	2017	**2016**	**2015**
Net loss	$ (302,139)	$ (245,874)	$ (145,618)
Other comprehensive income (loss):			
Foreign currency translation adjustments	(10,110)	1,322	—
Transfer of currency translation adjustments balance to other income for the liquidation of a foreign entity	3,490	—	—
Unrealized gain (loss) on available-for-sale securities	35	451	(694)
Other comprehensive income (loss):	(6,585)	1,773	(694)
Total comprehensive loss	$ (308,724)	$ (244,101)	$ (146,312)

See accompanying notes.

ULTRAGENYX PHARMACEUTICAL INC.

CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY

(In thousands, except share amounts)

	Common Stock		Additional Paid-In Capital	Accumulated Other Comprehensive Income (Loss)	Accumulated Deficit	Total Stockholders' Equity
	Shares	Amount				
Balance as of December 31, 2014	31,934,682	$ 32	$ 324,128	$ (174)	$ (139,041)	$ 184,945
Issuance of common stock in connection with underwritten public offering, net of issuance costs	5,980,000	6	461,130	—	—	461,136
Employee stock-based compensation	—	—	24,884	—	—	24,884
Issuance of common stock under equity plan awards, net of tax	967,712	1	6,436	—	—	6,437
Other comprehensive loss	—	—	—	(694)	—	(694)
Net loss	—	—	—	—	(145,618)	(145,618)
Balance as of December 31, 2015	38,882,394	39	816,578	(868)	(284,659)	531,090
Issuance of common stock in connection with at-the-market offering, net of issuance costs	1,159,415	1	79,485	—	—	79,486
Issuance of common stock in connection with collaboration agreement, net of issuance costs	727,120	1	52,271	—	—	52,272
Put option grant in connection with collaboration agreement	—	—	(916)	—	—	(916)
Employee stock-based compensation	—	—	48,309	—	—	48,309
Issuance of common stock under equity plan awards, net of tax	471,301	—	7,834	—	—	7,834
Other comprehensive income	—	—	—	1,773	—	1,773
Net loss	—	—	—	—	(245,874)	(245,874)
Balance as of December 31, 2016	41,240,230	41	1,003,561	905	(530,533)	473,974
Issuance of common stock in connection with at-the-market offering, net of issuance costs	2,251,217	2	131,958	—	—	131,960
Fair value of vested stock options assumed from acquisition	—	—	8,979	—	—	8,979
Employee stock-based compensation	—	—	68,014	—	—	68,014
Issuance of common stock under equity plan awards, net of tax	675,624	1	9,250	—	—	9,251
Other comprehensive loss	—	—	—	(6,585)	—	(6,585)
Net loss	—	—	—	—	(302,139)	(302,139)
Balance as of December 31, 2017	44,167,071	$ 44	$ 1,221,762	$ (5,680)	$ (832,672)	$ 383,454

See accompanying notes.

ULTRAGENYX PHARMACEUTICAL INC.
CONSOLIDATED STATEMENTS OF CASH FLOWS
(In thousands)

	Year Ended December 31,		
	2017	**2016**	**2015**
Operating activities:			
Net loss	$ (302,139)	$ (245,874)	$ (145,618)
Adjustments to reconcile net loss to net cash used in operating activities:			
Stock-based compensation	68,014	48,309	24,884
Amortization of premium on investment securities, net	1,706	4,842	5,637
Depreciation and amortization	5,825	3,424	1,384
Foreign currency remeasurement (gain) loss	(7,018)	1,322	—
Non-cash license fee from collaboration arrangement	—	700	—
Changes in operating assets and liabilities:			
Prepaid expenses and other current assets	(3,338)	(7,147)	(7,131)
Other assets	522	(1,242)	179
Accounts payable	3,459	2,502	(1,982)
Accrued liabilities and other liabilities	(4,628)	32,189	16,670
Deferred tax liabilities	(16,246)	—	—
Net cash used in operating activities	(253,843)	(160,975)	(105,977)
Investing activities:			
Acquisition, net of cash acquired	(142,804)	—	—
Purchase of property and equipment	(2,793)	(10,188)	(4,955)
Purchase of investments	(230,487)	(442,490)	(624,226)
Proceeds from sale of investments	157,934	140,556	89,321
Proceeds from maturities of investments	273,632	403,239	249,050
Decrease (increase) in restricted cash	934	(1,202)	(1,541)
Net cash provided by (used in) investing activities	56,416	89,915	(292,351)
Financing activities:			
Proceeds from the issuance of common stock in connection with underwritten public offerings, net	—	—	461,136
Proceeds from the issuance of common stock in connection with at-the-market offering, net	131,960	79,486	—
Proceeds from the issuance of common stock in connection with collaboration agreement, net	—	51,356	—
Proceeds from the issuance of common stock under equity plan awards, net of tax	9,251	7,834	6,437
Repayment of note payable	(4,944)	—	—
Net cash provided by financing activities	136,267	138,676	467,573
Effect of exchange rate changes on cash	528	(65)	—
Net increase (decrease) in cash and cash equivalents	(60,632)	67,551	69,245
Cash and cash equivalents at beginning of year	161,120	93,569	24,324
Cash and cash equivalents at end of year	$ 100,488	$ 161,120	$ 93,569
Supplemental disclosures of non-cash investing and financing information:			
Fair value of vested stock options assumed in acquisition	$ 8,979	$ —	$ —
Costs of property and equipment included in accounts payable and accrued liabilities	$ 400	$ 147	$ 769
Tenant improvement allowance	$ —	$ 3,467	$ —

See accompanying notes.

1. Organization and Basis of Presentation

Ultragenyx Pharmaceutical Inc. (the Company) is a biopharmaceutical company and was incorporated in California on April 22, 2010. The Company subsequently reincorporated in the state of Delaware in June 2011.

The Company is focused on the identification, acquisition, development, and commercialization of novel products for the treatment of rare and ultra-rare diseases, with a focus on serious, debilitating genetic diseases. On November 15, 2017, the U.S. Food and Drug Administration (FDA), approved the Company's first product, Mepsevii (vestronidase alfa), the first medicine approved for the treatment of children and adults with MPS VII, also known as Sly syndrome. Mepsevii is an intravenous enzyme replacement therapy for the treatment of MPS VII, a rare lysosomal storage disease that often leads to multi-organ dysfunction, pervasive skeletal disease, and death.

The Company is conducting Phase 2 and Phase 3 studies of burosumab (KRN23 or UX023), an antibody targeting fibroblast growth factor 23 (FGF23), in pediatric and adult patients with X-linked hypophosphatemia (XLH) and a Phase 2 study in tumor induced osteomalacia (TIO), both rare diseases that impair bone mineralization; a Phase 3 study for UX007 in patients with glucose transporter type-1 deficiency syndrome (Glut1 DS), a brain energy deficiency, who are experiencing movement disorders; a Phase 2 clinical study of UX007 in patients severely affected by long-chain fatty acid oxidation disorders (LC-FAOD), a genetic disorder in which the body is unable to convert long chain fatty acids into energy and a Phase 1/2 open label clinical study of DTX 301, an adeno-associated virus (AAV8) gene therapy product candidate designed for the treatment of patients with ornithine transcarbamylase (OTC) deficiency, the most common urea cycle disorder. The Company operates as one reportable segment.

In the course of its research activities, the Company has sustained operating losses and expects such annual losses to continue over the next several years. The Company's ultimate success depends on the outcome of its research and development activities. Management expects to incur additional losses in the future to conduct product research and development and recognizes the need to raise additional capital to fully implement its business plan. Through December 31, 2017, the Company has relied primarily on the proceeds from equity offerings to finance its operations.

The Company intends to raise additional capital through the issuance of equity, borrowings, or strategic alliances with partner companies. However, if such financing is not available at adequate levels, the Company will need to reevaluate its operating plans.

2. Summary of Significant Accounting Policies

Basis of Consolidation

The consolidated financial statements include the accounts of Ultragenyx Pharmaceutical Inc. and our wholly-owned subsidiaries. All intercompany balances and transactions have been eliminated.

Use of Estimates

The accompanying consolidated financial statements have been prepared in accordance with U.S. generally accepted accounting principles ("GAAP"). The preparation of the consolidated financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, disclosure of contingent liabilities and the reported amounts of expenses in the consolidated financial statements and the accompanying notes. On an ongoing basis, management evaluates its estimates, including those related to clinical trial accruals, fair value of assets and liabilities, income taxes, and stock-based compensation. Management bases its estimates on historical experience and on various other market-specific and relevant assumptions that management believes to be reasonable under the circumstances. Actual results could differ from those estimates.

Cash and Cash Equivalents

The Company considers all highly liquid investments with original maturities of three months or less from the date of purchase to be cash equivalents. Cash equivalents consist primarily of amounts invested in money market accounts.

Investments

All investments have been classified as "available-for-sale" and are carried at estimated fair value as determined based upon quoted market prices or pricing models for similar securities. Management determines the appropriate classification of its investments at the time of purchase and reevaluates such designation as of each balance sheet date. Investments with a maturity of one year or less from the balance sheet date are reported as short-term investments and investments with a maturity of greater than one year from the balance sheet date are reported as long-term investments. Unrealized gains and losses are excluded from earnings and are reported as a component of comprehensive loss. Realized gains and losses and declines in fair value judged to be other than temporary, if any, on available-for-sale securities are included in other income (expense). The cost of securities sold is based on the specific-identification method. Interest on investments is included in interest income.

Concentration of Credit Risk and Other Risks and Uncertainties

Financial instruments that potentially subject the Company to a concentration of credit risk consist of cash, cash equivalents, and investments. The Company's cash, cash equivalents, and investments are held by financial institutions that management believes are of high credit quality. The Company's investment policy limits investments to fixed income securities denominated and payable in U.S. dollars such as U.S. government obligations, money market instruments and funds, corporate bonds, and asset-backed securities and places restrictions on maturities and concentrations by type and issuer. Such deposits may, at times, exceed federally insured limits. The Company has not experienced any losses on its deposits of cash and cash equivalents and its accounts are monitored by management to mitigate risk. The Company is exposed to credit risk in the event of default by the financial institutions holding its cash and cash equivalents, corporate bond issuers and other financial instruments to the extent recorded in the balance sheets.

Concentrations on credit risk with respect to accounts receivable are limited due to the Company's limited number of customers.

The Company is dependent on third-party manufacturers to supply products for research and development activities in its programs. In particular, the Company relies and expects to continue to rely on a small number of manufacturers to supply it with its requirements for the active pharmaceutical ingredients and formulated drugs related to these programs. These programs could be adversely affected by a significant interruption in the supply of active pharmaceutical ingredients and formulated drugs.

Inventory

The Company values inventory at the lower of cost and net realizable value and determines the cost of inventory using the average-cost method. Inventories consist of currently approved product.

The Company periodically reviews its inventories for excess amounts or obsolescence and writes down obsolete or otherwise unmarketable inventory to its estimated net realizable value.

Restricted Cash

Restricted cash primarily consists of money market accounts as collateral for its obligations under its facility leases of the Company's corporate headquarters in Novato, California and for its facilities in Brisbane, California and Woburn and Cambridge, Massachusetts.

Property and Equipment

Property and equipment are stated at cost, less accumulated depreciation and amortization. Depreciation and amortization is computed using the straight-line method over the estimated useful lives of the respective assets. Depreciation and amortization begins at the time the asset is placed in service. Maintenance and repairs are charged to operations as incurred. Upon sale or retirement of assets, the cost and related accumulated depreciation are removed from the balance sheet and the resulting gain or loss, if any, is reflected in operations.

The useful lives of the property and equipment are as follows:

Research and development equipment	5 years
Furniture and office equipment	5 years
Computer equipment	3 years
Software	3-5 years
Leasehold improvements	Shorter of lease term or estimated useful life

Intangible Assets

The Company recognizes an acquired intangible apart from goodwill whenever the intangible arises from contractual or other legal rights, or whenever it can be separated or divided from the acquired entity and sold, transferred, licensed, rented or exchanged, either individually or in combination with a related contract, asset or liability. The Company's intangible assets consist of acquired in-process research and development (IPR&D) and an acquired contract asset.

IPR&D assets represent capitalized incomplete research projects that the Company acquired through business combinations. Such assets are initially measured at their acquisition date fair values and are tested for impairment, until the completion or abandonment of the associated research and development efforts. If and when development is complete, which generally occurs when regulatory approval to market a product is obtained, the associated assets will be deemed finite-lived and will be amortized over a period that best reflects the economic benefits provided by these assets. The acquired contract asset was initially recorded at fair value and is amortized over estimated useful live.

The Company tests its definite and indefinite-lived intangible assets for impairment annually during the fourth quarter and more frequently if events or changes in circumstances indicate that it is more likely than not that the asset is impaired. The Company also reviews the useful lives of its assets periodically to determine whether events and circumstances warrant a revision to the remaining useful life. Changes in the useful life are adjusted prospectively by revising the remaining period over which the asset is amortized. The Company has not recorded any impairments nor made any adjustments to the useful lives of its assets since inception.

Goodwill

Goodwill represents the excess of purchase price over fair value of net assets acquired in a business combination and is not amortized. Goodwill is subject to impairment testing at least annually during the fourth quarter or when a triggering event occurs that could indicate a potential impairment. The Company has not recorded any impairments since inception.

Impairment of Long-Lived Assets

The Company evaluates its long-lived assets, including property and equipment, for impairment whenever events or changes in circumstances indicate that the carrying value of these assets may not be recoverable. Recoverability of these assets is measured by comparison of the carrying amount of each asset to the future undiscounted cash flows expected to result from the use of the asset and its eventual disposition. If the asset is considered to be impaired, the amount of any impairment is measured as the difference between the carrying value and the fair value of the impaired asset. The Company has not recorded impairment of any long-lived assets since inception.

Accruals of Research and Development Costs

The Company records accruals for estimated costs of research, preclinical and clinical studies and manufacturing development. These costs are a significant component of the Company's research and development expenses. A substantial portion of the Company's ongoing research and development activities are conducted by third-party service providers, including contract research organizations. The Company accrues the costs incurred under its agreements with these third parties based on actual work completed in accordance with agreements established with these third parties. The Company determines the actual costs through discussions with internal personnel and external service providers as to the progress or stage of completion of the services and the agreed-upon fee to be paid for such services.

Revenue Recognition

In May 2014, the Financial Accounting Standards Board (FASB), issued Accounting Standards Update (ASU) 2014-09, *Revenue from Contracts with Customers (ASC 606)*, to supersede nearly all existing revenue recognition guidance under GAAP. The core principle of ASU 2014-09 is to recognize revenues when promised goods or services are transferred to customers in an amount that reflects the consideration that is expected to be received for those goods or services. ASU 2014-09 defines a five-step process to achieve this core principle and, in doing so, it is possible more judgment and estimates may be required within the revenue recognition process than are required under existing GAAP, including identifying performance obligations in a contract, estimating the amount of variable consideration to include in the transaction price and allocating the transaction price to each separate performance obligation. The Company has early adopted the new revenue standard as of January 1, 2017 using a full retrospective application to each prior reporting period presented. Through January 1, 2017, the Company had recorded a cumulative inception to date total of $0.1 million of revenues. The adoption did not have an effect on the Consolidated Financial Statements on the adoption date and no adjustment to prior year consolidated financial statements was required.

Product sales

The Company sells Mepsevii through a limited number of distributors. Under ASC 606, revenue from product sales is recognized at the point in time when the delivery is made and when title and risk of loss transfers to these distributors. The Company also recognizes revenue from sales of Mepsevii on a "named patient" basis, which are allowed in certain countries prior to the commercial approval of the product in the territory. Prior to recognizing revenue, the Company makes estimates of the transaction price, including variable consideration that is subject to a constraint. Amounts of variable consideration are included in the transaction price to the extent that it is probable that a significant reversal in the amount of cumulative revenue recognized will not occur when the uncertainty associated with the variable consideration is subsequently resolved. Product sales are recorded net of estimated government-mandated rebates and chargebacks, distribution fees, estimated product returns and other deductions.

Collaboration and license revenue

The Company has certain license and collaboration agreements that are within the scope of ASC 808, *Collaborative Agreements*, which provides guidance on the presentation and disclosure of collaborative arrangements. Funding received related to research and development services and pre-commercialization costs are classified as a reduction of research and development expenses and selling, general and administrative expenses, respectively in the consolidated statement of operations because the provision of such services for collaborative partners are not considered to be part of the Company's ongoing major or central operations.

The Company also receives royalty revenues under certain of the Company's license or collaboration agreements in exchange for license of intellectual property. If the Company does not have any future performance obligations under these license or collaborations agreements, royalty revenue is recorded as the underlying sales occur.

The Company also recognizes collaboration and license revenue under certain of the Company's license or collaboration agreements that are within the scope of ASC 606. The terms of these agreements may contain multiple performance obligations, which may include licenses and research and development activities. The Company evaluates these agreements under ASC 606 to determine the distinct performance obligations.

Prior to recognizing revenue, the Company makes estimates of the transaction price, including variable consideration that is subject to a constraint. Amounts of variable consideration are included in the transaction price to the extent that it is probable that a significant reversal in the amount of cumulative revenue recognized will not occur and when the uncertainty associated with the variable consideration is subsequently resolved. Variable consideration may include nonrefundable upfront license fees, payments for research and development activities, reimbursement of certain third-party costs, payments based upon the achievement of specified milestones, and royalty payments based on product sales derived from the collaboration.

If there are multiple distinct performance obligations, the Company allocates the transaction price to each distinct performance obligation based on its relative standalone selling price. The standalone selling price is generally determined based on the prices charged to customers or using expected cost plus margin. Revenue is recognized by measuring the progress toward complete satisfaction of the performance obligations using an input measure.

Leases

The Company enters into lease agreements for its office and laboratory facilities. These leases are classified as operating leases. Rent expense is recognized on a straight-line basis over the term of the lease and, accordingly, the Company records the difference between cash rent payments and the recognition of rent expense as a deferred rent liability. Incentives granted under the Company's facilities leases, including allowances to fund leasehold improvements, are deferred and are recognized as adjustments to rental expense on a straight-line basis over the term of the lease.

Comprehensive Loss

Comprehensive loss is the change in stockholders' equity from transactions and other events and circumstances other than those resulting from investments by stockholders and distributions to stockholders. The Company's other comprehensive loss is comprised of unrealized gains and losses on investments in available-for-sale securities and foreign currency translation adjustments.

Research and Development

Research and development costs are expensed as incurred and consist of salaries and benefits, stock-based compensation expense, lab supplies and facility costs, as well as fees paid to other nonemployees and entities that conduct certain research and development activities on the Company's behalf. Amounts incurred in connection with license agreements are also included in research and development expense. Nonrefundable advance payments for goods or services to be received in the future for use in research and development activities are deferred and capitalized. The capitalized amounts are expensed as the related goods are delivered or the services are performed.

Stock-Based Compensation

Stock-based awards issued to employees, including stock options, restricted stock units (RSUs), and performance stock units (PSUs) are recorded at fair value as of the grant date and recognized as expense on a straight-line basis over the employee's requisite service period (generally the vesting period). PSUs vest only if certain specified criteria are achieved and the employees' continued service requirements are met; therefore, the expense recognition occurs when the likelihood of the PSUs being earned is deemed probable. Noncash stock compensation expense on awards expected to vest are recognized net of estimated forfeitures.

In March 2016, the FASB issued ASU 2016-09, *Compensation — Stock Compensation (Topic 718): Improvements to Employee Share-Based Payment Accounting*, which simplifies several aspects of the accounting for employee share-based payments, including income tax consequences, application of award forfeitures to expense, classification on the statement of cash flows, and classification of awards as either equity or liabilities. The Company adopted ASU 2016-09 as of January 1, 2017. On January 1, 2017, there was $19.7 million of cumulative unrecognized excess tax benefits which was fully offset by a corresponding increase in the valuation allowance. The adoption did not have any other impact on the Consolidated Financial Statements on the adoption date.

Income Taxes

The Company uses the liability method of accounting for income taxes. Under this method, deferred tax assets and liabilities are determined based on the differences between the financial reporting and the tax bases of assets and liabilities and are measured using the enacted tax rates and laws that will be in effect when the differences are expected to reverse. The Company must then assess the likelihood that the resulting deferred tax assets will be realized. A valuation allowance is provided when it is more likely than not that some portion or all of a deferred tax asset will not be realized. Due to the Company's lack of earnings history, the net deferred tax assets have been fully offset by a valuation allowance.

In conjunction with Dimension acquisition, a deferred tax liability was recorded reflecting the tax impact of the difference between the book basis and tax basis of acquired IPR&D. Such deferred income tax liability is not used to offset deferred tax assets when analyzing the Company's valuation allowance as the acquired IPR&D is considered to have an indefinite life until the Company completes or abandons development of the acquired IPR&D.

The Company recognizes benefits of uncertain tax positions if it is more likely than not that such positions will be sustained upon examination based solely on their technical merits, as the largest amount of benefit that is more likely than not to be realized upon the ultimate settlement. The Company's policy is to recognize interest and penalties related to the underpayment of income taxes as a component of income tax expense or benefit. To date, there have been no interest or penalties charged in relation to the unrecognized tax benefits.

Foreign Currency

Assets and liabilities of non-U.S. subsidiaries that operate in a local currency environment, where the local currency is the functional currency, are translated to U.S. dollars at exchange rates in effect at the balance sheet date, with the resulting translation adjustments directly recorded to a separate component of accumulated other comprehensive loss. Income and expense accounts are translated at average exchange rates for the period. Transactions which are not in the functional currency of the entity are remeasured into the functional currency and gains or losses resulting from the remeasurement recorded in other income (expense).

Net Loss per Share

Basic net loss per share is calculated by dividing the net loss by the weighted-average number of shares of common stock outstanding during the period, without consideration for common stock equivalents. Diluted net loss per share is the same as basic net loss per share, since the effects of potentially dilutive securities are antidilutive. In periods when we have incurred a net loss, options and warrants to purchase common stock are considered common stock equivalents, but have been excluded from the calculation of diluted net loss per share, as their effect is antidilutive.

Business Combinations

The Company applies the provisions of ASC Topic 805, "*Business Combinations" (Topic 805)*", in the accounting for acquisitions. The Company allocates the purchase price of acquired businesses to the tangible and intangible assets acquired and liabilities assumed based upon their estimated fair values on the acquisition date. The purchase price allocation process requires management to make significant estimates and assumptions, especially at the acquisition date with respect to intangible assets which includes IPR&D.

Recent Accounting Pronouncements

In February 2016, the FASB issued ASU No. 2016-02, *Leases (Topic 842)*, which requires an entity that is a lessee to record a right of use asset and a corresponding lease liability on the balance sheet for all leases with terms longer than 12 months. This guidance also requires disclosures about the amount, timing, and uncertainty of cash flows arising from leases. This guidance is effective for annual reporting periods beginning after December 15, 2018, and interim periods within those annual periods, using a modified retrospective approach, and early adoption is permitted. The Company is evaluating the effect that this guidance will have on its Consolidated Financial Statements and related disclosures.

In October 2016, the FASB issued ASU 2016-16, *Income Taxes - Intra-Entity Transfers of Assets Other Than Inventory*, which requires entities to recognize the income tax consequences of an intra-entity transfer of an asset other than inventory when the transfer occurs. The standard is effective for fiscal years beginning after December 15, 2017, including interim periods within those fiscal

years. Early adoption is permitted as of the beginning of a fiscal year. The new standard must be adopted using a modified retrospective transition method which is a cumulative-effective adjustment to retained earnings as of the beginning of the first effective reporting period. The Company is evaluating the effect that this guidance will have on its Consolidated Financial Statements and related disclosures; however, the impact is expected to be immaterial.

In November 2016, the FASB issued ASU 2016-18, *Statement of Cash Flows (Topic 230): Restricted Cash*, which requires restricted cash to be presented with cash and cash equivalents on the statement of cash flows and disclosure of how the statement of cash flows reconciles to the balance sheet if restricted cash is shown separately from cash and cash equivalents on the balance sheet. The guidance is effective for interim and annual periods beginning after December 15, 2017, and early adoption is permitted. The Company is evaluating the effect that this guidance will have on our statement of cash flows and related disclosures; however the impact is expected to be immaterial.

In January 2017, the FASB issued ASU 2017-04, *Intangibles – Goodwill and Other (Topic 350): Simplifying the Test for Goodwill Impairment*, which will eliminate the requirement to calculate the implied fair value of goodwill, commonly referred to as "Step 2" in the current goodwill impairment test. An entity will still have the option to perform the qualitative assessment for a reporting unit to determine if the quantitative impairment test is necessary. This guidance will be effective for annual and interim impairment tests performed in annual reporting periods beginning after December 15, 2020, and early adoption is permitted for annual or interim impairment tests performed after January 1, 2017. The Company is evaluating the effect that this guidance will have on its Consolidated Financial Statements and related disclosures.

3. Acquisition

On November 7, 2017, the Company acquired all of the issued and outstanding share capital of Dimension Therapeutics, Inc. (Dimension), headquartered in Cambridge, Massachusetts for a purchase price of $6.00 per share or $152.3 million in cash. Dimension is developing new therapeutic adeno-associated virus (AAV) gene therapies for those living with rare metabolic diseases. In connection with the acquisition, the Company also paid a $2.9 million termination fee to REGENXBIO Inc. (REGENX), as a result of a previously existing merger agreement between REGENX and Dimension and assumed all the outstanding equity awards of Dimension at the date of the acquisition. The assumed equity awards were valued at $15.4 million using Black-Scholes option pricing model on the acquisition date. The equity awards assumed were allocated $9.0 million to the purchase consideration relating to the vested portion of stock options assumed, $2.2 million for the acceleration of certain awards that were recognized immediately as expense in the post-combination financial statements and $4.2 million is expected to be recognized as expense prospectively over the employee's remaining service period. The acquisition date fair value of the consideration transferred for Dimension was approximately $164.1 million, which consisted of the following (in thousands):

Cash payments	$	152,292
Fair value of vested stock options assumed		8,979
REGENX termination fee		2,850
Fair value of total consideration	$	164,121

The following table summarizes the fair values of assets acquired and liabilities assumed as of the date of acquisition (in thousands):

Cash and cash equivalents	$	12,338
Short-term investments		9,737
Other current assets		11,155
Property and equipment		6,580
In-process research and development		129,000
Bayer collaboration agreement		13,526
Accounts payable and accrued liabilities		(10,265)
Notes payable		(4,944)
Deferred tax liabilities		(47,412)
Net identifiable net assets acquired		119,715
Goodwill		44,406
Net assets acquired	$	164,121

The transaction was accounted for as a business combination under the acquisition method of accounting as outlined in ASC 805, *Business Combinations*. The excess of purchase consideration over the fair value of net tangible and identifiable intangible assets acquired was recorded as goodwill. The fair values assigned to tangible and identifiable intangible assets acquired and liabilities assumed were based on management's estimates and assumptions based on the information that was available as of the date of the acquisition. See also Note 6 "Intangible Assets, net" for a description of the intangible assets.

The Company recorded $47.4 million in non-current deferred tax liability resulting from the acquisition reflecting the tax impact of the difference between the book basis and tax basis of acquired IPR&D. Such deferred income tax liability is not used to offset deferred tax assets when analyzing the Company's valuation allowance as the acquired IPR&D is considered to have an indefinite life until the Company completes or abandons development of the acquired IPR&D.

The goodwill balance is primarily attributed to the deferred tax liabilities arising on the temporary differences on IPR&D assets between book and tax basis as well as the relating to the assembled workforce and expanded market opportunities when integrating Dimension's research with the Company. The goodwill balance is not deductible for U.S. income tax purposes.

The assumed notes payable of $4.9 million, along with any outstanding interest was repaid in December 2017. In connection with the acquisition, the Company recognized transaction costs of $6.0 million as selling, general and administrative expense.

Pro Forma Financial Information

The Company's consolidated statement of operations from November 7, 2017 through December 31, 2017 includes Dimension total revenue of $2.1 million and a net loss of $7.5 million.

The following supplemental unaudited pro forma information presents the financial results as if the acquisition had occurred on January 1, 2016 (in thousands):

	For the year ended December 31,	
	2017	**2016**
Total revenues	$ 18,528	$ 12,684
Net loss	341,737	306,596

The unaudited pro forma financial information include pro forma adjustments that assume the acquisition occurred on January 1, 2016. These items include adjustments to remove the impact of transaction costs related to the acquisition of $9.6 million for the year ended December 31, 2017 and to record the amortization of definite-lived intangible assets of $1.8 million and $11.1 million for the years ended December 31, 2017 and 2016, respectively. Other adjustments include reduction of interest income, amounts related to severance of certain employees, acceleration of certain equity awards, and adjustments to conform to the Company's accounting policies on revenue. These unaudited pro forma results are presented for informational purposes only and are not necessarily indicative of what the actual results of operations of the combined company would have been if the acquisition had occurred at the beginning of the period presented, nor are they indicative of future results of operations.

4. Fair Value Measurements

Financial assets and liabilities are recorded at fair value. The carrying amount of certain financial instruments, including cash and cash equivalents, accounts receivable, accounts payable and accrued liabilities approximate fair value due to their relatively short maturities. Assets and liabilities recorded at fair value on a recurring basis in the balance sheets are categorized based upon the level of judgment associated with the inputs used to measure their fair values. Fair value is defined as the exchange price that would be received for an asset or an exit price that would be paid to transfer a liability in the principal or most advantageous market for the asset or liability in an orderly transaction between market participants on the measurement date. The authoritative guidance on fair value measurements establishes a three-tier fair value hierarchy for disclosure of fair value measurements as follows:

Level 1—Inputs are unadjusted, quoted prices in active markets for identical assets or liabilities at the measurement date;

Level 2—Inputs are observable, unadjusted quoted prices in active markets for similar assets or liabilities, unadjusted quoted prices for identical or similar assets or liabilities in markets that are not active, or other inputs that are observable or can be corroborated by observable market data for substantially the full term of the related assets or liabilities; and

Level 3—Unobservable inputs that are significant to the measurement of the fair value of the assets or liabilities that are supported by little or no market data.

The Company's financial instruments consist of Level 1 and Level 2 assets. Where quoted prices are available in an active market, securities are classified as Level 1. Money market funds are classified as Level 1. Level 2 assets consist primarily of corporate bonds, asset backed securities, commercial paper and U.S. Government agency securities based upon quoted market prices for similar movements in active markets, quoted prices for identical or similar instruments in markets that are not active and model-based valuation techniques for which all significant inputs are observable in the market or can be corroborated by observable market data for substantially the full term of the assets. Where applicable these models project future cash flows and discount the future amounts to a present value using market-based observable inputs obtained from various third party data providers, including but not limited to, benchmark yields, interest rate curves, reported trades, broker/dealer quotes and reference data.

The following table sets forth the fair value of the Company's financial assets and liabilities remeasured on a recurring basis based on the three-tier fair value hierarchy (in thousands):

	December 31, 2017			
	Level 1	Level 2	Level 3	Total
Financial Assets:				
Money market funds	$ 79,670	$ —	$ —	$ 79,670
Corporate bonds	—	39,240	—	39,240
U.S. Government Treasury and agency securities	—	104,739	—	104,739
Total financial assets	$ 79,670	$ 143,979	$ —	$ 223,649

	December 31, 2016			
	Level 1	Level 2	Level 3	Total
Financial Assets:				
Money market funds	$ 123,536	$ —	$ —	$ 123,536
Corporate bonds	—	207,726	—	207,726
Commercial paper	—	11,970	—	11,970
Asset-backed securities	—	27,713	—	27,713
U.S. Government Treasury and agency securities	—	111,931	—	111,931
Total financial assets	$ 123,536	$ 359,340	$ —	$ 482,876

5. Balance Sheet Components

Cash Equivalents and Investments

The fair values of cash equivalents, short-term investments, and long-term investments classified as available-for-sale securities, consisted of the following (in thousands):

	December 31, 2017			
		Gross Unrealized		
	Amortized Cost	Gains	Losses	Estimated Fair Value
Money market funds	$ 79,670	$ —	$ —	$ 79,670
Corporate bonds	39,330	—	(90)	39,240
U.S. Government Treasury and agency securities	105,029	—	(290)	104,739
Total	$ 224,029	$ —	$ (380)	$ 223,649

	December 31, 2016			
		Gross Unrealized		
	Amortized Cost	Gains	Losses	Estimated Fair Value
Money market funds	$ 123,536	$ —	$ —	$ 123,536
Corporate bonds	207,909	14	(197)	207,726
Commercial paper	11,970	—	—	11,970
Asset-backed securities	27,712	3	(2)	27,713
U.S. Government Treasury and agency securities	112,166	10	(245)	111,931
Total	$ 483,293	$ 27	$ (444)	$ 482,876

At December 31, 2017, the remaining contractual maturities of available-for-sale securities were less than two years. There have been no significant realized gains or losses on available-for-sale securities for the periods presented. All marketable securities with unrealized losses at December 31, 2017 have been in a loss position for less than twelve months or the loss is not material and were temporary in nature. We do not intend to sell the investments that are in an unrealized loss position before recovery of their amortized cost basis.

Inventory

Inventory consists of the following (in thousands):

	December 31,	
	2017	2016
Work-in-process	$ 737	$ —
Finished goods	20	—
Total inventory	$ 757	$ —

Property and Equipment, net

Property and equipment, net consists of the following (in thousands):

	December 31,	
	2017	2016
Research and development equipment	$ 7,696	$ 2,154
Furniture and office equipment	2,873	2,595
Computer equipment	2,563	2,013
Software	4,182	3,931
Leasehold improvements	15,085	12,486
Construction-in-progress	429	37
Property and equipment, gross	32,828	23,216
Less accumulated depreciation	(10,991)	(6,161)
Property and equipment, net	$ 21,837	$ 17,055

Depreciation expense for the years ended December 31, 2017, 2016 and 2015 was $4.8 million, $3.4 million and $1.4 million respectively. Amortization of leasehold improvements and software is included in depreciation expense.

Accrued Liabilities

Accrued liabilities consists of the following (in thousands):

	December 31,	
	2017	2016
Research and clinical study expenses	$ 17,141	$ 18,593
Payroll and related expenses	26,527	17,226
Repayment liability under collaboration agreement	3,681	13,650
Contract liability	5,986	—
Other	8,092	5,085
Total accrued liabilities	$ 61,427	$ 54,554

6. Intangible Assets, net

In connection with the acquisition as described in Note 3 “Acquisition" the Company recognized IPR&D assets of $129.0 million and a contract asset of $13.5 million. The estimated fair value of these intangible assets was measured using Level 3 inputs as of the acquisition date.

IPR&D assets represent the fair value of acquired programs to develop an AAV gene therapy for OTC deficiency and to develop an AAV gene therapy for glycogen storage disease type Ia. The fair value of IPR&D assets acquired was determined based on the discounted present value of each research project’s projected cash flows using an income approach, including the application of probability factors related to the likelihood of success of the program reaching final development and commercialization. Additionally, the projections consider the relevant market sizes and growth factors, estimated future cash flows from product sales resulting from completed products and in-process projects and timing and costs to complete the in-process projects. The rates utilized to discount the net cash flows to their present value are commensurate with the stage of development of the projects and uncertainties in the economic estimates used in the projections. IPR&D assets are considered to be indefinite-live until the completion or abandonment of the associated research and development efforts.

The contract asset represents the fair value of the agreement with Bayer HealthCare LLC to research, develop, and commercialize AAV gene therapy products for treatment of hemophilia A. The fair value of the contract asset was determined based on the discounted present value of the estimated net future income and would be amortized to research and development expense over the research term which is expected to be complete in 2019. The Company recorded research and development expense of $1.0 million for the period from November 7, 2017 through December 31, 2017 related to the amortization of the asset. As of December 31, 2017, the estimated future amortization expense associated with the contract asset is $10.5 million in 2018 and $2.0 million in 2019.

7. License and Research Agreements

Saint Louis University License Agreement

In November 2010, the Company entered into a license agreement with Saint Louis University (SLU). Under the terms of this license agreement, SLU granted the Company an exclusive worldwide license to make, have made, use, import, offer for sale, and sell therapeutics related to SLU's beta-glucuronidase product for use in the treatment of human diseases.

The Company made a milestone payment of $0.1 million upon approval of Mepsevii for treatment of MPS 7. The Company is required to pay to SLU a low single-digit royalty on net sales of the licensed products in any country or region, upon reaching a certain level of cumulative worldwide sales of the product, if such product sales are ever achieved.

St. Jude Children's Research Hospital License Agreement

In September 2012, the Company entered into a license agreement with St. Jude Children's Research Hospital (St. Jude). Under the terms of this license agreement, St. Jude granted the Company an exclusive license under certain know-how to research, develop, make, use, offer to sell, import, and otherwise commercialize and exploit St. Jude's protective protein, cathepsin, a protein product to treat, prevent, and/or diagnose galactosialidosis and other monogenetic diseases.

The Company will pay to St. Jude a royalty of less than 1% on net sales of the licensed products in the licensed territories, if such product sales are ever achieved.

Baylor Research Institute License Agreement

In September 2012, the Company entered into a license agreement with Baylor Research Institute (BRI). Under the terms of this license agreement, BRI exclusively licensed to the Company its territories for certain intellectual property related to triheptanoin.

The Company may make future payments of up to $10.5 million contingent upon attainment of various development milestones and $7.5 million contingent upon attainment of various sales milestones. Additionally, the Company will pay to BRI a mid-single digit royalty on net sales of the licensed product in the licensed territories, if such product sales are ever achieved.

Kyowa Hakko Kirin Collaboration and License Agreement

In August 2013, the Company entered into a collaboration and license agreement with Kyowa Hakko Kirin Co., Ltd. (KHK). Under the terms of this collaboration and license agreement, as amended, the Company and KHK will collaborate on the development and commercialization of certain products containing burosumab in the field of orphan diseases in the United States and Canada, or the profit share territory, and in the European Union and Switzerland, or the European territory, and the Company will have the right to develop and commercialize such products in the field of orphan diseases in Mexico and Central and South America, or Latin America. In the field of orphan diseases, and except for ongoing studies being conducted by KHK, the Company will be the lead party for development activities in the profit share territory and in the European territory until the applicable transition date; the Company will also be the lead party for core development activities conducted in Japan and Korea, for which the core development plan is limited to clinical trials mutually agreed to by the Company and KHK. The Company will share the costs for development activities in the profit share territory and the European territory conducted pursuant to the development plan before the applicable transition date equally with KHK, and KHK shall be responsible for 100% of the costs for development activities in Japan and Korea. On the applicable transition date in the profit share territory and the European territory, KHK will become the lead party and be responsible for the costs of the development activities. However, the Company will continue to share the costs of the studies commenced prior to the applicable transition date equally with KHK. The Company has the primary responsibility for conducting certain research and development services. If burosumab is approved, the Company and KHK will share commercial responsibilities and profits in the profit share territory until the applicable transition date and KHK will commercialize burosumab in the European territory. The Company will develop and commercialize burosumab in Latin America.

KHK will manufacture and supply burosumab for clinical use globally and will manufacture and supply burosumab for commercial use in the profit share territory and Latin America. The remaining profit or loss from commercializing products in the profit-share territory, until the applicable transition date, will be shared between the Company and KHK on a 50/50 basis. Thereafter, the Company will be entitled to receive a tiered double-digit revenue share in the mid-to-high 20% range in the profit share territory. Net proceeds from the anticipated sale of the priority review voucher, if received, will be shared equally with KHK. The Company

will also be entitled to receive a royalty of up to 10% on net sales in the European territory. In Latin America, the Company will pay to KHK a low single-digit royalty on net sales.

In May 2017, the Company signed an agreement with a wholly-owned subsidiary of KHK pursuant to which the Company was granted the right to commercialize burosumab in Turkey. KHK's subsidiary has the option to assume responsibility for commercialization efforts from the Company, after a certain minimum period.

The Company is accounting for the agreement as a collaboration arrangement as defined in ASC 808, *Collaborative Agreements.* The Company's expenses were reduced by $31.2 million and $25.3 million for the years ended December 31, 2017 and 2016, respectively, for its share of the costs as research and development and were reduced by $4.5 million and $1.5 million for the years ended December 31, 2017 and 2016, respectively, for its share of the selling, general and administrative expenses. As of December 31, 2017 and 2016, the Company had receivables in the amount of $10.3 million and $8.6 million, respectively, for this collaboration arrangement.

Arcturus Research Collaboration and License Agreement

In October 2015, the Company entered into a Research Collaboration and License Agreement with Arcturus Therapeutics, Inc. (Arcturus). The Company and Arcturus are collaborating on the research and development of therapies for select rare diseases. As consideration for entering into the arrangement, the Company paid Arcturus an upfront fee of $10.0 million. Arcturus has the primary responsibility for conducting certain research services, funded by the Company, and the Company will be responsible for development and commercialization costs.

Takeda License and Collaboration and Purchase Agreements

In June 2016, the Company executed a collaboration and license agreement with Takeda Pharmaceutical Company Limited (Takeda). Pursuant to the agreement, which became effective in July 2016, the Company obtained an exclusive license for a pre-clinical compound from Takeda in a pre-determined field of use. The Company is responsible for the development costs for the pre-clinical compound and the identified option product pursuant to an initial development plan. Because the license to the pre-clinical compound has no alternative future use, the estimated fair value of $0.7 million was recorded as a research and development expense upon acquisition. Any products resulting from the pre-clinical compound or the identified option product is referred to in this report as the "licensed product." The Company discontinued the development efforts on the pre-clinical compound in the pre-determined field of use and the identified option product.

As part of the agreement, the Company and Takeda established a five-year research collaboration whereby the parties may mutually agree to add additional option products candidates to the collaboration, in which case the Company will bear the cost of the development activities, with certain exceptions.

In July 2016, the Company consummated a common stock purchase agreement, executed in conjunction with the collaboration and license agreement, whereby Takeda purchased 374,590 shares of the Company's common stock for $40.0 million in cash. The fair market value of the common stock issued to Takeda was $27.3 million, based on the closing stock price of $72.95 on the date of issuance, resulting in a $12.7 million premium paid to the Company. The Company also received a put option to require Takeda to purchase an additional $25.0 million in shares of the Company's common stock which was exercised in October 2016, whereby Takeda purchased 352,530 shares of the Company's common stock for $25.0 million in cash. Takeda is subject to a five-year standstill (subject to customary exceptions or release). The Company estimated the fair value of the put options to be $0.9 million and recorded the put options in additional paid-in capital.

The Company also granted Takeda an exclusive option for Asian rights, for a limited period, to any licensed products and any additional products resulting from the collaboration, as well as an option to exclusively license one of the Company's products for development and commercialization in Japan. If Takeda exercises any of its option rights to license a product pursuant to the agreement, Takeda will pay for the development costs within the licensed territory, will share in a portion of the global development costs, and will make a milestone payment upon regulatory approval. Takeda will also owe royalties on net sales in the licensed territory for any licensed product, depending on the development stage when the product is licensed as well as sales levels. The royalties related to the option to license the Company's product, as well as the additional product are subject to future good faith negotiations at the time that the option is exercised.

The research and license agreement and the stock purchase agreement are being accounted for as one arrangement because they were entered into at the same time with interrelated financial terms. The Company analogized to *Topic 606* for the accounting for the arrangements. The Company concluded that there are multiple promised goods and services under the collaboration agreement, including obligations related to research and development services with respect to licensed products as well as committee participation, which were determined to represent distinct performance obligations. The total consideration received from Takeda was $14.3 million and was comprised of the $12.7 million premium on the sale of the common stock, the $0.9 million estimated fair value of the put options, and the $0.7 million estimated fair value of the pre-clinical compound.

The Company is responsible for the costs under the initial development plan. A significant portion of this work is performed by Takeda which has an estimated cost of approximately $10.0 million to $11.2 million and is subject to changes as development activities are adjusted and cost estimates are refined. The Company concluded that the payment to Takeda is not in return for a distinct service that Takeda transfers to the Company, therefore, the payment made to Takeda is accounted for as a reduction in the transaction price. As of December 31, 2017, the Company concluded that $3.1 million of the estimated transaction price should not be constrained because it is probable that a significant reversal in the amount to be recognized will not occur. The unconstrained transaction price was allocated to the distinct performance obligations on a relative standalone selling price basis. The Company recorded $2.5 million for the year ended December 31, 2017, respectively, as a reduction of research and development expenses by measuring the progress toward complete satisfaction of the individual performance obligation using an input measure.

The Company concluded that the remaining transaction price should continue to be constrained as of December 31, 2017. The Company will continue to re-evaluate the application of the constraint to the transaction price at each reporting period end date.

Costs incurred by the Company associated with co-development activities performed under this collaboration are included in research and development expense in the accompanying consolidated statements of operations. As of December 31, 2017 and 2016, the Company had a repayment liability in the amount of $3.7 million and $14.3 million, respectively, and a contract liability in the amount of $0.6 million as of December 31, 2017 and none as of December 31, 2016.

University of Pennsylvania

The Company has an agreement with University of Pennsylvania School of Medicine (Penn) to sponsor certain research related to liver and hemophilia gene therapy. In consideration for funding such research, Penn granted the Company an option to obtain a worldwide, non-exclusive or exclusive, royalty-bearing license, with the right to sublicense, under certain patent rights conceived, created or reduced to practice in the conduct of the research. The Company is required to reimburse Penn for filing, prosecuting and maintaining such patent rights unless and until the Company declines to exercise its option. Penn provides the Company with task-based, scientific reports of progress and results of the research, and granted the Company a royalty-free, nontransferable, non-exclusive right to copy and distribute any research reports furnished to the Company for any reasonable purpose, provided the results are not made publicly available until certain conditions are met, and the right to use, disclose and otherwise exploit the research results for any reasonable purpose, subject to similar restrictions on our public disclosure of the research results. Otherwise, the sponsored research agreement contains customary confidentiality provisions.

The Company also has a research, collaboration, and license agreement with Penn, which provides the terms for the Company and Penn to collaborate with respect to the pre-clinical development of gene therapy products for the treatment of certain indications. Under the agreement, Penn granted the Company an exclusive, worldwide license to certain patent rights arising out of the research program, subject to certain retained rights, and a non-exclusive, worldwide license to certain Penn intellectual property, in each case to research, develop, make, have made, use, sell, offer for sale, commercialize and import licensed products in each indication for the term of the agreement. The Company will fund the cost of the research program in accordance with a mutually agreed-upon research budget and will be responsible for clinical development, manufacturing and commercialization of each indication. The Company will make milestone payments of up to $5.0 million for each indication, if certain development milestones are achieved over time, as well as low to mid-single digit royalties on net sales of each licensed product. The Company will also make milestone payments per approved product if certain commercial milestones are achieved.

REGENXBIO, Inc.

The Company has a license agreement with REGENX, for an exclusive, sublicensable, worldwide commercial license under certain intellectual property for preclinical and clinical research and development, and commercialization of drug therapies using REGENX 's licensed patents for the treatment of hemophilia A, hemophilia B, OTC deficiency and GSD1a. The Company will pay an annual fee and certain milestone fees per disease indication, low to mid single-digit royalty percentages on net sales of licensed products, and milestone and sublicense fees owed by REGENX to its licensors, contingent upon the attainment of certain development activities as outlined in the agreement.

The Company also has an option and license agreement with REGENX under which the Company has an exclusive, sublicensable, worldwide license to make, have made, use, import, sell, and offer for sale licensed products with respect to three disease indications, subject to certain exclusions and has an option for another disease indication. The exercise of the remaining option will require payment of a $1.0 million option fee, is subject to availability and if not exercised, will automatically terminate in 2019 (which may be extended for additional time for a fee). Each exercised option carries an annual maintenance fees of $0.1 million. In addition, for each option exercised, the Company is obligated to pay up to $9.0 million upon achievement of various milestones, as well as mid to high single-digit royalties on net sales of licensed products and mid single-digit to low double-digit percentage sublicenses fees, if any.

Bayer HealthCare LLC

The Company has an agreement with Bayer Healthcare LLC (Bayer) to research, develop and commercialize AAV gene therapy products for treatment of hemophilia A (DTX 201). Under this agreement, Bayer has been granted an exclusive license to develop and commercialize one or more novel gene therapies for hemophilia A. The Company is responsible for the development of DTX201 under the agreement through a proof-of-concept (POC) clinical trial, in accordance with the mutually agreed upon research budget. Upon the successful demonstration of clinical POC, the agreement requires that Bayer use commercially reasonable efforts to manage and fund any subsequent clinical trials and commercialization of gene therapy products for treatment of hemophilia A. Bayer will have worldwide rights to commercialize the potential future product.

Bayer is responsible to fund certain research and development services performed by the Company in the performance of its obligations under the annual research plan and budget. Under the terms of the agreement with Bayer, the Company is eligible to receive development and commercialization milestone payments of up to $232.0 million, as well as, royalty payments ranging in the high single-digit to low double-digit percentages, not exceeding the mid-teens, of net sales of licensed products. In December 2017, the first milestone was achieved and the Company invoiced Bayer $5.0 million for the milestone.

As of the acquisition date of November 7, 2017, the Company valued the contract under ASC 805 *Business Combinations* and recorded an intangible asset of $13.5 million. The intangible asset will be amortized to research and development expense over the remainder of the research term which is expected to be complete in 2019. The Company recorded a research and development expense of $1.0 million for the period from November 7, 2017 through December 31, 2017 related to the amortization of the intangible asset.

The Company also evaluated the agreement under ASC 606 *Revenue from Contracts with Customers*, and recorded a contract liability as of November 7, 2017 of $2.5 million. It was determined that the performance obligations under the agreement includes (i) research and development services to be provided over the research term, (ii) a development and commercialization license and (iii) the Company's participation in certain committees. It was determined that these performance obligations are not distinct in the context of the contract and therefore are a single performance obligation. The Company calculated the transaction price by including the unconstrained milestones along with the estimated payments for research and development services. $2.1 million was recorded as collaboration and license revenue for the period from November 7, 2017 through December 31, 2017 by measuring the progress toward complete satisfaction of the performance obligation using an input measure and $5.4 million of contract liability as of December 31, 2017. The performance obligation under the contract is estimated to be substantially complete by end of 2019.

8. Equity

At-the-Market Offerings

In July 2016, the Company entered into an At-The-Market (ATM) sales agreement with Cowen and Company, LLC (Cowen), whereby the Company sold $150.0 million in aggregate proceeds of common stock, through Cowen as our sales agent. During the years ended December 31, 2017 and 2016, the Company sold 912,351 and 1,159,415 shares of common stock, resulting in net proceeds of approximately $67.6 million and $79.5 million, respectively, after commissions and other offering costs.

In July 2017, the Company entered into an additional ATM sales agreement with Cowen whereby the Company may sell up to $150.0 million in aggregate proceeds of common stock from time to time, through Cowen as its sales agent. During the year ended December 31, 2017, the Company sold an additional 1,338,866 shares of common stock, resulting in net proceeds of approximately $64.3 million, after commissions and other offering costs.

Common Stock Warrants

As of December 31, 2017 and 2016, there was an aggregate of 149,700 of common stock warrants outstanding that were issued in June 2010 and June 2011 with a contractual term of 10 years and an exercise price of $3.01.

9. Stock-Based Awards

Equity Plan Awards

In 2011, the Company adopted the 2011 Equity Incentive Plan (the 2011 Plan). The 2011 Plan provides for the granting of stock-based awards to employees, directors, and consultants under terms and provisions established by the board of directors. In 2014, the Company adopted the 2014 Incentive Plan (the 2014 Plan). The 2014 Plan had 2,250,000 shares of common stock available for future issuance at the time of its inception, which included 655,038 shares available under the 2011 Plan, which were transferred to the 2014 Plan upon adoption. No further grants subsequent to the IPO were made under the 2011 Plan. The 2014 Plan provides for automatic annual increases in shares available for grant, beginning on January 1, 2015 through January 1, 2024. Under the terms of the 2014 Plan, awards may be granted at an exercise price not less than fair market value. For employees holding more than 10% of the voting rights of all classes of stock, the exercise prices for awards must be at least 110% of fair market of the common stock on the grant date, as determined by the board of directors. The term of an award granted under the 2014 Plan may not exceed ten years. Typically, the vesting schedule for option grants to the employees provides that 1/4 of the grant vests upon the first anniversary of the date of grant, with the remainder of the shares vesting monthly thereafter at a rate of 1/48 of the total shares subject to the option. The vesting schedule for RSU grants provides that 1/4 of the grant vests upon the annual anniversary of the date of grant over the period of four years.

As part of the acquisition of Dimension (discussed in Note 3 “Acquisition”), the Company assumed an equivalent 639,897 options to purchase shares of common stock of the Company from the equity plans of Dimension. No further grants subsequent to the acquisition are available under these equity plans.

As of December 31, 2017, an aggregate of 9,732,069 shares of common stock have been authorized for issuance under all equity award plans.

Stock Option Activity

The following table summarizes activity under the Company’s stock option plans, including the 2011 Plan, the 2014 Plan, the assumed equity awards from the Dimension plans and related information:

	Options Outstanding			
	Number of Options	Weighted- Average Exercise Price	Weighted-Average Remaining Contractual Term (Years)	Aggregate Intrinsic Value
				(In thousands)
Outstanding — December 31, 2014	2,739,475	$ 16.15	8.43	$ 79,840
Options granted	2,013,350	90.60		
Options exercised	(795,825)	8.65		
Options cancelled	(130,037)	31.49		
Outstanding — December 31, 2015	3,826,963	$ 56.36	8.58	$ 217,386
Options granted	1,435,995	67.00		
Options exercised	(425,922)	21.21		
Options cancelled	(407,564)	70.87		
Outstanding — December 31, 2016	4,429,472	$ 61.85	8.22	$ 79,135
Options granted	1,328,860	71.99		
Options assumed	639,897	27.97		
Options exercised	(478,470)	16.25		
Options cancelled	(520,349)	78.70		
Outstanding — December 31, 2017	5,399,410	$ 62.75	7.40	$ 37,687
Vested and exercisable — December 31, 2017	2,709,510	$ 53.53	6.22	$ 34,558
Vested and expected to vest — December 31, 2017	5,216,110	$ 62.50	7.35	$ 37,528

The aggregate intrinsic values of options outstanding, vested and exercisable, and vested and expected to vest were calculated as the difference between the exercise price of the options and the fair value of the Company’s common stock. The total intrinsic value of options exercised during the years ended December 31, 2017, 2016, and 2015 was $20.4 million, $22.2 million and $59.0 million, respectively. Cash received from the exercise of options was $7.8 million, $9.0 million, and $6.9 million as of December 31, 2017, 2016, and 2015, respectively.

The weighted-average estimated fair value of stock options granted was $44.20, $40.49 and $54.90 per share of the Company's common stock during the years ended December 31, 2017, 2016, and 2015, respectively. The total estimated fair value of options vested during the years ended December 31, 2017, 2016, and 2015 was $49.1 million, $43.8 million, and $10.7 million, respectively.

Restricted Stock Units

The following table summarizes activity under the Company's Restricted Stock Units (RSUs) from the 2014 Plan and related information:

	RSUs Outstanding	
	Number of Shares	Weighted- Average Grant Date Fair Value
Unvested — December 31, 2014	31,000	$ 53.23
RSUs granted	187,260	89.67
RSUs released	(18,209)	54.72
RSUs cancelled	(2,900)	84.89
Unvested — December 31, 2015	197,151	$ 87.24
RSUs granted	477,816	66.83
RSUs released	(52,273)	82.59
RSUs cancelled	(48,950)	78.04
Unvested — December 31, 2016	573,744	$ 71.45
RSUs granted	516,161	71.58
RSUs released	(156,021)	71.93
RSUs cancelled	(112,324)	76.78
Unvested — December 31, 2017	821,560	$ 70.71

The fair value of the RSUs is determined on the grant date based on the fair value of the Company's common stock. The fair value of the RSUs is recognized as expense ratably over the vesting period of one to four years. The total fair value of the 156,021 shares vested during 2017 was approximately $11.2 million with an aggregate intrinsic value of the shares of $9.2 million.

Performance Stock Units

In December 2017, the Company granted 508,850 performance stock units (PSUs) to certain employees at a grant date fair value of $48.03 per share of the Company's common stock, of which no shares vested during 2017. These PSUs are subject to vest only if certain specified criteria are achieved and the employees' continued service with the Company after achievement of the specified criteria. Stock-based compensation for these PSUs is recognized over the service period beginning in the period the Company determines it is probable that the performance criteria will be achieved. In December 2017, the Company began recognizing stock compensation expense on one of the criteria as the outcome was deemed probable.

Employee Stock Purchase Plan

In January 2014, the Company adopted the 2014 Employee Stock Purchase Plan (ESPP) and had reserved a total of 600,000 shares of common stock for issuance under the ESPP. The ESPP provides for automatic annual increases in shares available for grant, beginning on January 1, 2015 through January 1, 2024. Eligible employees may purchase common stock at 85% of the lesser of the fair market value of common stock on the offering date or the purchase date with a six-month look-back feature. ESPP purchases are settled with common stock from the ESPP's previously authorized and available pool of shares. During the year ended December 31, 2017, the Company issued 62,412 shares of common stock under the ESPP.

Stock-Based Compensation Expense

Total stock-based compensation recognized was as follows (in thousands):

	Year Ended December 31,		
	2017	2016	2015
Research and development	$ 38,212	$ 29,412	$ 17,100
Selling, general and administrative	29,802	18,897	7,784
Total stock-based compensation expense	$ 68,014	$ 48,309	$ 24,884

As of December 31, 2017, the total unrecognized compensation expense related to unvested equity awards, net of estimated forfeitures, was $165.3 million, which the Company expects to recognize over an estimated weighted-average period of 2.52 years. In determining the estimated fair value of the stock options and ESPP, the Company uses the Black-Scholes option-pricing model and assumptions discussed below. Each of these inputs is subjective and generally requires significant judgment to determine.

Expected Term—The Company's expected term represents the period that the Company's stock-based awards are expected to be outstanding and is determined using the simplified method (based on the mid-point between the vesting date and the end of the contractual term).

Expected Volatility—As the Company does not have sufficient historical stock price information from the Company to meet the expected life of the stock-based awards, our approach to estimating expected volatility is to phase in our own common stock trading history and supplement the remaining historical information with a blended volatility from the trading history from the common stock of the set of comparable publicly traded biopharmaceutical companies. When selecting comparable publicly traded biopharmaceutical companies on which to base the expected stock price volatility, we selected companies with comparable characteristics to it, including enterprise value, risk profiles, position within the industry, and with historical share price information sufficient to meet the expected life of the stock-based awards. The historical volatility data was computed using the daily closing prices for the selected companies' shares during the equivalent period of the calculated expected term of the stock-based awards. The average volatility for comparable publicly traded biopharmaceutical companies over a period equal to the expected term of the stock option grants is used to supplement the Company's historical volatility. We will continue to apply this process until a sufficient amount of historical information regarding the volatility of our own stock price becomes available.

Risk-Free Interest Rate—The risk-free interest rate is based on the U.S. Treasury zero coupon issues in effect at the time of grant for periods corresponding with the expected term of option.

Expected Dividend—The Company has never paid dividends on its common stock and has no plans to pay dividends on its common stock. Therefore, the Company used an expected dividend yield of zero.

The fair value of stock option awards granted was estimated at the date of grant using a Black-Scholes option-pricing model with the following weighted-average assumptions:

	Year Ended December 31,		
	2017	**2016**	**2015**
Expected term (years)	6.23	6.23	6.23
Expected volatility	65%	65%	65%
Risk-free interest rate	2.1%	1.5%	1.8%
Expected dividend rate	0.0%	0.0%	0.0%

10. Defined Contribution Plan

Since 2013, the Company has sponsored a 401(k) retirement plan, in which substantially all of its full-time employees are eligible to participate. Eligible participants may contribute a percentage of their annual compensation to this plan, subject to statutory limitations. Prior to 2015, the Company had not provided any contributions to the plan. The Company recorded $2.1 million, $1.5 million, and $0.6 million as contribution expenses for the years ended December 31, 2017, 2016, and 2015, respectively.

11. Income Taxes

The components of the Company's loss before income taxes were as follows (in thousands):

	Year Ended December 31,		
	2017	**2016**	**2015**
Domestic	$ 250,917	$ 192,287	$ 145,618
Foreign	67,421	53,552	—
Total loss before income taxes	$ 318,338	$ 245,839	$ 145,618

The components of the Company's income tax provision were as follows (in thousands):

	Year Ended December 31,		
	2017	2016	2015
Current provision for income taxes:			
Federal	$ —	$ —	$ —
State	5	—	—
International	42	35	—
Total current tax provision	47	35	—
Deferred tax benefit:			
Federal	(16,243)	—	—
State	(3)	—	—
International	—	—	—
Total deferred tax benefit	(16,246)	—	—
Total (benefit from) provision for income taxes	$ (16,199)	$ 35	$ —

The Company has incurred net operating losses since inception. The Company has not reflected any benefit of such net operating loss carryforwards in the accompanying financial statements. The Company has established a full valuation allowance against its deferred tax assets due to the uncertainty surrounding the realization of such assets.

The effective tax rate of our provision for income taxes differs from the federal statutory rate as follows:

	Year Ended December 31,		
	2017	2016	2015
Federal statutory income tax rate	34.0 %	34.0 %	34.0 %
State income taxes, net of federal benefit	—	1.3	7.5
Federal tax credits	9.0	13.7	5.9
Other	(0.9)	(0.3)	0.8
Nondeductible permanent items	—	—	—
Stock-based compensation	(0.6)	(1.4)	(1.3)
Uncertain tax positions	(1.8)	2.0	(7.7)
Change in valuation allowance	(32.5)	(41.9)	(39.2)
Foreign rate differential	(7.2)	(7.4)	—
Change in federal tax rate	5.1	—	—
Provision for income taxes	5.1	—	—

The tax effect of temporary differences that give rise to significant portions of the deferred tax assets is presented below (in thousands):

	Year Ended December 31,	
	2017	2016
Deferred tax assets:		
Loss carryforwards	$ 154,949	$ 102,960
Tax credits	119,542	78,324
Stock options	21,336	16,084
Accruals and reserves	5,939	10,039
Fixed assets and intangibles	1,194	3,014
Other	1,286	1,950
Gross deferred tax assets	304,246	212,371
Valuation allowance	(304,246)	(212,371)
Total deferred tax assets	—	—
Deferred tax liabilities:		
In-process research and development	(31,166)	—
Net deferred tax assets (liabilities)	$ (31,166)	$ —

As of December 31, 2017 and 2016, the Company had $422.3 million and $315.5 million of federal net operating loss carryforwards available to reduce future taxable income that will begin to expire in 2030. As of December 31, 2017 and 2016, the Company had $457.7 million and $259.8 million of state net operating loss carryforwards available to reduce future taxable income that will begin to expire in 2030.

As of December 31, 2017 and 2016, the Company had federal research tax credit carryforwards of $4.5 million and $2.5 million available to reduce future tax liabilities that will begin to expire in 2030. As of December 31, 2017 and 2016, the Company had state research credit carryforwards of $12.4 million and $6.7 million available to reduce future tax liabilities that will be carried forward indefinitely.

As of December 31, 2017 and 2016, the Company had federal Orphan Drug Credits of $124.6 million and $84.3 million available to reduce future tax liabilities that will begin to expire in 2031.

The Company's ability to use net operating loss and tax credit carryforwards to reduce future taxable income and liabilities may be subject to annual limitations pursuant to Internal Revenue Code Sections 382 and 383 as a result of ownership changes in the past and future. As a result of ownership changes in 2012 and 2011, $3.6 million of federal net operating loss carryforwards, $3.6 million of state net operating loss carryforwards, and $0.2 million of federal tax credits are permanently limited. Deferred tax assets for net operating losses and tax credits have been reduced and a corresponding adjustment to the valuation allowance has been recorded.

On November 7, 2017, the Company acquired Dimension (see Note 3 "Acquisition"). The Company recorded a $47.4 million deferred tax liability relating to the tax impact of future GAAP amortization or potential impairments associated with the identified intangible assets acquired, which are indefinitely lived assets and are not currently deductible for tax purposes. Due to the reduction of the US corporate tax rate to 21% in the period subsequent to the acquisition, the Company recorded a net decrease to the deferred tax liability of $16.2 million with a corresponding benefit from income taxes of $16.2 million for the year ended December 31, 2017.

The valuation allowance increased by $91.9 million and $102.9 million during the year ended December 31, 2017 and 2016, respectively.

On December 22, 2017, the U.S. government enacted comprehensive tax legislation commonly referred to as the Tax Cuts and Jobs Act (Tax Act). The Company has calculated its best estimate of the impact of the Tax Act in its year end income tax provision in accordance with its understanding of the Tax Act and guidance available as of the date of this filing. The provisional amount related to the remeasurement of certain deferred tax assets and liabilities based on the rates at which they are expected to reverse in the future was a net decrease related to deferred tax assets and deferred tax liabilities of $70.5 million, with a corresponding net adjustment to benefit from income taxes of $16.1 million and offsetting change in valuation allowance of $86.6 million for the year ended December 31, 2017. The Company does not expect a material impact related to the one-time transition tax on the mandatory deemed repatriation of foreign earnings.

On December 22, 2017, Staff Accounting Bulletin No. 118 (SAB 118) was issued to address the application of GAAP in situations when a registrant does not have the necessary information available, prepared, or analyzed (including computations) in reasonable detail to complete the accounting for certain income tax effects of the Act. In accordance with SAB 118, the Company has determined that the adjustment to deferred taxes was a provisional amount and a reasonable estimate at December 31, 2017. The determination of the benefit from (provision for) income taxes requires complex estimations, significant judgments and significant knowledge and experience concerning the applicable tax laws. Given that the Company is still in the transition period for the accounting for income tax effects of the Tax Act, the current assessment on deferred tax assets (liabilities) is based on the currently available information and guidance. If in the future any element of the tax reform changes the related accounting guidance for income tax, it could affect the Company's income tax position and the Company may need to adjust the benefit from (provision for) income taxes accordingly.

The Company recorded unrecognized tax benefits for uncertainties in income taxes. A reconciliation of the Company's unrecognized tax benefits for the years ended December 31, 2017, 2016, and 2015 is as follows (in thousands):

	December 31,		
	2017	2016	2015
Balance at beginning of year	$ 13,505	$ 24,010	$ 7,275
Additions based on tax positions related to current year	9,338	6,777	15,628
Additions for tax positions of prior years	5,534	877	5,505
Reductions for tax positions of prior years	—	(18,159)	(4,398)
Balance at end of year	$ 28,377	$ 13,505	$ 24,010

The entire amount of the unrecognized tax benefits would not impact the Company's effective tax rate if recognized. The Company has elected to include interest and penalties as a component of tax expense. During the years ended December 31, 2017 and 2016, the Company did not recognize accrued interest and penalties related to unrecognized tax benefits. The Company does not anticipate that the amount of existing unrecognized tax benefits will significantly increase or decrease during the next year.

It is our intention to reinvest the earnings of our non-U.S. subsidiaries in their operations. As of December 31, 2017, the Company had not made a provision for U.S. income taxes or foreign withholding taxes on a nominal amount of the excess of the amount of net income for financial reporting over the tax basis of investments in foreign subsidiaries that are essentially permanent in duration. Generally, such amounts become subject to U.S. taxation upon repatriation as dividends and under certain other circumstances. If these earnings were repatriated to the U.S., the deferred tax liability associated with these temporary differences would result in a nominal amount.

The Company files income tax returns in the U.S. federal, California, and other state tax jurisdictions. The federal and state income tax returns from inception to December 31, 2017 remain subject to examination.

12. Commitments and Contingencies

Facilities

The Company leases office space and research, testing and manufacturing laboratory space in various facilities in Novato and Brisbane, California and in Cambridge and Woburn, Massachusetts, under operating agreements expiring at various dates through 2026. Certain of the leases provide for options by the Company to extend the lease for multiple five-year renewal periods and also provide for annual minimum increases in rent, usually based on a consumer price index or annual minimum increases.

The Company recognizes rent expense on a straight-line basis over the noncancelable term of its operating lease. Rent expense was $4.5 million, $3.3 million, and $1.4 million during the years ended December 31, 2017, 2016 and 2015, respectively.

Other Commitments

The Company has various manufacturing, clinical, research, and other contracts with vendors in the conduct of the normal course of its business. Other than as noted below, contracts are terminable, with varying provisions regarding termination. If a contract with a specific vendor were to be terminated, the Company would only be obligated for the products or services that the Company had received at the time the termination became effective.

As of December 31, 2017, the aggregate future minimum lease payments under the noncancelable operating lease arrangements and future payments under contractually binding manufacturing and service agreements are as follows (in thousands):

Year Ending December 31,	Leases	Manufacturing and Services
2018	$ 6,210	$ 7,542
2019	5,293	1,224
2020	3,727	62
2021	2,477	—
2022	2,413	—
Thereafter	9,033	—
	$ 29,153	$ 8,828

Contingencies

While there are no material legal proceedings the Company is aware of, the Company may become party to various claims and complaints arising in the ordinary course of business. Management does not believe that any ultimate liability resulting from any of these claims will have a material adverse effect on its results of operations, financial position, or liquidity. However, management cannot give any assurance regarding the ultimate outcome of these claims, and their resolution could be material to operating results for any particular period, depending upon the level of income for the period.

Guarantees and Indemnifications

The Company indemnifies each of its directors and officers for certain events or occurrences, subject to certain limits, while the director is or was serving at the Company's request in such capacity, as permitted under Delaware law and in accordance with its certificate of incorporation and bylaws. The term of the indemnification period lasts as long as a director may be subject to any proceeding arising out of acts or omissions of such director in such capacity. The maximum amount of potential future indemnification is unlimited; however, the Company currently holds director liability insurance. This insurance allows the transfer of risk associated with the Company's exposure and may enable it to recover a portion of any future amounts paid. The Company believes that the fair value of these indemnification obligations is minimal. Accordingly, it has not recognized any liabilities relating to these obligations for any period presented.

13. Net Loss per Share

The following table sets forth the computation of the basic and diluted net loss per share during the years ended December 31, 2017, 2016 and 2015 (in thousands, except share and per share data):

	Year Ended December 31,		
	2017	2016	2015
Numerator:			
Net loss	$ (302,139)	$ (245,874)	$ (145,618)
Denominator:			
Weighted-average shares used to compute net loss per share, basic and diluted	42,453,135	39,586,908	36,782,603
Net loss per share, basic and diluted	$ (7.12)	$ (6.21)	$ (3.96)

The following weighted-average outstanding common stock equivalents were excluded from the computation of diluted net loss per share for the periods presented because including them would have been antidilutive:

	Year Ended December 31,		
	2017	2016	2015
Options to purchase common stock, RSUs, and PSUs	5,862,784	4,699,111	3,368,507
Employee stock purchase plan	2,728	7,933	—
Common stock warrants	149,700	149,700	195,762
	6,015,212	4,856,744	3,564,269

14. Accumulated Other Comprehensive Income (Loss)

Total accumulated other comprehensive income (loss) consisted of the following (in thousands):

	Unrealized Gain (Loss) on Securities Available-for-Sale	Foreign Currency Translation Adjustments	Accumulated Other Comprehensive Income (Loss)
December 31, 2014	$ (174)	$ —	$ (174)
Current period other comprehensive loss	(694)	—	(694)
December 31, 2015	(868)	—	(868)
Current period other comprehensive income	451	1,322	1,773
December 31, 2016	(417)	1,322	905
Current period other comprehensive income (loss)	35	(10,110)	(10,075)
Reclassification from accumulated other comprehensive income	—	3,490	3,490
December 31, 2017	$ (382)	$ (5,298)	$ (5,680)

15. Quarterly Financial Data (unaudited)

The following table presents certain unaudited quarterly financial information. This information has been prepared on the same basis as the audited financial statements and includes all adjustments (consisting only of normal recurring adjustments) necessary to present fairly the unaudited quarterly results of operations set forth herein (in thousands, except share and per share data):

	2017			
	March 31,	June 30,	September 30,	December 31,
Revenue	$ —	$ —	$ 198	$ 2,414
Operating expenses	69,954	78,441	83,911	99,248
Net loss	(68,290)	(72,891)	(79,227)	(81,731)
Net loss per share, basic and diluted	$ (1.63)	$ (1.72)	$ (1.87)	$ (1.89)

	2016			
	March 31,	June 30,	September 30,	December 31,
Revenue	$ —	$ 17	$ 111	$ 5
Operating expenses	53,622	58,070	65,894	70,554
Net loss	(52,757)	(56,923)	(64,907)	(71,287)
Net loss per share, basic and diluted	$ (1.35)	$ (1.46)	$ (1.64)	$ (1.75)

16. Subsequent Events

ATM Offering

During the period of January 1, 2018 through February 21, 2018, the Company sold an additional 240,417 shares of common stock, resulting in net proceeds of approximately $11.8 million, after commissions and other offering costs.

Priority Review Voucher sale

On January 10, 2018, the Company completed the sale of a PRV to Novartis Pharma AG for $130.0 million. The Company had received the PRV from the FDA in connection with the approval of Mepsevii.

Underwritten Public Offering

In January 2018, the Company completed an underwritten public offering in which 5,043,860 shares of common stock were sold, which included 657,895 shares purchased by the underwriters pursuant to an option granted to them in connection with the offering, at a public offering price of $57.00 per share. The total proceeds that the Company received from the offering were approximately $271.0 million, net of underwriting discounts and commissions.

ASSET PURCHASE AGREEMENT

BY AND BETWEEN

NOVARTIS PHARMA AG,

ULTRAGENYX PHARMACEUTICAL INC.,

AND

ULTRAGENYX INTERNATIONAL UX003 LTD.

December 14, 2017

TABLE OF CONTENTS

List of Exhibits

ASSET PURCHASE AGREEMENT

This ASSET PURCHASE AGREEMENT (this "***Agreement***") is made and entered into as of December 14, 2017 (the "***Effective Date***"), by and between **Novartis Pharma AG**, a Switzerland corporation ("***Buyer***"), **Ultragenyx Pharmaceutical Inc.**, a Delaware corporation ("***U.S. Seller***"), and **Ultragenyx International UX003 Ltd.**, an exempted company incorporated in the Cayman Islands and a wholly-owned subsidiary of the U.S. Seller (the "***Cayman Seller***," and together with the U.S. Seller, the "***Sellers***"). Buyer and Sellers may hereinafter be referred to individually as a ***"Party"*** and collectively as the "***Parties***."

RECITALS

WHEREAS, Sellers are the sole and exclusive owners of a Priority Review Voucher (as defined below).

WHEREAS, Sellers and Buyer each (a) desire that Buyer purchase from Sellers, and Sellers sell, transfer and assign to Buyer, the Purchased Assets (as defined below), all on the terms set forth herein (such transaction, the "***Asset Purchase***") and (b) in furtherance thereof, have adopted and approved this Agreement and, upon the terms and subject to the conditions set forth in this Agreement, have adopted and approved the Asset Purchase as contemplated by this Agreement in accordance with all applicable Legal Requirements (as defined below).

WHEREAS, Sellers and Buyer desire to make certain representations, warranties, covenants and other agreements as set forth herein in connection with the Asset Purchase contemplated by this Agreement.

NOW, THEREFORE, in consideration of the foregoing and their mutual undertakings hereinafter set forth, and intending to be legally bound, the Parties hereto agree as follows:

ARTICLE 1
DEFINITIONS

1.1 Certain Definitions. As used in this Agreement, the following capitalized terms shall have the meanings indicated below:

(a) "***Action***" means any claim, audit, examination, action, cause of action or suit (whether in contract or tort or otherwise), litigation (whether at law or in equity, whether civil or criminal), assessment, arbitration, mediation, investigation, hearing, charge, complaint, demand, notice or proceeding.

(b) "***Adverse Claim***" means (a) a claim asserted by any Third Party that Sellers do not have the right to transfer the Priority Review Voucher that Sellers sell and transfer to Buyer by this Agreement and as a result of such a claim, a court, tribunal, or government body issues an injunction or decree that prohibits Buyer from using the Priority Review Voucher, or (b) any Third Party is granted an injunction, declaration, decree, or remedy that would prevent Buyer from using the Priority Review Voucher.

(c) "***Affiliate***" means any Person which, directly or indirectly through one or more intermediaries, controls, is controlled by, or is under common control with, a Party to this Agreement, for so long as such control exists, whether such Person is or becomes an Affiliate on or after the Effective Date. A Person shall be deemed to "control" another Person if it: (i) owns, directly or indirectly, beneficially or legally, at least fifty percent (50%) of the outstanding capital stock, voting securities or other ownership interest (or such lesser percentage which is the maximum allowed to be owned by such Person in a particular jurisdiction) of such other Person (or, with respect to a limited partnership or other similar entity, its general partner or controlling entity); or (ii) has the power, whether pursuant to Contract, ownership of securities or otherwise, to direct the management and policies of such other Person.

(d) "***Alternative Transaction***" means, other than the transactions contemplated by this Agreement, any proposal or offer from any Person or group of Persons (other than Buyer or its Affiliates or their respective Representatives) for any acquisition by, or transfer, license or other grant of rights to, such Person or group of Persons of any right, title or interest in or to the Purchased Assets; *provided* that "***Alternative Transaction***" shall not include any acquisition of Sellers (whether through a stock purchase, merger, sale of all or substantially all assets or otherwise).

(e) "***Approval Letter***" means the approval letter from the Department of Health and Human Services to the U.S. Seller, regarding Biologics License Application 761047 for Mepsevii™ (vestrodinase alfa-vjbk).

(f) "***Business Day***" means a day (i) other than Saturday or Sunday and (ii) on which commercial banks are open for business in New York, New York, United States and Zurich, Switzerland; and (iii) other than 26th, 27th, 28th or 29th December 2017.

(g) "***Confidential Information***" means (i) any and all confidential and proprietary information, including data, results, conclusions, know-how, product information, research and trade secrets, that may be delivered, made or communicated by or on behalf of a Party or its Representatives related to the subject matter hereof or otherwise in connection with this Agreement and (ii) the terms (including financial terms), conditions and existence of this Agreement.

(h) "***Consent***" means any and all filings, authorizations, consents, approvals, notices, permits, orders, registrations or declarations.

(i) "***Contract***" means any written or oral legally binding contract, agreement, instrument, commitment or undertaking (including leases, licenses, mortgages, notes, guarantees, sublicenses, subcontracts and purchase orders).

(j) "***DOJ***" means the United States Department of Justice.

(k) "***Encumbrance***" means any lien, pledge, charge, mortgage, easement, encroachment, imperfection of title, title exception, title defect, right of possession, right of negotiation or refusal, leasehold interest, security interest, encumbrance, adverse claim, interference or restriction on use arising out of any Contract or Legal Requirement, or restriction on transfer.

(l) "***FDA***" means the United States Food and Drug Administration.

(m) "***FDA Approval***" means the Department of Health and Human Services U.S. License No. 2040 issued to the U.S. Seller relating to Biologics License Application 761047.

(n) "***FFDCA***" means the United States Federal Food, Drug, and Cosmetic Act, 21 U.S.C. § 301 *et seq.*, as amended from time to time, together with any rules, regulations and requirements promulgated thereunder (including all additions, supplements, extensions, and modifications thereto).

(o) "***FTC***" means the United States Federal Trade Commission.

(p) "***Governmental Entity***" means any supranational, national, state, municipal, local or foreign government, any court, tribunal, arbitrator, administrative agency, commission or other governmental official, authority or instrumentality, in each case whether domestic or foreign, any stock exchange or similar self-regulatory organization or any quasi-governmental, private body or arbitral body exercising any executive, legislative, judicial, quasi-judicial, regulatory, taxing, importing, administrative or other governmental or quasi-governmental authority.

(q) "***HSR Act***" means the Hart-Scott-Rodino Antitrust Improvements Act of 1976, as amended from time to time.

(r) "***Indemnified Party***" means any of the Buyer Indemnified Parties or Seller Indemnified Parties, as applicable.

(s) "***Indemnifying Party***" means any Person against whom a claim for indemnification is being asserted under any provision of ARTICLE 8.

(t) "***Judgment***" means any orders, writs, injunctions, awards, judgments, stipulations, determinations and decrees entered by or with any Governmental Entity.

(u) "***Knowledge***" means, with respect to Sellers, the actual knowledge of the facts and information of any director or executive officer of Sellers, after performing a reasonable inquiry with respect to such facts and information.

(v) "***Law***" means any federal, state, foreign, local, municipal or other law, statute, constitution, principle of common law, resolution, ordinance, code, edict, decree, rule, regulation, ruling or requirement issued, enacted, adopted, promulgated, implemented or otherwise put into effect by or under the authority of any Governmental Entity.

(w) "***Legal Requirement***" means any Law, or any Judgment, or any license, franchise, authorization of any Governmental Entity or similar right granted under any of the forgoing, or any similar provision having the force or effect of Law applicable to a Party or to any of its assets, properties or businesses. Legal Requirements shall include, with respect to Sellers or their Affiliates, any requirements, conditions or obligations relating to the Priority Review Voucher set forth in the FFDCA or the Approval Letter or in any other correspondence received by Sellers or their Affiliates from the FDA regarding the Priority Review Voucher.

(x) "***Liabilities***" means all debts, liabilities and obligations, whether presently in existence or arising hereafter, accrued or fixed, absolute or contingent, matured or unmatured, determined or determinable, asserted or unasserted, known or unknown, including those arising under any Law, action or governmental order and those arising under any Contract, including in connection with the Priority Review Voucher.

(y) "***License Agreement***" means the Amended and Restated Licensing Agreement by and between the Sellers, effective December 6, 2017.

(z) "***Losses***" means all losses, Liabilities, damages, claims, causes of action, judgments, awards, suits, Taxes, fines, penalties, costs or expenses (including reasonable attorneys' and experts' fees and expenses).

(aa) "***Mutual Confidential Disclosure Agreement***" means that certain mutual confidential disclosure agreement by and between the Parties, dated November 27, 2017.

(bb) "***Person***" means any natural person, company, corporation, limited liability company, general partnership, limited partnership, trust, proprietorship, joint venture, business organization or Governmental Entity.

(cc) "***Priority Review***" means a priority review of and action upon a human drug application by the FDA not later than six (6) months after the filing of such application to the FDA, as defined in the FFDCA.

(dd) "***Priority Review Voucher***" means the priority review voucher issued by the United States Secretary of Health and Human Services to the U.S. Seller, as evidenced in the FDA press release set forth at https://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm585308.htm, tracking number PRV BLA 761047, as the sponsor of a rare pediatric disease product application, that entitles the holder of such voucher to request Priority Review of a single human drug application submitted under section 505(b)(1) or a single biologic application submitted under section 351(a) of the United States Public Health Service Act, as further defined in the FFDCA.

(ee) "***Proceeding***" means any action, arbitration, audit, hearing, investigation, litigation or suit (whether civil, criminal, administrative, judicial or investigative, whether formal or informal, whether public or private) commenced, brought, conducted or heard by or before, or otherwise involving, any Governmental Entity or arbitrator.

(ff) "***Purchased Assets***" means certain intangible assets, consisting of the Priority Review Voucher, including any and all rights, benefits and entitlements with respect thereto afforded to the holder of the Priority Review Voucher.

(gg) "***Regulatory Change***" means any (i) new Legal Requirement, amendment or supplement to any then-existing Legal Requirement, or (ii) new, amended or supplemented term or condition imposed on the Priority Review Voucher that is not set forth in the Approval Letter, that in either case of (i) or (ii) has been enacted, adopted, approved, or imposed between the Effective Date and the Closing Date and adversely impacts the manner in which Buyer may use, receive, hold or otherwise exploit the Priority Review Voucher.

(hh) "***Representative***" means, with respect to a particular Person, any director, officer, manager, employee, agent, consultant, advisor, accountant, financial advisor, legal counsel or other representative of that Person.

(ii) "***Tax***" or "***Taxes***" means any net income, alternative or add-on minimum tax, gross income, gross receipts, sales, use, value added tax, ad valorem, transfer, franchise, profits, license, withholding, payroll, employment, excise, severance, stamp, occupation, municipal tax, municipal surcharge premium, property, environmental or windfall profit tax, social security contribution or other tax of any kind whatsoever, together with any interest or any penalty, addition to tax or additional amount in the nature of a tax imposed by any Governmental Entity responsible for the imposition of any such tax (domestic or foreign), whether disputed or not and including (i) the tax

liability of any other Person imposed pursuant to Treasury Regulations Section 1.1502-6 or any similar provision of other tax Law, and (ii) the obligation to indemnify or assume or otherwise succeed to the tax liability of any other Person, by contract or pursuant to any Law.

(jj) "***Third Party***" means any Person other than a Party and such Party's Affiliates.

Other capitalized terms defined elsewhere in this Agreement and not defined in this Section 1.1 shall have the meanings assigned to such terms in this Agreement.

ARTICLE 2
PURCHASE AND SALE; CLOSING

2.1 Purchase and Sale of Purchased Assets.

(a) Upon the terms and subject to the conditions of this Agreement, at and as of the Closing, Buyer shall purchase from Sellers and Sellers shall sell, transfer, convey, assign and deliver to Buyer all of Sellers' right, title and interest in and to the Purchased Assets free and clear of all Encumbrances. Sellers shall perform all actions necessary to facilitate the transfer of the Purchased Assets to Buyer.

(b) Buyer shall not assume, nor shall it be liable for, or otherwise be obligated to pay, perform or discharge, any Liabilities of Sellers or their Affiliates, including any Liabilities arising from or related to Sellers' ownership prior to the Closing of any rights with respect to the Purchased Assets (such Liabilities, the "***Excluded Liabilities***"). Sellers shall be solely responsible for all such Excluded Liabilities.

2.2 Purchase Price. The total consideration to be paid by Buyer for all of the Purchased Assets shall be ONE HUNDRED THIRTY MILLION U.S. DOLLARS (U.S. $130,000,000) (the "***Purchase Price***"). Buyer shall pay the Purchase Price to Sellers on the Closing Date in United States dollars by wire transfer of immediately available funds to a bank account designated by the Sellers in accordance with the wire instructions provided by the Sellers to the Buyer at least two (2) Business Days prior to the Closing Date.

2.3 Closing. The closing of the transactions contemplated hereby (the "***Closing***") shall take place remotely via the exchange of documents and signatures, at 11:59 p.m. California time, on the fifth (5th) Business Days following the date on which all of the conditions precedent set forth in ARTICLE 6 have been satisfied or waived (other than conditions to be satisfied only by the delivery of certificates or other documents at the Closing, but subject to the satisfaction or waiver of such conditions at the Closing), or at such other time and place as the Parties may mutually agree in writing. The date on which the Closing actually takes place is referred to in this Agreement as the "***Closing Date***".

2.4 Title Passage; Delivery of Purchased Assets.

(a) *Title Passage*. Upon the Closing, all of the right, title and interest of Sellers in and to the Purchased Assets shall pass to Buyer free and clear of all Encumbrances.

(b) *Method of Delivery of Assets*. Within one (1) Business Day following the Closing Date, the U.S. Seller and Buyer will each submit to the FDA the separate notifications referred to in Section 2.5(b) and Section 2.6(c), respectively.

(c) *Filings; Notifications*. Buyer and Sellers agree to cooperate and assist each other with respect to all filings or notifications to FDA related to the transfer and assignment of the Purchased Assets.

2.5 Closing Deliveries by Sellers. At the Closing, Sellers shall deliver to Buyer the following:

(a) an executed Bill of Sale substantially in the form attached hereto as Exhibit 2.5(a);

(b) a copy of the notification of the purchase and sale of the Priority Review Voucher pursuant to this Agreement to be submitted to the FDA by the U.S. Seller pursuant to Section 2.4(b), which notification shall be in the form of Exhibit 2.5(b) or such other form as the FDA may require as of the Closing Date;

(c) a certificate of Sellers dated as of the Closing Date, in the form set out in Exhibit 2.5(c), duly executed by Sellers, certifying as to the satisfaction of the conditions set forth in Sections 6.2(a) and 6.2(b); and

(d) such other documents and instruments as may be required to be delivered by Sellers by any other provision of this Agreement or as may be reasonably required to consummate the transactions contemplated by this Agreement.

2.6 Closing Deliveries by Buyer. At the Closing, Buyer shall deliver to Sellers the following:

(a) payment of the Purchase Price in accordance with Section 2.2;

(b) an executed Bill of Sale substantially in the form attached hereto as Exhibit 2.5(a);

(c) a copy of the notification of the purchase and sale of the Priority Review Voucher pursuant to this Agreement to be submitted to the FDA by Buyer pursuant to Section 2.4(b), which notification shall be in the form of Exhibit 2.6(c) or such other form as the FDA may require as of the Closing Date;

(d) a certificate of Buyer dated as of the Closing Date, in the form set out in Exhibit 2.6(d), duly executed by Buyer, certifying as to the satisfaction of the conditions set forth in Sections 6.1(a) and 6.1(b); and

(e) such other documents and instruments as may be required to be delivered by Buyer by any other provision of this Agreement or as may be reasonably required to consummate the transactions contemplated by this Agreement.

2.7 Withholding. Any payments by Buyer to Sellers shall be made without any deduction or withholding for or on account of any Taxes, levies, duties, deductions, withholdings, assessments, fees or other charges imposed by any Governmental Entity.

2.8 Transfer Taxes. Notwithstanding any other provision in this Agreement to the contrary, each respective Party shall bear and pay any and all sales Taxes, value added Taxes, use Taxes, transfer Taxes, documentary charges, recording fees or similar Taxes, charges or fees (including any penalties, interest and additions thereto) that may become payable by it or its Affiliates in connection with the sale of the Purchased Assets to Buyer (collectively, "***Transfer Taxes***").

ARTICLE 3
REPRESENTATIONS AND WARRANTIES OF SELLER

Sellers hereby represent and warrant to Buyer as of the date hereof and as of the Closing Date as follows:

3.1 Organization, Standing and Power. The U.S. Seller is a corporation duly organized, validly existing and in good standing under the laws of the State of Delaware and the Cayman Seller is an exempted company duly incorporated, validly existing and in good standing under the laws of the Cayman Islands. Each Seller has the requisite corporate power and authority to own, operate and lease its properties and to carry on its business as presently conducted and is qualified or licensed to do business and is in good standing in each jurisdiction where the character of its properties owned or leased or the nature of its activities make such qualification or licensing necessary, except where the failure to be so qualified or licensed would not, individually or in the aggregate, reasonably be expected to materially adversely affect any of the Purchased Assets, either Sellers' ability to consummate the transactions contemplated by this Agreement, or Buyer's ownership and rights with respect to any of the Purchased Assets after the Closing. Sellers are not in violation of their organizational documents, as amended to date.

3.2 Due Authority. Sellers have all requisite corporate power and authority to execute and deliver, perform their obligations under, and consummate the transactions contemplated by, this Agreement. The execution, delivery and performance of this Agreement, and the consummation of the Asset Purchase, have been duly and validly authorized by all necessary corporate action on the part of Sellers. This Agreement has been duly executed and delivered by Sellers. This Agreement, upon due execution and delivery by the Parties, will constitute a valid and binding obligation of Sellers enforceable against Sellers in accordance with its terms, subject only to the effect, if any, of (a) applicable bankruptcy and other similar Laws affecting the rights of creditors generally and (b) rules of Law governing specific performance, injunctive relief and other equitable remedies (whether considered in an action at Law or in equity).

3.3 No Contravention. The execution and delivery by Sellers of this Agreement does not, and the consummation of the transactions contemplated hereby, including the transfer of title to, ownership in, and possession of the Purchased Assets, will not, (a) result in the creation of any Encumbrance on the Purchased Assets or (b) conflict with, or result in any violation or default under (with or without notice or lapse of time, or both), or give rise to a right of termination, revocation, suspension, cancellation or acceleration of any obligation or loss of any benefit under, or require any consent, approval or waiver from any Person pursuant to, (i) any provision of the certificate of incorporation, bylaws, memorandum and article of association of Sellers, as applicable, in each case as amended to date, (ii) the Priority Review Voucher, the Approval Letter or any Contract to which Sellers or any of their Affiliates are a party or bound by which involves or affects in any way any of the Purchased Assets or (iii) Legal Requirements (except as may be required to comply with the HSR Act) applicable to Sellers or their Affiliates or the Purchased Assets, except, in the case of clause (b)(ii) or (b)(iii), for any such conflicts, violations, defaults or other occurrences that would not, individually or in the aggregate, reasonably be expected to have a material adverse effect on the ability of Buyer to consummate the purchase of the Purchased Assets at Closing.

3.4 No Consents. Except for (a) any Antitrust Approvals required by the HSR Act; (b) the letters referenced in Section 2.4(b); (c) any Consents, the absence of which would not

individually or in the aggregate, reasonably be expected to have a material adverse effect on the Purchased Assets or prevent, materially delay or materially impede the performance by Sellers or their Affiliates' of Sellers' obligations under this Agreement or the consummation of the transactions contemplated hereby; or (d) as may be necessary as a result of any facts or circumstances relating to the Buyer or any of its Affiliates, no Consent of a Governmental Entity or any other Person, is necessary or required in connection with the execution, delivery and performance by Sellers of this Agreement, and the consummation by Sellers or their Affiliates of the transactions contemplated hereby.

3.5 Title to Purchased Assets. Sellers are the sole and exclusive owners of all right, title and interest in and to the Purchased Assets and own good and transferable title to the Purchased Assets free and clear of any Encumbrances. In furtherance of Sellers developing, obtaining and maintaining the FDA Approval, the Sellers have neither (a) misappropriated the intellectual property of any Third Party nor (b) used any data in connection with such activities where Sellers did not have sufficient right, title, or interest to such data. Sellers have performed all actions necessary to perfect their ownership of, and their ability to transfer, the Purchased Assets. Sellers have the full right to sell, transfer, convey, assign and deliver the Purchased Assets to Buyer at the Closing free and clear of all Encumbrances. The right, title and interest in and to the Purchased Assets that are to be sold, transferred, conveyed, assigned and delivered by Sellers to Buyer at the Closing in accordance with this Agreement collectively constitute the entire right, title and interest in and to the Purchased Assets and immediately following the Closing, Buyer shall have all right, title and interest in and to the Purchased Assets free and clear of all Encumbrances. In addition to the foregoing, there are no Adverse Claims with respect to any of the Purchased Assets.

3.6 Contracts. Except for this Agreement and the License Agreement, there is no Contract to which Sellers or any of their Affiliates are a party to or bound by that assigned, transferred, licensed, conveyed or encumbered, or granted or allowed to exist any Encumbrance with respect to, any of Sellers' right, title or interest in, to or under the Purchased Assets.

3.7 Compliance With Legal Requirements. Sellers and their Affiliates are, and at all times have been, in compliance with all Legal Requirements that are or were applicable to the Purchased Assets, including Sellers' and their Affiliates' conduct, acts or omissions with respect to the Purchased Assets. None of Sellers nor any of their Affiliates have received any written or, to Sellers' Knowledge, oral notice or other communication from any Person regarding any actual or alleged violation of, or failure to comply with, any such Legal Requirement.

3.8 Regulatory Compliance. Since the three (3) year period prior to the date hereof and as it relates to the FDA Approval, the Approval Letter or the activities giving rise to such FDA Approval, the Approval Letter or the Priority Review Voucher, neither Sellers, any Affiliate of Sellers, nor to the Knowledge of Sellers, any officer or employee of Sellers or any Affiliate of Sellers, has made an untrue statement of material fact or a fraudulent statement to the FDA or any other Governmental Entity, failed to disclose a material fact or a fraudulent statement to the FDA or any other Governmental Entity or committed an act, made a statement or failed to make a statement that, at the time such disclosure was made, would reasonably be expected to provide a basis for the FDA to invoke its policy respecting "Fraud, Untrue Statements of Material Facts, Bribery, and Illegal Gratuities," set forth in 56 Fed. Reg. 46191 (September 10, 1991) or for any other Governmental Entity to invoke any similar policy.

3.9 Legal Proceedings. There is no pending, or to Sellers' Knowledge, threatened, Action involving Sellers or any of their Affiliates, nor has there been an Action involving Sellers or any of their Affiliates, and neither Sellers nor any of their Affiliates are a party or subject to the provisions of any Judgment, (a) that involves or affects the issuance of, ownership of, transfer of, title to, or use of any of the Purchased Assets, or (b) that otherwise challenges the transactions contemplated by this Agreement. Except as set forth in the Priority Review Voucher, none of the Purchased Assets are subject to any order of any Governmental Entity or arbitrator. To the Knowledge of Sellers, there is no fact or circumstance that would reasonably be expected to serve as a basis for any of the foregoing Actions.

3.10 Governmental Authorizations. Neither Sellers nor any of their Affiliates is required to hold any license, registration, or permit issued by any Governmental Entity to own, use or transfer the Purchased Assets, other than such licenses, registrations or permits that have already been obtained.

3.11 Revocation; Use of Purchased Assets. The Priority Review Voucher has not been terminated, suspended, cancelled or revoked and to Sellers' Knowledge there are no facts or circumstances that could reasonably be expected to (with or without notice or lapse of time, or both) give rise to a right of FDA to terminate, suspend, cancel or revoke the Priority Review Voucher. There is nothing that could reasonably be expected to preclude or interfere with (a) the sale and transfer of the Purchased Assets to Buyer or (b) Buyer's use of the Purchased Assets to obtain Priority Review or any other benefit associated with the Purchased Assets following the Closing. There is no term or condition imposed by the FDA on the Priority Review Voucher as of the date hereof that is not set forth in the Approval Letter. Sellers have provided to Buyer true and complete copies of the Approval Letter and all other correspondence received by Sellers or any of their respective Affiliates regarding the Priority Review Voucher. Neither Sellers nor any of their Affiliates have notified FDA of their own intent to use the Priority Review Voucher.

3.12 Marketed Product. Sellers have initiated marketing in the United States of the rare pediatric disease product for which the Priority Review Voucher was awarded within the three hundred sixty five (365)-day period beginning on the date of the FDA approval of such rare pediatric disease product and has continuously marketed such product in the United States since Sellers initiated marketing of such product. The rare pediatric disease product application for which the Priority Review Voucher was awarded was not submitted by Sellers to the FDA prior to the date that is ninety (90) days after the date of enactment of the Prescription Drug User Fee Amendments of 2012.

3.13 Brokers. Except for Merrill Lynch, Pierce, Fenner & Smith Incorporated, no broker, finder or investment banker is entitled to any brokerage or finder's fee in connection with the purchase and sale of the Purchased Assets hereunder or any of the other transactions contemplated by this Agreement based upon arrangements made by or on behalf of Sellers.

3.14 Exclusivity of Representations and Warranties. Neither the Sellers nor any of their Affiliates or their respective Representatives is making any representation or warranty of any kind or nature whatsoever, oral or written, express or implied, except as otherwise expressly set forth in this ARTICLE 3, and Sellers hereby disclaim any such other representations or warranties.

3.15 Solvency. Sellers are not entering into this Agreement with the actual intent to hinder, delay, or defraud any creditor of Sellers or any Affiliate of Sellers. The remaining assets of Sellers after the Closing will not be unreasonably small in relation to the business in which

Sellers will engage after the Closing. After the Closing, Sellers will have the ability to pay their debts as they become due.

ARTICLE 4
REPRESENTATIONS AND WARRANTIES OF BUYER

Buyer hereby represents and warrants to Sellers as of the date hereof and as of the Closing Date as follows:

4.1 Organization, Standing and Power. Buyer is a company duly organized, validly existing and in good standing under the laws of Switzerland.

4.2 Authority. Buyer has all requisite corporate power and authority to execute and deliver, perform its obligations under, and consummate the transactions contemplated by, this Agreement. The execution, delivery and performance of, and the consummation of the transactions contemplated by, this Agreement have been duly and validly approved and authorized by all necessary corporation action. This Agreement has been duly executed and delivered by Buyer. This Agreement, upon due execution and delivery by the Parties, will constitute a valid and binding obligation of Buyer, enforceable against Buyer in accordance with its terms, subject only to the effect, if any, of (a) applicable bankruptcy and other similar Laws affecting the rights of creditors generally and (b) rules of Law governing specific performance, injunctive relief and other equitable remedies (whether considered in an action at Law or in equity).

4.3 No Contravention. The execution and delivery by Buyer of this Agreement does not, and the consummation of the transactions contemplated hereby will not, conflict with, or result in any violation of or default under (with or without notice or lapse of time, or both), or give rise to a right of termination, cancellation or acceleration of any obligation or loss of any benefit under, or require any consent, approval or waiver from any Person pursuant to, (a) any provision of the organizational or governing documents of Buyer, in each case as amended to date, (b) any Contract to which Buyer is a party or bound by or by which its assets or properties are bound or under which Buyer has rights or benefits, or (c) any Legal Requirements (except as may be required to comply with the HSR Act) applicable to Buyer or any of its assets or properties, except, in the case of clause (b) or (c), for any such conflicts, violations, defaults or other occurrences that would not, individually or in the aggregate, reasonably be expected to have a material adverse effect on the ability of Buyer to consummate the purchase of the Purchased Assets at Closing.

4.4 No Consents. Except for (a) any Antitrust Approvals required by the HSR Act, (b) the letters referenced in Section 2.4(b), and (c) any Consents, the absence of which would not reasonably be expected to have a material adverse effect on the ability of Buyer to consummate the purchase of the Purchased Assets at Closing, no Consent of any Governmental Entity or any other Person is required by or with respect to Buyer in connection with the execution, delivery and performance by Buyer of this Agreement or the consummation by Buyer of the transactions contemplated hereby.

4.5 Brokers. No broker, finder or investment banker is entitled to any brokerage or finder's fee in connection with the purchase and sale of the Purchased Assets hereunder or any of the other transactions contemplated by this Agreement based upon arrangements made by or on behalf of Buyer.

4.6 Financing. Buyer has sufficient funds to permit Buyer to consummate the transactions contemplated by this Agreement. Buyer has provided Sellers with accurate and complete copies of the commitment letters or other materials satisfactory to the Sellers evidencing Buyer's possession of sufficient funds for the transactions contemplated by this Agreement. Notwithstanding anything to the contrary contained herein, the Parties acknowledge and agree that it shall not be a condition to the obligations of Buyer to consummate the transactions contemplated hereby that Buyer have sufficient funds for payment of the Purchase Price.

4.7 Non-Reliance. Neither Sellers nor any of their Affiliates or Representatives has made any representation or warranty, express or implied, as to the accuracy or completeness of any information concerning the Purchased Assets contained herein or made available in connection with Buyer's investigation of the foregoing, except as expressly set forth in this Agreement, and Sellers and their Affiliates and Representatives expressly disclaim any and all liability that may be based on such information or errors therein or omissions therefrom. Buyer has not relied and is not relying on any statement, representation or warranty, oral or written, express or implied (including any representation or warranty as to merchantability or fitness for a particular purpose), made by Sellers or any of their Affiliates or Representatives, except as expressly set forth in ARTICLE 3. Neither Sellers nor any of their Affiliates or Representatives shall have or be subject to any liability to Buyer or any other Person resulting from the distribution to Buyer, or Buyer's use of, any information, documents or materials made available to Buyer, whether orally or in writing, in any confidential information memoranda, "data rooms," presentations, due diligence discussions or in any other form in expectation of, or in connection with, the transactions contemplated by this Agreement.

ARTICLE 5
COVENANTS

5.1 Negative Covenants of Sellers. During the period from the Effective Date and continuing until the earlier of the termination of this Agreement or the Closing Date (the "***Pre-Closing Period***"), except as otherwise expressly contemplated by this Agreement or with Buyer's prior written consent, which consent shall not be unreasonably withheld, conditioned or delayed, Sellers shall not, and shall cause their Affiliates not to, knowingly take or permit any action that, or omit to take any action the absence of which, could reasonably be expected to prevent the satisfaction of the condition set forth in Section 6.2(a).

5.2 Negative Covenant of Buyer. During the Pre-Closing Period, except as otherwise expressly contemplated by this Agreement or with Sellers' prior written consent, which consent shall not be unreasonably withheld, conditioned or delayed, Buyer shall not, and shall cause its Affiliates not to, knowingly take or permit any action that, or omit to take any action the absence of which, could reasonably be expected to prevent the satisfaction of the condition set forth in Section 6.1(a).

5.3 Compliance with Legal Requirements. During the Pre-Closing Period, and from and after the Closing, Sellers shall, and shall cause their Affiliates and each of their respective successors in interest to the rare pediatric disease product for which the Priority Review Voucher was awarded to, materially comply with all Legal Requirements applicable to such Persons relating to the Priority Review Voucher and to forward to Buyer any communications it or any of its Affiliates receives from FDA in respect of the Priority Review Voucher. Without limiting the

generality of the immediately preceding sentence, to the extent required, now or in the future, under applicable Legal Requirements or otherwise by FDA for the use or transfer of the Priority Review Voucher, or to avoid revocation of the Priority Review Voucher, Sellers shall, and shall cause their Affiliates and each of their respective successors in interest to the rare pediatric disease product for which the Priority Review Voucher was awarded to, submit a post-approval production report to the United States Secretary of Health and Human Services not later than five (5) years after the approval of such rare pediatric disease product in accordance with section 529(e)(2) of the FFDCA.

5.4 No Solicitation.

(a) During the Pre-Closing Period, Sellers shall not, nor shall they authorize, instruct or permit any of their Affiliates or each of their Representatives, to (i) solicit, initiate, facilitate or knowingly encourage any inquiries, proposals or offers with respect to, or the submission of, any Alternative Transaction by any Person (other than Buyer or its Affiliates or their respective Representatives) or any inquiry, proposal or offer that is reasonably likely to lead to an Alternative Transaction, (ii) engage, continue or participate in any discussions or negotiations regarding, or take any other action intended or reasonably expected to facilitate the making of any inquiry or proposal to Sellers that constitutes, or may reasonably be expected to lead to, any Alternative Transaction by any Person (other than Buyer or its Affiliates or their respective Representatives) other than to state that they are not permitted to have discussions and to refer to this Agreement, (iii) accept any proposal or offer from any Person (other than Buyer) in respect of an Alternative Transaction, or (iv) resolve to propose or agree to do any of the foregoing.

(b) Upon execution of this Agreement, Sellers and their Affiliates shall immediately cease and cause to be terminated any existing discussions with any Person (other than Buyer) that are in respect of an Alternative Transaction.

5.5 Antitrust Notification.

(a) Unless this Agreement shall have been validly terminated in accordance with Section 7.1, Buyer and Sellers shall, as promptly as practicable after the Effective Date as they shall mutually agree file with the FTC and the DOJ the premerger notification and report form required as a result of the contemplated purchase and sale of the Purchased Assets and the other transactions contemplated hereby, and shall include any supplemental information requested in connection therewith, pursuant to the HSR Act. Any such filing, notification and report form and supplemental information shall be in substantial compliance with the requirements of the HSR Act. The Parties shall work together and shall furnish to one another such necessary information and reasonable assistance as the other may request in connection with its preparation of any filing or submission which is necessary under the HSR Act. The Parties shall (A) cooperate with one another and keep one another apprised of the status of any communications with, and any inquiries or requests for additional information from, the FTC, the DOJ or any other applicable Governmental Entity, (B) comply promptly with any such reasonable inquiry or request, (C) not participate, or permit its Affiliates to participate, in any substantive meeting or discussion with any Governmental Entity in respect of any filings, investigation or inquiry concerning this Agreement unless it consults with the other Party in advance and, to the extent permitted by such Governmental Entity, gives the other Party the opportunity to attend and participate thereat, and (D) with the exception of business documents deemed highly confidential by the possessing Party (including documents submitted as attachments to the Party's notification and report form under

the HSR Act), furnish the other Party or the other Party's outside counsel with copies of all correspondence, filings, and communications (and memoranda setting forth the substance thereof) between a Party or its Affiliates, on the one hand, and any Governmental Entity, on the other hand, with respect to the transactions contemplated hereunder or any investigation with respect to the transactions contemplated hereunder. Buyer shall pay all filing fees and other charges for the filing under the HSR Act by both Parties.

(b) From and after the date on which the filings are made pursuant to Section 5.5(a), Buyer and Sellers shall use reasonable best efforts to obtain any clearance required under the HSR Act (any such clearance, an "***Antitrust Approval***"), including replying at the earliest practicable date to any requests for information received from the FTC or DOJ pursuant to the HSR Act and making any permitted request for early expiration or termination of the applicable waiting periods under the HSR Act as soon as possible.

(c) Notwithstanding the foregoing, nothing in this Agreement shall require, or be construed to require, the Parties or any of their respective Affiliates to offer or agree to (i) (A) sell, hold, separate, divest, license, discontinue or limit, before or after the Closing Date, any assets, businesses, equity holdings, intellectual property, or other interests or (B) any conditions relating to, or changes or restrictions in, the operations of any such assets, businesses, equity holdings, intellectual property or interests (including but not limited to any requirements to enter into new contracts or modify or terminate existing contracts) or (ii) any material modification or waiver of the terms and conditions of this Agreement.

5.6 Expenses. Whether or not the purchase and sale of the Purchased Assets and the other transactions contemplated by this Agreement are consummated, and except as otherwise set forth in this Agreement, each of the Parties shall bear its own fees and expenses incurred or owed in connection with the purchase and sale of the Purchased Assets, this Agreement and the transactions contemplated hereby.

5.7 Further Assurances. During the Pre-Closing Period, and from and after the Closing, the Parties shall cooperate reasonably with each other in connection with any steps required to be taken as part of their respective obligations under this Agreement, including without limitation any notifications or filings required to be made to the FDA in connection with the transfer of the Purchased Assets, and shall (a) furnish upon request to each other such further information, (b) execute and deliver to each other such other documents, and (c) do such other acts and things, all as the other Party may reasonably request for the purpose of carrying out the intent of this Agreement and the transactions contemplated by this Agreement, including the use of the Purchased Assets to obtain Priority Review.

5.8 Confidentiality. Each Party shall, and shall cause its Affiliates and its and their Representatives to, keep confidential and not publish or otherwise disclose to a Third Party and not use, directly or indirectly, for any purpose, any Confidential Information furnished or otherwise made known to it, directly or indirectly, by the other Party, except to the extent such disclosure or use is expressly permitted by the terms of this Agreement. Notwithstanding the foregoing, to the extent the receiving Party can demonstrate by documentation or other competent proof, the confidentiality and non-use obligations under this Section 5.8 with respect to any Confidential Information shall not include any information that:

(a) has been published by a Third Party or otherwise is or hereafter becomes part of the public domain by public use, publication, general knowledge or the like through no wrongful act, fault or negligence on the part of the receiving Party;

(b) has been in the receiving Party's possession prior to disclosure by the disclosing Party without any obligation of confidentiality with respect to such information;

(c) is subsequently received by the receiving Party from a Third Party without restriction and without breach of any agreement between such Third Party and the disclosing Party;

(d) is generally made available to Third Parties by the disclosing Party without restriction on disclosure; or

(e) has been independently developed by or for the receiving Party without reference to, or use or disclosure of, the disclosing Party's Confidential Information.

Specific aspects or details of Confidential Information shall not be deemed to be within the public domain or in the possession of the receiving Party merely because the Confidential Information is embraced by more general information in the public domain or in the possession of the receiving Party. Further, any combination of Confidential Information shall not be considered in the public domain or in the possession of the receiving Party merely because individual elements of such Confidential Information are in the public domain or in the possession of the receiving Party unless the combination and its principles are in the public domain or in the possession of the receiving Party.

5.9 Permitted Disclosures. Each Party may disclose Confidential Information to the extent that such disclosure is:

(a) in the reasonable opinion of the receiving Party's legal counsel, required to be disclosed pursuant to Law, regulation or a valid order of a court of competent jurisdiction or other Governmental Entity of competent jurisdiction (including by reason of filing with securities regulators, but subject to Section 5.10); *provided*, that the receiving Party shall first have given prompt written notice (and to the extent possible, at least five (5) Business Days' notice) to the disclosing Party and given the disclosing Party a reasonable opportunity to take whatever action it deems necessary to protect its Confidential Information (for example, quash such order or to obtain a protective order or confidential treatment requiring that the Confidential Information and documents that are the subject of such order be held in confidence by such court or Governmental Entity or, if disclosed, be used only for the purposes for which the order was issued). In the event that no protective order or other remedy is obtained, or the disclosing Party waives compliance with the terms of this Agreement, the receiving Party shall furnish only that portion of Confidential Information which the receiving Party is advised by counsel is legally required to be disclosed;

(b) made to its or its Affiliates' financial, legal and other advisors who have a need to know such disclosing Party's Confidential Information and are either under professional codes of conduct giving rise to expectations of confidentiality and non-use or under written agreements of confidentiality and non-use, in each case, at least as restrictive as those set forth in this Agreement; *provided*, that the receiving Party shall remain responsible for any failure by such financial, legal and other advisors, to treat such Confidential Information as required under this Agreement;

(c) made by or on behalf of Buyer or its Affiliates to the FDA or other Governmental Entity as required in connection with any filing, application or request for regulatory approval in which Priority Review is sought; or

(d) made by Buyer or its Affiliates to its or their advisors, consultants, clinicians, vendors, service providers, contractors, existing or prospective collaboration partners, licensees, sublicensees, or other Third Parties as may be necessary or useful in connection with the transactions contemplated by this Agreement, including the use of the Purchased Assets to obtain Priority Review; *provided*, that such Persons shall be subject to obligations of confidentiality and non-use with respect to such Confidential Information substantially similar to the obligations of confidentiality and non-use of the receiving Party pursuant to Section 5.8.

5.10 Public Announcements. Sellers and Buyer shall consult with each other before issuing, and provide each other the opportunity to review and comment upon, any press release or other public statement with respect to the transactions contemplated hereby, and shall not issue any such press release or make any such public statement prior to such consultation, except as may be required by applicable Law. Buyer and Sellers each acknowledge that each of the Buyer and U.S. Seller, as a publicly traded company, is legally obligated to make timely disclosures of materials events relating to its business. The Parties acknowledge that the other Parties may be obligated to file a copy of this Agreement with the United States Securities and Exchange Commission. Notwithstanding the foregoing, without prior submission to or approval of the other Parties, either Party may issue press releases or public announcements which incorporate information concerning this Agreement which information was included in a press release or public disclosure which was previously disclosed under the terms of this Agreement.

5.11 Use of Name. Except as expressly provided herein, neither Party shall mention or otherwise use the name, logo, or trademark of the other Parties or any of their Affiliates (or any abbreviation or adaptation thereof) in any publication, press release, marketing and promotional material, or other form of publicity without the prior written approval of such other Party in each instance. The restrictions imposed by this Section 5.11 shall not prohibit a Party from making any disclosure identifying the other Parties that, in the opinion of the disclosing Party's counsel, is required by applicable Law or the rules of a stock exchange on which the securities of the disclosing Party are listed; *provided*, that such disclosing Party shall submit the proposed disclosure identifying the other Parties in writing to the other Parties as far in advance as reasonably practicable (and in no event less than two (2) Business Days prior to the anticipated date of disclosure) so as to provide a reasonable opportunity to comment thereon.

5.12 Other Covenants. Until the earlier of the Closing or the termination of this Agreement, (a) Sellers shall, and shall cause each of their Affiliates to, provide Buyer with prompt written notice of the occurrence of any Regulatory Change and maintain the Priority Review Voucher in full force and effect and (b) Sellers shall not, and shall cause each of their Affiliates not to, (i) enter into any Contract with respect to the Purchased Assets or (ii) take or permit, or omit to take any action that could reasonably be expected to (A) prevent the satisfaction of the conditions set forth in ARTICLE 6 or (B) adversely affect any of the Purchased Assets, Sellers' or any of their Affiliates' ability to consummate the transactions contemplated by this Agreement or Buyer's ownership and rights with respect to any of the Purchased Assets after the Closing.

ARTICLE 6
CONDITIONS PRECEDENT TO CLOSING

6.1 Conditions Precedent to Sellers' Obligations. The obligations of Sellers to consummate the transactions contemplated by this Agreement are subject to the satisfaction or waiver on or prior to the Closing Date of the following conditions:

(a) Representations and Warranties of Buyer. Each of the representations and warranties of Buyer made in ARTICLE 4 shall be true and correct in all respects as of the Effective Date and as of the Closing Date (or in the case of representations and warranties that are made as of a specified date, such representations and warranties shall be true and correct as of such specified date), unless the failure of such representations to be so true and correct (without giving effect to any limitation or qualification as to "materiality" (including the word "material") or "material adverse effect" set forth therein) would not, individually or in the aggregate, reasonably be expected to have a material adverse effect on the ability of Buyer to consummate the transactions contemplated hereby.

(b) Compliance with Agreements and Covenants. Buyer and its Affiliates shall have performed in all material respects all obligations and agreements and complied in all material respects with all covenants and conditions required by this Agreement to be performed or complied with by Buyer or any such Affiliate on or before the Closing Date.

(c) Antitrust. Any waiting period (or extension thereof) applicable to the transactions contemplated by this Agreement under the HSR Act shall have been terminated or shall have expired.

(d) No Injunction or Legal Restraint. No Governmental Entity shall have enacted, issued, promulgated, enforced or entered any Law nor shall any temporary restraining order, preliminary or permanent injunction or other order or decree have been issued by any court of competent jurisdiction (other than any such orders, injunctions or decrees issued due to any Action commenced by or on behalf of Sellers) that is in effect and which has the effect of making the transactions contemplated by this Agreement illegal or otherwise preventing, prohibiting or restraining the consummation of the transactions contemplated by this Agreement.

(e) Closing Deliveries. Buyer shall have made the deliveries contemplated under Section 2.6.

6.2 Conditions Precedent to Buyer's Obligation. The obligation of Buyer to consummate the transactions contemplated by this Agreement is subject to the satisfaction or waiver on or prior to the Closing Date of the following conditions:

(a) Representations and Warranties of Sellers. Each of the representations and warranties of Sellers made in ARTICLE 3 shall be true and correct in all respects as of the Effective Date and as of the Closing Date (or in the case of representations and warranties that are made as of a specified date, such representations and warranties shall be true and correct as of such specified date), unless the failure of such representations to be so true and correct (without giving effect to any limitation or qualification as to "materiality" (including the word "material") or "material adverse effect" set forth therein) would not, individually or in the aggregate, reasonably be expected to have a material adverse effect on the Purchased Assets or prevent, materially delay

or materially impede the performance by Sellers of their obligations under this Agreement or the consummation of the transactions contemplated hereby.

(b) Compliance with Agreements and Covenants. Sellers and their Affiliates shall have performed in all material respects all obligations and agreements and complied in all material respects with all covenants and conditions required by this Agreement to be performed or complied with by Sellers or any such Affiliates on or before the Closing Date.

(c) Antitrust. Any waiting period (or extension thereof) applicable to the transactions contemplated by this Agreement under the HSR Act shall have been terminated or shall have expired and all other Antitrust Approvals shall have been made or obtained.

(d) No Injunction or Legal Restraint. No Governmental Entity shall have enacted, issued, promulgated, enforced or entered any Law nor shall any temporary restraining order, preliminary or permanent injunction or other order or decree have been issued by any court of competent jurisdiction (other than any such orders, injunctions or decrees issued due to any Action commenced by or on behalf of Buyer) that is in effect and which has the effect of making the transactions contemplated by this Agreement illegal or otherwise preventing, prohibiting or restraining the consummation of the transactions contemplated by this Agreement.

(e) Closing Deliveries. Sellers shall have made the deliveries contemplated under Section 2.5.

(f) No Regulatory Change. There shall not have occurred and remain in effect any Regulatory Change.

ARTICLE 7
TERMINATION

7.1 Termination. This Agreement may be terminated, and the transactions contemplated hereby may be abandoned, at any time prior to Closing:

(a) by mutual written consent of Buyer and Sellers; or

(b) by Sellers, if the Buyer has not submitted the premerger notification and report required pursuant to Section 5.5(a) within ten (10) Business Days of the Effective Date;

(c) by Buyer or Sellers, if the Closing has not occurred by 11:59 p.m. California time on the date that is three (3) months following the date hereof; *provided*, that neither Party may terminate this Agreement pursuant to this clause (b) if such Party is in breach of this Agreement;

(d) by Buyer or Sellers, if (i) any Law having the effect referred to in Section 6.2(d) or Section 6.1(d), as applicable, has been enacted, issued, promulgated, enforced or entered, or (ii) any order, injunction or decree having the effect referred to in Section 6.2(d) or Section 6.1(d), as applicable, is in effect and has become final and non-appealable;

(e) by Buyer, if Buyer is not in material breach of its obligations under this Agreement and there has been a violation or breach by Sellers of any of their representations, warranties, covenants or other agreements contained in this Agreement , which has prevented or would prevent the satisfaction of any condition to the obligations of Buyer at the Closing set forth in Section 6.2, and (i) such violation or breach has not been waived by Buyer, (ii) Buyer has

provided written notice to Sellers of such violation or breach setting forth the allegations of violation or breach in reasonable detail, and (iii) such violation or breach cannot be or has not been cured by Sellers within twenty (20) Business Days after receiving written notice thereof from Buyer; or

(f) by Sellers, if Sellers are not in material breach of their obligations under this Agreement and there has been a violation or breach by Buyer of any of its representations, warranties, covenants or other agreements contained in this Agreement, which has prevented or would prevent the satisfaction of any condition to the obligations of Sellers at the Closing set forth in Section 6.1 and (i) such violation or breach has not been waived by Sellers, (ii) Sellers have provided written notice to Buyer of such violation or breach setting forth the allegations of violation or breach in reasonable detail, and (iii) such violation or breach cannot be or has not been cured by Buyer within twenty (20) Business Days after receiving written notice thereof from Sellers.

7.2 Effect of Termination. If this Agreement is terminated and the transactions contemplated hereby are abandoned as described in this ARTICLE 7, this Agreement shall become void and of no further force or effect, except that the provisions of this Section 7.2, Sections 5.8, 5.9, 5.10 and 5.11, and ARTICLE 1 and ARTICLE 9 shall survive the termination of this Agreement and shall remain in full force and effect; *provided*, that nothing in this Section 7.2 shall be deemed to release any Party from any liability in respect of any breach by such Party of the terms and provisions of this Agreement prior to the effective date of such termination.

ARTICLE 8
INDEMNIFICATION

8.1 Indemnification.

(a) Indemnification by Sellers. From and after the Closing, Sellers shall indemnify, defend and hold Buyer and its Affiliates and its and their respective directors, officers, employees, shareholders, partners, members and agents (each, a "***Buyer Indemnified Party***") harmless for, from and against any and all Losses which any Buyer Indemnified Party may suffer, incur, sustain or become subject to, to the extent arising out of or resulting from (i) any breach of any representations, warranties, covenants or obligations of Sellers made under this Agreement and/or (ii) all Excluded Liabilities.

(b) Indemnification by Buyer. From and after the Closing, Buyer shall indemnify, defend and hold harmless Sellers and their Affiliates, and and each of their respective directors, officers, employees and agents (each, a "***Seller Indemnified Party***") from and against any and all Losses which any Seller Indemnified Party may suffer, incur, sustain or become subject to, to the extent arising out of or resulting from any breach of any representations, warranties, covenants or obligations of Buyer under this Agreement.

8.2 Notice of Loss; Third Party Claims.

(a) A claim for indemnification for any matter not involving a Third Party Claim may be asserted by written notice to the Party from whom indemnification is sought. Such notice shall include the facts constituting the basis for such claim for indemnification, the Sections of this Agreement upon which such claim for indemnification is then based and an estimate, if possible, of the amount of Losses suffered or reasonably expected to be suffered by the Indemnified Party.

(b) In the event that any claim shall be instituted or asserted by any Third Party in respect of which payment may be sought under Section 8.1(a) or Section 8.1(b) hereof (each, a "***Third Party Claim***"), the Indemnified Party shall promptly cause written notice of the assertion of any Third Party Claim of which it has knowledge which is covered by the provisions of Section 8.1(a) or Section 8.1(b), as applicable, to be forwarded to the Indemnifying Party. The failure of the Indemnified Party to give reasonably prompt notice of any Third Party Claim shall not release, waive or otherwise affect the Indemnifying Party's obligations with respect thereto except to the extent that the Indemnifying Party is actually prejudiced as a result of such failure. The Indemnifying Party shall have the right, at its sole option and expense, to be represented by counsel reasonably acceptable to the Indemnified Party and to defend against, negotiate, settle or otherwise deal with any Third Party Claim which relates to any Losses indemnified by it hereunder, subject to the provisions below. If the Indemnifying Party elects to defend against, negotiate, settle or otherwise deal with any Third Party Claim which relates to any Losses indemnified by it hereunder, it shall within thirty (30) days (or sooner, if the nature of the Third Party Claim so requires) notify the Indemnified Party of its intent to do so. If the Indemnifying Party elects not to defend against, negotiate, settle or otherwise deal with any Third Party Claim which relates to any Losses indemnified against hereunder, the Indemnified Party may defend against, negotiate, settle or otherwise deal with such Third Party Claim, subject to the provisions below. If the Indemnifying Party shall assume the defense of any Third Party Claim pursuant to the terms of this Agreement, the Indemnified Party may participate, at his, her or its own expense, in the defense of such Third Party Claim. The Parties hereto agree to reasonably cooperate with each other in connection with the defense, negotiation or settlement of any such Third Party Claim. Notwithstanding anything in this Section 8.2 to the contrary, the Indemnifying Party shall not, without the written consent of the Indemnified Party, settle or compromise any Third Party Claim or permit a default or consent to entry of any judgment unless (1) the claimant provides to the Indemnified Party an unqualified release of the Indemnified Parties from all liability in respect of such Third Party Claim, (2) such settlement does not involve any injunctive relief binding upon the Indemnified Party or any of its Affiliates, (3) such settlement does not encumber any of the material assets of any Indemnified Party or impose any restriction or condition that would apply to or materially affect any Indemnified Party or the conduct of any Indemnified Party's business, and (4) such settlement does not involve any admission of liability or wrongdoing by any Indemnified Party or any of its Affiliates.

(c) In the event that the Indemnified Party conducts the defense of the Third Party Claim pursuant to this Section 8.2, the Indemnifying Party will (i) advance the Indemnified Party promptly and periodically for the reasonable costs of defending against the Third Party Claim (including reasonable attorneys' and experts' fees and expenses) and (ii) remain responsible for any and all other Losses that the Indemnified Party may incur or suffer resulting from, arising out of, relating to, in the nature of or caused by the Third Party Claim to the fullest extent provided in this ARTICLE 8.

8.3 Survival. The representations and warranties of Sellers and Buyer under this Agreement, and liability for the breach thereof, shall survive the Closing Date and shall remain in full force and effect for a period of twelve (12) months following the Closing Date; *provided*, *however*, that the representations and warranties contained in Sections 3.1, 3.2, 3.5, 3.7 through 3.15, 4.1, 4.2, 4.5, and 4.7 shall survive the Closing Date and shall remain in full force and effect until the expiration of the applicable statute of limitations. The survival periods set forth in this

Section 8.3 are in lieu of, and the parties expressly waive, any otherwise applicable statute of limitations, whether arising at law or in equity. Any claim for breach of representation or warranty hereunder shall be deemed to have accrued as of the Closing. No claim for breach of any representation, warranty, covenant or agreement may be brought after expiration of the survival periods set forth in this Section 8.3.

8.4 Adjustments. Any amount paid under this ARTICLE 8 shall be treated as an adjustment to the Purchase Price for all Tax purposes unless otherwise required by applicable Law.

8.5 Limits on Indemnification. Notwithstanding anything to the contrary contained in this Agreement, (i) the maximum aggregate amount of indemnifiable Losses (other than reasonable attorneys' and experts' fees and expenses included in such Losses) that may be recovered from Sellers by Buyer Indemnified Parties pursuant to Section 8.1(a) shall equal the Purchase Price, and (ii) Sellers shall in any event also indemnify Buyer pursuant to Section 8.1(a) for any and all reasonable attorneys' and experts' fees and expenses that are included in Losses. No party hereto shall have any liability under any provision of this Agreement for any punitive, incidental, consequential, special or indirect damages, including business interruption, diminution of value, loss of future revenue, profits or income, or loss of business reputation or opportunity relating to the breach or alleged breach of this Agreement and, in particular, no "multiple of profits" or "multiple of cash flow" or other valuation methodology will be used in calculating the amount of any Losses, regardless of the legal theory under which such liability or obligation may be sought to be imposed, whether sounding in contract or tort, or whether at law or in equity, or otherwise. In the event Buyer proceeds with the Closing notwithstanding actual knowledge by Buyer or any Affiliate of Buyer at or prior to the Closing of any breach by Sellers of any representation, warranty or covenant in this Agreement, no Buyer Indemnified Party shall have any claim or recourse against Sellers or any of their Affiliates or Representatives with respect to such breach, under this ARTICLE 8 or otherwise.

8.6 Exclusivity. This ARTICLE 8 will provide the exclusive remedy against Sellers for any breach of any representation, warranty, covenant or other claim arising out of or relating to this Agreement and/or the transactions contemplated hereby. The Parties hereto agree that the provisions in this Agreement relating to indemnification, and the limits imposed on Buyer's remedies with respect to this Agreement and the transactions contemplated hereby, were specifically bargained for between sophisticated parties and were specifically taken into account in the determination of the amounts to be paid to Sellers hereunder.

ARTICLE 9
GENERAL PROVISIONS

9.1 Notice Requirements. Any notice, request, demand, waiver, consent, approval, or other communication permitted or required under this Agreement shall be in writing, shall refer specifically to this Agreement and shall be deemed given only if (a) delivered by hand, (b) sent by facsimile transmission (with transmission confirmed), or (c) sent by internationally recognized overnight delivery service that maintains records of delivery, addressed to the Parties at their respective addresses specified in this Section 9.1 or to such other address as the Party to whom notice is to be given may have provided to the other Party in accordance with this Section 9.1. Such notice shall be deemed to have been given as of the date delivered by hand or transmitted by facsimile (with transmission confirmed) or on the second Business Day (at the place of delivery)

after deposit with an internationally recognized overnight delivery service. Any notice delivered by facsimile shall be confirmed by a hard copy delivered as soon as practicable thereafter.

If to Buyer, to:

Novartis Pharma AG
Lichtstrasse 35
CH 4056 Basel
Switzerland
Attention: Roy Papatheodorou, General Counsel Pharmaceuticals
Email: Roy.Papatheodorou@Novartis.com

with a copy (which shall not constitute notice) to:

Norton Rose Fulbright US LLP
1301 Avenue of the Americas
New York, New York 10019-6022
Attention: Andres Liivak, Esq.
Email: andres.liivak@nortonrosefulbright.com
Facsimile: 212.318.3400

If to Sellers, to:

Ultragenyx Pharmaceutical Inc.
60 Leveroni Court
Novato, California 94949
Attention: President and Chief Executive Officer
Facsimile: 415.483.8810

with a copy (which shall not constitute notice) to:

Ultragenyx Pharmaceutical Inc.
60 Leveroni Court
Novato, California 94949
Attention: General Counsel
Facsimile: 415.483.8810

9.2 Construction. Except where the context otherwise requires, wherever used, the singular shall include the plural, the plural the singular, the use of any gender shall be applicable to all genders and the word "or" is used in the inclusive sense (and/or). Whenever this Agreement refers to a number of days, unless otherwise specified, such number refers to calendar days. The captions of this Agreement are for convenience of reference only and in no way define, describe, extend, or limit the scope or intent of this Agreement or the intent of any provision contained in this Agreement. The term "including," "include," or "includes" as used herein shall mean "including, but not limited to," and shall not limit the generality of any description preceding such term. The words "will" and "shall" have the same meaning. The language of this Agreement shall be deemed to be the language mutually chosen by the Parties and no rule of strict construction shall be applied against either Party hereto. Each Party represents that it has been represented by

legal counsel in connection with this Agreement and acknowledges that it has participated in the drafting hereof. In interpreting and applying the terms and provisions of this Agreement, the Parties agree that no presumption will apply against the Party which drafted such terms and provisions.

9.3 References. Unless otherwise specified, (a) references in this Agreement to any Article, Section, Schedule or Exhibit shall mean references to such Article, Section, Schedule or Exhibit of this Agreement, (b) references in any Section to any clause are references to such clause of such Section, and (c) references to any agreement, instrument, or other document in this Agreement refer to such agreement, instrument, or other document as originally executed or, if subsequently amended, replaced, or supplemented from time to time, as so amended, replaced, or supplemented and in effect at the relevant time of reference thereto.

9.4 Entire Agreement; Amendments. This Agreement sets forth and constitutes the entire agreement and understanding between the Parties with respect to the subject matter hereof and all prior agreements, understandings, promises, and representations, whether written or oral, with respect thereto are superseded hereby (including that certain Mutual Confidential Disclosure Agreement). Each Party confirms that it is not relying on any representations or warranties of the other Party except as specifically set forth in this Agreement. No amendment, modification, release, or discharge shall be binding upon the Parties unless in writing and duly executed by authorized representatives of both Parties.

9.5 Assignment. Without the prior written consent of the other Party neither Party shall sell, transfer, assign, delegate, pledge, or otherwise dispose of, whether voluntarily, involuntarily, by operation of law or otherwise, this Agreement or any of its rights or duties hereunder; *provided*, that (a) either Party may make such an assignment without the other Party's consent to any of its Affiliates or to a successor, whether in a merger, sale of stock, sale of all or substantially all assets or any other similar transaction, and (b) Buyer may make such an assignment, in whole or in part, without Sellers' consent, to any purchaser, transferee, or assignee of the Purchased Assets. With respect to any permitted assignment, the assigning Party shall remain responsible for the performance by such permitted assignee of the assigning Party's duties and obligations hereunder. Any attempted assignment or delegation in violation of this Section 9.5 shall be void and of no effect. All validly assigned and delegated rights and obligations of the Parties hereunder shall be binding upon and inure to the benefit of and be enforceable by and against the successors and permitted assigns of Buyer or Sellers, as the case may be. The permitted assignee or transferee shall assume all obligations of its assignor or transferor under this Agreement.

9.6 Severability. If any provision of this Agreement is held to be illegal, invalid, or unenforceable under any present or future law, and if the rights or obligations of either Party under this Agreement will not be materially and adversely affected thereby, (a) such provision shall be fully severable, (b) this Agreement shall be construed and enforced as if such illegal, invalid, or unenforceable provision had never comprised a part hereof, (c) the remaining provisions of this Agreement shall remain in full force and effect and shall not be affected by the illegal, invalid, or unenforceable provision or by its severance herefrom, and (d) in lieu of such illegal, invalid, or unenforceable provision, there shall be added automatically as a part of this Agreement a legal, valid, and enforceable provision as similar in terms to such illegal, invalid, or unenforceable provision as may be possible and reasonably acceptable to the Parties. To the fullest extent permitted by applicable Law, each Party hereby waives any provision of Law that would render any provision hereof illegal, invalid, or unenforceable in any respect.

9.7 Governing Law. This Agreement or the performance, enforcement, breach or termination hereof shall be interpreted, governed by and construed in accordance with the laws of the State of Delaware, United States, excluding any conflicts or choice of law rule or principle that might otherwise refer construction or interpretation of this Agreement to the substantive law of another jurisdiction.

9.8 Submission to Jurisdiction. Each Party irrevocably agrees that any legal action or proceeding arising out of or relating to this Agreement brought by the other Party or its successors or assigns shall be brought and determined in any Delaware state or federal court, and each of the Parties hereby irrevocably submits to the exclusive jurisdiction of the aforesaid courts with regard to any such action or proceeding arising out of or relating to this Agreement and the transactions contemplated hereby. Each Party agrees not to commence any action, suit or proceeding relating thereto except in the courts described above in Delaware, other than actions in any court of competent jurisdiction to enforce any judgment, decree or award rendered by any such court in Delaware as described herein. Each Party hereby irrevocably and unconditionally waives, and agrees not to assert, by way of motion or as a defense, counterclaim or otherwise, in any action or proceeding arising out of or relating to this Agreement or the transactions contemplated hereby, (a) any claim that it is not personally subject to the jurisdiction of the courts in Delaware as described herein for any reason, (b) that it or its property is exempt or immune from jurisdiction of any such court or from any legal process commenced in such courts (whether through service of notice, attachment prior to judgment, attachment in aid of execution of judgment, execution of judgment or otherwise) and (c) that (i) the suit, action or proceeding in any such court is brought in an inconvenient forum, (ii) the venue of such suit, action or proceeding is improper or (iii) this Agreement, or the subject matter hereof, may not be enforced in or by such courts.

9.9 WAIVER OF JURY TRIAL. EACH PARTY, TO THE EXTENT PERMITTED BY LAW, KNOWINGLY, VOLUNTARILY, AND INTENTIONALLY WAIVES ITS RIGHT TO A TRIAL BY JURY IN ANY ACTION OR OTHER LEGAL PROCEEDING ARISING OUT OF OR RELATING TO THIS AGREEMENT AND THE TRANSACTIONS IT CONTEMPLATES. THIS WAIVER APPLIES TO ANY ACTION OR LEGAL PROCEEDING, WHETHER SOUNDING IN CONTRACT, TORT, OR OTHERWISE.

9.10 Waiver and Non-Exclusion of Remedies. Any term or condition of this Agreement may be waived at any time by the Party that is entitled to the benefit thereof, but no such waiver shall be effective unless set forth in a written instrument duly executed by or on behalf of the Party waiving such term or condition. The waiver by either Party hereto of any right hereunder or of the failure to perform or of a breach by the other Party shall not be deemed a waiver of any other right hereunder or of any other breach or failure by such other Party whether of a similar nature or otherwise, and nothing in this Agreement shall be deemed a waiver by any Party of any right to specific performance or injunctive relief. The rights and remedies provided herein are cumulative and do not exclude any other right or remedy provided by applicable Law or otherwise available except as expressly set forth herein.

9.11 No Benefit to Third Parties. Except as provided in ARTICLE 8, the covenants and agreements set forth in this Agreement are for the sole benefit of the Parties hereto and their successors and permitted assigns, and they shall not be construed as conferring any rights on any other Persons.

9.12 Counterparts; Facsimile Execution. This Agreement may be executed in two (2) or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one (1) and the same instrument. This Agreement may be executed by facsimile or electronically transmitted signatures and such signatures shall be deemed to bind each Party hereto as if they were original signatures.

[SIGNATURE PAGE FOLLOWS**]**

IN WITNESS WHEREOF, each of Buyer, U.S. Seller and Cayman Seller has caused this Agreement to be executed and delivered by their respective officers thereunto duly authorized, all as of the date first written above.

NOVARTIS PHARMA AG

By: /s/ Mark Rodgers
Name: Mark Rodgers, Ph.D., MBA, LLM
Title: Global Head BD&L Transactions Pharma

NOVARTIS PHARMA AG

By: /s/ Natalie Tan
Name: Natalie Tan
Title: Head Legal Respiratory Franchise

ULTRAGENYX PHARMACEUTICAL INC.

By: /s/ Emil D. Kakkis
Name: Emil D. Kakkis, M.D., Ph.D.
Title: President and Chief Executive Officer

ULTRAGENYX INTERNATIONAL UX003 LTD.

By: /s/ Yun Zheng
Name: Yun Zheng
Title: Director

Exhibit 2.5(a)

Form of Bill of Sale

BILL OF SALE

This BILL OF SALE (the "***Bill of Sale***") is made and entered into as of [●], 2017, by and between Novartis Pharma AG, a company formed under the laws of Switzerland ("***Buyer***"), Ultragenyx Pharmaceutical Inc., a company formed under the laws of the State of Delaware ("***U.S. Seller***"), and Ultragenyx International UX003 Ltd., an exempted company incorporated in the Cayman Islands and a wholly-owned subsidiary of the U.S. Seller (the "***Cayman Seller***," and together with the U.S. Seller, the "***Sellers***").

Upon the terms and subject to the conditions of the Asset Purchase Agreement, dated as of December 14, 2017 (the "***Purchase Agreement***"), by and among Buyer and Sellers, Sellers have agreed to sell, and Buyer has agreed to purchase, all of Sellers' right, title and interest in and to the Purchased Assets, including the Priority Review Voucher, in each case free and clear of all Encumbrances.

For good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, Buyer and Sellers, intending to be legally bound, hereby agree as follows:

1. Defined Terms; Interpretation. Except as otherwise set forth herein, capitalized terms used in this Bill of Sale shall have the meanings assigned to them in the Purchase Agreement. This Bill of Sale shall be interpreted in accordance with the rules of construction set forth in Section 9.2 of the Purchase Agreement.

2. Transfer of the Purchased Assets. Pursuant to the terms and subject to the conditions of the Purchase Agreement, Sellers hereby sell, assign, transfer, and convey to Buyer and its successors and its assigns, and Buyer hereby does purchase from Sellers, all of Sellers' right, title and interest in and to the Purchased Assets (including the Priority Review Voucher), in each case free and clear of all Encumbrances. The right, title and interest in and to the Purchased Assets that are sold, transferred, conveyed, assigned and delivered by Sellers to Buyer hereunder collectively constitute the entire right, title and interest in and to the Purchased Assets and upon the Closing, Buyer shall have all right, title and interest in and to the Purchased Assets, free and clear of all Encumbrances.

3. Effective Time. This Bill of Sale shall be effective as of the Closing.

4. Binding Effect; Amendments. This Bill of Sale shall be binding upon, inure to the benefit of, and be enforceable by, the Parties hereto and their respective legal representatives, successors and permitted assigns. Neither this Bill of Sale, nor any term or provision hereof, may be amended, modified, superseded or cancelled except by an instrument in writing signed by each Party hereto.

5. Governing Law. This Bill of Sale and any disputes arising under or related hereto shall be governed by the rules set forth in Sections 9.7, 9.8, and 9.9 of the Purchase Agreement.

6. Counterparts. This Bill of Sale may be executed in two (2) or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one (1) and the same instrument. This Bill of Sale may be executed by facsimile or electronically transmitted signatures and such signatures shall be deemed to bind each Party hereto as if they were original signatures.

[SIGNATURE PAGE FOLLOWS]

IN WITNESS WHEREOF, each of Buyer, U.S. Seller and Cayman Seller has caused this Bill of Sale to be executed and delivered by their respective officers thereunto duly authorized, all as of the date first written above.

NOVARTIS PHARMA AG

By: _____
Name:
Title:

NOVARTIS PHARMA AG

By: _____
Name:
Title:

ULTRAGENYX PHARMACEUTICAL INC.

By: _____
Name: Emil D. Kakkis, M.D., Ph.D.
Title: President and Chief Executive Officer

ULTRAGENYX INTERNATIONAL UX003 LTD.

By: _____
Name: Yun Zheng
Title: Director

Exhibit 2.5(b)

Form of Seller FDA Transfer Notification

[Ultragenyx Letterhead]

[Date]

[●]
[Address 1]
[Address 2]
Food and Drug Administration
[Address 3]
[Address 4]]

Re: BLA 761047 Mepsevii™ (vestrodinase alfa-vjbk)

Transfer of Rare Pediatric Disease Priority Review Voucher PRV BLA 761047 (the "*Voucher*")

Dear [●]:

Reference is made to the above-referenced BLA and all related correspondence.

Please be advised that as of [Date], Novartis Pharma AG ("***Buyer***") has legally accepted complete ownership of the Voucher from Ultragenyx Pharmaceutical Inc. ("***Ultragenyx***"). Ultragenyx hereby authorizes transfer of ownership of the Voucher to Buyer.

Please do not hesitate to contact me should you have any questions or comments. I may be reached by email at [INSERT] or by phone at [INSERT].

Sincerely,

[NAME/TITLE]

Exhibit 2.5(c)(i)

Form of Sellers' Closing Certificate

ULTRAGENYX PHARMACEUTICAL INC.

Closing Certificate

[●], 2017

This Closing Certificate (this "***Certificate***") is delivered pursuant to Section 2.5(b) of the Asset Purchase Agreement (the "***Agreement***"), dated as of December 14, 2017, by and between Ultragenyx Pharmaceutical Inc. ("***U.S. Seller***"), Ultragenyx International UX003 Ltd. ("***Cayman Seller***"), and Novartis Pharma AG ("***Buyer***"). Unless otherwise defined herein or if the context otherwise requires, capitalized terms used in this Certificate have the meanings provided in the Agreement.

The undersigned, _____, in [his/her] capacity as a duly authorized officer of the U.S. Seller, solely in such capacity and not in [his/her] individual capacity, is duly authorized to execute and deliver this Certificate on behalf of the U.S. Seller. By executing this Certificate, the undersigned hereby certifies to Buyer that as of the date hereof:

1. Each of the (i) representations and warranties of the U.S. Seller made in Article 3 of the Agreement were and are true and correct in all respects as of the Effective Date and as of the date hereof (or in the case of representations and warranties that are made as of a specified date, such representations and warranties shall be true and correct as of such specified date), except where the failure of such representations and warranties to be so true and correct (without giving effect to any limitation or qualification as to "materiality" (including the word "material") or "material adverse effect" set forth therein) would not, individually or in the aggregate, reasonably be expected to have a material adverse effect on the Purchased Assets or prevent, materially delay or materially impede the performance by the U.S. Seller of its obligations under the Agreement or the consummation of the transactions contemplated thereby.

2. The U.S. Seller and its Affiliates have performed in all material respects all obligations and agreements and complied in all material respects with all covenants and conditions required by the Agreement to be performed or complied with by the U.S. Seller or any such Affiliate on or before the date hereof.

IN WITNESS WHEREOF, the undersigned has executed and delivered this Certificate as of the date first set forth above.

By:
Name:
Title:

Exhibit 2.5(c)(ii)

Form of Sellers' Closing Certificate

ULTRAGENYX INTERNATIONAL UX003 LTD.

Closing Certificate

[●], 2017

This Closing Certificate (this "***Certificate***") is delivered pursuant to Section 2.5(b) of the Asset Purchase Agreement (the "***Agreement***"), dated as of December 14, 2017, by and between Ultragenyx Pharmaceutical Inc. ("***U.S. Seller***"), Ultragenyx International UX003 Ltd. ("***Cayman Seller***"), and Novartis Pharma AG ("***Buyer***"). Unless otherwise defined herein or if the context otherwise requires, capitalized terms used in this Certificate have the meanings provided in the Agreement.

The undersigned, _____, in [his/her] capacity as a duly authorized officer of the Cayman Seller, solely in such capacity and not in [his/her] individual capacity, is duly authorized to execute and deliver this Certificate on behalf of the Cayman Seller. By executing this Certificate, the undersigned hereby certifies to Buyer that as of the date hereof:

1. Each of the (i) representations and warranties of the Cayman Seller made in Article 3 of the Agreement were and are true and correct in all respects as of the Effective Date and as of the date hereof (or in the case of representations and warranties that are made as of a specified date, such representations and warranties shall be true and correct as of such specified date), except where the failure of such representations and warranties to be so true and correct (without giving effect to any limitation or qualification as to "materiality" (including the word "material") or "material adverse effect" set forth therein) would not, individually or in the aggregate, reasonably be expected to have a material adverse effect on the Purchased Assets or prevent, materially delay or materially impede the performance by the Cayman Seller of its obligations under the Agreement or the consummation of the transactions contemplated thereby.

2. The Cayman Seller and its Affiliates have performed in all material respects all obligations and agreements and complied in all material respects with all covenants and conditions required by the Agreement to be performed or complied with by the Cayman Seller or any such Affiliate on or before the date hereof.

IN WITNESS WHEREOF, the undersigned has executed and delivered this Certificate as of the date first set forth above.

By:
Name:
Title:

Exhibit 2.6(c)

Form of Buyer FDA Transfer Notification

[Buyer Letterhead]

[Date]

[●]
[Address 1]
[Address 2]
Food and Drug Administration
[Address 3]
[Address 4]

Re: BLA 761047 Mepsevii™ (vestrodinase alfa-vjbk)

Transfer of Rare Pediatric Disease Priority Review Voucher PRV BLA 761047(the "*Voucher*")

Dear [●]:

Reference is made to the above-referenced BLA and all related correspondence.

Please be advised that as of [Date], Novartis Pharma AG ("***Buyer***") has legally accepted complete ownership of the Voucher from Ultragenyx Pharmaceutical Inc. ("***Ultragenyx***"). Buyer hereby advises the Agency of the legal transfer of the Voucher from Ultragenyx to Buyer.

The Buyer regulatory contact for the Voucher is as follows:

[Buyer Contact]

Please do not hesitate to contact me should you have any questions or comments.

Sincerely,

[Buyer Contact]

Exhibit 2.6(d)

Form of Buyer Closing Certificate

NOVARTIS PHARMA AG

Closing Certificate

[●], 2017

This Closing Certificate (this "***Certificate***") is delivered pursuant to Section 2.6(c) of the Asset Purchase Agreement (the "***Agreement***"), dated as of December 14, 2017, by and between Ultragenyx Pharmaceutical Inc. ("***U.S. Seller***"), Ultragenyx International UX003 Ltd. ("***Cayman Seller***"), and Novartis Pharma AG ("***Buyer***"). Unless otherwise defined herein or if the context otherwise requires, capitalized terms used in this Certificate have the meanings provided in the Agreement.

The undersigned, _____, in [his/her] capacity as a duly authorized officer of Buyer, solely in such capacity and not in [his/her] individual capacity, is duly authorized to execute and deliver this Certificate on behalf of Buyer. By executing this Certificate, the undersigned hereby certifies to Sellers that as of the date hereof:

1. Each of the representations and warranties of Buyer made in Article 4 of the Agreement were and are true and correct in all respects as of the Effective Date and as of the date hereof (or in the case of representations and warranties that are made as of a specified date, such representations and warranties shall be true and correct as of such specified date), except where the failure of such representations and warranties to be so true and correct (without giving effect to any limitation or qualification as to "materiality" (including the word "material") or "material adverse effect" set forth therein) would not, individually or in the aggregate, reasonably be expected to have a material adverse effect on the ability of Buyer to consummate the transactions contemplated by the Agreement.

2. Buyer and its Affiliates have performed in all material respects all obligations and agreements and complied in all material respects with all covenants and conditions required by the Agreement to be performed or complied with by Buyer or any such Affiliate on or before the date hereof.

IN WITNESS WHEREOF, the undersigned has executed and delivered this Certificate as of the date first set forth above.

By:
Name:
Title:

Exhibit 10.3

AMENDMENT NO. 2 TO COLLABORATION AND LICENSE AGREEMENT

This Amendment No. 2 to the Collaboration and License Agreement ("***Amendment***") is made and entered into by and between Kyowa Hakko Kirin Co., Ltd., a company organized and existing under the laws of Japan, with an address at 1-6-1 Ohtemachi, Chiyoda-ku, Tokyo, 100-8185, Japan ("***KHK***") and Ultragenyx Pharmaceutical Inc., a company organized and existing under the laws of the State of Delaware, with an address at 60 Leveroni Court, Novato, California 94949, USA ("***UGNX***").

RECITALS

A. WHEREAS, KHK and UGNX entered into a Collaboration and License Agreement effective as of August 29, 2013 (the "***Original Agreement***") and an Amendment No.1 to Collaboration and License Agreement effective as of August 24, 2015 (together with the Original Agreement, the "***Agreement***").

B. WHEREAS, both Parties wish to further amend the Agreement as set forth below.

C. NOW, THEREFORE, in consideration of the mutual covenants and premises herein contained, the Parties agree as follows:

1. This Amendment shall be effective as of November 28, 2016 (the "***Amendment Effective Date***").

2. Any capitalized terms that are not defined in this Amendment will have their respective meanings set forth in the Agreement.

3. The following words shall be added at the end of Section 1.1.72 of the Original Agreement:

   "Notwithstanding the foregoing, in the event that KHK sells and otherwise provides the Licensed Products in any country in the European Territory as part of Named Patient Sales, or UGNX sells and otherwise provides the Licensed Products in any country in Latin America as part of Named Patient Sales, the Royalty Term with respect to such country shall commence, if it has not previously commenced based upon a First Commercial Sale in that country, on the date of the first sale of such Named Patient Sale in that country. For clarity, the first sale of such Named Patient Sale in a country will be deemed to occur on the date the Licensed Products sold as part of Named Patient Sales are shipped to the applicable patient(s) in that country."

4. Notwithstanding anything contained in the Agreement (including Section 3.2 of the Original Agreement) to the contrary, as of the Amendment Effective Date, the Parties hereby agree to disband the JDC and JCC and establish a subcommittee named Joint Core Team subcommittee ("***JCT***") instead. The JCT will consist of the same number of representatives designated by each Party, which number will initially be at least seven (7) each for seven (7) functions (PPM, Clinical Science, Commercial, Medical Affairs, Regulatory, CMC, Clinical Operations), provided

that at least one (1) of each representative shall be responsible for one (1) function. The number of each Party's representatives in the JCT thereafter may be changed by mutual written agreement between the Parties. Without changing the total number of its representatives in the JCT, each Party will be free to change its representatives in the JCT by giving written notice to the other Party. Accordingly, all of the obligations and responsibilities of the JCC and JDC shall be assumed by the JCT which shall be a "Committee" under the Agreement. For clarity, except as expressly provided in this Amendment, the word "JDC" (together with "Joint Development Committee") and "JCC" (together with "Joint Commercialization Committee") in the Original Agreement (including Sections 3.2, 3.3, 3.4, 3.5 and 3.6) are hereby all eliminated, and the word "JCT" (together with "Joint Core Team") are substituted, as of the Amendment Effective Date.

5. Notwithstanding anything contained in the Agreement to the contrary, the Parties hereby agree that if UGNX requests to conduct Clinical Trials in any country or region outside the Territory and the European Territory for supporting the Core Development Activities, UGNX shall submit to the JSC a written request to add such country or region as an additional territory (each a "***New Territory***") and such request shall be promptly reviewed by the JSC. A New Territory shall be finally added as a further amendment to the Appendix attached hereto by the Parties' mutual written agreement. To the extent necessary for supporting Core Development Activities, KHK will grant to UGNX a non-exclusive, royalty-free license under the Licensed Technology to conduct the Clinical Trials in the Field in such New Territory. For clarity, as of the Amendment Effective Date, the Parties hereby agree that Australia shall be added as a New Territory and therefore, KHK grants UGNX a non-exclusive, royalty-free license under the Licensed Technology to conduct the Clinical Trials in the Field in Australia.

6. With respect to the Clinical Trials conducted in the New Territory, the Parties hereby acknowledge and agree as follows;
(1) the Parties may use data which is acquired through such Clinical Trials conducted by UGNX in the New Territory for filing of the application for a Marketing Approval in its respective territories where it is permitted to apply for Marketing Approvals under the Agreement,
(2) all Development Costs incurred by UGNX and attributable to, or reasonably allocable to, the Clinical Trials conducted in the New Territory will be shared and allocated in accordance with the terms of the Agreement (including Section 4.9 of the Original Agreement),
(3) any extension study arising out of a Clinical Trial conducted in the New Territory (including costs and expenses related thereto) must be mutually agreed upon by the Parties in writing,
(4) KHK shall have no obligation to file a new drug application or obtain Marketing Approval in such New Territory, and
(5) even if KHK decides to sell the Licensed Product in such New Territory, KHK shall have no obligation to pay any kind of royalties to UGNX.

7. Notwithstanding anything in the Agreement to the contrary, the Parties hereby agree that, to the extent permitted under Applicable Laws, each of them shall promptly take all necessary actions (if required) to have Kyowa Kirin International Plc. ("***KKI***") which is a wholly owned subsidiary of KHK or KKI's Affiliate designated by KKI be (a) the party submitting the Marketing Authorization Application ("***MAA***") in the European Territory and (b) the Marketing Authorization Holder ("***MAH***") for any Marketing Approval in the European Territory; provided, however, UGNX shall continue to have responsibility for the activities specified as below;
(1) during the MAA process up to the completion of such respective Clinical Trials, contact for all correspondence regarding such Marketing Approval, including without limitation, all requests, responses and submissions and shall continue to be responsible for all Regulatory Activities in the European Territory; and
(2) following KKI's obtainment of the Marketing Approval, prepare and provide to KKI the necessary and available documents requested by KKI (including but not limited to interim/full CSR, if available) to support KKI and enable KKI to perform the obligations to the applicable Regulatory Authorities as MAH, including but not limited to, report the On-Going Clinical Trial and/or new clinical trial updates and safety data to such Regulatory Authorities.

8. Except as expressly provided in this Amendment, all other terms, conditions and provisions of the Agreement shall continue in full force and effect as provided therein. Capitalized terms used in this Amendment that are not otherwise defined herein shall have the same meanings as such terms are defined in the Agreement.

9. This Amendment may be executed in identical duplicate copies exchanged by facsimile or e-mail (PDF form) transmission. The Parties agree to execute two identical original copies of this Amendment after exchanging signed facsimile versions. Each identical counterpart will be deemed an original, but all of which together will constitute one and the same instrument.

IN WITNESS WHEREOF, the Parties have executed this Amendment No. 2 to Collaboration and License Agreement to be effective as of the Amendment Effective Date.

KYOWA HAKKO KIRIN CO., LTD.

By: /s/ Tamao Watanabe
Name: Tamao Watanabe
Title: Director,
Business Development Department

ULTRAGENYX PHARMACEUTICAL INC.

By: /s/ Tom Kassberg
Name: Tom Kassberg
Title: CBO

Appendix

	country or region as a New Territory	date
1	Australia	November 28, 2016

Exhibit 10.4

Certain information in this document has been omitted and filed separately with the Securities and Exchange Commission. Confidential treatment has been requested with respect to the omitted portions marked [***].

AMENDMENT NO. 3 TO COLLABORATION AND LICENSE AGREEMENT

This Amendment No. 3 to the Collaboration and License Agreement ("***Amendment***") is made and entered into by and between Kyowa Hakko Kirin Co., Ltd., a company organized and existing under the laws of Japan, with an address at 1-9-2 Otemachi, Chiyoda-ku, Tokyo, 100-0004, Japan ("***KHK***") and Ultragenyx Pharmaceutical Inc., a company organized and existing under the laws of the State of Delaware, with an address at 60 Leveroni Court, Novato, California 94949, USA ("***UGNX***").

RECITALS

A. WHEREAS, KHK and UGNX entered into a Collaboration and License Agreement effective as of August 29, 2013 (the "***Original Agreement***") as well as an Amendment No.1 to Collaboration and License Agreement effective as of August 24, 2015 and an Amendment No.2 to Collaboration and License Agreement effective as of November 28, 2016 (together with the Original Agreement, the "***Agreement***").

B. WHEREAS, KHK has been licensed certain patents by [***] and the Parties desire to treat such patents as the Licensed Patent Rights under the Agreement.

C. WHEREAS, both Parties wish to further amend the Agreement as set forth below.

D. NOW, THEREFORE, in consideration of the mutual covenants and premises herein contained, the Parties agree as follows:

1. This Amendment shall be effective as of September 29, 2017 (the "***Amendment Effective Date***").

2. Any capitalized terms that are not defined in this Amendment will have their respective meanings set forth in the Agreement.

3. The following two patents (collectively, the "***Added Patent Rights***") shall be added to the Licensed Patent Rights.

1) U.S. Patent [***]
(Title: [***])
(Application No.: [***])
(Filling Date: [***])
(Issue Date: [***])
(Applicant/Assignee: [***])

2) U.S. Patent [***]
(Title: [***])
(Application No.: [***])
(Filling Date: [***])
(Issue Date: [***])
(Applicant/Assignee: [***])

4. To the extent enforceable under applicable law, the parties acknowledge and agree that KHK may terminate the License Agreement at KHK's sole and absolute discretion, in the event UGNX (or its sublicensee(s), if applicable) [***]

5. Except as expressly provided in this Amendment, all other terms, conditions and provisions of the Agreement shall continue in full force and effect as provided therein.

6. This Amendment may be executed in identical duplicate copies exchanged by facsimile or e-mail (PDF form) transmission. The Parties agree to execute two identical original copies of this Amendment after exchanging signed facsimile versions. Each identical counterpart will be deemed an original, but all of which together will constitute one and the same instrument.

IN WITNESS WHEREOF, the Parties have executed this Amendment No. 3 to Collaboration and License Agreement to be effective as of the Amendment Effective Date.

KYOWA HAKKO KIRIN CO., LTD	**ULTRAGENYX PHARMACEUTICAL INC.**
By:/s/ Masahi Miyamoto	By: /s/ Emil D. Kakkis
Name:Masahi Miyamoto	Name:Emil D. Kakkis
Title:Director of the Board, Managing Executive Officer, Director, Corporate Strategy & Planning Department	Title:President and Chief Executive Officer

Exhibit 10.5

Certain information in this document has been omitted and filed separately with the Securities and Exchange Commission. Confidential treatment has been requested with respect to the omitted portions marked [***].

AMENDMENT NO. 4 TO COLLABORATION AND LICENSE AGREEMENT

This Amendment No. 4 to the Collaboration and License Agreement ***(this "Amendment")*** is made and entered into as of January 29, 2018 ("***Effective Date***"), by and between Kyowa Hakko Kirin Co., Ltd., a company organized and existing under the laws of Japan, with an address at 1-9-2 Ohtemachi, Chiyoda-ku, Tokyo, 100- 0004, Japan ***("KHK")*** and Ultragenyx Pharmaceutical Inc., a company organized and existing under the laws of the State of Delaware, with an address at 60 Leveroni, Novato, California 94949, USA ***("UGNX").***

RECITALS

A. KHK and UGNX are parties to a Collaboration and License Agreement dated August 29, 2013, regarding the joint development and commercialization of KRN23 (the "Licensed Product"), an Amendment No. 1 to Collaboration and License Agreement effective as of September 24, 2015, an Amendment 2 effective as of November 28, 2016, and an Amendment 3 effective September 29, 2017 (collectively, the"Collaboration Agreement").

B. Pursuant to Section 13.6 of the Collaboration Agreement, KHK wishes to conduct the Commercialization of the Licensed Product with UGNX in the Profit Share Territory through its Affiliate, Kyowa Kirin Inc. ("KKUS").

C. With the first approval and Commercialization of the Licensed Product in the United States anticipated in the near future, the Parties desire to further clarify their relationship related to the Profit Share Territory under the Collaboration Agreement.

D. Terms defined in the Collaboration Agreement shall have the same meaning in this Amendment as they have in the Collaboration Agreement.

E. All terms and conditions of the Collaboration Agreement not expressly addressed in this Amendment shall remain in full force and effect.

NOW, THEREFORE, in consideration of the foregoing premises and the mutual covenants herein contained, the parties hereby agree as follows:

1. The following sentence will be added to the end of Section 5.4.

"In addition to the above, KKI, on behalf of Kyowa Hakko Kirin, will enter into a Safety Agreement with UGNX, that will supersede the above Safety Agreement and describe detailed pharmacovigilance processes and responsibilities of each Party."

2. A new Section 5.9 shall be added that provides as follows:

"5.9 **BLA Transfer.** [***] (or a mutually agreed-to period), of approval by FDA of a Biologics Licensing Application for Licensed Product ("BLA"), UGNX shall transfer ownership of any BLA to KKUS.

(a) Promptly after transferring the BLA to KKUS, UGNX shall send FDA a letter of the type described in 21 C.F.R. § 314.72, informing the agency of the transfer of the BLA to KKUS.

(b) At the same time, KKUS will send FDA a letter accepting the transfer of ownership and notifying FDA that KKUS is appointing UGNX as its agent for regulatory matters associated with each BLA.

(c) UGNX shall be responsible for contact to and from FDA, including emails and other correspondence, except as otherwise agreed to in writing by the Parties. UGNX shall immediately share all FDA contacts with KKUS. The Parties will agree on an electronic method to accomplish this sharing."

3. A new Section 5.10 shall be added that provides as follows:

"5.10 **Labeling and Packaging.** To the extent of commercialization in the United States, in accordance with 21 C.F.R. § 201.1(h)(5), the label, packaging and labeling of the Licensed Product will state as follows:

Manufactured by:

Kyowa Hakko Kirin Co., Ltd

Takasaki Plant

100-1 Hagiwara-machi, Takasaki

Gunma 370-0013, Japan

Manufactured for:

Kyowa Kirin Inc.

235 Route 202/206 Suite 6,

Bedminster NJ 07921

Distributed by:

Ultragenyx Pharmaceutical Inc.
Novato, CA 94949 USA"

However, should FDA require a change to the above wording, the Parties agree to amend it accordingly."

4. A new Section 5.11 shall be added that provides as follows:

"5.11 **Other Reports to FDA and other Regulatory Authorities with respect to the Commercialization of the Licensed Product in the United States.**

(a) Each party shall be responsible for reporting payments or other transfers of value ("POTV") made by that Party or any of its Affiliates or any of their respective Third Party contractors related to the conduct of the Commercialization of the Licensed Products or otherwise in connection with this Agreement to Recipients (as defined below), as required under the Sunshine Laws. "Sunshine Laws" means Applicable Laws requiring collection, reporting and disclosure of POTVs to certain healthcare providers, entities and individuals, including, without limitation, relevant provisions of the Patient Protection and Affordable Health Care Act of 2010 and implementing regulations thereunder. "Recipients" means healthcare providers, teaching hospitals and/or other persons for whom ownership interest, transfers of value or payments must be reported under the Sunshine Laws.

(b) KKUS shall be responsible for drafting all BLA supplements dealing with manufacturing changes or issues. KKUS will submit these supplements to UGNX for its review and approval [***] prior to submission to FDA.

(c) UGNX shall be responsible for drafting all other BLA supplements and FDA submissions. UGNX shall submit all routine or planned BLA supplements and other submissions to KKUS for its review and approval [***] prior to submission to FDA. For non-routine submissions to FDA that require expedited processing, UGNX will discuss and agree with KKUS on timing for the KKUS review."

5. A new Section 5.12 shall be added that provides as follows:

"5.12 **National Drug Code Numbers.** To the extent of the Commercialization of the Licensed Product in the United States, UGNX will obtain National Drug Code numbers (NDCs) for the various presentations of the Licensed Product. KKUS will obtain its own NDCs for Licensed Product prior to the Profit Share Territory Transition Date. After the Profit Share Territory Transition Date, UGNX grants KKUS the right to use its NDCs to the extent necessary to sell, manage, transfer and dispose of Licensed Product inventory bearing UGNX's NDCs. The Parties agree to cooperate with each other to ensure a seamless transition of inventory and associated tasks."

6. A new Section 6.5 shall be added that provides as follows:

"6.5 **Marketing Materials Review Process with Respect to the Commercialization of the Licensed Product in the United States.**

6.5.1 **Brand Book**. KKUS and UGNX will jointly create a brand book and message platform for the Licensed Product, which will contain key claims and imagery.

6.5.2 **KKUS Core Material Review**. KKUS [***] will have access to review core Marketing Materials before they are approved for distribution by UGNX or sent to the FDA on form 2253. [***] At the request of either Party, a meeting will be held by telephone or in person to resolve any matters related to regulatory or legal. Subject to Section 6.4 of this

Agreement, UGNX shall have the final authority to determine the content of Marketing Materials through the day immediately preceding the Profit Share Territory Transition Date. [***]

7. A new Section 6.6 shall be added that provides as follows:

"6.6 **Third Party Logistics.** To the extent of the Commercialization of the Licensed Product in the United States, KKUS will select and contract with a Third Party logistics provider ("Third Party Logistics Provider") to manage and control inventory of the Licensed Product, including picking, packing and shipping of Licensed Product and invoicing UGNX's customers of the Licensed Product ("Customer"). Legal title to Licensed Product shall remain with KKUS until transfer to Customer or other Third Party destination specified by UGNX. UGNX will have direct access to the inventory and sales information generated by the Third Party Logistics Provider. [***] Risk to inventory until the point of transfer to the Customer or other Third Party destination shall remain with KKUS."

8. A new Section 6.7 shall be added that provides as follows:

"6.7. **Transition of Commercial and Regulatory Activities in the United States.**

6.7.1. **Quarterly Commercial Meeting.** To the extent of the Commercialization of the Licensed Product in the United States, during the entire five-year collaboration period, UGNX and KKUS shall meet each quarter under the guidance of the JCT to review significant commercial developments related to the Licensed Product.

6.7.2 **Year Preceding Transition.** To the extent of the Commercialization of the Licensed Product in the United States, UGNX and KKUS agree to cooperate with each other and use best efforts to ensure a seamless transition of the Licensed Product from UGNX to KKUS upon the Profit Share Territory Transition Date. The following activities shall occur during the year preceding the Profit Share Territory Transition Date:

(a) KKUS and UGNX shall form a Transition Committee that will hold a transition planning meeting to map and outline steps and key activities and timing.
(b) The Transition Committee shall draft plans for transition of supply, packaging, and labeling responsibilities, regulatory responsibilities and reporting (including Sunshine Laws, government pricing and adverse experience reporting), clinical trials, advisory boards, grants and sponsorships, continuing medical education programs, and communications with Customers and other third parties. These plans will include transfer to KKUS of all documents and data that will assist in such transitions.
(c) Any required contract amendments with third parties will be initiated. UGNX will cooperate as requested by KKUS to complete the assignment process.
(d) KKUS and UGNX will create a schedule that will allow KKUS personnel to observe in real time existing patient support service programs and other interactions with service providers and Customers, and to accompany UGNX personnel to these observations. The schedule will be reasonable and not significantly disrupt the work of UGNX personnel.

6.7.3 **Training.** UGNX and KKUS will train KKUS personnel on the programs, procedures and tasks that will be transitioned from UGNX to KKUS."

9. Section 7.5 shall be deleted and replaced as follows:

"7.5 **Foreign Currency Exchange.** For any currency conversion from the currency of one country in which the Licensed Products are sold into U.S. Dollars (or another currency if applicable) required in determining the Net Sales or any royalties or revenue share, such conversion shall be equal to the average exchange rate, over the applicable quarter, calculated at the conversion rate as reported by OANDA (www.oanda.com), or an equivalent resource as agreed by the parties, on the last Business Day of the quarter in which the applicable Net Sales were made."

10. A new Section 7.8 shall be added that provides as follows:

"7.8 **Sale of Priority Review Voucher**. UGNX and KHK agree that they will share equally in the pre-tax net proceeds of the sale of the priority review voucher, defined as the sales price minus the costs associated with the sale."

11. A new Section 7.9 shall be added that provides as follows:

"7.9. **Pricing and Cash Management with Respect to the Commercialization of the Licensed Product in the United States.**

7.9.1 KKUS will establish and maintain ownership of a Lockbox Account (as defined below) for all payments from Customers. KKUS will provide UGNX with the ability to view the Lockbox Account. For purposes of this agreement, "Lockbox Account" shall mean a remittance service whereby KKUS establishes an electronic lockbox account that is accessible by KKUS's bank in order to receive Customers' payments for Licensed Products invoiced by Third Party Logistics Provider under UGNX's name.

7.9.2 UGNX and KKUS agree to form a treasury committee that will oversee cash management issues with respect to the Licensed Product distributed by UGNX and invoiced by Third Party Logistics Provider under UGNX's name, the composition of the treasury committee will be approved by the JSC. KKUS, however, [***]

7.9.3 UGNX and KKUS agree to form a pricing committee for the purpose of establishing predefined pricing parameters to be jointly agreed upon, as well as for reviewing and approving on-going contractually offered discounts, rebates and other proposed price concessions. This pricing committee will operate within the guidelines established by the JSC. UGNX [***]

7.9.4 UGNX shall have the right to review gross to Net Sales of the Licensed Product which will be calculated by KKUS, on a quarterly basis.

7.9.5 If KKUS cannot book revenues of the Licensed Product invoiced by Third Party Logistics Provider under UGNX's name due to changes in accounting guidance, the

"Sales Order To Cash Process" (as defined below) will be amended as agreed by both Parties to achieve KKUS revenue recognition. "Sales Order To Cash Process" shall mean: A business process for receiving and processing Customer orders and payments. This includes order creation, order fulfillment, distribution, invoicing, Customer payment collection and cash allocation."

12. A new Section 9.3 shall be added that provides as follows:

"9.3 **Licensed Product-Related Contracts with Respect to Commercialization of the Licensed Product in the United States.**

9.3.1 UGNX will upon request of KKUS send or otherwise make a copy of all supply, pricing, rebate, discount and other commercial contracts related to Licensed Product within [***] Other commercial contracts set forth above shall include sponsorships, grants and charitable contributions but not such things as minor consulting agreements.

9.3.2 UGNX shall ensure that all Customer contracts provide UGNX and KKUS with access to and the right to audit the data supporting Net Sales calculations, as described in Section 9.1 of this Agreement. All commercial contracts related to the Commercialization of the Licensed Product in the United States entered into by UGNX and the Customer shall permit assignment to KKUS upon UGNX's written notice to the corresponding Customer and without any consent of such Customer. Notwithstanding the foregoing, UGNX shall not assign any commercial contracts to KKUS without KKUS's prior written consent for such assignment."

13. A new section 14.6 and 14.7 shall be added that provides as follows:

"Additional Indemnity.

14.6 UGNX agrees to defend, hold harmless and indemnify the KHK lndemnitees from and against any and all Losses incurred by a KHK Indemnitee in connection with any and all Third Party claims arising or resulting from any document, other communication or activity used or made by UGNX in connection with Licensed Product in the Profit Share Territory that has not been provided to KHK based on the process described in Section 6.5 of the Agreement. Nothing contained in this Section 14.6 is intended to limit the existing indemnity obligations of UGNX set forth in Section 14.1. Any claim for indemnity under this Section 14.6 shall follow the procedure set forth in Section 14.3.

14.7 KHK agrees to defend, hold harmless and indemnify the UGNX lndemnitees from and against any and all Losses incurred by a UGNX Indemnitee in connection with any and all Third Party claims arising or resulting from any document, other communication or activity used or made by KKUS in connection with Licensed Product in the Profit Share Territory that has not been reviewed and approved by UGNX in accordance with the terms of the Agreement. Nothing contained in this Section 14.7 is intended to limit the existing indemnity obligations of KHK set forth in Section 14.1. Any claim for indemnity under this Section 14.7 shall follow the procedure set forth in Section 14.3.

IN WITNESS WHEREOF, the Parties have executed this Amendment, by their representatives duly thereunto authorized as of the Effective Date.

KYOWA HAKKO KIRIN CO., LTD

By:/s/ Masahi Miyamoto

Name:Masahi Miyamoto

Title:Director of the Board, Managing

Executive Officer; Director, Corporate
Strategy & Planning Department

Date:January 29, 2018

ULTRAGENYX PHARMACEUTICAL INC.

By: /s/ Emil D. Kakkis

Name: Emil D. Kakkis

Title: President and Chief Executive Officer

Date:January 29, 2018

Exhibit 10.11

SUPPLY AGREEMENT

between

CREMER OLEO GmbH & **Co KG,** Glockengiesserwall 3, 20095 Hamburg,

Germany

— hereinafter referred to as Cremer —

and

Ultragenyx Pharmaceutical Inc , 60 Leveroni Court, Suite 200, Novato, California 94949, United States of America

— hereinafter referred to as Ultragenyx —

- each party also referred to as a "Party" and jointly as the "Parties" –

Preamble

Whereas, Cremer is a producer of oleo chemical products;

Whereas, Ultragenyx is a biotechnology company committed to bringing life-enhancing therapeutics for patients with rare and ultra-rare genetic diseases, also known as orphan diseases, to market;

Whereas, the Parties desire that Cremer supplies to Ultragenyx the product Triheptanoin (hereinafter also referred to as the " **Product** ") in bulk form pursuant to the terms and conditions of this Agreement;

Whereas, Ultragenyx intends to process the Product into a pharmaceutical product in the meaning of Sec. 2 German Pharmaceuticals Act (Arzneimittelgesetz—AMG) and to market the processed Product in the Field (as defined below) (hereinafter referred to as the "Purpose"); and

Whereas, Ultragenyx intends to obtain regulatory approval for the processed Product as a pharmaceutical product in the meaning of Sec. 2 AMG.

Now therefore, the Parties hereto agree as follows:

Article 1 Supply of Product

1) Subject to the terms and conditions set forth in this Agreement Cremer shall supply Ultragenyx with the Product free from defect and meeting the product specification attached to this Agreement as **Annex A** (the "Product Specifications").

2) Cremer shall supply Ultragenyx exclusively with the Product worldwide. The aforesaid exclusivity is limited to the pharmaceutical sector in the meaning of the AMG, the medical foods sector and the nutritional supplement sector (collectively, the "Field"). Cremer may supply the Product to other customers outside of the Field.

3) Ultragenyx shall purchase the Product exclusively from Cremer.

Article 2 Orders and Delivery

1) The Product will be ordered by Ultragenyx through purchase orders. Purchase orders shall be submitted in any written or electronic form or by facsimile, setting out the quantity of Product required and the date for delivery. Cremer shall give its order confirmation in writing stating the quantity and Price (as defined below). Cremer shall not be obliged to deliver the Product in the absence of a written order confirmation given to Ultragenyx.

2) Delivery of the Product in bulk form by Cremer shall be EXW (Incoterms 2010), unless otherwise agreed in writing by the Parties.

3) Within thirty (30) days of execution of this Agreement, Cremer shall deliver to Ultragenyx the Master Batch Record for the Product for Ultragenyx to review.

4) All Product shall be delivered with the applicable certificate of analysis and batch records for the Product delivered and an invoice for the quantity of Product delivered.

5) If Ultragenyx obtains regulatory approval for the processed Product, the Parties shall enter into a separate commercial supply agreement for the Product that sets forth the forecasting and ordering mechanism for commercial supply of the Product, enablement of the manufacturing process in the event of a failure to supply, the term of such commercial supply agreement and other customary terms and conditions.

Article 3 Prices and payment

1) The prices payable by Ultragenyx to Cremer for the Product (the “Price”) shall be agreed once every contract year; provided, that the Price may not increase more than the German Producer Price Index for such period or 5%, whichever is higher. At the date of signing the Parties agree on a Price of €85 per kilogram for the Product.

2) If the parties cannot agree on a price for the Product by the beginning of a following contract year, Cremer may refuse to deliver the Product to Ultragenyx until the Parties agreed on a respective price.

3) Payments shall be made by Ultragenyx in Euro and within 30 days after receipt of a proper invoice.

4) Transfer of title with respect to any Product shall be subject to full payment and settlement of all claims Cremer may have against Ultragenyx in connection with the execution of this Agreement.

Article 4 Specification; Warranties; Cremer’s Liability; Indemnification

1) The Parties assume that the Product constitutes an active pharmaceutical ingredient in the meaning of Sec. 4 para. 19 AMG. Ultragenyx shall process the Product into a pharmaceutical product in the meaning of Sec. 2 AMG and market the processed Product as a pharmaceutical product in the meaning of Sec 2 AMG and to perform clinical trials. Cremer does not participate in the processing, manufacturing and marketing of the respective pharmaceutical product or in the clinical trials.

2) Upon execution of this Agreement and any purchase order, Cremer shall provide Ultragenyx with following documentation regarding the Product: Certificate of Analysis and the applicants' part of the Drug Master File once compiled.

3) Cremer represents and warrants that all quantities of Product delivered under the Agreement were manufactured in accordance with GMP. The Product shall be free from defects if it is within the specifications according to Annex A.

4) Cremer represents and warrants that it has not received any written notice from a third party alleging that the manufacture, use or sale of the Product infringes intellectual property rights of a third party.

5) Ultragenyx will perform final release of the Product. Ultragenyx may rely on the documentation provided by Cremer and Ultragenyx will not need to independently test the Product unless Ultragenyx determines such independent testing is necessary. In the event that the Product fails to conform to the Product Specifications, and/or GMP, Ultragenyx may reject the Product by giving written notice to Cremer within fifteen (15) days after receipt of the Product and all documentation (except such fifteen (15) day period will not apply for any latent defect). Within thirty (30) days following receipt of the rejected and returned Product from Ultragenyx, Cremer will, at Ultragenyx's choice, replace such quantity of Product with Product conforming to the Product Specifications, and GMP or refund Ultragenyx the Price paid for such Product.

6) Cremer does not warrant or represent that the Product is effective in a pharmaceutical way within the meaning of Sec. 4 para. 19 AMG. Cremer does not warrant or represent that the Product is safe in a pharmaceutical and pharmacological way. Cremer does not warrant or represent that the Product is suitable for the intended Purpose by Ultragenyx. Cremer is not a pharmaceutical manufacturer within the meaning of Sec. 4 para. 18 AMG. Cremer's liability in connection with the Purpose and the processing and marketing of a pharmaceutical product is excluded. No. 9 below applies.

7) Except for a claim arising out of Cremer's intentional misconduct or gross negligence under this Agreement, in the event of legal proceedings being instituted against Cremer by a third party arising out of Ultragenyx's development, processing and commercialization of the Product, Ultragenyx shall indemnify and keep indemnified Cremer in full against all damages, losses, injuries, costs and expenses in connection with such legal proceedings. Cremer will inform Ultragenyx about any legal proceedings being instituted against Cremer without delay. Ultragenyx shall control the respective legal proceedings but shall not settle any claim that admits fault on behalf of Cremer without Cremer's consent (not be unreasonably withheld).

8) In the event of legal proceedings being instituted against Ultragenyx by a third party arising out of Cremer's intentional misconduct or gross negligence under this Agreement, Cremer shall indemnify and keep indemnified Ultragenyx in full against all damages, losses, injuries, costs and expenses in connection with such legal proceedings. Ultragenyx will inform Cremer about any legal proceedings being instituted against Ultragenyx without delay. Cremer shall control the respective legal proceedings but shall not settle any claim without Ultragenyx's consent (not be unreasonably withheld).

9) Cremer's liability arising from this Agreement is limited to intentional misconduct or gross negligence. This limitation of liability does not apply to the injury of the life, body or health of a person, to claims according to the Product Liability Act (Produkthaftungsgesetz) or any other coercive legal liability claims.

10) NEITHER PARTY MAY CLAIM AND NEITHER PARTY IS LIABLE FOR CLAIMS FOR INDIRECT DAMAGES AND LOSSES, SUCH AS SPECIAL OR CONSEQUENTIAL LOSS OR DAMAGE, ANY LOSS OF ACTUAL OR ANTICIPATED PROFIT, OR REVENUE, ANTICIPATED SAVINGS OR BUSINESS OR DAMAGE TO GOODWILL OR BRAND EQUITY, ARE EXCLUDED.

Article 5 Term and Termination

1) This Agreement shall become effective on the date of its execution and shall remain in force for three years (the "Initial Term"). Thereafter, the Agreement shall be automatically renewed for additional two year periods (each a "Renewal Term", the Initial Term and all Renewal Terms, the "Term") unless either Party notifies the other Party of its intention not to renew in writing at least three calendar months before the expiration of the then current Term.

2) If a Party materially breaches an obligation under this Agreement and does not cure such breach within sixty (60) days of receiving notice of such breach from the non-breaching Party, the non-breaching Party may terminate this Agreement immediately upon written notice to the breaching Party.

3) Every termination has to be in writing.

Article 6 General Terms and Conditions

The application of General Terms and Conditions of any Party is excluded.

Article 7 Product Development

At the request and expense of Ultragenyx, Cremer shall perform development work for Ultragenyx to develop new formulations of the Product. All such work shall be performed pursuant to a statement of work (including a budget) to be agreed upon by the Parties and attached as an annex to this Agreement (each, a "Statement of Work"). In the event that in the course of performing a Statement of Work new Product know-how and intellectual property rights may result, can be created or have been created the Parties will enter into a separate Agreement in order to define the rights and duties regarding the aforesaid know how and intellectual property rights.

Article 8 Invalidity

In the event that any individual clauses of these terms and conditions are, or shall become, invalid, this shall not affect the validity of the remaining clauses. An invalid condition shall be deemed to have been replaced by such provision which is legally valid and corresponds nearest to the economic purpose of the clause originally deemed invalid.

Article 9 Applicable Law; Modifications; Annexes; Miscellaneous

1) The laws of the Federal Republic of Germany shall apply to the Agreement and any legal relations thereof, especially any purchase order, between Cremer and Ultragenyx shall be governed by that law. The law of the United Nations Conventions of the formation of Agreements for the international sale of goods (CISG) is excluded. Exclusive place of Jurisdiction is Hamburg, Germany.

2) No addition or modification to this Agreement shall be valid unless made in writing and signed by the Parties.

3) The Annex attached to this Agreement form an integral part of the Agreement.

4) This Agreement, including the Annexes and any Statement of Work, constitutes the entire agreement between the Parties concerning the subject matter hereof and supersedes all written or oral prior agreements or understandings with respect thereto except the Confidentiality Agreement between the parties dated September 26th, 2012. This Agreement shall be binding upon and shall inure to the benefit of the Parties hereto, their successors and assigns.

5) All waivers must be in writing and signed by the Party to be charged. Any waiver or failure to enforce any provision of this Agreement on one occasion will not be deemed a waiver of any other provision or of such provision on any other occasion.

6) Each Party must deliver all notices, consents, and approvals required or permitted under this Agreement in writing to the other Party at the address specified above, by personal delivery, by certified or registered mail (postage prepaid and return receipt requested), by a nationally-recognized overnight carrier, or by facsimile transmission with electronic confirmation of transmission. Notice will be effective upon receipt or refusal of delivery. Each Party may change its address for receipt of notice by giving notice of such change to the other Party.

7) This Agreement may be executed in counterparts by original signature, facsimile or PDF files, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

Hamburg, November 19 th , 2012

/s/ Thomas Kassberg
Ultragenyx Pharmaceutical Inc

/s/ Dr. R. Stephan
CREMER OLEO GmbH & Co KG

CREMER OLEO GmbH & Co. KG
Postfach 10 11 20, D-20007 Hamburg
Tel: 040/320 11-0, Telefax 320 11-400

Annex A — Specification of the Product
Trihepatanoin (Heptansäuretriglycerid)

No	Test	EP Method	Limits
1	Appearance	2.2.1,	clear
2	Color	2.2.2	Slightly yellowish, oily liquid, less intense Y3
3	Relative Density	2.2.5	0,95-0,98
4	Refraction Index	2.2.6	1,4445-1,4465
5	Viscosity	2.2.9	15-23 mPa*s
6	Acid value	2.5.1	<0.2
7	Hydroxyl value	2.5.3 Method B	max 10
8	Iodine value	2.5.4	max 1.0
9	Peroxide value	2.5.5 Method A	max 1.0
10	Saponification value	2.5.6	330-415
11	Composition of fatty acids	2.4.22	C7 > 95%
12	Heavy Metal		≤ 20 ppm
13	Water	2.5.12	max 0.2%
18	Total ash	2.4.16	max 0.1%

Exhibit 10.13

***Text Omitted and Filed Separately with the Securities and Exchange Commission
Confidential Treatment Requested Under
17 C.F.R. Sections 200.80(b)(4) and 240.24b-2

LICENSE AGREEMENT

This LICENSE AGREEMENT ("Agreement") is entered into as of October 30, 2013 ("Effective Date") by and between ReGenX Biosciences, LLC, a limited liability company organized under the laws of the State of Delaware, with offices at 750 17th Street, NW, Suite 1100, Washington, DC 20006 ("Licensor"), and Dimension Therapeutics, Inc., a corporation organized under the laws of the State of Delaware, with offices at 1 Main Street, 13th Floor, Cambridge, MA 02142 ("Licensee"). Licensor and Licensee are hereinafter referred to individually as a "Party" and collectively as the "Parties."

WHEREAS, Licensor has exclusive rights under certain patents pertaining to various recombinant adeno-associated virus vectors; and

WHEREAS, Licensee desires to obtain an exclusive license under the Licensed Technology under the terms set forth herein;

NOW, THEREFORE, in consideration of the promises and covenants contained in this Agreement, and intending to be legally bound, the Parties hereby agree as follows:

ARTICLE 1: DEFINITIONS

1.1 "Affiliate" means any legal entity directly or indirectly controlling, controlled by, or under common control with another entity. For purposes of this Agreement, "control" means the direct or indirect ownership of more than 50% of the outstanding voting securities of a legal entity, or the right to receive more than 50% of the profits or earnings of a legal entity, or the right to control the policy decisions of a legal entity.

1.2 "Calendar Quarter" means each three-month period or any portion thereof, beginning on January 1, April 1, July 1, and October 1.

1.3 "Collaboration" means an arrangement between Licensee and a Sublicensee under which research and development activities are performed on a shared basis for the purpose of the parties jointly developing and exploiting Licensed Products in the Field; provided that a Collaboration will not include an arrangement whereby Licensee is compensated solely for performing research or development activities.

1.4 "Commercial License" means a license agreement between Licensor and a Third Party pursuant to which Licensor grants a license to the Licensed Technology and which license agreement meets the following: (a) the agreement contains provisions substantially comparable to Section 2.6 with respect to improvements of the Third Party that are substantially similar to "Licensed Back Improvements" as defined in this Agreement; (b) the Third Party grants to Licensor a sublicensable license to such "Licensed Back Improvements" of the Third Party; and (c) Licensor is not required to pay any royalties, milestones, or other fees in connection with the exploitation of such sublicensable license.

1.5 "Confidential Information" means and includes all technical information, inventions, developments, discoveries, software, Know-How, methods, techniques, formulae, animate and inanimate materials, data, processes, finances, business operations or affairs, and other

proprietary ideas, whether or not patentable or copyrightable, of either Party that are (a) marked or otherwise identified as confidential or proprietary at the time of disclosure in writing; or (b) if disclosed orally, visually, or in another non-written form, identified as confidential at the time of disclosure and summarized in reasonable detail in writing as to its general content within 30 days after original disclosure. The Parties acknowledge that (i) the terms and conditions of this Agreement and (ii) the records and reports referred to in Section 3.5 will be deemed the Confidential Information of both Parties, regardless of whether such information is marked or identified as confidential. In addition, information provided to Licensee pursuant to the provisions of Section 7.1 will be deemed the Confidential Information of Licensor, regardless of whether such information is marked or identified as confidential. Notwithstanding the foregoing, Confidential Information will not include the following, in each case, to the extent evidenced by competent written proof of the Receiving Party:

1.5.1 information that was already known to the Receiving Party, other than under an obligation of confidentiality, at the time of disclosure by the Disclosing Party;

1.5.2 information that was generally available to the public or otherwise part of the public domain at the time of its disclosure to the Receiving Party;

1.5.3 information that became generally available to the public or otherwise part of the public domain after its disclosure, other than through any act or omission of the Receiving Party in breach of this Agreement;

1.5.4 information that is independently discovered or developed by the Receiving Party without the use of Confidential Information of the Disclosing Party; or

1.5.5 information that was disclosed to the Receiving Party, other than under an obligation of confidentiality, by a Third Party who had no obligation to the Disclosing Party not to disclose such information to others.

1.6 "Control" means the possession by Licensor (whether by ownership or license, other than pursuant to this Agreement) of the ability to grant to Licensee access, a license, or a sublicense (as applicable) to the applicable patent, patent application, Know-How, or other intellectual property on the terms and conditions set forth herein without violating the terms of any agreement or other arrangement with any Third Party.

1.7 "Disclosing Party" has the meaning set forth in Section 5.1.

1.8 "Domain Antibody" […***…].

1.9 "Existing Licenses" means the GSK Agreement and Penn Agreement.

1.10 "FDA" means the United States Food and Drug Administration, or a successor agency in the United States with responsibilities comparable to those of the United States Food and Drug Administration.

1.11 "Field" means each of the following: (a) the treatment of hemophilia A in human beings by *in vivo* gene therapy administration; (b) the treatment of hemophilia B in human beings by *in vivo* gene therapy administration; and (c) the treatment of the specific disease indication(s) included within the "Field" pursuant to Section 2.4 in human beings by *in vivo* gene therapy administration.

1.12 "GSK Agreement" means that certain License Agreement entered into between Licensor and SmithKline Beecham Corporation, effective on March 6, 2009, as amended by that certain Amendment to License Agreement dated April 15, 2009, and as amended from time to time.

1.13 "Know-How" means any and all ideas, information, know-how, data, research results, writings, inventions, discoveries, and other technology (including any proprietary materials), whether or not patentable or copyrightable.

1.14 "Licensed Know-How" means

(a) any Know-How that, as of the Effective Date, (i) is Controlled by Licensor pursuant to the Existing Licenses or the Penn Sponsored Research Agreement or pursuant to Licensor's ownership thereof and (ii) is reasonably necessary for the use, sale, offer for sale, or import of Licensed Products in the Field, including that which is set forth on Exhibit B ; and

(b) if a specific disease indication is added to the Field pursuant to Section 2.4, any Know-How that, as (x) of the Effective Date or (y) if the added disease indication is one of the indications set forth on Exhibit D, as of the date on which such disease indication is added, (i) is Controlled by Licensor pursuant to the Existing Licenses or the Penn Sponsored Research Agreement or pursuant to Licensor's ownership thereof, (ii) is directed to the specific disease indication that is added, and (iii) is reasonably necessary for the use, sale, offer for sale, or import of Licensed Products in the added specific disease indication in the Field;

provided that "Licensed Know-How" will not include any Manufacturing Technology other than Triple-Transfection Know-How that otherwise falls within clause (a) or (b) above; provided further that "Licensed Know-How" will not include any patents or patent applications.

1.15 "Licensed Patents" means (a) all United States patents and patent applications listed in Exhibit A, as modified pursuant to Section 2.7.1, including patents arising from such patent applications; (b) any additional claims of patents and patent applications as required pursuant to Section 8.1.7; and (c) any re-examination certificates thereof, and their foreign counterparts and extensions, continuations, divisionals, and re-issue applications; provided that "Licensed Patents" will not include any claim of a patent or patent application covering any Manufacturing Technology.

1.16 "Licensed Product" means (a) any product that is made, made for, used, sold, offered for sale, or imported by Licensee, its Affiliates and any of its or their Sublicensees, the manufacture, use, sale, offer for sale, or import of which product, in the absence of the license granted pursuant to this Agreement, would infringe or is covered by at least one Valid Claim in the

country of manufacture, use, sale, offer for sale, or import, including products manufactured by a process that would infringe or is covered by at least one Valid Claim in the country of manufacture, use, sale, offer for sale, or import; or (b) any service with respect to the administration of any product to patients that, in the absence of the licenses granted pursuant to this Agreement, would infringe or is covered by at least one Valid Claim in the country of sale.

1.17 "Licensed Technology" means, collectively, the Licensed Patents and Licensed Know-How.

1.18 "Licensor Improvements" means any patent or patent application that meets all of the following criteria:

(a) is directed to any of: the composition of recombinant adeno-associated virus vectors, methods of use of such vectors, or methods of developing such vectors, but, in each case, only to the extent of such claims;

(b) is reasonably necessary for any of: the use, sale, offer for sale, or import of Licensed Products in the Field; and

(c) prior to the 18 month anniversary of (i) the Effective Date, with respect to the disease indications of the Field set forth in Section 1.11(a) or (b), or (ii) the date on which a disease indication is added to the Field pursuant to Section 2.4, with respect to the disease indications of the Fields set forth in Section 1.11(c), is (x) is developed by Licensor or (y) becomes Controlled by Licensor pursuant to a Commercial License;

provided that "Licensor Improvements" will not include any Manufacturing Technology.

1.19 "Manufacturing Technology" means any and all patents, patent applications, Know-How, and all intellectual property rights associated therewith, and including all tangible embodiments thereof, that are necessary or useful for the manufacture of adeno- associated viruses, adeno-associated virus vectors, research or commercial reagents related thereto, Licensed Products, or other products, including manufacturing processes, technical information relating to the methods of manufacture, protocols, standard operating procedures, batch records, assays, formulations, quality control data, specifications, scale up, any and all improvements, modifications, and changes thereto, and any and all activities associated with such manufacture. Any and all chemistry, manufacturing, and controls (CMC), drug master files (DMFs), or similar materials provided to regulatory authorities and the information contained therein are deemed Manufacturing Technology.

1.20 "Muscular Dystrophy" means those Muscular Dystrophies as identified by the Muscular Dystrophy Association (MDA) as of the Effective Date and listed in Exhibit C.

1.21 "NDA" means a New Drug Application filed with the FDA as described in 21 C.F.R. § 314, a Biological License Application (BLA) pursuant to 21 C.F.R. § 601.2, or any equivalent or any corresponding application for regulatory approval in any country or regulatory jurisdiction other than the United States.

1.22 "Net Sales" means the gross receipts from sales or other disposition of a Licensed Product (including fees for services within the definition of "Licensed Product") by Licensee and/or its Affiliates and/or any Sublicensees to Third Parties less the following deductions that are directly attributable to a sale, specifically and separately identified on an invoice or other documentation and actually borne by Licensee, its Affiliates, or any Sublicensees: […***…]. In the event consideration other than cash is paid to Licensee, its Affiliates, or any Sublicensees, for purposes of determining Net Sales, the Parties shall use the cash consideration that Licensee, its Affiliates, or any Sublicensees would realize from an unrelated buyer in an arm's length sale of an identical item sold in the same quantity and at the time and place of the transaction, as determined jointly by Licensor and Licensee based on transactions of a similar type and standard industry practice, if any.

1.23 "Penn Agreement" means that certain License Agreement entered into between Licensor and The Trustees of the University of Pennsylvania, effective on February 24, 2009, as amended by that letter agreement dated March 6, 2009, and as amended from time to time.

1.24 "Penn Sponsored Research Agreement" means that certain Sponsored Research Agreement entered into between Licensor and The Trustees of the University of Pennsylvania, effective on February 24, 2009, as amended from time to time, including by Amendment No. 1, effective February 24, 2010, Amendment No. 2, dated March 31, 2010, Amendment No. 3, dated December 31, 2010, Amendment No. 4, effective December 31, 2011, Amendment No. 5, effective April 1, 2012, and Amendment No. 6, effective December 31, 2012.

1.25 "Prosecute" means preparation, filing, and prosecuting patent applications and maintaining patents, including any reexaminations, reissues, oppositions, and interferences.

1.26 "Receiving Party" has the meaning set forth in Section 5.1.

1.27 "Retained Rights" has the meaning set forth in Section 2.2.

1.28 "Sublicensee" means any Third Party or Affiliate to whom Licensee grants a sublicense of some or all of the rights granted to Licensee under this Agreement as permitted by this Agreement.

1.29 "Third Party" means any person or entity other than a Party to this Agreement or Affiliates of a Party to this Agreement.

1.30 "Triple Transfection Know-How" means unpatented Know-How that, as of the Effective Date, (a) is Controlled by Licensor pursuant to the Existing Licenses or the Penn Sponsored

Research Agreement or pursuant to Licensor's ownership thereof, (b) is directed to the triple-transfection method for making adeno- associated virus vectors, and (c) is set forth on Exhibit B ; provided that, notwithstanding the scope of the license grant in Section 2.1, any rights granted to Licensee under this Agreement with respect to the Triple Transfection Know-How will be limited to use of such Know-How in the Field through Phase 2 clinical trials.

1.31 "Valid Claim" means a claim of an issued and unexpired patent (including any patent claim the term of which is extended by any extension, supplementary protection certificate, patent term restoration, or the like) included within the Licensed Patents or a claim of a pending patent application included within the Licensed Patents, which has not lapsed, been abandoned, been held revoked, or been deemed unenforceable or invalid by a non-appealable decision or an appealable decision from which no appeal was taken within the time allowed for such appeal of a court or other governmental agency of competent jurisdiction.

ARTICLE 2: LICENSE GRANT

2.1 License Grant. Subject to the terms and conditions of this Agreement, including the Retained Rights, Licensor hereby grants to Licensee an exclusive, sublicensable (as provided in Section 2.5 only), non-transferable (except as provided in Section 10.2), royalty- bearing, worldwide license, under the Licensed Technology to make, have made, use, import, sell, and offer for sale Licensed Products solely in the Field, including, for the avoidance of doubt, the right to conduct research and development, including conducting pre-clinical and clinical trials.

2.2 Retained Rights. Except for the rights and licenses specified in Section 2.1, or as provided in Section 8.1.7, no license or other rights are granted to Licensee under any intellectual property of Licensor, whether by implication, estoppel, or otherwise, whether any such intellectual property dominates or is dominated by the Licensed Technology. Notwithstanding anything to the contrary in this Agreement, Licensor may use and permit others to use the Licensed Technology for any research, development, commercial, or other purposes, outside of the Field. Without limiting the foregoing, and notwithstanding anything in this Agreement to the contrary, Licensee acknowledges and agrees to the following rights retained by Licensor and its direct and indirect licensors (individually and collectively, the "Retained Rights"), whether inside or outside the Field:

2.2.1 The rights and licenses granted in Section 2.1 shall not include any right (and Licensor and its direct and indirect licensors retain the exclusive (even as to Licensee), fully sublicensable right) under the Licensed Technology to make, have made, use, sell, offer to sell, and import Domain Antibodies that are expressed by an adeno-associated vector.

2.2.2 Licensor and its direct and indirect licensors retain the following rights with respect to the Licensed Technology:

(a) A non-exclusive, sublicensable right under the Licensed Technology to make, have made, use, sell, offer to sell, and import products that deliver RNA interference and antisense drugs using an adeno-associated vector; and

(b) A non-exclusive right for Licensor's direct and indirect licensors (which right is sublicensable by such licensors) to use the Licensed Technology for non-commercial research purposes and to use the Licensed Technology for such licensors' discovery research efforts with non-profit organizations and collaborators.

2.2.3 The rights and licenses granted in Section 2.1 shall not include any right (and Licensor retains the exclusive (even as to Licensee), fully sublicensable right) under (a) the Licensed Technology that cover the rAAV serotype 8, to make, have made, use, sell, offer for sale, and import products for the treatment of all forms of hemophilia B; or (b) the Licensed Technology that cover the rAAV serotype 9, to make, have made, use, sell, offer for sale, and import products for the treatment of (i) all forms of Muscular Dystrophy; (ii) congestive heart failure suffered by Muscular Dystrophy patients; and (iii) any and all cardiovascular diseases by delivery of any or all of genes encoding I-lc and Serca2a and creatine kinase.

2.2.4 Licensor and its direct and indirect licensors retain the following rights with respect to the Licensed Technology: a non- exclusive, sublicensable right to make, have made, use, sell, offer for sale, and import all of the various serotypes of any adeno- associated vector that is the subject of at least one claim in the Licensed Patents solely for non-commercial research in the areas of Muscular Dystrophy, hemophilia B, congestive heart failure suffered by Muscular Dystrophy patients, and other cardiovascular disease.

2.2.5 Licensor retains the following rights with respect to the Licensed Technology: to the extent Licensed Technology pertains to recombinant adeno-associated virus serotype 8, an exclusive, sublicensable right to make, have made, use, sell, offer for sale, and import products for the treatment of hemophilia A.

2.2.6 The rights and licenses granted in Section 2.1 shall not include any right (and Licensor retains the exclusive (even as to Licensee), fully sublicensable right) under the Licensed Technology:

(a) to conduct commercial reagent and services businesses, which includes the right to make, have made, use, sell, offer to sell, and import research reagents, including any viral vector construct; provided that, for clarity, such rights retained by Licensor shall not include the right to conduct clinical trials in humans in the Field; or

(b) to use the Licensed Technology to provide services to any Third Parties; provided that, for clarity, Licensee's license under Section 2.1 does include the right to administer Licensed Products to patients. For clarity, activities conducted by Licensee for a Sublicensee as part of a Collaboration are not intended to be deemed services under this Section 2.2.6(b).

2.2.7 Licensor retains the fully sublicensable right under the Licensed Technology to grant non-exclusive research and development licenses to Affiliates and Third Parties; provided

that such development rights granted by Licensor shall not include the right to conduct clinical trials in humans in the Field or any rights to sell products in the Field.

2.2.8 The University of Pennsylvania may use and permit other non-profit organizations or other non-commercial entities to use the Licensed Technology solely for educational, research, and other non-commercial purposes.

2.2.9 The Parties acknowledge that the Retained Rights included in Sections 2.2.3 and 2.2.4 are excluded from this Agreement because they were retained by the licensor under the GSK Agreement and that the Retained Rights included in Section 2.2.5 are excluded from this Agreement because of rights granted by Licensor to other licensees or Third Parties. If Licensor is granted the rights described in Section 2.2.3 or 2.2.4 or regains the rights described in Section 2.2.5, Licensor will notify Licensee of such event, together with a description of the rights granted or regained, in which case, the applicable Retained Rights granted or regained will no longer be considered Retained Rights, and the license granted to Licensee under Section 2.1 will no longer be subject to such granted or regained rights.

2.3 Government Rights. Licensee acknowledges that the United States government retains certain rights in intellectual property funded in whole or part under any contract, grant, or similar agreement with a federal agency. The license grant hereunder is expressly subject to all applicable United States government rights, including any applicable requirement that products resulting from such intellectual property sold in the United States must be substantially manufactured in the United States absent, with respect to such manufacturing requirement, a waiver of such requirement obtained by Licensee from the applicable governmental agency.

2.4 Additional Disease Indications.

2.4.1 At any time prior to the […***…]of the Effective Date (the "Election Term"), Licensee may nominate in writing to Licensor a specific disease indication for inclusion in the "Field" under this Agreement. Within […***…] of Licensor's receipt of such notice, Licensor will inform Licensee in writing whether the nominated disease indication is available for licensing based on whether it: (a) is a disease indication set forth on Exhibit D ; provided that the indications so listed do not constitute a limitation on the indications Licensee may nominate; (b) is the subject of a conflicting license with a Third Party (or the subject of a license being negotiated with a Third Party, as to which (i) there has been a written request for license terms from such Third Party, (ii) such Third Party or Licensor has submitted a written proposal for terms for a license (which may be limited to financial terms), (iii) Licensor and such Third Party have entered into a confidentiality agreement for purposes of such Third Party conducting a due diligence review, and (iv) a "writing" for purposes of the foregoing clauses includes e-mail correspondence); or (c) is part of an existing Licensor program (*i.e.*, a program that is the subject of on-going advanced preclinical study (*e.g.*, there has been a pre-IND meeting) or is in clinical development or at a later stage of development or commercialization). If the nominated disease indication is subject to a conflicting Third Party license or subject to an existing Licensor program, then the disease indication will be deemed rejected. Otherwise, the specific disease indication will be deemed available for licensing, and the Field will automatically be deemed to include the nominated specific disease indication immediately upon Licensor's delivery of a confirmatory written notice. For purposes of nominating a disease indication for inclusion in the

"Field," the indication must be a specific type of condition and not a general disease class, for instance "mucopolysaccharidosis (MPS) VI" and not "mucopolysaccharidosis (MPS)" and "hemophilia A" not "hemophilia." If Licensor determines that a disease indication nominated by Licensee pursuant to this Section 2.4 is not specific, Licensor will notify Licensee within […***…]of Licensor's receipt of the notice of nomination, and the Parties will negotiate in good faith as to the proposed scope and definition of the nominated disease indication.

2.4.2 Licensee will be entitled to nominate a reasonable number of specific disease indications during the Election Term until two additional specific disease indications are included in the Field.

2.4.3 During the Election Term, Licensor will not license (or enter into negotiations to license) a Third Party or initiate a Licensor program in any of the specific disease indications listed on Exhibit D, without the prior consent of Licensee. Except for the foregoing, nothing in this Agreement will prevent Licensor from granting licenses to any Third Parties for any disease indications or from initiating Licensor's own programs for any disease indications, in either case, other than the specific disease indications within the Field.

2.4.4 Notwithstanding Section 2.4.3 or anything herein to the contrary, nothing in this Agreement will prevent Licensor from (a) granting non-exclusive research licenses to Third Parties in any field; or (b) maintaining Licensor's commercial reagent and services business.

2.5 Sublicensing.

2.5.1 The license granted pursuant to Section 2.1 is sublicensable by Licensee to any Affiliates or Third Parties; provided that any such sublicense must comply with the provisions of this Section 2.5 (including Section 2.5.2).

2.5.2 The right to sublicense granted to Licensee under this Agreement is subject to the following conditions:

(a) Licensee may only grant sublicenses […***…] pursuant to a written sublicense agreement with the Sublicensee. Licensor must receive written notice as soon as practicable following execution of any such sublicenses.

(b) In each sublicense agreement, the Sublicensee must be required to comply with the terms and conditions of this Agreement to the same extent as Licensee has agreed and must acknowledge that Licensor is an express third party beneficiary of such terms and conditions under such sublicense agreement; provided that nothing shall prevent Licensee from granting sublicenses of more limited scope than Licensee's rights, e.g. in a more limited territory, field of use, or term.

(c) The official language of any sublicense agreement shall be English.

(d) Within […***…] after entering into a sublicense, Licensor must receive a copy of the sublicense written in the English language for Licensor's

redacted to exclude confidential information of the applicable Sublicensee, but such copy shall not be redacted to the extent that it impairs Licensor's (or any of its licensors') ability to ensure compliance with this Agreement; provided that, if any of Licensor's licensors require a complete, unredacted copy of the sublicense, Licensee shall provide such complete, unredacted copy.

(e) Licensee's execution of a sublicense agreement will not relieve Licensee of any of its obligations under this Agreement. Licensee is and shall remain […***…] to Licensor for all of Licensee's duties and obligations contained in this Agreement and for any act or omission of an Affiliate or Sublicensee that would be a breach of this Agreement if performed or omitted by Licensee, and Licensee will be deemed to be in breach of this Agreement as a result of such act or omission.

2.6 Licensee's Improvements.

2.6.1 Licensee hereby grants to Licensor a non-exclusive, worldwide, […***…], transferable, sublicensable, irrevocable, perpetual license:

(a) to use any Licensed Back Improvements (and any intellectual property rights with respect thereto) consummate in scope to the Retained Rights; and

(b) to practice the Licensed Back Improvements (and any intellectual property rights with respect thereto) in connection with any recombinant adeno-associated virus vectors, including the right to research, develop, make, have made, use, offer for sale, and sell products and services; provided that, during the term of this Agreement, Licensor shall have no right under the license in this Section 2.6.1(b) to practice the Licensed Back Improvements in the Field.

2.6.2 For purposes of this Agreement, "Licensed Back Improvements" means any patentable modifications or improvements developed by Licensee, any Affiliates, or any Sublicensees to any vector that is the subject of a claim within the Licensed Patents.

2.6.3 Licensee agrees to provide prompt notice to Licensor upon the filing of any patent application covering any Licensed Back Improvement, together with a reasonably detailed description of or access to such Licensed Back Improvement to permit the practice of any such invention or improvement.

2.7 Licensor Improvements.

2.7.1 Licensor agrees to provide notice within […***…] to Licensee upon the filing of any patent application covering any Licensor Improvement, together with a reasonably detailed description of or access to such Licensor Improvement to permit the practice of any such

improvement. Upon the filing of any patent application covering any Licensor Improvement, Exhibit A attached hereto will be modified to add such patent application.

2.7.2 If Licensor files any patent or patent application that would constitute a Licensor Improvement but for the temporal limitation in Section 1.18(c), Licensor will within […***…] so inform Licensee, and, upon Licensee's written request, Licensor will, on a non-exclusive basis, discuss in good faith licensing such patent or patent application to Licensee for use in connection with the Licensed Products in the Field.

2.7.3 To the extent that the scope of Licensor's rights to any Licensor Improvements Controlled by Licensor pursuant to a Commercial License, as described in Section 1.18(c)(y), are less than or more restrictive than the license rights granted to Licensee pursuant to Section 2.1, then Licensee's rights with respect to such Licensor Improvements will be limited to the lesser or more restrictive rights Licensor can sublicense pursuant to the terms of the Commercial License. Examples of more restrictive provisions include Licensor's rights being limited to the following: (a) non-exclusive rights, (b) use in connection with only specific recombinant adeno-associate virus vectors, (c) use only in specific territories or specific fields, and (d) use only for research but not commercial purposes.

2.8 Transfer of Licensed Know-How.

2.8.1 During the […***…] period following the Effective Date, at Licensee's sole expense, to the extent not previously disclosed to Licensee, (a) Licensor will deliver to Licensee copies of Licensed Know-How set forth on Exhibit B in the form that such Licensed Know-How then exists; (b) Licensor will use commercially reasonable efforts to deliver, in the form that such Licensed Know-How then exists, such additional Licensed Know-How not listed on Exhibit B that is reasonably requested in writing by Licensee; and (c) Licensor will otherwise disclose, through not more than two meetings with Licensee personnel, other Licensed Know-How, which meetings will be at such times and in such places as are agreed to by the Parties.

2.8.2 During the […***…] period following the date on which a disease indication is added to the Field pursuant to Section 2.4, at Licensee's sole expense, to the extent not previously disclosed to Licensee, (a) Licensor will use commercially reasonable efforts to deliver, in the form that such Licensed Know-How then exists, such Licensed Know-How described in Section 1.14(b) that relates to such added disease indication that is reasonably requested in writing by Licensee; and (b) Licensor will otherwise disclose, through not more than two meetings with Licensee personnel, other Licensed Know-How described in Section 1.14(b) with respect to such added disease indication, which meetings will be at such times and in such places as are agreed to by the Parties.

2.8.3 Notwithstanding the foregoing, with respect to any Licensed Know-How not in Licensor's possession, Licensor's obligation will be limited to using reasonable efforts to cause such copies to be delivered to Licensee. Licensee acknowledges and agrees that all Licensed Know-How disclosed pursuant to this Section 2.8 will be deemed "Confidential Information" of Licensor, regardless of whether such information is marked or identified as confidential and without an obligation to summarize oral information.

2.9 Covenants Related to Existing Licenses. During the term of this Agreement, without the prior written consent of Licensee, which consent shall not be unreasonably withheld, Licensor agrees not to exercise its right to terminate and will not amend either of the Existing Licenses if such termination or amendment would materially, adversely alter the rights of Licensee under this Agreement. During the term of this Agreement, if Licensor receives a notice of termination under Section 6.3 of the Penn License, Licensor will so notify Licensee no later than […***…] before expiration of the applicable cure period and provide the particulars of the alleged breach.

ARTICLE 3: CONSIDERATION

3.1 Initial Fee. In consideration of the license granted to Licensee under Section 2.1, Licensee shall issue to Licensor 10,000 shares of Common Stock of Licensee pursuant to that certain Dimension Therapeutics, Inc. Common Stock Purchase Agreement of even date herewith.

3.2 Annual Maintenance Fee. In consideration of the license granted to Licensee under Section 2.1, Licensee shall pay Licensor on- going annual maintenance fees of $35,000 for each disease indication within the Field, which fees will be due on each anniversary of the Effective Date.

3.3 Royalties. In further consideration of the license granted to Licensee under Section 2.1, Licensee shall pay to Licensor the following royalties based upon Net Sales of Licensed Products, subject to the reductions in royalty rates set forth in Section 3.3.1:

Cumulative Annual Net Sales of all Licensed Products Worldwide	**Royalty Percentage**
Portion of Net Sales less than […***…]	[…***…]
Portion of Net Sales between (and including) […***…] through (and including) […***…]	[…***…]
Portion of Net Sales greater than […***…]	[…***…]

3.3.1 Adjustment of Royalties. The Parties acknowledge that the royalties set forth in this Section 3.3 have been set at an […***…].

(a) If, after the Effective Date, […***…], which amendment the Parties will negotiate in good faith.

(b) If, after the Effective Date, Licensee determines that (x) one or more Licensed Products (i) would fall within […***…] or (ii) would be entitled to a […***…], or (y) Licensor would be entitled to […***…]

[…***…], Licensee may provide Licensor with written notice thereof and reasonable documentation supporting Licensee's determination. Upon receipt thereof, Licensor will negotiate in good faith regarding whether Licensee's determination is correct and, if the Parties agree, an appropriate amendment to the royalties set forth in this Section 3.3

(c) Negotiations for any adjustments to royalties under this Section 3.3.1 will take into account the royalties […***…] in the aggregate, as well as any […***…].

3.3.2 Royalty Payment Period. Licensee's obligation hereunder for payment of a royalty under this Section 3.3 on the Net Sales of Licensed Products in a given country will end on a country-by-country basis […***…].

3.4 Third Party Obligations. In consideration of the license granted to Licensee under Section 2.1, Licensee agrees to the following:

3.4.1 Assumption of Obligations. Licensee acknowledges that certain Licensed Technology is licensed to Licensor pursuant to the Existing Licenses and will be sublicensed to Licensee hereunder. In addition to the obligations set forth herein, Licensee expressly agrees to be bound by and comply with all applicable provisions of the Existing Licenses to the extent such provisions apply to Licensee's or any of its Affiliates' or any Sublicensees' exploitation of Licensed Technology under this Agreement. To the extent that (a) any Licensed Technology is Controlled by Licensor pursuant to the Existing Licenses and sublicensed to Licensee under this Agreement and (b) the scope of rights granted under such Existing Licenses are less than the rights granted hereunder (such as Licensor's rights under the Existing Licenses being limited to non-exclusive rights), Licensee acknowledges that Licensee's rights and licenses hereunder with respect to such Licensed Technology are limited to such lesser scope.

3.4.2 Third Party Reports and Payments.

(a) Licensee will pay any milestone amounts owed under Section 3.2 of the GSK Agreement that are owed with respect to activities of Licensee in exercising its license under this Agreement. Licensee's obligation under this Section 3.4.2(a) for payments shall continue for so long as any payment obligations are due during the term of this Agreement under the Existing Licenses. For the avoidance of doubt, Licensee will not be deemed to owe a milestone amount if Licensor or a different licensee of Licensor achieves the milestone for which a payment is due prior to Licensee achieving such milestone.

(b) To the extent that any payment under Section 3.3 or 3.4.2(a) is deemed "Sublicensing Revenues" under Section 3.5 of the Penn Agreement or sublicensee fees under Section 3.4 of the GSK Agreement (collectively, "Sublicensing Fees"), Licensee will gross up such payments to ensure that Licensor receives exactly the amount that is owed for such payment under this Agreement and the Sublicensing Fees under the Existing Licenses.

(c) Licensee will make all payments due with respect to the Existing Licenses to Licensor not less than […***…] prior to the date on which such amounts must be paid by Licensor to its licensors under the applicable Existing Licenses.

(d) Licensee agrees to submit and to require its Affiliates and Sublicensees to submit to Licensor (or as otherwise directed by Licensor) all reports, including development and diligence reports, that Licensor is required to submit or pay pursuant to the Existing Licenses and all payments that Licensee has agreed to make as set forth in Section 3.4.2 (a), in each case, to the extent such reports or payments are triggered by or otherwise result from Licensee's and its Affiliates' and any Sublicensees' exploitation of Licensed Technology under this Agreement. Unless otherwise agreed, with respect to any reporting and payment obligations under the Existing Licenses, Licensee (or its Affiliates or any Sublicensees) will provide the required reports to Licensor in sufficient time for Licensor to provide them to the applicable licensor within the time periods required by the applicable Existing License; provided that such reports will be provided to Licensor by not less than […***…] prior to the date on which such reports must be delivered by Licensor to its licensors under the applicable Existing License. All financial reports required to be delivered will be certified by the chief financial officer of Licensee.

(e) Without limiting the foregoing, within […***…] after the occurrence of a milestone event requiring a payment under either Existing License, Licensee will deliver to Licensor a report describing the milestone event that occurred and the date on which it occurred.

3.5 Reports and Records.

3.5.1 Licensee must deliver to Licensor within […***…] after the end of each Calendar Quarter after the first commercial sale of a Licensed Product a report setting forth the calculation of the royalties due to Licensor for such Calendar Quarter, including:

(a) Number of Licensed Products included within Net Sales, listed by country;

(b) Gross consideration for Net Sales of Licensed Product, including all amounts invoiced, billed, or received;

(c) Qualifying costs to be excluded from the gross consideration, as described in Section 1.22, listed by category of cost;

(d) Net Sales of Licensed Products listed by country;

(e) Royalties owed to Licensor, listed by category; and

(f) The computations for any applicable currency conversions.

3.5.2 Licensee shall pay the royalties due under Section 3.3 within […***…] following the last day of the Calendar Quarter in which the royalties accrue. Licensee shall send the royalty payments along with the report described in Section 3.5.1.

3.5.3 All financial reports under this Section 3.5 will be certified by the chief financial officer of Licensee.

3.5.4 Licensee shall maintain and require its Affiliates and all Sublicensees to maintain, complete and accurate books and records that enable the royalties, fees, and payments payable under this Agreement (directly or through the Existing Licenses) to be verified. The records must be maintained for […***…] after the submission of each report under Article 3. Upon reasonable prior written notice to Licensee, Licensee and its Affiliates and all Sublicensees will provide Licensor (and its accountants) with access to all of the relevant books, records, and related background information required to conduct a review or audit of the royalties, fees, and payments payable to Licensor under this Agreement to be verified. Access will be made available: (a) during normal business hours; (b) in a manner reasonably designed to facilitate the auditing party's review or audit without unreasonable disruption to Licensee's business; and (c) no more than once each calendar year during the term of this Agreement and for a period of […***…] thereafter. Licensee will promptly pay to Licensor the amount of any underpayment determined by the review or audit, plus accrued interest. If the review or audit determines that Licensee has underpaid any payment by […***…] or more, then Licensee will also promptly pay the costs and expenses of Licensor and accountants in connection with the review or audit. Without limiting the foregoing, Licensee acknowledges that its books and records will also be subject to the separate audit right of Licensor's licensors in accordance with the terms of the Existing Licenses.

3.6 Currency, Interest.

3.6.1 All dollar amounts referred to in this Agreement are expressed in United States dollars. All payments to Licensor under this Agreement must be made in United States dollars.

3.6.2 If Licensee receives payment in a currency other than United States dollars for which a royalty or fee or other payment is owed under this Agreement, then (a) the payment will be converted into United States dollars at the conversion rate for the foreign currency as published in the eastern edition of the *Wall Street Journal*, *N.Y.* edition, as of the last business day of the Calendar Quarter in which the payment was received by Licensee; and (b) the conversion computation will be documented by Licensee in the applicable report delivered to Licensor under Section 3.5.

3.6.3 All amounts that are not paid by Licensee when due will accrue interest from the date due until paid at a rate equal to 1.5% per month (or the maximum allowed by law, if less).

ARTICLE 4: DILIGENCE

4.1 Diligence Obligations. Licensee will use commercially reasonable efforts to develop, commercialize, market, promote, and sell Licensed Products in each of the disease indications within the Field. Commercially reasonable efforts means efforts equivalent to those utilized by […***…].

4.2 Specific Milestones. Without limiting Section 4.1, Licensee will meet the following milestones:

Event	Date
(a) Closing of $[…***…] in financing	[…***…] from Effective Date
(b) Milestones will be set forth in the initial Development Plan for the hemophilia A indication described in Section 1.11(a) and agreed upon by the Parties	[…***…]
(c) Milestones will be set forth in the initial Development Plan for the hemophilia B indication described in Section 1.11(b) and agreed upon by the Parties	[…***…]
(d) Filing of an investigational new drug application with the FDA for the proposed initial clinical trial of a Licensed Product targeting the first additional specific disease indication (as set forth in Section 1.11(c))	[…***…] from the date on which the specific disease indication is added to the Field pursuant to Section 2.4
(e) Filing of an investigational new drug application with the FDA for the proposed initial clinical trial of a Licensed Product targeting the second additional specific disease indication (as set forth in Section 1.11(c))	[…***…] from the date on which the specific disease indication is added to the Field pursuant to Section 2.4

Licensee will provide Licensor written notice within […***…] of the accomplishment of each of the foregoing milestones. For the avoidance of doubt, a breach of the milestone in (a) above will be deemed a breach with respect to all disease indications within the Field. If Licensee fails to meet a milestone for a particular disease indication within the Field, the date of the milestone ([…***…]) may, at Licensee's option, be extended for a period of […***…] from the original deadline date upon a payment to Licensor of […***…] within […***…] of the original deadline date; provided that Licensee will be entitled only to […***…] for each

disease indication within the Field, and each […***…] will require a separate payment of […***…].

The Parties agree that the failure of Licensee to achieve a specific milestone contained in this Section 4.2 or in a Development Plan described in Section 4.3 for reasons beyond Licensee's reasonable control […***…] will not be considered a material breach hereunder; […***…].

4.3 Development Plans

4.3.1 For each disease indication and corresponding Licensed Product in the Field, Licensee will prepare and deliver to Licensor a development plan and budget (each a "Development Plan"). The initial Development Plans for the initial two indications set forth in Section 1.11(a) or (b) will be delivered within […***…] after the Effective Date, and the Development Plan for each of the subsequent indications set forth in Section 1.11(c) will be delivered within […***…] of the date on which the applicable indication is added to the Field pursuant to Section 2.4.

4.3.2 Each Development Plan will cover the next two years, and will include future development activities to be undertaken by Licensee, its Affiliates, or any Sublicensees during the next reporting period under Section 4.4 relating directly to the Licensed Product, Licensee's strategy to bring the Licensed Product to commercialization, and projected timeline for completing the necessary tasks to accomplish the goals of the strategy.

4.3.3 Following receipt by Licensor of each Development Plan, Licensor will promptly notify Licensee of any comments or requested revisions, and the Parties will thereupon negotiate any appropriate revisions in good faith. With respect to developmental milestones to be set forth in the initial Development Plans for each of the initial two indications set forth in Section 1.11(a) or (b), the Parties will agree upon reasonable milestones and completion dates to be set forth in the Development Plan (and any amendments thereto).

4.4 Reporting. Within […***…] after the Effective Date and within […***…] of each December 1 thereafter, Licensee shall provide Licensor with written progress reports, setting forth in such detail as Licensor may reasonably request, the progress of the development, evaluation, testing, and commercialization of each Licensed Product pursuant to each Development Plan. Licensee will also notify Licensor within […***…] of the first commercial sale by Licensee, its Affiliates, or any Sublicensees of each Licensed Product. Such a report ("Development Progress Report"), setting forth the current stage of development of Licensed Products, shall include:

4.4.1 Date of Development Progress Report and time covered by such report;

4.4.2 Major activities and accomplishments completed by Licensee, its Affiliates, and any Sublicensees relating directly to the Licensed Product since the last Development Progress Report;

4.4.3 Significant research and development projects relating directly to the Licensed Product currently being performed by Licensee, its Affiliates, and any Sublicensees and projected dates of completion;

4.4.4 Updates to each Development Plan, including coverage of the next two years;

4.4.5 Projected total development remaining before product launch of each Licensed Product; and

4.4.6 Summary of significant development efforts using the Licensed Technology being performed by Third Parties, including the nature of the relationship between Licensee and such Third Parties.

4.5 Confidential Information. The Parties agree that Development Progress Reports shall be deemed Licensee's Confidential Information; provided that Licensor may share a copy of such reports with its licensors under the Existing Licenses.

4.6 Improvements. Simultaneously with the Development Progress Report, Licensee shall deliver a detailed description of any Licensed Back Improvements, if not previously provided pursuant to Section 2.6.3.

4.7 Exclusivity. […***…]

ARTICLE 5: CONFIDENTIALITY

5.1 Treatment of Confidential Information. Each Party, as a receiving party (a "Receiving Party"), agrees that it will (a) treat Confidential Information of the other Party (the "Disclosing Party") as strictly confidential; (b) not disclose such Confidential Information to Third Parties without the prior written consent of the Disclosing Party, except as may be permitted in this Agreement; provided that any disclosure permitted hereunder be under confidentiality agreements with provisions at least as stringent as those contained in this Agreement; and (c) not use such Confidential Information for purposes other than those authorized expressly in this Agreement. The Receiving Party agrees to ensure that its employees who have access to Confidential Information are obligated in writing to abide by confidentiality obligations at least as stringent as those contained under this Agreement.

5.2 Public Announcements. The Parties agree they will release a joint press release in the form attached hereto as Exhibit E. Except as provided in Section 5.3, any other press releases by either Party with respect to the other Party or any other public disclosures concerning the existence of or terms of this Agreement shall be subject to review and approval by the other

Party. Once the joint press release or any other written statement is approved for disclosure by both Parties, either Party may make subsequent public disclosure of the contents of such statement without the further approval of the other Party.

5.3 Authorized Disclosure. Notwithstanding the provisions of Section 5.1 or 5.2, either Party may disclose Confidential Information or make such a disclosure of the existence of and/or terms of this Agreement to any […***…]; provided that, in each case, such recipient of Confidential Information is obligated to keep such information confidential on terms no less stringent than those set forth in this Agreement. Furthermore, Licensee agrees that Licensor may share a copy of this Agreement, reports and notices provided by Licensee to Licensor pursuant to the terms of this Agreement, and copies of sublicense agreements provided to Licensor hereunder with any of Licensor's direct and indirect licensors of the Licensed Technology. In the event that the Receiving Party receives service of legal process that purports to compel disclosure of the Disclosing Party's Confidential Information or becomes obligated by law to disclose the Confidential Information of the Disclosing Party or the existence of or terms of this Agreement to any governmental authority, the Receiving Party shall promptly notify the Disclosing Party, so that the Disclosing Party may seek an appropriate protective order or other remedy with respect to narrowing the scope of such requirement and/or waive compliance by the Receiving Party with the provisions of this Agreement. The Receiving Party will provide the Disclosing Party with reasonable assistance in obtaining such protective order or other remedy. If, in the absence of such protective order or other remedy, the Receiving Party is nonetheless required by law to disclose the existence of or terms of this Agreement or other Confidential Information of the Disclosing Party, the Receiving Party may disclose such Confidential Information without liability hereunder; provided that the Receiving Party shall furnish only such portion of the Confidential Information that is legally required to be disclosed and only to the extent required by law.

5.4 Term of Confidentiality. The obligations of this Article 5 shall continue for a period of […***…] following the expiration or termination of this Agreement.

ARTICLE 6: TERM AND TERMINATION

6.1 Term of Agreement. This Agreement, unless sooner terminated as provided in this Agreement, expires upon the expiration, lapse, abandonment, or invalidation of the last Valid Claim to expire, lapse, or become abandoned or unenforceable in all countries of the world. Upon expiration of this Agreement (but not early termination), Licensee's license to Licensed Know-How under Section 2.1 will become non-exclusive, perpetual, irrevocable, royalty-free with respect to the Licensed Know-How owned by Licensor and will continue with respect to all other Licensed Know-How for so long as Licensor's rights continue under the Existing Licenses (subject to Licensee paying any ongoing amounts due under the Existing Licenses and complying with any applicable ongoing obligations under the Existing Licenses); but, for the avoidance of doubt, such license will remain limited to the Field and subject to the Retained Rights.

6.2 Licensee's Right to Terminate. Licensee may, upon […***…] prior written notice to Licensor, terminate this Agreement for any reason. In exercising such termination right, Licensee may terminate the Agreement in its entirety or, if desired, Licensee may specify in the written notice that this Agreement is terminating only with respect to one or more of the disease indications within the Field.

6.3 Termination for Breach.

6.3.1 Licensor may terminate this Agreement, if Licensee is late in paying to Licensor royalties, fees, or any other monies due under this Agreement, and Licensee does not pay Licensor in full within […***…] upon written demand from Licensor, which termination shall be effective immediately upon the expiration of such […***…] cure period.

6.3.2 Either Party may terminate this Agreement, if the other Party materially breaches this Agreement and does not cure such material breach within […***…] after written notice of the breach, which termination shall be effective immediately upon the expiration of such […***…] cure period; provided that, if termination is by Licensor as a result of Licensee's materially breaching Article 4, and if such breach only relates to one disease indication within the Field, but not all, then Licensor's termination right shall only be with respect to the disease indication with respect to which the breach related and not the remaining disease indications.

6.3.3 Notwithstanding the foregoing, if Licensee disputes in good faith that a payment is due or that such material breach exists, and gives Licensor written notice of such dispute within […***…], in the case of payment, or […***…], in the case of a material breach, following Licensee's receipt of Licensor's notice of default, then, Licensor may not terminate this Agreement until the dispute is resolved in accordance with Section 10.6 (and a payment is found to be due or a breach found to have occurred); provided that Licensor will be entitled to terminate this Agreement at the end of the original […***…] or […***…] cure period, as applicable, without waiting for resolution of the dispute in accordance with Section 10.6, if the breach by Licensee of this Agreement would cause Licensor to be in breach of the GSK Agreement or the Penn Agreement.

6.4 Termination for Insolvency.

6.4.1 Licensor may terminate this Agreement, effective immediately upon written notice to Licensee, if Licensee any of its Controlling Affiliates experiences any Trigger Event. "Controlling Affiliate" means an Affiliate that directly or indirectly controls Licensee within the meaning of Section 1.1.

6.4.2 Licensee shall include in each sublicense agreement entered into with a Sublicensee a right of Licensee to terminate such sublicense agreement if such Sublicensee experiences any Trigger Event; and Licensee shall terminate the sublicense agreement, effective immediately upon written notice to the Sublicensee, if the Sublicensee experiences any Trigger Event. In addition, if the Sublicensee's experiencing of a Trigger Event gives Licensor's licensor a right of termination under the Penn Agreement and such licensor threatens to terminate the Penn Agreement, then, upon receipt of notice to such effect, Licensor may terminate this

Agreement, effective immediately upon written notice to Licensee, if the Sublicensee experiences any Trigger Event.

6.4.3 For purposes of this Section 6.4, "Trigger Event" means any of the following: (a) if Licensee, any Controlling Affiliate, or any Sublicensee, as applicable, (i) becomes insolvent, becomes bankrupt, or generally fails to pay its debts as such debts become due, (ii) is adjudicated insolvent or bankrupt, (iii) admits in writing its inability to pay its debts, (iv) suffers the appointment of a custodian, receiver, or trustee for it or its property and, if appointed without its consent, is not discharged within […***…], (v) makes an assignment for the benefit of creditors, or (vi) suffers proceedings being instituted against it under any law related to bankruptcy, insolvency, liquidation, or the reorganization, readjustment, or release of debtors and, if contested by it, not dismissed or stayed within […***…]; (b) the institution or commencement by Licensee, any Controlling Affiliate, or any Sublicensee, as applicable, of any proceeding under any law related to bankruptcy, insolvency, liquidation, or the reorganization, readjustment, or release of debtors; (c) the entering of any order for relief relating to any of the proceedings described in Section 6.4.3(a) or (b) above; (d) the calling by Licensee, any Controlling Affiliate, or any Sublicensee, as applicable, of a meeting of its creditors with a view to arranging a composition or adjustment of its debts; or (e) the act or failure to act by Licensee, any Controlling Affiliate, or any Sublicensee, as applicable, indicating its consent to, approval of, or acquiescence in any of the proceedings described in Section 6.4.3(b) through (d) above.

6.5 Patent Challenge.

6.5.1 Licensor may terminate this Agreement, effective immediately upon written notice to Licensee, upon the commencement by Licensee or any of its Affiliates of a Patent Challenge.

6.5.2 Licensee shall include in each sublicense agreement entered into with a Sublicensee a right of Licensee to terminate such sublicense agreement if such Sublicensee commences a Patent Challenge; and Licensee shall terminate the sublicense agreement, effective immediately upon written notice to the Sublicensee, if the Sublicensee commences a Patent Challenge. In addition, if the Sublicensee's commencement of a Patent Challenge gives Licensor's licensor a right of termination under the Penn Agreement and such licensor threatens to terminate the Penn Agreement, then, upon receipt of notice to such effect, Licensor may terminate this Agreement, effective immediately upon written notice to Licensee, if the Sublicensee commences a Patent Challenge.

6.5.3 For purposes of this Section 6.5, "Patent Challenge" means any action against Licensor or the University of Pennsylvania or SmithKline Beecham Corporation (or their successors under the Existing Licenses), including an action for declaratory judgment, to declare or render invalid or unenforceable the Licensed Patents, or any claim thereof.

6.6 Effects of Termination. The effect of termination by Licensee pursuant to Section 6.2, by either Party, as applicable, under Section 6.3, or by Licensor pursuant to Section 6.4 or 6.5 shall be as follows:

6.6.1 The licenses granted by Licensor hereunder shall terminate, and Licensee, its Affiliates, and (unless the sublicense agreement is assigned pursuant to Section 6.6.2) all Sublicensees shall cease to make, have made, use, import, sell, and offer for sale all Licensed Products and shall cease to otherwise practice the Licensed Technology; provided that Licensee, its Affiliates, and Sublicensees, shall have the right to continue to sell their existing inventories of Licensed Products for a period not to exceed […***…] after the effective date of such termination;

6.6.2 Licensee shall assign to Licensor any or all sublicenses granted to Third Parties to the extent of the rights licensed to Licensee hereunder and sublicensed to the Sublicensee; provided that (i) prior to such assignment, Licensee shall advise Licensor whether such Sublicensee is then in full compliance with all terms and conditions of its sublicense and continues to perform thereunder, and, if such Sublicensee is not in full compliance or is not continuing to perform, Licensor may elect not to have such sublicense assigned; and (ii) following such assignment, Licensor shall not be liable to such Sublicensee with respect to any obligations of Licensee to the Sublicensee that are not consistent with, or not required by, Licensor's obligations to Licensee under this Agreement; and all sublicenses not requested to be assigned to Licensor shall terminate;

6.6.3 If termination is by Licensee pursuant to Section 6.2 or by Licensor pursuant to Section 6.3, 6.4, or 6.5,

(a) Licensee shall grant, and hereby grants (effective only upon any such termination of this Agreement), to Licensor a non-exclusive, perpetual, irrevocable, worldwide, […***…], transferable, sublicensable license under any patentable modifications or improvements (and any intellectual property rights with respect thereto) developed by Licensee, any Affiliates, or any Sublicensees to any vector that is the subject of a claim within any of the Licensed Patents, for use by Licensor for the research, development, and commercialization of products in any therapeutic indication;

(b) Licensee shall grant, and hereby grants (effective only upon any such termination of this Agreement), to Licensor an exclusive (even as to Licensee), worldwide, […***…], transferable, perpetual license, with the right to grant sublicenses, under the Licensee Technology to make, have made, use, import, sell, and offer for sale Licensed Products solely in the Field. For this purpose, the "Licensee Technology" means Licensee's patents, Know-How, and other intellectual property that improvements or modifications to or that are based on or derived in whole or in part from or that otherwise relate to any Licensed Technology to the extent such patents, Know-How, or other intellectual property pertains to (i) a recombinant adeno-associated virus vector or (ii) any expression construct provided by Licensor to Licensee as part of the Licensed Technology. To effectuate such license, upon any such termination of this Agreement, Licensee will promptly disclose to Licensor all Licensee Technology not already known to Licensor; and

(c) Licensee will transfer to Licensor ownership of any regulatory approvals then in Licensee's, its Affiliate's, or any Sublicensee's name related to Licensed Products containing any expression construct provided by Licensor to Licensee as part of the Licensed Technology and notify the appropriate regulatory authorities and take any other action reasonably necessary to effect such transfer of ownership. If ownership of any such regulatory approval cannot be transferred to Licensor in any country, Licensee hereby grants (effective only upon any such termination of this Agreement) to Licensor a permanent, exclusive (even as to Licensee), and irrevocable right of access and reference to such regulatory approvals for Licensed Products containing any expression construct provided by Licensor to Licensee as part of the Licensed Technology in such country in the Field.

6.6.4 […***…]

6.6.5 Licensee shall pay all monies then-owed to Licensor under this Agreement; and

6.6.6 Each Receiving Party shall, at the other Party's request, return all Confidential Information of the Disclosing Party. Notwithstanding the foregoing, one copy may be kept by either Party for a record of that Party's obligations.

If termination is only with respect to a particular disease indication within the Field, but not all disease indications, then the provisions of this Section 6.6 shall only apply with respect to the terminated disease indications, and this Agreement shall continue with respect to the non-terminated disease indications.

6.7 Survival. Licensee's obligation to pay all monies due and owed to Licensor under this Agreement which have matured as of the effective date of termination or expiration shall survive the termination or expiration of this Agreement. In addition, the provisions of Section 2.2 (Retained Rights), 2.3 (Government Rights), 2.6 (Licensee's Improvements), 3.4 (if this Agreement expires and there are any continuing obligations under the Existing Licenses applicable to Licensee's continuing activities following expiration), Article 3 (Consideration) (with respect to any final reports or to the extent any amounts are due but unpaid), Section 3.5 (Reports and Records), Article 5 (Confidentiality), Article 6 (Term and Termination) except for Section 6.5, Section 8.3 (Disclaimer of Warranties, Damages), Section 8.4 (Indemnification), Section 8.5 (Insurance), Article 9 (Use of Name), and Article 10 (Additional Provisions) shall survive such termination or expiration of this Agreement in accordance with their respective terms.

ARTICLE 7: PATENT MAINTENANCE; PATENT INFRINGEMENT

7.1 Prosecution of Licensed Patents. As between Licensor and Licensee, the Parties agree as follows:

7.1.1 Licensor shall have the sole right, but not the obligation, to Prosecute patent applications and issued patents within Licensed Patents, in Licensor's sole discretion. Subject to Section 7.1.3, Licensor shall provide Licensee with a reasonable opportunity to review and provide comments in connection with the Prosecution of the Licensed Patents; and Licensor shall keep Licensee reasonably informed as to all material developments with respect to such Licensed Patents and shall supply to Licensee copies of material communications received and filed in connection with the Prosecution of such Licensed Patents.

7.1.2 Nothing in this Agreement obligates Licensor to continue to Prosecute any patent applications or issued patents, and Licensee acknowledges that Licensor shall have no obligation to undertake any inter-party proceedings, such as oppositions or interferences, or to undertake any re-examination or re-issue proceedings, in either case, with respect to the Licensed Patents.

7.1.3 Licensee acknowledges that the University of Pennsylvania controls Prosecution of the Licensed Patents, with Licensor having certain rights to review. Licensee acknowledges and agrees that (a) the rights and obligations under this Section 7.1 are subject to the rights of Licensor's licensors under the Existing Licenses, and (b) Licensor's obligations under this Agreement only apply to the extent of Licensor's rights with respect to participation in Prosecuting the Licensed Patents under the Existing Licenses.

7.2 Infringement Actions Against Third Parties.

7.2.1 Licensee is responsible for notifying Licensor promptly of any infringement of Licensed Patents (other than Retained Rights) that may come to Licensee's attention. Licensee and Licensor shall consult one another in a timely manner concerning any appropriate response to the infringement.

7.2.2 As between Licensor and Licensee, […***…] shall have the first right, but not the obligation, to prosecute any such infringement […***…]. In any action to enforce any of the Licensed Patents, […***…], at the request and expense of […***…], shall cooperate to the fullest extent reasonably possible, including in the event that, if […***…] is unable to initiate or prosecute such action solely in its own name, […***…] shall join such action voluntarily and shall execute all documents necessary to initiate litigation to prosecute, maintain, and settle such action.

7.2.3 If […***…] elects not to pursue any infringement of a Licensed Patent, then, to the extent that a Licensed Product is covered by any such License Patent and such Licensed Patent is being infringed by another product […***…] (such infringement, the "[…***…] Infringement"), […***…] shall have the second right, but not the obligation, to prosecute such […***…] Infringement with respect to such other product […***…], at […***…] own expense. In any such action to enforce any of the Licensed Patents, […***…], at the request and expense of […***…], shall cooperate to the fullest extent reasonably possible, including in the event that, if […***…] is unable to initiate or prosecute such action solely in its own name,

[…***…] shall join such action voluntarily and shall execute all documents necessary to initiate litigation to prosecute and maintain such action. In prosecuting any such […***…] Infringement, […***…] (a) shall not take any actions that would be detrimental to the Licensed Patents and […***…] rights with respect thereto […***…] and (b) shall not settle any such […***…] Infringement without the prior consent of […***…].

7.2.4 Any recovery of damages by […***…] for any infringement other than a […***…] Infringement shall be […***…]. Any recovery of damages by the Party undertaking enforcement or defense of a suit for […***…] Infringement shall be applied, as between Licensor and Licensee but subject to the obligations to Licensor's licensors under the Existing Licenses, first to reimburse each such Party for costs and expenses (including reasonable attorneys' fees and costs) incurred by such Party in connection with such suit, and the balance remaining, if any, from any such recovery shall be […***…].

7.2.5 Licensee acknowledges and agrees that (a) the rights and obligations under this Section 7.2 are subject to the rights of Licensor's licensors under the Existing Licenses (including any consent or approval rights or rights to control or participate in any enforcement actions); and (b) Licensor's obligations under this Agreement only apply to the extent that Licensor has any rights with respect to enforcing the Licensed Patents under the Existing Licenses. Furthermore, Licensee acknowledges the following:

7.2.5.1 All monies recovered upon the final judgment or settlement of any action with respect to […***…] Infringement will also need to be allocated to Licensor's licensors under the Existing Licenses (a) to reimburse the costs and expenses (including reasonable attorneys' fees and costs) of such licensors, (b) to take into account the royalties payable to such licensors; and (c) to take into account the relative extent of such licensors' financial participation in such action, if applicable.

7.2.5.2 Licensor's licensors under the Existing Licenses retain the continuing right to intervene at their own expense and join Licensor or Licensee in any claim or suit for infringement of the Licensed Patents.

7.2.5.3 In any infringement prosecuted by Licensors' licensors under the Existing Licenses, all financial recoveries will be […***…].

7.2.5.4 In any infringement prosecuted by Licensor's licensors under the Existing Licenses, […***…] agrees, at the request and expense of such licensors, to cooperate to the fullest extent reasonably possible, to the same extent as though […***…] were prosecuting such suit (as provided in this Section 7.2, including Section 7.2.2).

7.2.5.5 The written consent of […***…] under the […***…] will be required (a) for any decision that would have a materially adverse effect on the validity, scope of patent claims, or enforceability of the Patent Rights and (b) for any settlement or compromise of any infringement suit that would impose any obligations or restrictions on any of its […***…], or grants any rights to the Licensed Patents other than rights that […***…].

7.3 Defense of Infringement Claims.

7.3.1 In the event Licensee or Licensor becomes aware that Licensee's or any of its Affiliates' or any Sublicensees' practice of the Licensed Patents is the subject of a claim for patent infringement by a Third Party, that Party shall promptly notify the other, and the Parties shall consider the claim and the most appropriate action to take. Licensee shall cause each of its Affiliates and each Sublicensee to notify Licensee promptly in the event such entity becomes aware that its practice of the Licensed Patents is the subject of a claim of patent infringements by another.

7.3.2 To the extent Licensor takes any action, Licensor (or its licensors under the Existing Licenses) shall have the right to require Licensee's reasonable cooperation in any such suit, upon written notice to Licensee; and Licensee shall have the obligation to participate upon Licensor's request, in which event, […***…]. Without Licensor's prior written permission, Licensee must not settle or compromise any such suit in a manner that imposes any material obligations or restrictions on Licensor or any of its licensors under the Existing Licenses or grants any rights to the Licensed Patents other than rights that Licensee has the right to grant under this Agreement.

ARTICLE 8: WARRANTIES; INDEMNIFICATION

8.1 Warranty by Licensor. Licensor represents and warrants to Licensee as of the Effective Date:

8.1.1 Licensor has the right, power, and authority to enter into this Agreement and to grant to Licensee the rights specified in this Agreement;

8.1.2 This Agreement when executed shall become the legal, valid and binding obligation of it, enforceable against it, in accordance with its terms;

8.1.3 There are no actions, suits, proceedings, or arbitrations pending or, to the Licensor's knowledge, threatened against Licensor relating to the Licensed Technology that would impact activities under this Agreement;

8.1.4 To Licensor's knowledge, (a) the Licensed Patents are solely owned by the University of Pennsylvania, and (b) no Third Party has any right, interest, or claim in or to such Licensed Patents in the Field that are inconsistent with those granted to Licensee herein;

8.1.5 Licensor has not received any written notice from any Third Party patentee alleging infringement of, and to Licensor's knowledge Licensor has not been sued for patent infringement of, Third Party technology by the practice of the Licensed Patents in the Field;

8.1.6 Licensor has not received any written notice from any of its licensors under the Existing Licenses informing Licensor that there are any actions, suits, proceedings, or arbitrations pending against such licensors relating to the Licensed Patents that would impact activities under this Agreement;

8.1.7 To Licensor's knowledge, Licensor does not Control (through ownership or Control pursuant to the Existing Licenses) as of the Effective Date any patent or patent application (other than the Licensed Patents set forth on Exhibit A) that would necessarily be infringed by Licensee's practice of the Licensed Patents set forth on Exhibit A in connection with using, importing selling, and offering for sale of adeno-associated virus vectors claimed in such Licensed Patents in the Field. If it is determined, in accordance with the procedure of this Section 8.1.7, that Licensor Controls (through ownership or Control pursuant to the Existing Licenses) as of the Effective Date a patent or patent application (other than the Licensed Patents) that would necessarily be infringed by Licensee's practice of the Licensed Patents set forth on Exhibit A in connection with using, importing selling, and offering for sale of adeno-associated virus vectors claimed in such Licensed Patents in the Field, then Licensor shall include the applicable patent or patent application as a "Licensed Patent" hereunder but solely to the extent of the claim(s) that would necessarily be infringed by such practice of such Licensed Patents by Licensee, which inclusion shall be Licensee's sole remedy. At any time during the term of this Agreement, Licensee may notify Licensor in writing of any such patent or patent application that Licensee believes should be included as a "Licensed Patent" pursuant to this Section 8.1.7. Such written notice shall identify the relevant patent or patent application and relevant claim(s) and shall explain briefly why Licensee, in good faith, believes it should be included as a "Licensed Patent." If Licensor does not agree with Licensee, Licensor shall have […***…] following Licensor's receipt of Licensee's written notice to notify Licensee that Licensor disputes the inclusion of such patent or patent application or the scope of the remedy; in which event, such dispute will be resolved in accordance with Section 10.6. Upon the Parties' agreement (or a resolution, in favor of Licensee, of the dispute pursuant to Section 10.6), the applicable claim(s) of the applicable patent or patent application will be deemed a "Licensed Patent" hereunder. For the avoidance of doubt, Licensor makes no representation or warranty under this Section 8.1.7 as to any claim of (a) a patent or patent application covering Manufacturing Technology or (b) a patent or patent application that is not Controlled by Licensor pursuant to the Existing Licenses or pursuant to Licensor's ownership thereof, and Licensee acknowledges that (i) Manufacturing Technology claims of any patents or patent applications or (ii) claims of any patents or patent applications not Controlled by Licensor pursuant to the Existing Licenses or pursuant to Licensor's ownership thereof will not be added as "Licensed Patents" pursuant to the procedure set forth in this Section 8.1.7; and

8.1.8 To Licensor's knowledge, the Existing Licenses are in full force and effect and Licensor is not in breach of any provisions thereof.

8.2 Warranty by Licensee. Licensee represents and warrants to Licensor as of the Effective Date that:

8.2.1 Licensee has the right, power, and authority to enter into this Agreement and to grant the rights granted by it hereunder;

8.2.2 This Agreement when executed shall become the legal, valid and binding obligation of it, enforceable against it, in accordance with its terms;

8.2.3 Licensee has the ability and the resources, including financial resources, necessary to carry out its obligations under this Agreement; and

8.2.4 There are no actions, suits, proceedings, or arbitrations pending or, to the Licensee's knowledge, threatened against Licensee that would impact activities under this Agreement.

8.3 Disclaimer of Warranties, Damages. EXCEPT AS SET FORTH IN SECTIONS 8.1 AND 8.2, THE LICENSED TECHNOLOGY, LICENSED PRODUCTS, AND ALL RIGHTS LICENSED BY EITHER PARTY TO THE OTHER UNDER THIS AGREEMENT ARE PROVIDED ON AN "AS IS" BASIS, AND NEITHER PARTY MAKES ANY REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, WITH RESPECT THERETO. BY WAY OF EXAMPLE BUT NOT OF LIMITATION, NEITHER PARTY MAKES ANY REPRESENTATIONS OR WARRANTIES, AND HEREBY DISCLAIMS ALL EXPRESS AND IMPLIED REPRESENTATIONS AND WARRANTIES, (i) OF COMMERCIAL UTILITY, ACCURACY, COMPLETENESS, PERFORMANCE, MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, VALIDITY OR ENFORCEABILITY OF ANY RIGHTS LICENSED BY EITHER PARTY TO THE OTHER, AND PROFITABILITY; OR (ii) THAT THE USE OF ANY RIGHTS GRANTED BY EITHER PARTY TO THE OTHER, INCLUDING ANY PRODUCTS RESULTING THEREFROM, WILL NOT INFRINGE ANY PATENT, COPYRIGHT, TRADEMARK, OR OTHER PROPRIETARY RIGHTS OF THIRD PARTIES. EXCEPT AS SET FORTH HEREIN, NEITHER PARTY OR ANY OF SUCH PARTY'S DIRECT OR INDIRECT LICENSORS SHALL BE LIABLE TO THE OTHER PARTY, ITS SUCCESSORS OR ASSIGNS, OR ANY SUBLICENSEES OF EITHER PARTY, OR ANY THIRD PARTY WITH RESPECT TO: (a) ANY CLAIM ARISING FROM USE OF ANY OR ALL RIGHTS LICENSED UNDER THIS AGREEMENT OR FROM THE DEVELOPMENT, TESTING, MANUFACTURE, USE, OR SALE OF PRODUCTS ARISING THEREFROM; OR (b) ANY CLAIM FOR LOSS OF PROFITS, LOSS OR INTERRUPTION OF BUSINESS, OR FOR INDIRECT, SPECIAL, INCIDENTAL, PUNITIVE, OR CONSEQUENTIAL DAMAGES OF ANY KIND, INCLUDING ANY ARISING FROM OR RELATING TO ANY BREACH OF THIS AGREEMENT OR THE EXERCISE OF RIGHTS HEREUNDER, REGARDLESS OF ANY NOTICE OF SUCH DAMAGES. NOTHING IN THIS SECTION 8.3 IS INTENDED TO LIMIT OR RESTRICT THE INDEMNIFICATION RIGHTS OR OBLIGATIONS OF EITHER PARTY UNDER SECTION 8.4 OR TO LIMIT A PARTY'S LIABILITY FOR BREACHES OF ITS OBLIGATION REGARDING CONFIDENTIALITY UNDER Article 5.

8.4 Indemnification.

8.4.1 By Licensee. Licensee shall defend, indemnify, and hold harmless Licensor, its Affiliates, sublicensees, the licensors under the Existing Licenses, and their respective shareholders, members, partners, officers, trustees, faculty, students, contractors, agents, and employees (individually, a "Licensor Indemnified Party" and, collectively, the "Licensor Indemnified Parties") from and against any and all Third Party liability, loss, damage, action, claim, fee, cost, or expense (including attorneys' fees) (individually, a "Third Party Liability" and, collectively, the "Third Party Liabilities") suffered or incurred by the Licensor Indemnified Parties from claims of such Third Parties that result from or arise out of: […***…]

[…***…]; provided, however, that Licensee shall not be liable for claims based on any breach by Licensor of the representations, warranties, or obligations of this Agreement or the gross negligence or intentional misconduct of any of the Licensor Indemnified Parties. Without limiting the foregoing, Licensee must defend, indemnify, and hold harmless the Licensor Indemnified Parties from and against any Third Party Liabilities resulting from:

(a) any […***…] or other claim of any kind related to the […***…] by a Third Party of a […***…] by Licensee, its Affiliates, any Sublicensees, their respective assignees, or vendors;

(b) any claim by a Third Party that the […***…]; and

(c) […***…] conducted by or on behalf of Licensee, its Affiliates, any Sublicensees, their respective assignees, or vendors relating to the Licensed Technology or Licensed Products, including any claim by or on behalf of a […***…].

8.4.2 By Licensor. Licensor shall defend, indemnify, and hold harmless Licensee, its Affiliates and Sublicensees and their respective shareholders, members, partners, officers, trustees, contractors, agents, and employees (individually, a "Licensee Indemnified Party" and, collectively, the "Licensee Indemnified Parties") from and against any and all Third Party Liabilities suffered or incurred by the Licensee Indemnified Parties from claims of such Third Parties that result from or arise out of: […***…]; provided, however, that Licensor shall not be liable for claims based on any breach by Licensee of the representations, warranties, or obligations of this Agreement or the gross negligence or intentional misconduct of any of the Licensor Indemnified Parties.

8.4.3 Indemnification Procedure. Each Party, as an indemnifying party (an "Indemnifying Party"), shall not be permitted to settle or compromise any claim or action giving rise to Third Party Liabilities in a manner (i) that imposes any restrictions or obligations on the indemnified party (an "Indemnified Party") or, if Licensee is the Indemnifying Party, on Licensor's licensors under the Existing Licenses, without the other Party's prior written consent, (ii) if Licensee is the Indemnifying Party, that grants any rights to the Licensed Technology or Licensed Products other than those Licensee has the right to grant under this Agreement without Licensor's prior written consent, or (iii) if Licensor is the Indemnifying Party, that grants any rights that are inconsistent with those granted to Licensee under this Agreement without

Licensee's prior written consent. The Indemnifying Party shall be permitted to control any litigation or potential litigation involving the defense of any claim subject to indemnification pursuant to this Section 8.4, including the selection of counsel, with the reasonable approval of the Indemnified Party. If an Indemnifying Party fails or declines to assume the defense of any such claim or action within […***…] after notice thereof, the Indemnified Party may assume the defense of such claim or action at the cost and risk of the Indemnifying Party, and any Third Party Liabilities related thereto shall be conclusively deemed a Third Party Liability of the Indemnifying Party. The indemnification rights of a Indemnified Party contained in this Agreement are in addition to all other rights which such Indemnified Party may have at law or in equity or otherwise. The Indemnifying Party will pay directly all Third Party Liabilities incurred for defense or negotiation of any claim hereunder or will reimburse the Indemnified Party for all documented Third Party Liabilities incident to the defense or negotiation of any such claim within […***…] after the Indemnifying Party's receipt of invoices for such fees, expenses, and charges.

8.5 Insurance. Within […***…] of the Effective Date, Licensee will procure and maintain insurance policies for the following coverages with respect to product liability, personal injury, bodily injury, and property damage arising out of Licensee's (and its Affiliates' and any Sublicensees') performance under this Agreement: (a) during the term of this Agreement, comprehensive general liability, including broad form and contractual liability, in a minimum amount of […***…] combined single limit per occurrence (or claim) and in the aggregate annually; (b) prior to the commencement of clinical trials involving Licensed Products and thereafter for a period of not less than […***…] (or such longer period as Licensee is required by applicable law to continue to monitor the participants in the clinical trial), clinical trials coverage in amounts that are reasonable and customary in the U.S. pharmaceutical industry, subject always to a minimum limit of […***…] combined single limit per occurrence (or claim) and in the aggregate annually; and (c) from […***…] of a Licensed Product until […***…] after the last sale of a Licensed Product, product liability coverage, in amounts that are reasonable and customary in the U.S. pharmaceutical industry, subject always to a minimum limit of […***…] combined single limit per occurrence (or claim) and in the aggregate annually. Licensee acknowledges that Licensor's licensors under the Existing Licenses may review periodically the adequacy of the minimum amounts of insurance for each coverage required by the Existing Licenses, and Licensor reserves the right to require Licensee to adjust the limits set forth in this Section 8.5 to conform to any adjustments made by Licensor's licensors under the Existing Licenses. The required minimum amounts of insurance do not constitute a limitation on Licensee's liability or indemnification obligations to the Licensor Indemnified Parties under this Agreement. The policies of insurance required by this Section 8.5 will be issued by an insurance carrier with an A.M. best rating of […***…] or better and will name Licensor as an additional insured with respect to Licensee's performance (and its Affiliates' and any Sublicensees') under this Agreement. Licensee will provide Licensor with insurance certificates evidencing the required coverage within […***…] after the Effective Date and the commencement of each policy period and any renewal periods. Each certificate will provide that the insurance carrier will notify Licensor in writing at least […***…] prior to the cancellation or material change in coverage. Licensee will cause all Sublicensees to comply with the terms of this Section 8.5 to the same extent as Licensee.

ARTICLE 9: USE OF NAME

Licensee, its Affiliates, any Sublicensees, and all of its and their employees and agents must not use Licensor's, the University of Pennsylvania's, or SmithKline Beecham Corporation's name, seal, logo, trademark, or service mark (or any adaptation thereof) or the name, seal, logo, trademark, or service mark (or any adaptation thereof) of any of such entities' representative, school, organization, employee, or student in any way without the prior written consent of Licensor or such entity, as applicable; provided, however that Licensee may acknowledge the existence and general nature of this Agreement.

ARTICLE 10: ADDITIONAL PROVISIONS

10.1 Relationship. Nothing in this Agreement shall be deemed to establish a relationship of principal and agent between Licensee and Licensor, nor any of their agents or employees for any purpose whatsoever, nor shall this Agreement be construed as creating any other form of legal association or arrangement which would impose liability upon one Party for the act or failure to act of the other Party.

10.2 Assignment. The rights and obligations of Licensee and Licensor hereunder shall inure to the benefit of, and shall be binding upon, their respective permitted successors and assigns. Licensee may not assign this Agreement or any of its rights or obligations under this Agreement without the prior written consent of Licensor; provided, however, that Licensee may assign this Agreement, without Licensor's prior written consent, pursuant to a merger or sale of all or substantially all of the assets to which the Agreement relates; provided that, as part of any permitted assignment, (a) Licensee provides Licensor with notice of such assignment at least five business days prior to the effectiveness of such assignment, and (b) Licensee requires any such assignee to agree in writing to be legally bound by this Agreement to the same extent as Licensee and provides Licensor with a copy of such assignee undertaking. In addition, Licensee will provide Licensor with notice of any change of control (i.e., the acquisition by a person or group of "control" of Licensee, as defined in Section 1.1) of Licensee at least five business days prior to the effectiveness of such change of control. Licensor may assign this Agreement and its rights and obligations without the consent of Licensee. No assignment shall relieve the assigning Party of responsibility for the performance of any accrued obligations which it has prior to such assignment. Any attempted assignment by Licensee in violation of this Section 10.2 shall be null and void and of no legal effect.

10.3 Waiver. A waiver by either Party of a breach of any provision of this Agreement will not constitute a waiver of any subsequent breach of that provision or a waiver of any breach of any other provision of this Agreement.

10.4 Notices. Notices, payments, statements, reports, and other communications under this Agreement shall be in writing and shall be deemed to have been received as of the date received if sent by public courier (*e.g.*, Federal Express), by Express Mail, receipt requested, or by facsimile (with a copy of such facsimile also sent by one of the other methods of delivery) and addressed as follows:

If for Licensor:

ReGenX Biosciences, LLC
750 17th Street, NW
Suite 1100
Washington, DC 20006
USA
Attn: Chief Executive Officer
Telephone: 202-785-7438
Facsimile: 202-785-7439

with a copy to:

ReGenX Biosciences, LLC
750 17th Street, NW
Suite 1100
Washington, DC 20006
USA
Attn: General Counsel
Telephone: 202-785-7438
Facsimile: 202-785-7439

If for Licensee:

Dimension Therapeutics, Inc.
1 Main Street, 13th Floor
Cambridge, MA 02142
USA
Attn: President and CEO
Telephone: 617-231-2403
Facsimile: 617-231-2425

Either Party may change its official address upon written notice to the other Party.

10.5 Applicable Law. This Agreement shall be construed and governed in accordance with the laws of the State of New York, without giving effect to conflict of law provisions that may require the application of the laws of another jurisdiction. Subject to Section 10.6, the Parties hereby submit to the exclusive jurisdiction of and venue in the courts located in the State of New York with respect to any and all disputes concerning the subject of this Agreement.

10.6 Dispute Resolution. In the event of any controversy or claim arising out of or relating to this Agreement, the Parties shall first attempt to resolve such controversy or claim through good faith negotiations between senior executives of each Party with authority to resolve the dispute for a period of not less than […***…] following notification of such controversy or claim to the other Party. If such controversy or claim cannot be resolved by means of such negotiations during such period, then such controversy or claim shall be resolved by binding arbitration administered by the American Arbitration Association ("AAA") in accordance with the Commercial Arbitration Rules of the AAA in effect on the date of commencement of the arbitration, subject to the provisions of this Section 10.6. The arbitration shall be conducted as follows:

10.6.1 The arbitration shall be conducted by three arbitrators, each of whom by training, education, or experience has knowledge of the research, development, and commercialization of biological therapeutic products in the United States. The arbitration shall be conducted in English and held in New York, New York.

10.6.2 In its demand for arbitration, the Party initiating the arbitration shall provide a statement setting forth the nature of the dispute, the names and addresses of all other parties, an estimate of the amount involved (if any), the remedy sought, otherwise specifying the issue to be

resolved, and appointing one neutral arbitrator. In an answering statement to be filed by the responding Party within […***…] after confirmation of the notice of filing of the demand is sent by the AAA, the responding Party shall appoint one neutral arbitrator. Within […***…] from the date on which the responding Party appoints its neutral arbitrator, the first two arbitrators shall appoint a chairperson.

10.6.3 If a Party fails to make the appointment of an arbitrator as provided in Section 10.6.2, the AAA shall make the appointment. If the appointed arbitrators fail to appoint a chairperson within the time specified in Section 10.6.2 and there is no agreed extension of time, the AAA shall appoint the chairperson.

10.6.4 The arbitrators will render their award in writing and, unless all Parties agree otherwise, will include an explanation in reasonable detail of the reasons for their award. Judgment upon the award rendered by the arbitrators may be entered in any court having jurisdiction thereof, including in the courts described in Section 10.5. The arbitrators will have the authority to grant injunctive relief and other specific performance; provided that the arbitrators will have no authority to award damages in contravention of this Agreement, and each Party irrevocably waives any claim to such damages in contravention of this Agreement. The arbitrators will, in rendering their decision, apply the substantive law of the State of New York, without giving effect to conflict of law provisions that may require the application of the laws of another jurisdiction. The decision and award rendered by the arbitrators will be final and non-appealable (except for an alleged act of corruption or fraud on the part of the arbitrator).

10.6.5 The Parties shall use their reasonable efforts to conduct all dispute resolution procedures under this Agreement as expeditiously, efficiently, and cost-effectively as possible.

10.6.6 All expenses and fees of the arbitrators and expenses for hearing facilities and other expenses of the arbitration will be borne equally by the Parties unless the Parties agree otherwise or unless the arbitrators in the award assess such expenses against one of the Parties or allocate such expenses other than equally between the Parties. Each of the Parties will bear its own counsel fees and the expenses of its witnesses except to the extent otherwise provided in this Agreement or by applicable law.

10.6.7 Compliance with this Section 10.6 is a condition precedent to seeking relief in any court or tribunal in respect of a dispute, but nothing in this Section 10.6 will prevent a Party from seeking equitable or other interlocutory relief in the courts of appropriate jurisdiction, pending the arbitrators' determination of the merits of the controversy, if applicable to protect the confidential information, property, or other rights of that Party or to otherwise prevent irreparable harm that may be caused by the other Party's actual or threatened breach of this Agreement.

10.7 No Discrimination. Licensee, its Affiliates, and any Sublicensees, in their respective activities under this Agreement, shall not discriminate against any employee or applicant for employment because of race, color, sex, sexual, or affectional preference, age, religion, national, or ethnic origin, handicap, or because he or she is a disabled veteran or a veteran (including a veteran of the Vietnam Era).

10.8 Compliance with Law. Licensee (and its Affiliates' and any Sublicensees') must comply with all prevailing laws, rules, and regulations that apply to its activities or obligations under this Agreement. Without limiting the foregoing, it is understood that this Agreement may be subject to United States laws and regulations controlling the export of technical data, computer software, laboratory prototypes, and other commodities, articles, and information, including the Arms Export Control Act as amended in the Export Administration Act of 1979 and that Licensee's obligations are contingent upon compliance with applicable United States export laws and regulations. The transfer of certain technical data and commodities may require a license from the cognizant agency of the United States Government and/or written assurances by Licensee that Licensee shall not export data or commodities to certain foreign countries without prior approval of such agency. Licensor neither represents that a license is not required nor that, if required, it will issue.

10.9 Entire Agreement. This Agreement embodies the entire understanding between the Parties relating to the subject matter hereof and supersedes all prior understandings and agreements, whether written or oral. All "Confidential Information" disclosed by Licensor to Fidelity Biosciences Corp. (and then disclosed by Fidelity Biosciences Corp. to Licensee) pursuant to that certain Confidentiality Agreement dated September 10, 2012 between Licensor and Fidelity Biosciences Corp. or pursuant to any other agreements between them will be deemed "Confidential Information" under this Agreement (unless and until it falls within one of the exclusions set forth in Section 1.5). This Agreement may not be varied except by a written document signed by duly authorized representatives of both Parties.

10.10 Marking. Licensee, its Affiliates, and any Sublicensees shall mark any Licensed Product (or their containers or labels) made, sold, or otherwise distributed by it or them with any notice of patent rights necessary or desirable under applicable law to enable the Licensed Patents to be enforced to their full extent in any country where Licensed Products are made, used, sold, offered for sale, or imported.

10.11 Severability and Reformation. If any provision of this Agreement is held to be invalid or unenforceable by a court of competent jurisdiction, then such invalid or unenforceable provision will be automatically revised to be a valid or enforceable provision that comes as close as permitted by law to the Parties' original intent; provided that, if the Parties cannot agree upon such valid or enforceable provision, the remaining provisions of this Agreement will remain in full force and effect, unless the invalid or unenforceable provisions are of such essential importance to this Agreement that it is to be reasonably assumed that the Parties would not have entered into this Agreement without the invalid or unenforceable provisions.

10.12 Further Assurances. Each Party hereto agrees to execute, acknowledge, and deliver such further instruments, and to do all other acts, as may be necessary or appropriate in order to carry out the purposes and intent of this Agreement.

10.13 Interpretation; Construction. The captions to the several Articles and Sections of this Agreement are included only for convenience of reference and shall not in any way affect the construction of, or be taken into consideration in interpreting, this Agreement. In this Agreement, unless the context requires otherwise, (a) the word "including" shall be deemed to be followed by the phrase "without limitation" or like expression; (b) references to the singular shall

include the plural and vice versa; (c) references to masculine, feminine, and neuter pronouns and expressions shall be interchangeable; (d) the words “herein” or “hereunder” relate to this Agreement; (e) “or” is disjunctive but not necessarily exclusive; (f) the word “will” shall be construed to have the same meaning and effect as the word “shall”; (g) all references to “dollars” or “$” herein shall mean U.S. Dollars; (h) unless otherwise provided, all reference to Sections and exhibits in this Agreement are to Sections and exhibits of and in this Agreement; and (i) whenever this Agreement refers to a number of days, such number shall refer to calendar days unless business days are specified. Business days shall mean a day on which banking institutions in Washington, D.C. are open for business. Each Party represents that it has been represented by legal counsel in connection with this Agreement and acknowledges that it has participated in the drafting hereof. In interpreting and applying the terms and provisions of this Agreement, the Parties agree that no presumption will apply against the Party which drafted such terms and provisions.

10.14 Cumulative Rights and Remedies. The rights and remedies provided in this Agreement and all other rights and remedies available to either Party at law or in equity are, to the extent permitted by law, cumulative and not exclusive of any other right or remedy now or hereafter available at law or in equity. Neither asserting a right nor employing a remedy shall preclude the concurrent assertion of any other right or employment of any other remedy, nor shall the failure to assert any right or remedy constitute a waiver of that right or remedy.

10.15 Counterparts. This Agreement may be executed in one or more counterparts, each of which will be deemed an original, but all of which together will constitute one and the same instrument.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

IN WITNESS WHEREOF, the Parties, intending to be legally bound, have caused this License Agreement to be executed by their duly authorized representatives.

REGENX BIOSCIENCES, LLC		DIMENSION THERAPEUTICS, INC.	
By:	/s/ Kenneth Mills	By:	/s/ Don Hayden
Name:	Kenneth Mills	Name:	Don Hayden
Title:	President & CEO	Title:	President and CEO

Exhibit A
Licensed Patents

App #	Title	Inventors	Nos.	Penn Docket #
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]

Exhibit B
Licensed Know-How

[…***…]

Exhibit C
Muscular Dystrophies

Duchenne Muscular Dystrophy (DMD) (Also known as Pseudohypertrophic)

Becker Muscular Dystrophy (BMD)

Emery-Dreifuss Muscular Dystrophy (EDMD)

Limb-Girdle Muscular Dystrophy (LGMD)

Facioscapulohumeral Muscular Dystrophy (FSH or FSHD) (Also known as Landouzy-Dejerine)

Myotonic Dystrophy (MMD) (Also known as DM or Steinert Disease)

Oculopharyngeal Muscular Dystrophy (OPMD)

Distal Muscular Dystrophy (DD) (Miyoshi)

Congenital Muscular Dystrophy (CMD)

Exhibit D
Disease Indications

[…***…]

Exhibit E
Press Release

*** Confidential Treatment Requested ***

FIRST AMENDMENT TO LICENSE AGREEMENT

This FIRST AMENDMENT TO LICENSE AGREEMENT (this "Amendment") is entered into as of June 18, 2014 (the "Amendment Effective Date") by and between ReGenX Biosciences, LLC, a limited liability company organized under the laws of the State of Delaware, with offices at 750 17th Street, NW, Suite 1100, Washington, DC 20006 ("Licensor"), and Dimension Therapeutics, Inc., a corporation organized under the laws of the State of Delaware, with offices at 1 Main Street, 13th Floor, Cambridge, MA 02142 ("Licensee"). Licensor and Licensee are hereinafter referred to individually as a "Party" and collectively as the "Parties."

WHEREAS, Licensor and Licensee entered into that certain License Agreement dated October 30, 2013 (the "Original Agreement"); and

WHEREAS, the Parties desire to make certain amendments to the Original Agreement;

NOW, THEREFORE, in consideration of the promises and covenants contained in this Agreement, and intending to be legally bound, the Parties hereby agree as follows:

1. Definitions. Capitalized terms not defined in this Amendment have the meanings given such terms in the Original Agreement.

2. Amendments.

(a) The introductory paragraph of Section 3.5.1 of the Original Agreement is hereby amended and restated in its entirety to read as follows:

> 3.5.1 Licensee must deliver to Licensor within […***…] after the end of each Calendar Quarter after the first commercial sale of a Licensed Product a report setting forth the calculation of the royalties due to Licensor for such Calendar Quarter, including:

(b) Section 3.5.2 of the Original Agreement is hereby amended and restated in its entirety to read as follows:

> 3.5.2 Licensee shall pay the royalties due under Section 3.3 within […***…] following the last day of the Calendar Quarter in which the royalties accrue. Licensee shall send the royalty payments along with the report described in Section 3.5.1.

(c) Section 4.2 of the Original Agreement is hereby amended by replacing clause (b) of the milestone chart in such section with the following:

> (b) […***…]

(d) Section 6.3.1 of the Original Agreement is hereby amended and restated in its entirety to read as follows:

6.3.1 Licensor may terminate this Agreement, if Licensee is late in paying to Licensor royalties, fees, or any other monies due under this Agreement, and Licensee does not pay Licensor in full within […***…] upon written demand from Licensor, which termination shall be effective immediately upon the expiration of such […***…] cure period.

(e) Section 6.3.2 of the Original Agreement is hereby amended and restated in its entirety to read as follows:

6.3.2 Either Party may terminate this Agreement, if the other Party materially breaches this Agreement and does not cure such material breach within 30 days after written notice of the breach, which termination shall be effective immediately upon the expiration of such […***…] cure period; provided that, if termination is by Licensor as a result of Licensee's materially breaching Article 4, […***…], but not all, then Licensor's termination right shall only be with respect to the disease indication with respect to which the breach related and not the remaining disease indications; provided further that, if termination is by Licensor as a result of Licensee materially breaching Section 3.5.1, such cure period will be […***…] (in place of […***…]).

(f) Section 8.5 of the Original Agreement is hereby amended by replacing the last sentence thereof with the following:

Licensee will cause all Sublicensees to comply with the terms of this Section 8.5 to the same extent as Licensee; provided that, with Licensor's prior written consent, a Sublicensee may self-insure all or parts of the limits described above.

3. Incorporation. Article 10 of the Original Agreement is hereby incorporated *mutatis mutandis* into this Amendment.

4. Effect on Original Agreement. Except as specifically amended by this Amendment, the Original Agreement will remain in full force and effect and is hereby ratified and confirmed. Each future reference to the Original Agreement will refer to the Original Agreement as amended by this Amendment. To the extent a conflict arises between the terms of the Original Agreement and this Amendment, the terms of this Amendment shall prevail but only to the extent necessary to accomplish their intended purpose.

[*Remainder of Page Intentionally Left Blank*]

IN WITNESS WHEREOF, the Parties, intending to be legally bound, have caused this First Amendment to License Agreement to be executed by their duly authorized representatives.

REGENX BIOSCIENCES, LLC		DIMENSION THERAPEUTICS, INC.	
By:	/s/ Kenneth Mills	By:	/s/ Thomas R. Beck
Name:	Kenneth Mills	Name:	Thomas R. Beck
Title:	President & CEO	Title:	President & CEO

SECOND AMENDMENT TO LICENSE AGREEMENT

This SECOND AMENDMENT TO LICENSE AGREEMENT (this "Second Amendment") is entered into as of September 29, 2014 (the "Second Amendment Effective Date") between REGENXBIO Inc. (f/k/a ReGenX Biosciences, LLC), a corporation organized under the laws of the State of Delaware, with offices at 1701 Pennsylvania Avenue, NW, Suite 900, Washington, DC 20006 ("Licensor"), and Dimension Therapeutics, Inc., a corporation organized under the laws of the State of Delaware, with offices at 840 Memorial Drive, 4th Floor, Cambridge, MA 02139 ("Licensee"). Licensor and Licensee are hereinafter referred to individually as a "Party" and collectively as the "Parties."

WHEREAS, Licensor and Licensee entered into that certain License Agreement dated October 30, 2013, as amended by that First Amendment to License Agreement dated June 18, 2014 (collectively, the "Original Agreement");

WHEREAS, by letter dated September 10, 2014, Licensee notified Licensor of its desire to exercise its option under Section 2.4 to nominate "ornithine transcarbamylase deficiency (OTCD)" as one of Licensee's two additional specific disease indications to be included in the Field, which nomination, by letter dated September 22, 2014, Licensor confirmed was available for licensing; and

WHEREAS, […***…].

NOW, THEREFORE, in consideration of the promises and covenants contained in this Agreement, and intending to be legally bound, the Parties hereby agree as follows:

1. Definitions. Capitalized terms not defined in this Second Amendment have the meanings given such terms in the Original Agreement.

2. Acknowledgements & Amendments.

(a) The Parties acknowledge that, effective as of September 23, 2014, pursuant to the provisions of Section 2.4, the following has been added to the Field set forth in Section 1.11(c): "the treatment of ornithine transcarbamylase deficiency (OTCD) in human beings by in vivo gene therapy administration."

(b) The Parties agree that the "Election Term" is hereby […***…]. As such, the first sentence of Section 2.4.1 of the Original Agreement is hereby amended and restated in its entirety to read as follows:

At any time prior to the […***…] of the Effective Date (the "Election Term"), Licensee may nominate in writing to Licensor a specific disease indication for inclusion in the "Field" under this Agreement.

(c) Clause (a) of the second sentence of Section 2.4.1 of the Original Agreement is hereby amended and restated in its entirety to read as follows:

(a) [Intentionally omitted]

(d) Section 2.4.1 of the Original Agreement is hereby further amended to add the following as a new sentence at the end of such section:

> Notwithstanding the foregoing, without Licensor's prior written consent (which may be withheld in its sole discretion), Licensee may not nominate any of the following disease indications for inclusion in the "Field" under this Agreement: […***…].

(e) Sections 2.4.3 and 2.4.4 of the Original Agreement are hereby amended and restated in their entirety to read as follows:

> 2.4.3 Nothing in this Agreement will prevent Licensor from granting licenses to any Third Parties for any disease indications or from initiating Licensor's own programs for any disease indications, in either case, other than the specific disease indications within the Field.
>
> 2.4.4 Notwithstanding anything herein to the contrary, nothing in this Agreement will prevent Licensor from (a) granting non-exclusive research licenses to Third Parties in any field; or (b) maintaining Licensor's commercial reagent and services business.

(f) Licensor and Licensee agree that the provisions of Section 1.14(b)(y) will apply with respect to ornithine transcarbamylase deficiency (OTCD), the specific disease indication added as of September 23, 2014, […***…].

(g) In consideration of the […***…], Licensee will pay Licensor a fee of $150,000, which fee will be due within […***…] of the Second Amendment Effective Date.

(h) Section 10.4 of the Original Agreement is hereby amended and restated in its entirety to read as follows:

> 10.4 Notices. Notices, payments, statements, reports, and other communications under this Agreement shall be in writing and shall be deemed to have been received as of the date received if sent by public courier (e.g., Federal Express), by Express Mail, receipt requested, or by facsimile or electronic mail (with a copy of such facsimile or electronic mail also sent by one of the other methods of delivery) and addressed as follows:

If for Licensor:

REGENXBIO Inc.
1701 Pennsylvania Avenue, NW
Suite 900

with a copy to:

REGENXBIO Inc.
1701 Pennsylvania Avenue, NW
Suite 900

Washington, DC 20006
Attn: Chief Executive Officer
Telephone: 202-785-7438
Facsimile: 202-785-7439
E-mail: kmills@regenxbio.com

Washington, DC 20006
Attn: General Counsel
Telephone: 202-785-7438
Facsimile: 202-785-7439
E-mail: sberl@regenxbio.com

If for Licensee:

Dimension Therapeutics, Inc.
840 Memorial Drive, 4th Floor
Cambridge, MA 02139
Attn: President and CEO
Telephone: 617-231-2403
Facsimile: 617-231-2425
E-mail: annalisa.jenkins@dimensiontx.com

Either Party may change its official address upon written notice to the other Party.

General communications required under this Agreement (including notices under Sections 2.2.9, 2.4, 2.5.2, 2.6.3, 2.7, 3.3.1, 3.5.4, 4.2, 4.3.3, 4.4, 7.1, 7.2, 7.3, 8.1.7, 8.5, and 10.2 and notices of changes of address under this Section 10.4) may be sent by any of the means outlined in the first sentence of this Section 10.4 or a copy of the notice letter may be sent by electronic mail (without the requirement of a copy being sent by another means, provided that the receiving Party has confirmed receipt of such electronic mail); however, communications related to termination of the Penn Agreement, requests for disclosures of Confidential Information, breaches or termination of this Agreement, indemnification, and dispute resolution (including notices under Sections 2.9, 5.3, 6.2, 6.3, 6.4, 6.5, 8.4, and 10.6) must be sent by one of the means outlined in the first sentence of this Section 10.4.

3. Incorporation. Article 10 of the Original Agreement is hereby incorporated *mutatis mutandis* into this Second Amendment.

4. Effect on Original Agreement. Except as specifically amended by this Second Amendment, the Original Agreement will remain in full force and effect and is hereby ratified and confirmed. Each future reference to the Original Agreement will refer to the Original Agreement as amended by this Second Amendment. To the extent a conflict arises between the terms of the Original Agreement and this Second Amendment, the terms of this Second Amendment shall prevail but only to the extent necessary to accomplish their intended purpose.

[*Remainder of Page Intentionally Left Blank*]

IN WITNESS WHEREOF, the Parties, intending to be legally bound, have caused this Second Amendment to License Agreement to be executed by their duly authorized representatives.

REGENXBIO, LLC		DIMENSION THERAPEUTICS, INC.	
By:	/s/ Kenneth Mills	By:	/s/ Annalisa Jenkins
Name:	Kenneth Mills	Name:	Annalisa Jenkins
Title:	President & CEO	Title:	CEO

Exhibit 10.14

***Text Omitted and Filed Separately with the Securities and Exchange Commission
Confidential Treatment Requested Under
17 C.F.R. Sections 200.80(b)(4) and 240.24b-2

OPTION AND LICENSE AGREEMENT

This OPTION AND LICENSE AGREEMENT ("Agreement") is entered into as of March 10, 2015 (the "Execution Date"), with effectiveness as of February 18, 2014 (the "Effective Date"), by and between REGENXBIO Inc., a limited liability company organized under the laws of the State of Delaware, with offices at 1701 Pennsylvania Avenue, NW, Suite 900, Washington, DC 20006 ("Licensor"), and Dimension Therapeutics, Inc., a corporation organized under the laws of the State of Delaware, with offices at 840 Memorial Drive, 4th Floor, Cambridge, MA 02139 ("Licensee"). Licensor and Licensee are hereinafter referred to individually as a "Party" and collectively as the "Parties."

WHEREAS, Licensor has exclusive rights under certain patents pertaining to various recombinant adeno-associated virus vectors;

WHEREAS, Licensor and Licensee are parties to that certain License Agreement, dated October 30, 2013, as amended by the First Amendment to License Agreement, dated June 18, 2014, and the Second Amendment to License Agreement, dated September 29, 2014 and as amended from time to time (collectively, the "2013 License Agreement"), pursuant to which Licensor granted Licensee an exclusive license under certain technology of Licensor related to hemophilia A, hemophilia B, and additional disease indications to be selected as provided therein;

WHEREAS, Licensor, Licensee, and certain other persons are parties to that certain Series A Preferred Stock Purchase Agreement, dated October 30, 2013 (the "Series A SPA"); and

WHEREAS, Licensee, having met the conditions set forth in Section 6.16 of the Series A SPA on the Effective Date, desires to obtain an option for an exclusive license under the Licensed Technology under the terms set forth herein;

NOW, THEREFORE, in consideration of the promises and covenants contained in this Agreement, and intending to be legally bound, the Parties hereby agree as follows:

ARTICLE 1: DEFINITIONS

1.1 "Affiliate" means any legal entity directly or indirectly controlling, controlled by, or under common control with another entity. For purposes of this Agreement, "control" means the direct or indirect ownership of more than 50% of the outstanding voting securities of a legal entity, or the right to receive more than 50% of the profits or earnings of a legal entity, or the right to control the policy decisions of a legal entity.

1.2 "Calendar Quarter" means each three-month period or any portion thereof, beginning on January 1, April 1, July 1, and October 1.

1.3 "Collaboration" means an arrangement between Licensee and a Sublicensee under which research and development activities are performed on a shared basis for the purpose of the parties jointly developing and exploiting Licensed Products in the Field; provided that a Collaboration

will not include an arrangement whereby Licensee is compensated solely for performing research or development activities.

1.4 "Commercial License" means a license agreement between Licensor and a Third Party pursuant to which Licensor grants a license to the Licensed Technology and which license agreement meets the following: (a) the agreement contains provisions substantially comparable to Section 2.5 with respect to improvements of the Third Party that are substantially similar to "Licensed Back Improvements" as defined in this Agreement; (b) the Third Party grants to Licensor a sublicensable license to such "Licensed Back Improvements" of the Third Party; and (c) Licensor is not required to pay any royalties, milestones, or other fees in connection with the exploitation of such sublicensable license.

1.5 "Commercial Option" has the meaning set forth in Section 2.1.

1.6 "Confidential Information" means and includes all technical information, inventions, developments, discoveries, software, Know- How, methods, techniques, formulae, animate and inanimate materials, data, processes, finances, business operations or affairs, and other proprietary ideas, whether or not patentable or copyrightable, of either Party that are (a) marked or otherwise identified as confidential or proprietary at the time of disclosure in writing; or (b) if disclosed orally, visually, or in another non-written form, identified as confidential at the time of disclosure and summarized in reasonable detail in writing as to its general content within 30 days after original disclosure. The Parties acknowledge that (i) the terms and conditions of this Agreement and (ii) the records and reports referred to in Section 3.7 will be deemed the Confidential Information of both Parties, regardless of whether such information is marked or identified as confidential. In addition, information provided to Licensee pursuant to the provisions of Section 7.1 will be deemed the Confidential Information of Licensor, regardless of whether such information is marked or identified as confidential. Notwithstanding the foregoing, Confidential Information will not include the following, in each case, to the extent evidenced by competent written proof of the Receiving Party:

1.6.1 information that was already known to the Receiving Party, other than under an obligation of confidentiality, at the time of disclosure by the Disclosing Party;

1.6.2 information that was generally available to the public or otherwise part of the public domain at the time of its disclosure to the Receiving Party;

1.6.3 information that became generally available to the public or otherwise part of the public domain after its disclosure, other than through any act or omission of the Receiving Party in breach of this Agreement;

1.6.4 information that is independently discovered or developed by the Receiving Party without the use of Confidential Information of the Disclosing Party; or

1.6.5 information that was disclosed to the Receiving Party, other than under an obligation of confidentiality, by a Third Party who had no obligation to the Disclosing Party not to disclose such information to others.

1.7 "Control" or "Controlled" means the possession by Licensor (whether by ownership or license, other than pursuant to this Agreement) of the ability to grant to Licensee access, a license, or a sublicense (as applicable) to the applicable patent, patent application, Know-How, or other intellectual property on the terms and conditions set forth in this Agreement without violating the terms of any agreement or other arrangement with any Third Party.

1.8 "Disclosing Party" has the meaning set forth in Section 5.1.

1.9 "Domain Antibody" […***…].

1.10 "Existing Licenses" means the GSK Agreement and Penn Agreement.

1.11 "FDA" means the United States Food and Drug Administration, or a successor agency in the United States with responsibilities comparable to those of the United States Food and Drug Administration.

1.12 "Field" means, if and when a Commercial Option(s) is exercised pursuant to Section 2.1 and the license set forth in Section 2.1.4 is effective for a particular Licensed Indication(s), the treatment of such Licensed Indication(s) in human beings by in vivo gene therapy administration. Each Licensed Indication for the Field will be set forth on Exhibit D (to be amended as of the applicable Grant Date as provided in Section 2.1.3.4).

1.13 "First Commercial Sale" means, on a Licensed Product-by-Licensed Product and country-by-country basis, the date of the first arm's length transaction, transfer, or disposition for value by or on behalf of Licensee, its Sublicensees, or their respective Affiliates to a Third Party of such Licensed Product for end use or consumption of such Licensed Product after regulatory approval of such Licensed Product has been granted, or such marketing and sale is otherwise permitted, by the applicable regulatory authority of such country. First Commercial Sale excludes any sale or other distribution for use in a clinical trial or other development activity, promotional use (including samples), or for compassionate use or on a named patient basis.

1.14 "Grant Date" has the meaning set forth in Section 2.1.4.

1.15 "GSK Agreement" means that certain License Agreement entered into between Licensor and SmithKline Beecham Corporation, effective on March 6, 2009, as amended by that certain Amendment to License Agreement dated April 15, 2009, and as amended from time to time.

1.16 "Know-How" means any and all ideas, information, know-how, data, research results, writings, inventions, discoveries, and other technology (including any proprietary materials), whether or not patentable or copyrightable.

1.17 "Licensed Back Improvements" has the meaning set forth in Section 2.5.2.

1.18 "Licensed Indication" has the meaning set forth in Section 2.1.3.4.

1.19 "Licensed Know-How" means, on a specific Licensed Indication-by-Licensed Indication basis, any Know-How that, as of the Grant Date for the applicable Licensed Indication, (i) is Controlled by Licensor pursuant to the Existing Licenses or the Penn Sponsored Research Agreement or pursuant to Licensor's ownership thereof, (ii) is directed to the applicable Licensed Indication, (iii) is not generally available to the public or otherwise part of the public domain, other than through any act or omission of Licensee in breach of this Agreement, and (iv) is reasonably necessary for the use, sale, offer for sale, or import of Licensed Products in the applicable Licensed Indication in the Field, to be generally described in Exhibit B pursuant to Section 2.1.3.4(iv); provided that "Licensed Know-How" will not include any Manufacturing Technology; provided further that "Licensed Know-How" will not include any Know-How disclosed in patents or patent applications.

1.20 "Licensed Patents" means (a) all United States patents and patent applications listed in Exhibit A, as modified pursuant to Section 2.6.1, including patents arising from such patent applications; and (b) any re-examination certificates thereof, and their foreign counterparts and extensions, continuations, divisionals, and re-issue applications; provided that "Licensed Patents" will not include any claim of a patent or patent application covering any Manufacturing Technology.

1.21 "Licensed Product" means (a) any product that is made, made for, used, sold, offered for sale, or imported by Licensee, its Affiliates, and any of its or their Sublicensees, (i) the manufacture, use, sale, offer for sale, or import of which product, in the absence of the license granted pursuant to this Agreement, would infringe or is covered by at least one Valid Claim in the country of manufacture, use, sale, offer for sale, or import, including products manufactured by a process that would infringe or is covered by at least one Valid Claim in the country of manufacture, use, sale, offer for sale, or import or (ii) that incorporates, was developed using, or is produced or manufactured through the use of, or with respect to which Licensee otherwise acquired a license to, Licensed Know-How; or (b) any service with respect to the administration of any product to patients that (i) in the absence of the licenses granted pursuant to this Agreement, would infringe or is covered by at least one Valid Claim in the country of sale or (ii) that incorporates, was developed using, or is produced or manufactured through the use of, or with respect to which Licensee otherwise acquired a license to, Licensed Know-How.

1.22 "Licensed Technology" means, collectively, the Licensed Patents and Licensed Know-How.

1.23 "Licensor Improvements" means any patent or patent application that meets all of the following criteria:

(a) is directed to any of: the composition of recombinant adeno-associated virus vectors, methods of use of such vectors, or methods of developing such vectors, but, in each case, only to the extent of such claims;

(b) is reasonably necessary for any of: the use, sale, offer for sale, or import of Licensed Products in the Field; and

(c) on a Licensed Indication-by-Licensed Indication basis, prior to the 18-month anniversary of the Grant Date for the applicable Licensed Indication, (i) is developed by Licensor or (ii) becomes Controlled by Licensor pursuant to a Commercial License;

provided that "Licensor Improvements" will not include any Manufacturing Technology.

1.24 "Manufacturing Technology" means any and all patents, patent applications, Know-How, and all intellectual property rights associated therewith, and including all tangible embodiments thereof, that are necessary or useful for the manufacture of adeno- associated viruses, adeno-associated virus vectors, research or commercial reagents related thereto, Licensed Products, or other products, including manufacturing processes, technical information relating to the methods of manufacture, protocols, standard operating procedures, batch records, assays, formulations, quality control data, specifications, scale up, any and all improvements, modifications, and changes thereto, and any and all activities associated with such manufacture. Any and all chemistry, manufacturing, and controls (CMC), drug master files (DMFs), or similar materials provided to regulatory authorities and the information contained therein are deemed Manufacturing Technology.

1.25 "Muscular Dystrophy" means those Muscular Dystrophies as identified by the Muscular Dystrophy Association (MDA) as of the Effective Date and listed in Exhibit C.

1.26 "NDA" means a New Drug Application filed with the FDA as described in 21 C.F.R. § 314, a Biological License Application (BLA) pursuant to 21 C.F.R. § 601.2, or any equivalent or any corresponding application for regulatory approval in any country or regulatory jurisdiction other than the United States.

1.27 "Net Sales" means the gross receipts from sales or other disposition of a Licensed Product (including fees for services within the definition of "Licensed Product") by Licensee and/or its Affiliates and/or any Sublicensees to Third Parties less the following deductions that are directly attributable to a sale, specifically and separately identified on an invoice or other documentation and actually borne by Licensee, its Affiliates, or any Sublicensees: […***…]. In the event consideration other than cash is paid to Licensee, its Affiliates, or any Sublicensees, for purposes of determining Net Sales, the Parties shall use the cash consideration that Licensee, its Affiliates, or any Sublicensees would realize from an unrelated buyer in an arm's length sale of an identical item sold in the same quantity and at the time and place of the transaction, as determined jointly by Licensor and Licensee based on transactions of a similar type and standard industry practice, if any.

1.28 "Penn Agreement" means that certain License Agreement entered into between Licensor and The Trustees of the University of Pennsylvania, effective on February 24, 2009, as amended by that letter agreement dated March 6, 2009, and by that certain Second Amendment to License Agreement effective on September 9, 2014, and as amended from time to time.

1.29 "Penn Sponsored Research Agreement" means (a) that certain Sponsored Research Agreement entered into between Licensor and The Trustees of the University of Pennsylvania, effective on February 24, 2009, as amended by Amendment No. 1, effective February 24, 2010, Amendment No. 2, dated March 31, 2010, Amendment No. 3, dated December 31, 2010, Amendment No. 4, effective December 31, 2011, Amendment No. 5, effective April 1, 2012, Amendment No. 6, effective December 31, 2012, Amendment No. 7, effective January 1, 2014, and Amendment No. 8, effective March 15, 2014; (b) that certain Sponsored Research Agreement entered into between Licensor and The Trustees of the University of Pennsylvania, effective November 1, 2013; and (c) any additional amendments to either (a) or (b) effective prior to the Grant Date for a Licensed Indication.

1.30 "Phase 3 Clinical Trial" means a pivotal clinical trial in humans performed to gain evidence with statistical significance of the efficacy of a product in a target population, and to obtain expanded evidence of safety for such product that is needed to evaluate the overall benefit-risk relationship of such product, to form the basis for approval of an NDA and to provide an adequate basis for physician labeling, as described in 21 C.F.R. § 312.21(c) or the corresponding regulation in jurisdictions other than the United States.

1.31 "Program Costs" means all documented costs incurred by Licensor prior to the applicable Grant Date in researching or developing the applicable disease indication, as determined in accordance with Licensor's normal procedures, as accounted for and consistently applied according to U.S. generally accepted accounting principles. Program Costs will include all out-of-pockets costs, time of scientific, technical, or other personnel (which may be billed on a full-time-equivalent basis at Licensor's normal full-time- equivalent rate, taking into account the reasonable costs of employment of personnel, including salaries and benefits), and reasonable overhead and indirect costs allocated to such disease indication. Costs paid to a Third Party will equal 100% of the amounts invoiced by the Third Party.

1.32 "Prosecute" means preparation, filing, and prosecuting patent applications and maintaining patents, including any reexaminations, reissues, oppositions, interferences, and any post-grant proceedings including supplemental examination, post-grant review, and inter parties review.

1.33 "Receiving Party" has the meaning set forth in Section 5.1.

1.34 "Retained Rights" has the meaning set forth in Section 2.2.

1.35 "Sublicensee" means any Third Party or Affiliate to whom Licensee grants a sublicense of some or all of the rights granted to Licensee under this Agreement as permitted by this Agreement.

1.36 "Third Party" means any person or entity other than a Party to this Agreement or Affiliates of a Party to this Agreement.

1.37 "Valid Claim" means a claim of an issued and unexpired patent (including any patent claim the term of which is extended by any extension, supplementary protection certificate, patent term restoration, or the like) included within the Licensed Patents or a claim of a pending patent application included within the Licensed Patents, which has not lapsed, been abandoned, been held revoked, or been deemed unenforceable or invalid by a non-appealable decision or an appealable decision from which no appeal was taken within the time allowed for such appeal of a court or other governmental agency of competent jurisdiction.

ARTICLE 2: OPTION GRANT

2.1 Option Grant. Subject to the terms and conditions of this Agreement, Licensor hereby grants to Licensee four distinct options, exercisable at Licensee's sole discretion, each to obtain an exclusive, worldwide license (under the terms described in Section 2.1.4 and this Agreement) with respect to a single disease indication (each such option with respect to a particular disease indication, a "Commercial Option") in accordance with the following provisions:

2.1.1 Election Term. Licensee may exercise each Commercial Option at any time prior to the […***…] of the Effective Date (the "Election Term"); provided that Licensee may extend the Election Term for an additional […***…] at any time prior to the […***…] of the Effective Date by providing written notice to Licensor of such extension and simultaneously paying Licensor a fee of […***…], which notice and payment must be received by Licensor at least […***…] prior to the […***…] of the Effective Date. If Licensee does extend the Election Term by timely providing such notice and payment, the Election Term will automatically be extended until the […***…] of the Effective Date.

2.1.2 Transferability. The Commercial Options shall not be sublicensable or transferable, except in the case of any assignment of this Agreement pursuant to Section 10.2.

2.1.3 Method of Exercise. To exercise the Commercial Option for a particular disease indication:

2.1.3.1 Licensee must provide written notice to Licensor at least […***…] prior to the expiration of the Election Term, which written notice must specify the disease indication(s) with respect to which Licensee desires to exercise a Commercial Option (the "Nomination Notice").

2.1.3.2 Within […***…] of Licensor's receipt of such Nomination Notice, Licensor will inform Licensee in writing (the "Availability Notice") of whether the nominated disease indication is available for licensing based on whether it is the subject of any of the following:

(i) a conflicting license with a Third Party (such license, a "Conflicting License"),

(ii) a license being negotiated with a Third Party, as to which […***…]

[…***…], a "Conflicting Negotiation"); in which event, the Availability Notice will describe whether the license under negotiation would be exclusive or non-exclusive, the disease indication and territory subject to the Conflicting Negotiation, the applicable adeno-associated virus vector(s) being discussed, and any other exclusions that would apply to Licensee's exercise of its Commercial Option for the nominated disease indication (collectively, the "Excluded Rights"); or

(iii) an existing Licensor program (i.e., a program that is the subject of on-going advanced preclinical study (e.g., there has been a pre-IND meeting) or is in clinical development or at a later stage of development or commercialization by Licensor or its Affiliates) (such program, a "Conflicting Program").

2.1.3.3 If Licensor states in the Availability Notice that the nominated disease indication is subject to a Conflicting License or a Conflicting Program, then no Commercial Option will be deemed exercised with respect to such nominated disease indication, in which event Licensee will have the continuing right, until at least […***…] prior to the expiration of the Election Term, to nominate another disease indication with respect to which Licensee desires to exercise such Commercial Option. If Licensor states in the Availability Notice that the nominated disease indication is subject to a Conflicting Negotiation, then such nominated disease indication will be deemed available for licensing, but such license shall be subject to any Excluded Rights that are being negotiated with the Third Party as part of the Conflicting Negotiation, and the Availability Notice sent by Licensor to Licensee will include a statement of Program Costs, if any, associated with the nominated disease indication. If the nominated disease indication is not subject to a Conflicting License, Conflicting Program, or Conflicting Negotiation, Licensor will so state in the Availability Notice, and such nominated disease indication will be deemed available for licensing, and the Availability Notice sent by Licensor to Licensee will include a statement of (i) Program Costs, if any, associated with the nominated disease indication as of the date of such Availability Notice, plus Licensor's reasonable, good faith estimate for the anticipated Program Costs for the […***…] period following the date of such Availability Notice, and (ii) to Licensor's knowledge, a general description of any Know-How Controlled by Licensor that is applicable to the nominated disease indication and proposed to be included in Exhibit B as Licensed Know-How; provided that Licensor will not be required to disclose any such Licensed Know-How prior to the Grant Date.

2.1.3.4 If the nominated disease indication set forth in the Nomination Notice is available (in whole or, in the case of a Conflicting Negotiation, subject to the Excluded Rights), Licensee will have […***…] from receipt of the Availability Notice to notify Licensor whether it wishes to include in the license any Licensed Know-How identified by Licensor pursuant to 2.1.3.3 and to pay Licensor, by wire transfer, (a) the commercial option fee set forth in Section 3.1 and (b) if applicable, an amount equal to […***…] the Program Costs for such nominated disease indication; provided that Licensee will not be required to pay, on a Commercial Option-by-Commercial Option basis, more than […***…] in the aggregate under this clause (b). If Licensee fails to deliver such payment

within such […***…] period, the nominated disease indication will be deemed rejected by Licensee, and no Commercial Option will be deemed exercised with respect to such indication, in which event Licensee will have the continuing right, at least until […***…] prior to the expiration of the Election Term, to nominate another disease indication with respect to which Licensee desires to exercise a Commercial Option. If Licensee makes such payment within such […***…] period, (i) the license grant in Section 2.1.4 will become effective (subject to any Excluded Rights, if applicable), (ii) Exhibit D will be amended to set forth the applicable disease indication with respect to which the license in Section 2.1.4 has been granted (a "Licensed Indication") and, if applicable, any Excluded Rights, (iii) the additional representation and warranty by Licensor as set forth in Exhibit F shall become effective as of the Grant Date for the applicable Licensed Indication (unless Licensor has otherwise disclosed to Licensee in the Availability Notice any exceptions to such representation and warranty), (iv) the Parties shall promptly amend Exhibit A to include, subject to Section 2.6, any then-existing Licensor Improvements applicable to such Licensed Indication and, if Licensee has notified Licensor that it wishes to include Licensed Know-How in the license, the Parties shall promptly amend Exhibit B to include a general description of such Licensed Know-How, and (v) Licensee will have exhausted one of its four Commercial Options.

2.1.3.5 For purposes of nominating a disease indication for the exercise of a Commercial Option, the indication must be a specific type of condition and not a general disease class, for instance "mucopolysaccharidosis (MPS) VI" and not "mucopolysaccharidosis (MPS)" and "hemophilia A" not "hemophilia." If Licensor determines that a disease indication nominated by Licensee pursuant to this Section 2.1.3 is not sufficiently specific, prior to providing the Availability Notice and within […***…] of Licensor's receipt of the Nomination Notice, Licensor will notify Licensee, and the Parties will negotiate in good faith as to the proposed scope and definition of the nominated disease indication.

2.1.3.6 Licensee will be entitled to continue to nominate […***…] […***…] of specific disease indications at least […***…] prior to the expiration of the Election Term, until Licensee has exercised its four Commercial Options.

2.1.3.7 Nothing in this Agreement will prevent Licensor from granting licenses to any Third Parties for any disease indications or from initiating Licensor's own programs for any disease indications, in either case, other than the specific Licensed Indications with respect to which Licensee has exercised a Commercial Option.

2.1.3.8 Notwithstanding anything herein to the contrary, nothing in this Agreement will prevent Licensor from (a) granting non-exclusive research licenses to Third Parties in any field; or (b) maintaining Licensor's commercial reagent and services business.

2.1.3.9 Provided that Licensee has not already exercised all four of its Commercial Options, if a nominated disease indication that was subject to a Conflicting License or Conflicting Program becomes available for licensing prior to the expiration of the Election Term, Licensor will promptly notify Licensee, in which event Licensee may

submit a new Nomination Notice for such disease indication at least […***…] prior to the expiration of the Election Term.

2.1.4 License Grant Upon Exercise. If Licensee exercises one of its Commercial Options for a particular disease indication (after confirmation that the nominated disease indication is available as described in Section 2.1.3), effective only upon Licensor's receipt of the amounts set forth in, within the period set forth in, Section 2.1.3.4 (the date on which the payments are received in full shall be deemed to be the "Grant Date" for such disease indication), subject to the terms and conditions of this Agreement, including the Retained Rights and including any Excluded Rights, Licensor will be deemed to have granted to Licensee an exclusive, sublicensable (as provided in Section 2.4 only), non-transferable (except as provided in Section 10.2), royalty-bearing, worldwide license, under the Licensed Technology to make, have made, use, import, sell, and offer for sale Licensed Products solely in the Field for the Licensed Indication, including, for the avoidance of doubt, the right to conduct research and development, including conducting pre-clinical and clinical trials.

2.1.5 Disease Indications. For the avoidance of doubt, the foregoing license granted pursuant to Section 2.1.4 will be deemed granted on the Grant Date on a Commercial Option-by-Commercial Option and Licensed Indication-by-Licensed Indication basis, solely with respect to the Field associated with the Licensed Indication for which the specific Commercial Option was exercised under this Section 2.1. The Parties acknowledge that there may be different Grant Dates for each Licensed Indication, depending on when and if Licensee exercises a Commercial Option for a Licensed Indication.

2.1.6 Expiration of Commercial Options. If Licensee fails to exercise all four Commercial Options pursuant to this Section 2.1 by the expiration of the Election Period, any unexercised Commercial Options will terminate and be of no further force or effect upon the expiration of the Election Term.

2.2 Retained Rights. Except for the rights and licenses specified in Section 2.1.4 (if and when effective), no license or other rights are granted to Licensee under any intellectual property of Licensor, whether by implication, estoppel, or otherwise, whether any such intellectual property dominates or is dominated by the Licensed Technology. Notwithstanding anything to the contrary in this Agreement, Licensor may use and permit others to use the Licensed Technology for any research, development, commercial, or other purposes, outside of the Field. Without limiting the foregoing, and notwithstanding anything in this Agreement to the contrary, Licensee acknowledges and agrees to the following rights retained by Licensor and its direct and indirect licensors (individually and collectively, the "Retained Rights"), whether inside or outside the Field:

2.2.1 The rights and licenses granted in Section 2.1.4 (if and when effective) shall not include any right (and Licensor and its direct and indirect licensors retain the exclusive (even as to Licensee), fully sublicensable right) under the Licensed Technology to make, have made, use, sell, offer to sell, and import Domain Antibodies that are expressed by an adeno-associated vector.

2.2.2 Licensor and its direct and indirect licensors retain the following rights with respect to the Licensed Technology:

(a) A non-exclusive, sublicensable right under the Licensed Technology to make, have made, use, sell, offer to sell, and import products that deliver RNA interference and antisense drugs using an adeno-associated vector; and

(b) A non-exclusive right for Licensor's direct and indirect licensors (which right is sublicensable by such licensors) to use the Licensed Technology for non-commercial research purposes and to use the Licensed Technology for such licensors' discovery research efforts with non-profit organizations and collaborators.

2.2.3 The rights and licenses granted in Section 2.1.4 (if and when effective) shall not include any right (and Licensor retains the exclusive (even as to Licensee), fully sublicensable right) under (a) the Licensed Technology that cover the rAAV serotype 8, to make, have made, use, sell, offer for sale, and import products for the treatment of all forms of hemophilia B; or (b) the Licensed Technology that cover the rAAV serotype 9, to make, have made, use, sell, offer for sale, and import products for the treatment of (i) all forms of Muscular Dystrophy; (ii) congestive heart failure suffered by Muscular Dystrophy patients; and (iii) any and all cardiovascular diseases by delivery of any or all of genes encoding I-lc and Serca2a and creatine kinase.

2.2.4 Licensor and its direct and indirect licensors retain the following rights with respect to the Licensed Technology: a non-exclusive, sublicensable right to make, have made, use, sell, offer for sale, and import all of the various serotypes of any adeno-associated vector that is the subject of at least one claim in the Licensed Patents solely for non-commercial research in the areas of Muscular Dystrophy, hemophilia B, congestive heart failure suffered by Muscular Dystrophy patients, and other cardiovascular disease.

2.2.5 Licensor retains the following rights with respect to the Licensed Technology: to the extent Licensed Technology pertains to recombinant adeno-associated virus serotype 8, an exclusive, sublicensable right to make, have made, use, sell, offer for sale, and import products for the treatment of hemophilia A.

2.2.6 The rights and licenses granted in Section 2.1.4 (if and when effective) shall not include any right (and Licensor retains the exclusive (even as to Licensee), fully sublicensable right) under the Licensed Technology:

(a) to conduct commercial reagent and services businesses, which includes the right to make, have made, use, sell, offer to sell, and import research reagents, including any viral vector construct; provided that, for clarity, such rights retained by Licensor shall not include the right to conduct clinical trials in humans in the Field; or

(b) to use the Licensed Technology to provide services to any Third Parties; provided that, for clarity, Licensee's license under Section 2.1.4 (if and when effective) does include the right to administer Licensed Products to

patients. For clarity, activities conducted by Licensee for a Sublicensee as part of a Collaboration are not intended to be deemed services under this Section 2.2.6(b).

2.2.7 Licensor retains the fully sublicensable right under the Licensed Technology to grant non-exclusive research and development licenses to Affiliates and Third Parties; provided that such development rights granted by Licensor shall not include the right to conduct clinical trials in humans in the Field or any rights to sell products in the Field.

2.2.8 The Trustees of the University of Pennsylvania may use and permit other non-profit organizations or other non- commercial entities to use the Licensed Technology solely for educational, research, and other non-commercial purposes.

2.2.9 The Parties acknowledge that the Retained Rights included in Sections 2.2.3 and 2.2.4 are excluded from this Agreement because they were retained by the licensor under the GSK Agreement and that the Retained Rights included in Section 2.2.5 are excluded from this Agreement because of rights granted by Licensor to other licensees or Third Parties. If Licensor is granted the rights described in Section 2.2.3 or 2.2.4 or regains the rights described in Section 2.2.5, Licensor will notify Licensee of such event, together with a description of the rights granted or regained, in which case, the applicable Retained Rights granted or regained will no longer be considered Retained Rights, and the license granted to Licensee under Section 2.1.4 (if and when effective) will no longer be subject to such granted or regained rights.

2.3 Government Rights. Licensee acknowledges that the United States government retains certain rights in intellectual property funded in whole or part under any contract, grant, or similar agreement with a federal agency. The license grant hereunder is expressly subject to all applicable United States government rights, including any applicable requirement that products resulting from such intellectual property sold in the United States must be substantially manufactured in the United States absent, with respect to such manufacturing requirement, a waiver of such requirement obtained by Licensee from the applicable governmental agency.

2.4 Sublicensing.

2.4.1 Upon the effectiveness of each Grant Date and the rights granted pursuant to Section 2.1.4, Licensee's rights to sublicense will be limited to the specific Licensed Indication covered by such license. The license granted pursuant to Section 2.1.4 (if and when effective) is sublicensable by Licensee to any Affiliates or Third Parties; provided that any such sublicense must comply with the provisions of this Section 2.4 (including Section 2.4.2).

2.4.2 The right to sublicense granted to Licensee under this Agreement is subject to the following conditions:

(a) Licensee may grant sublicenses […***…] only pursuant to a written sublicense agreement with the Sublicensee. Licensor must receive written notice as soon as practicable following execution of any such sublicenses.

(b) In each sublicense agreement, the Sublicensee must be required to comply with the terms and conditions of this Agreement to the same extent as Licensee has agreed and must acknowledge that Licensor is an express third party beneficiary of such terms and conditions under such sublicense agreement; provided that nothing shall prevent Licensee from granting sublicenses of more limited scope than Licensee's rights, e.g. in a more limited territory, field of use, or term.

(c) The official language of any sublicense agreement shall be English.

(d) Within […***…] after entering into a sublicense, Licensor must receive a copy of the sublicense written in the English language for Licensor's records and to share with Licensor's licensors under the Existing Licenses. The copy of the sublicense may be redacted to exclude confidential information of the applicable Sublicensee, but such copy shall not be redacted to the extent that it impairs Licensor's (or any of its licensors') ability to ensure compliance with this Agreement; provided that, if any of Licensor's licensors require a complete, unredacted copy of the sublicense, Licensee shall provide such complete, unredacted copy.

(e) Licensee's execution of a sublicense agreement will not relieve Licensee of any of its obligations under this Agreement. Licensee is and shall remain […***…] to Licensor for all of Licensee's duties and obligations contained in this Agreement and for any act or omission of an Affiliate or Sublicensee that would be a breach of this Agreement if performed or omitted by Licensee, and Licensee will be deemed to be in breach of this Agreement as a result of such act or omission.

2.4.3 Any sublicense agreement granted by Licensee hereunder to a Third Party shall survive termination of this Agreement in accordance with and subject to the terms of Section 6.6.2.

2.5 Licensee's Improvements.

2.5.1 Licensee hereby grants to Licensor a non-exclusive, worldwide, royalty-free, transferable, sublicensable, irrevocable, perpetual license, effective only as of the first Grant Date:

(a) to use any Licensed Back Improvements (and any intellectual property rights with respect thereto) consummate in scope to the Retained Rights; and

(b) to practice the Licensed Back Improvements (and any intellectual property rights with respect thereto) in connection with any recombinant adeno-associated virus vectors, including the right to research, develop, make, have made, use, offer for sale, and sell products and services; provided that, during the term of this Agreement, Licensor shall have no right under the license in this Section 2.5.1(b) to practice the Licensed Back

Improvements in the Field with respect to the applicable Licensed Indication.

2.5.2 For purposes of this Agreement, "Licensed Back Improvements" means any patentable modifications or improvements developed by Licensee, any Affiliates, or any Sublicensees, after the first Grant Date and during the term of this Agreement, to any vector that is the subject of a claim within the Licensed Patents.

2.5.3 Licensee agrees to provide prompt notice to Licensor upon the filing of any patent application covering any Licensed Back Improvement, together with a reasonably detailed description of or access to such Licensed Back Improvement to permit the practice of any such invention or improvement.

2.6 Licensor Improvements.

2.6.1 Licensor agrees to provide notice within […***…] to Licensee upon the filing of any patent application covering any Licensor Improvement, together with a reasonably detailed description of or access to such Licensor Improvement to permit the practice of any such improvement. Upon the filing of any patent application covering any Licensor Improvement, Exhibit A attached hereto will be modified to add such patent application, but such patent application covering the Licensor Improvement will only be deemed a Licensed Patent with respect to Licensed Products for use in the Field for the applicable Licensed Indication to which such Licensor Improvements relates.

2.6.2 If Licensor files any patent or patent application that would constitute a Licensor Improvement but for the temporal limitation in Section 1.23(c), Licensor will within […***…] so inform Licensee, and, upon Licensee's written request, Licensor will, on a non-exclusive basis, discuss in good faith licensing such patent or patent application to Licensee for use in connection with the Licensed Products in the Field.

2.6.3 To the extent that the scope of Licensor's rights to any Licensor Improvements Controlled by Licensor pursuant to a Commercial License, as described in Section 1.23(c)(ii), are less than or more restrictive than the license rights granted to Licensee pursuant to Section 2.1.4 (if and when effective), then Licensee's rights with respect to such Licensor Improvements will be limited to the lesser or more restrictive rights Licensor can sublicense pursuant to the terms of the Commercial License. Examples of more restrictive provisions include Licensor's rights being limited to the following: (a) non-exclusive rights, (b) use in connection with only specific recombinant adeno-associate virus vectors, (c) use only in specific territories or specific fields, and (d) use only for research but not commercial purposes.

2.7 Transfer of Licensed Know-How.

2.7.1 During the […***…] period following the Grant Date for a particular Licensed Indication, at Licensee's sole expense, to the extent not previously disclosed to Licensee, (a) Licensor will deliver to Licensee copies of Licensed Know-How generally described in Exhibit B in the form that such Licensed Know-How then exists; (b) Licensor will use commercially reasonable efforts to deliver, in the form that such Licensed Know-How then exists, such additional Licensed Know-How not listed on Exhibit B that relates to such Licensed Indication

that is reasonably requested in writing by Licensee; and (c) Licensor will otherwise disclose, through not more than two meetings with Licensee personnel, other Licensed Know-How with respect to such Licensed Indication, which meetings will be at such times and in such places as are agreed to by the Parties.

2.7.2 Notwithstanding the foregoing, with respect to any Licensed Know-How not in Licensor's possession, Licensor's obligation will be limited to using reasonable efforts to cause such copies to be delivered to Licensee. Licensee acknowledges and agrees that all Licensed Know-How disclosed pursuant to this Section 2.7 will be deemed "Confidential Information" of Licensor, regardless of whether such information is marked or identified as confidential and without an obligation to summarize oral information.

2.8 Covenants Related to Existing Licenses. During the term of this Agreement, without the prior written consent of Licensee, which consent shall not be unreasonably withheld, Licensor agrees not to exercise its right to terminate and will not amend either of the Existing Licenses if such termination or amendment would materially, adversely alter the rights of Licensee under this Agreement. During the term of this Agreement, if Licensor receives a notice of termination under Section 6.3 of the Penn License, Licensor will so notify Licensee no later than […***…] before expiration of the applicable cure period and provide the particulars of the alleged breach.

ARTICLE 3: CONSIDERATION

3.1 Commercial Option Fee. Licensee shall pay Licensor a fee of $1,000,000 upon exercise of each Commercial Option, in accordance with clause (a) of Section 2.1.3.4.

3.2 Annual Maintenance Fee. In consideration of the rights and licenses granted to Licensee under Section 2.1 with respect to the exercise of a given Commercial Option, Licensee shall pay Licensor on-going annual maintenance fees of $50,000 for the Licensed Indication associated with such Commercial Option, which annual maintenance fee will be paid on the next-occurring anniversary of the Effective Date following the Grant Date for such Licensed Indication. For clarity, Licensee shall owe an annual maintenance fee for each Licensed Indication with respect to which a license was granted under Section 2.1 upon exercise of each Commercial Option.

3.3 Milestone Fees. In consideration of the rights and licenses granted to Licensee under Section 2.1 with respect to the exercise of a given Commercial Option, Licensee shall pay Licensor the following one-time milestone payments, on a per Licensed Indication basis, for the first Licensed Product for each Licensed Indication in the Field to achieve such milestone event:

Milestone	Milestone Payment
1. First treatment of human subject in a clinical trial (i.e., first patient, first dose)	[…***…]
2. First treatment in Phase 3 Clinical Trial (i.e., first patient, first dose)	[…***…]
3. NDA submission in any country	[…***…]
4. NDA approval in the United States	[…***…]

Milestone	Milestone Payment
5. NDA approval in the European Union	[…***…]
6. DA approval in any country other than the United States or the European Union	[…***…]
Total:	$9,000,000

For clarity, the milestone payments set forth in this Section 3.3 are payable […***…] with respect to the first Licensed Product in a Licensed Indication in the Field that achieves the milestone event, […***…]. To the extent that either of the two development milestones in this Section 3.3 (i.e., first treatment of human subject in a clinical trial or first treatment in Phase 3 Clinical Trial) has not been paid at the time of achievement of the NDA submission milestone, then, upon the achievement of such NDA submission milestone, the preceding unpaid development milestone payments shall be made in addition to the payment of the NDA submission milestone. For clarity, the total amount payable under this Section 3.3 with respect to any Licensed Indication for which a license was granted under Section 2.1 is $9,000,000, and the total amount payable to Licensor if all four Commercial Options are exercised is $36,000,000.

For clarity, if a Licensed Product for a Licensed Indication ceases to be a Licensed Product as defined in Section 1.21, and thereafter one or more of the above milestone events occurs with respect to such product (or service, as applicable), then no associated milestone payments shall be due as such product (or service, as applicable) is no longer deemed a Licensed Product at the time of such milestone achievement.

3.4 Royalties. In consideration of the rights and licenses granted to Licensee under Section 2.1 with respect to the exercise of a given Commercial Option, Licensee shall pay to Licensor the following royalties based upon Net Sales of Licensed Products, on a Licensed Indication-by-Licensed Indication basis, subject to the reductions in royalty rates set forth in Section 3.4.1:

Cumulative Annual Net Sales of all Licensed Products Worldwide for the Licensed Indication	Royalty Percentage
Portion of Net Sales less than […***…]	[…***…]
Portion of Net Sales between (and including) […***…] through (and including) […***…]	[…***…]
Portion of Net Sales greater than […***…]	[…***…]

3.4.1 Adjustment of Royalties For Licenses. On a Licensed Product-by-Licensed Product, country-by-country basis, upon the date on which the manufacture, use, sale, offer for sale, or import of a Licensed Product does not infringe or is not covered by a Valid Claim in such country, then the […***…].

3.4.2 Royalty Payment Period. Licensee's obligation hereunder for payment of a royalty under this Section 3.4 on the Net Sales of Licensed Products in a given country will end on a country-by-country basis, as follows:

(a) with respect to any Licensed Product under Section 1.21(a)(i) or 1.21(b)(i) only (which Licensed Product is not also a Licensed Product under Section 1.21(a)(ii) or 1.21(b)(ii)), such royalty obligations for any such Licensed Product will end at such time as […***…]; and

(b) with respect to any Licensed Product under Section 1.21(a)(ii) or 1.21(b)(ii) (whether it is only a Licensed Product under such sections or also a Licensed Product under Section 1.21(a)(i) or 1.21(b)(i)), such royalty obligations for any such Licensed Product will end on […***…].

3.5 Sublicense Fees.

3.5.1 In consideration of the rights and licenses granted to Licensee under Section 2.1 with respect to the exercise of a given Commercial Option, and subject to the remainder of this Section 3.5, Licensee will pay Licensor a percentage of any sublicense fees (including upfront payments and milestone payments and including any equity consideration received by Licensee or its Affiliates) received by Licensee or its Affiliates for the Licensed Technology from any Third Party Sublicensee or from any Third Party granted any option to obtain such a sublicense. The applicable percentage due to Licensor for each sublicense (or option), on a Licensed Indication-by-Licensed Indication basis, under each exclusive license granted under Section 2.1 upon exercise of a Commercial Option shall be as follows:

Event	Sublicense Fee Rate
If sublicensed (or optioned) on or before the […***…] anniversary of the Grant Date for the applicable Licensed Indication	[…***…]
If sublicensed (or optioned) on or before the […***…] anniversary of the Grant Date for the applicable Licensed Indication, but after the […***…] anniversary of such Grant Date	[…***…]

Event	Sublicense Fee Rate
If sublicensed (or optioned) on or before the […***…] anniversary of the Grant Date for the applicable Licensed Indication, but after the […***…] anniversary of such Grant Date	[…***…]
If sublicensed (or optioned) on or before the […***…] anniversary of the Grant Date for the applicable Licensed Indication, but after the […***…] anniversary of such Grant Date	[…***…]
If sublicensed (or optioned) on or before the […***…] anniversary of the Grant Date for the applicable Licensed Indication, but after the […***…] anniversary of such Grant Date	[…***…]
If sublicensed (or optioned) after the […***…] anniversary of the Grant Date for the applicable Licensed Indication	[…***…]

For the avoidance of doubt, with respect to a transaction with a Third Party involving the grant of an option to obtain a sublicense, if the sublicense is later granted as a result of the exercise of such option, the sublicense fees applicable to such sublicense will be determined by reference to the date the original option was granted, not the date the actual sublicense was granted.

3.5.2 With respect to the obligations under this Section 3.5, Licensee shall not be required to submit any amounts received from a Third Party for the following:

(a) Reimbursement for research, development, and/or manufacturing activities performed by Licensee or its Affiliates corresponding directly to the development of Licensed Products pursuant to a specific agreement;

(b) Consideration received for the purchase of an equity interest in Licensee or its Affiliates at fair market value or in the form of loans at commercially reasonable rates of interest; and

(c) Any and all amounts paid to Licensee or its Affiliates by a Third Party Sublicensee as royalties on sales of Licensed Product sold by such Sublicensee under a sublicense agreement.

3.5.3 To the extent Licensee or its Affiliates receives payment from a Third Party relating to one or more of the milestone events set forth in the table in Section 3.3, then the amount of the payment made to Licensor under such Section 3.3 with respect to such milestone event shall not be deemed sublicense fees under this Section 3.5; instead, the amounts due under this Section 3.5 shall be calculated by applying the applicable sublicense fee rate set forth in Section 3.5.1 above to the sublicense fees received by Licensee or its Affiliates from such Third Party after deducting the amount of the payment under Section 3.3.

3.5.4 If Licensee or its Affiliates receive sublicense fees from Third Party Sublicensees or from any Third Party granted any option to obtain a sublicense under this Agreement in the form of non-cash consideration, then, at Licensor's option, Licensee shall pay Licensor payments as required by this Section 3.5 […***…].

3.5.5 If Licensee or its Affiliate enters into any sublicense that is not an arm's length transaction, fees due under this Section 3.5 will be calculated based on the fair market value of such transaction, at the time of the transaction, assuming an arm's length transaction made in the ordinary course of business, as determined […***…] based on transactions of a similar type and standard industry practice, if any.

3.6 Third Party Obligations. In consideration of the rights and licenses granted to Licensee under this Agreement, Licensee agrees to the following:

3.6.1 Assumption of Obligations. Licensee acknowledges that certain Licensed Technology is licensed to Licensor pursuant to the Existing Licenses and will be sublicensed to Licensee hereunder. In addition to the obligations set forth herein, Licensee expressly agrees to be bound by and comply with all applicable provisions of the Existing Licenses to the extent such provisions apply to Licensee's or any of its Affiliates' or any Sublicensees' exploitation of Licensed Technology under this Agreement. To the extent that (a) any Licensed Technology is Controlled by Licensor pursuant to the Existing Licenses and sublicensed to Licensee under this Agreement and (b) the scope of rights granted under such Existing Licenses are less than the rights granted hereunder (such as Licensor's rights under the Existing Licenses being limited to non-exclusive rights), Licensee acknowledges that Licensee's rights and licenses hereunder with respect to such Licensed Technology are limited to such lesser scope.

3.6.2 Third Party Reports and Obligations. Licensee agrees to submit and to require its Affiliates and Sublicensees to submit to Licensor (or as otherwise directed by Licensor) all reports, including development and diligence reports, that Licensor is required to submit pursuant to the Existing Licenses, in each case, to the extent such reports are triggered by or otherwise result from Licensee's and its Affiliates' and any Sublicensees' exploitation of Licensed Technology under this Agreement. Unless otherwise agreed, with respect to any reporting obligations under the Existing Licenses, Licensee (or its Affiliates or any Sublicensees) will provide the required reports to Licensor in sufficient time for Licensor to provide them to the applicable licensor within the time periods required by the applicable Existing License; provided that such reports will be provided to Licensor by not less than […***…] prior to the date on which such reports must be delivered by Licensor to its licensors under the applicable Existing License. All financial reports required to be delivered will be certified by the chief financial officer of Licensee.

3.7 Reports and Records.

3.7.1 Licensee must deliver to Licensor within […***…] after the end of each Calendar Quarter after the First Commercial Sale of a Licensed Product a report setting forth the calculation of the royalties due to Licensor for such Calendar Quarter, including:

(a) Number of Licensed Products included within Net Sales, listed by country;

(b) Gross consideration for Net Sales of Licensed Product, including all amounts invoiced, billed, or received;

(c) Qualifying costs to be excluded from the gross consideration, as described in Section 1.27, listed by category of cost;

(d) Net Sales of Licensed Products listed by country;

(e) An accounting of any royalty reductions applied pursuant to Section 3.4.1;

(f) Royalties owed to Licensor; and (g)The computations for any applicable currency conversions.

3.7.2 Licensee shall pay the royalties due under Section 3.4 within […***…] following the last day of the Calendar Quarter in which the royalties accrue. Licensee shall send the royalty payments along with the report described in Section 3.7.1.

3.7.3 Within […***…] after the occurrence of a milestone event described in Section 3.3, Licensee must deliver to Licensor a report describing the milestone event that occurred, together with a payment of the applicable amount due to Licensor pursuant to Section 3.3. In addition, within […***…] after the receipt of sublicense fees from any Third Party as described in Section 3.5, Licensee must deliver to Licensor a report describing the fees received, together with a payment of the applicable amount due to Licensor pursuant to Section 3.5.

3.7.4 All financial reports under this Section 3.7 will be certified by the chief financial officer of Licensee.

3.7.5 Licensee shall maintain and require its Affiliates and all Sublicensees to maintain, complete and accurate books and records that enable the royalties, fees, and payments payable under this Agreement (directly or through the Existing Licenses) to be verified. The records must be maintained for […***…] after the submission of each report under Article 3. Upon reasonable prior written notice to Licensee, Licensee and its Affiliates and all Sublicensees will provide Licensor (and its accountants) with access to all of the relevant books, records, and related background information required to conduct a review or audit of the royalties, fees, and payments payable to Licensor under this Agreement to be verified. Access will be made available: (a) during normal business hours; (b) in a manner reasonably designed to facilitate the auditing party's review or, audit without unreasonable disruption to Licensee's business; and (c) no more than once each calendar year during the term of this Agreement and for a period of […***…] thereafter. Licensee will promptly pay to Licensor the amount of any underpayment determined by the review or audit, plus accrued interest. If the review or audit determines that Licensee has underpaid any payment by […***…] or more, then Licensee will also promptly pay the costs and expenses of Licensor and accountants in connection with the review or audit. Without limiting the foregoing, Licensee acknowledges that its books and records will also be subject to the separate audit right of Licensor's licensors in accordance with the terms of the Existing Licenses.

3.8 Currency, Interest.

3.8.1 All dollar amounts referred to in this Agreement are expressed in United States dollars. All payments to Licensor under this Agreement must be made in United States dollars.

3.8.2 If Licensee receives payment in a currency other than United States dollars for which a royalty or fee or other payment is owed under this Agreement, then (a) the payment will be converted into United States dollars at the conversion rate for the foreign currency as published in the eastern edition of the Wall Street Journal, N.Y. edition, as of the last business day of the Calendar Quarter in which the payment was received by Licensee; and (b) the conversion computation will be documented by Licensee in the applicable report delivered to Licensor under Section 3.7.

3.8.3 All amounts that are not paid by Licensee when due will accrue interest from the date due until paid at a rate equal to 1.5% per month (or the maximum allowed by law, if less).

3.9 Taxes and Withholding.

3.9.1 All payments hereunder will be made free and clear of, and without deduction or deferment in respect of, and Licensee shall pay and be responsible for, and shall hold Licensor harmless from and against, any taxes, duties, levies, fees, or charges, including sales, use, transfer, excise, import, and value added taxes (including any interest, penalties, or additional amounts imposed with respect thereto) but excluding withholding taxes to the extent provided in Section 3.9.2. At the request of Licensee, Licensor will give Licensee such reasonable assistance, which will include the provision of documentation as may be required by the relevant tax authority, to enable Licensee to pay and report and, as applicable, claim exemption from or reduction of, such tax, duty, levy, fee, or charge.

3.9.2 If any payment made by Licensee hereunder becomes subject to withholding taxes with respect to Licensor's gross or net income under the laws of any jurisdiction, Licensee will deduct and withhold the amount of such taxes for the account of Licensor to the extent required by law and will pay the amounts of such taxes to the proper governmental authority in a timely manner and promptly transmit to Licensor appropriate proof of payment of such withholding taxes. At the request of Licensor, Licensee will give Licensor such reasonable assistance, which will include the provision of appropriate certificates of such deductions made together with other supporting documentation as may be required by the relevant tax authority, to enable Licensor to claim exemption from or reduction of, or otherwise obtain repayment of, such withholding taxes, and will upon request provide such additional documentation from time to time as is reasonably required to confirm the payment of withholding tax.

ARTICLE 4: DILIGENCE

4.1 Diligence Obligations. Following the exercise of a Commercial Option, Licensee will use commercially reasonable efforts to develop, commercialize, market, promote, and sell Licensed Products for each of the Licensed Indications within the Field. Commercially reasonable efforts means efforts equivalent to those utilized by […***…]

[…***…].

4.2 Specific Milestones. Without limiting Section 4.1, Licensee will meet the following milestones for each Licensed Indication with respect to which a Commercial Option is exercised:

Event	Date
Filing of an investigational new drug application with the FDA for the proposed initial clinical trial of a Licensed Product targeting the Licensed Indication	[…***…] from the Grant Date for the Licensed Indication

Licensee will provide Licensor written notice within […***…] of the accomplishment of the foregoing milestone. If Licensee fails to meet the milestone for a particular Licensed Indication within the Field, the date of the milestone may, at Licensee's option, be extended for a period of […***…] from the original deadline date upon a payment to Licensor of […***…] within […***…] of the original deadline date; provided that Licensee will be entitled only to […***…] for each Licensed Indication within the Field, and […***…] extension will require a separate payment of […***…].

[…***…].

4.3 Development Plans

4.3.1 For each Licensed Indication and corresponding Licensed Product in the Field, Licensee will prepare and deliver to Licensor a development plan and budget (each a "Development Plan"). The initial Development Plans for each Licensed Indication will be delivered within […***…] after the Grant Date for such Licensed Indication.

4.3.2 Each Development Plan will cover the next two years, and will include future development activities to be undertaken by Licensee, its Affiliates, or any Sublicensees during the next reporting period under Section 4.4 relating directly to the Licensed Product, Licensee's strategy to bring the Licensed Product to commercialization, and projected timeline for completing the necessary tasks to accomplish the goals of the strategy.

4.3.3 Following receipt by Licensor of each Development Plan, Licensor will promptly notify Licensee of any comments or requested revisions, and the Parties will thereupon negotiate any appropriate revisions in good faith.

4.4 Reporting. Within […***…] after the first Grant Date and within […***…] of each December 1 thereafter, Licensee shall provide Licensor with written progress reports, setting forth in such detail as Licensor may reasonably request, the progress of the development, evaluation, testing,

and commercialization of each Licensed Product for each Licensed Indication pursuant to each Development Plan. Licensee will also notify Licensor within […***…] of the First Commercial Sale by Licensee, its Affiliates, or any Sublicensees of each Licensed Product. Such a report ("Development Progress Report"), setting forth the current stage of development of Licensed Products, shall include:

4.4.1 Date of Development Progress Report and time covered by such report;

4.4.2 Major activities and accomplishments completed by Licensee, its Affiliates, and any Sublicensees relating directly to the Licensed Product since the last Development Progress Report;

4.4.3 Significant research and development projects relating directly to the Licensed Product currently being performed by Licensee, its Affiliates, and any Sublicensees and projected dates of completion;

4.4.4 Updates to each Development Plan, including coverage of the next two years;

4.4.5 Projected total development remaining before product launch of each Licensed Product; and

4.4.6 Summary of significant development efforts using the Licensed Technology being performed by Third Parties, including the nature of the relationship between Licensee and such Third Parties.

4.5 Confidential Information. The Parties agree that Development Progress Reports shall be deemed Licensee's Confidential Information; provided that Licensor may share a copy of such reports with its licensors under the Existing Licenses.

4.6 Improvements. Simultaneously with the Development Progress Report, Licensee shall deliver a detailed description of any Licensed Back Improvements, if not previously provided pursuant to Section 2.5.3.

ARTICLE 5: CONFIDENTIALITY

5.1 Treatment of Confidential Information. Each Party, as a receiving party (a "Receiving Party"), agrees that it will (a) treat Confidential Information of the other Party (the "Disclosing Party") as strictly confidential; (b) not disclose such Confidential Information to Third Parties without the prior written consent of the Disclosing Party, except as may be permitted in this Agreement; provided that any disclosure permitted hereunder be under confidentiality agreements with provisions at least as stringent as those contained in this Agreement; and (c) not use such Confidential Information for purposes other than those authorized expressly in this Agreement. The Receiving Party agrees to ensure that its employees who have access to Confidential Information of the other Party are obligated in writing to abide by confidentiality obligations at least as stringent as those contained under this Agreement.

5.2 Public Announcements. The Parties agree they will release a joint press release in the form attached hereto as Exhibit E. Except as provided in Section 5.3, any other press releases by either

Party with respect to the other Party or any other public disclosures concerning the existence of or terms of this Agreement shall be subject to review and approval by the other Party. Once the joint press release or any other written statement is approved for disclosure by both Parties, either Party may make subsequent public disclosure of the contents of such statement without the further approval of the other Party.

5.3 Authorized Disclosure. Notwithstanding the provisions of Section 5.1 or 5.2, either Party may disclose Confidential Information or make such a disclosure of the existence of and/or terms of this Agreement to any […***…]; provided that, in each case, such recipient of Confidential Information is obligated to keep such information confidential on terms no less stringent than those set forth in this Agreement. Furthermore, Licensee agrees that Licensor may share a copy of this Agreement, reports and notices provided by Licensee to Licensor pursuant to the terms of this Agreement, and copies of sublicense agreements provided to Licensor hereunder with any of Licensor's direct and indirect licensors of the Licensed Technology. In the event that the Receiving Party receives service of legal process that purports to compel disclosure of the Disclosing Party's Confidential Information or becomes obligated by law to disclose the Confidential Information of the Disclosing Party or the existence of or terms of this Agreement to any governmental authority, the Receiving Party shall promptly notify the Disclosing Party, so that the Disclosing Party may seek an appropriate protective order or other remedy with respect to narrowing the scope of such requirement and/or waive compliance by the Receiving Party with the provisions of this Agreement. The Receiving Party will provide the Disclosing Party with reasonable assistance in obtaining such protective order or other remedy. If, in the absence of such protective order or other remedy, the Receiving Party is nonetheless required by law to disclose the existence of or terms of this Agreement or other Confidential Information of the Disclosing Party, the Receiving Party may disclose such Confidential Information without liability hereunder; provided that the Receiving Party shall furnish only such portion of the Confidential Information that is legally required to be disclosed and only to the extent required by law.

5.4 Term of Confidentiality. The obligations of this Article 5 shall continue for a period of […***…] following the expiration or termination of this Agreement.

ARTICLE 6: TERM AND TERMINATION

6.1 Term of Agreement.

6.1.1 Where at least one Commercial Option is exercised, this Agreement, unless sooner terminated as provided in this Agreement, expires upon the expiration of the royalty obligations with respect to all Licensed Products for all Licensed Indications under all licenses granted under all exercised Commercial Options, as described in Section 3.4.2. Upon expiration of this Agreement pursuant to this Section 6.1.1 (but not expiration pursuant to Section 6.1.2 or any early termination), Licensee's license to Licensed Know-How under Section 2.1.4 (to the extent it became effective) will become non-exclusive, perpetual, irrevocable, royalty-free with respect to the Licensed Know-How owned by Licensor and will continue with respect to all other Licensed Know-How for so long as Licensor's rights continue under the Existing Licenses (subject to Licensee paying any ongoing amounts due under the Existing Licenses and

complying with any applicable ongoing obligations under the Existing Licenses); but, for the avoidance of doubt, such license will remain limited to the applicable Licensed Indication in the Field under each such license and subject to the Retained Rights (and, if applicable, the Excluded Rights).

6.1.2 Where none of the Commercial Options is exercised in accordance with Section 2.1, this Agreement, unless sooner terminated as provided in this Agreement, expires on the expiration of the Election Term. Upon such expiration, Licensee shall have no further rights under any Commercial Option.

6.2 Licensee's Right to Terminate. Licensee may, upon […***…]' prior written notice to Licensor, terminate this Agreement for any reason. In exercising such termination right, Licensee may terminate this Agreement in its entirety or, if desired, Licensee may specify in the written notice that this Agreement is terminating only with respect to one or more of the Licensed Indications within the Field.

6.3 Termination for Breach.

6.3.1 Licensor may terminate this Agreement, if Licensee is late in paying to Licensor royalties, fees, or any other monies due under this Agreement, and Licensee does not pay Licensor in full within […***…] upon written demand from Licensor, which termination shall be effective immediately upon the expiration of such […***…] cure period.

6.3.2 Either Party may terminate this Agreement, if the other Party materially breaches this Agreement and does not cure such material breach within […***…] after written notice of the breach, which termination shall be effective immediately upon the expiration of such […***…] cure period; provided that, if termination is by Licensor as a result of Licensee's materially breaching Article 4, and if such breach only relates to one Licensed Indication within the Field, but not all, then Licensor's termination right shall only be with respect to such Licensed Indication with respect to which the breach related and not the remaining Licensed Indications; provided further that, if termination is by Licensor as a result of Licensee materially breaching Section 3.7.1, such cure period will be […***…] (in place of […***…]).

6.3.3 Notwithstanding the foregoing, if Licensee disputes in good faith that a payment is due or that such material breach exists, and gives Licensor written notice of such dispute within […***…], in the case of payment, or […***…], in the case of a material breach, following Licensee's receipt of Licensor's notice of default, then, Licensor may not terminate this Agreement until the dispute is resolved in accordance with Section 10.6 (and a payment is found to be due or a breach found to have occurred); provided that Licensor will be entitled to terminate this Agreement at the end of the original […***…] or […***…] cure period, as applicable, without waiting for resolution of the dispute in accordance with Section 10.6, if the breach by Licensee of this Agreement would cause Licensor to be in breach of the GSK Agreement or the Penn Agreement.

6.4 Termination for Insolvency.

6.4.1 Licensor may terminate this Agreement, effective immediately upon written notice to Licensee, if Licensee or any of its Controlling Affiliates experiences any Trigger Event.

"Controlling Affiliate" means an Affiliate that directly or indirectly controls Licensee within the meaning of Section 1.1.

6.4.2 Licensee shall include in each sublicense agreement entered into with a Sublicensee a right of Licensee to terminate such sublicense agreement if such Sublicensee experiences any Trigger Event; and Licensee shall terminate the sublicense agreement, effective immediately upon written notice to the Sublicensee, if the Sublicensee experiences any Trigger Event. In addition, if the Sublicensee's experiencing of a Trigger Event gives Licensor's licensor a right of termination under the Penn Agreement and such licensor threatens to terminate the Penn Agreement, then, upon receipt of notice to such effect, Licensor may terminate this Agreement, effective immediately upon written notice to Licensee, if the Sublicensee experiences any Trigger Event.

6.4.3 For purposes of this Section 6.4, "Trigger Event" means any of the following: (a) if Licensee, any Controlling Affiliate, or any Sublicensee, as applicable, (i) becomes insolvent, becomes bankrupt, or generally fails to pay its debts as such debts become due, (ii) is adjudicated insolvent or bankrupt, (iii) admits in writing its inability to pay its debts, (iv) suffers the appointment of a custodian, receiver, or trustee for it or its property and, if appointed without its consent, is not discharged within […***…], (v) makes an assignment for the benefit of creditors, or (vi) suffers proceedings being instituted against it under any law related to bankruptcy, insolvency, liquidation, or the reorganization, readjustment, or release of debtors and, if contested by it, not dismissed or stayed within […***…]; (b) the institution or commencement by Licensee, any Controlling Affiliate, or any Sublicensee, as applicable, of any proceeding under any law related to bankruptcy, insolvency, liquidation, or the reorganization, readjustment, or release of debtors; (c) the entering of any order for relief relating to any of the proceedings described in Section 6.4.3(a) or (b) above; (d) the calling by Licensee, any Controlling Affiliate, or any Sublicensee, as applicable, of a meeting of its creditors with a view to arranging a composition or adjustment of its debts; or (e) the act or failure to act by Licensee, any Controlling Affiliate, or any Sublicensee, as applicable, indicating its consent to, approval of, or acquiescence in any of the proceedings described in Section 6.4.3(b) through (d) above.

6.5 Patent Challenge.

6.5.1 Licensor may terminate this Agreement, effective immediately upon written notice to Licensee, upon the commencement by Licensee or any of its Affiliates of a Patent Challenge.

6.5.2 Licensee shall include in each sublicense agreement entered into with a Sublicensee a right of Licensee to terminate such sublicense agreement if such Sublicensee commences a Patent Challenge; and Licensee shall terminate the sublicense agreement, effective immediately upon written notice to the Sublicensee, if the Sublicensee commences a Patent Challenge. In addition, if the Sublicensee's commencement of a Patent Challenge gives Licensor's licensor a right of termination under the Penn Agreement and such licensor threatens to terminate the Penn Agreement, then, upon receipt of notice to such effect, Licensor may terminate this Agreement, effective immediately upon written notice to Licensee, if the Sublicensee commences a Patent Challenge.

6.5.3 For purposes of this Section 6.5, "Patent Challenge" means any action against Licensor or the Trustees of the University of Pennsylvania or SmithKline Beecham Corporation (or their successors under the Existing Licenses), including an action for declaratory judgment, to declare or render invalid or unenforceable the Licensed Patents, or any claim thereof.

6.6 Effects of Termination. The effect of termination by Licensee pursuant to Section 6.2, by either Party, as applicable, under Section 6.3, or by Licensor pursuant to Section 6.4 or 6.5 shall be as follows:

6.6.1 The Commercial Options and licenses granted by Licensor hereunder shall terminate, and Licensee, its Affiliates, and (unless the sublicense agreement is assigned pursuant to Section 6.6.2) all Sublicensees shall cease to make, have made, use, import, sell, and offer for sale all Licensed Products and shall cease to otherwise practice the Licensed Technology; provided that Licensee, its Affiliates, and Sublicensees shall have the right to continue to sell their existing inventories of Licensed Products for a period not to exceed […***…] after the effective date of such termination;

6.6.2 If a Commercial Option has been exercised with respect to a Licensed Indication, Licensee shall assign to Licensor, and Licensor shall accept, any or all sublicenses with respect to such Licensed Indication granted to Third Parties to the extent of the rights licensed to Licensee hereunder and sublicensed to the Sublicensee; provided that (i) prior to such assignment, Licensee shall advise Licensor whether such Sublicensee is then in full compliance with all terms and conditions of its sublicense and continues to perform thereunder, and, if such Sublicensee is not in full compliance or is not continuing to perform, Licensor may elect not to have such sublicense assigned, and Licensor will not be required to accept such sublicense; and (ii) following such assignment, Licensor shall not be liable to such Sublicensee with respect to any obligations of Licensee to the Sublicensee that are not consistent with, or not required by, Licensor's obligations to Licensee under this Agreement; and all sublicenses not assigned to Licensor shall terminate;

6.6.3 If termination is by Licensee pursuant to Section 6.2, or by Licensor pursuant to Section 6.3, 6.4, or 6.5:

(a) Licensee shall grant, and hereby grants (effective only upon any such termination of this Agreement), to Licensor a non-exclusive, perpetual, irrevocable, worldwide, […***…], transferable, sublicensable license under any patentable modifications or improvements (and any intellectual property rights with respect thereto) developed by Licensee, any Affiliates, or any Sublicensees during the term of this Agreement, to any vector that is the subject of a claim within any of the Licensed Patents, for use by Licensor for the research, development, and commercialization of products in any therapeutic indication; provided that, if this Agreement is terminated only with respect to a specific Licensed Indication, the foregoing license granted to Licensor will not apply to products for use in any Licensed Indication for which, and for so long as, the license granted under Section 2.1.4 continues or any indication for which, and for so long as, a license has

been granted (and continues to be in effect) under the 2013 License Agreement;

(b) Licensee shall grant, and hereby grants (effective only upon any such termination of this Agreement), to Licensor an exclusive (even as to Licensee), worldwide, […***…], transferable, perpetual license, with the right to grant sublicenses, under the Licensee Technology to make, have made, use, import, sell, and offer for sale Licensed Products, solely in the Field (or, if this Agreement is terminated only with respect to a specific Licensed Indication, such Licensed Indication in the Field). For this purpose, the "Licensee Technology" means Licensee's patents, Know-How, and other intellectual property that are improvements or modifications to or that are based on or derived in whole or in part from or that otherwise relate to any Licensed Technology to the extent such patents, Know-How, or other intellectual property pertains to (i) a recombinant adeno-associated virus vector or (ii) any expression construct provided by Licensor to Licensee as part of the Licensed Technology. To effectuate such license, upon any such termination of this Agreement, Licensee will promptly disclose to Licensor all Licensee Technology not already known to Licensor with respect to the Field or, if applicable, the Licensed Indication; and

(c) Licensee will transfer to Licensor ownership of any regulatory approvals then in Licensee's, its Affiliate's, or any Sublicensee's (to the extent the sublicense is not assigned pursuant to Section 6.6.2) name related to Licensed Products containing any expression construct provided by Licensor to Licensee as part of the Licensed Technology and notify the appropriate regulatory authorities and take any other action reasonably necessary to effect such transfer of ownership. If ownership of any such regulatory approval cannot be transferred to Licensor in any country, Licensee hereby grants (effective only upon any such termination of this Agreement) to Licensor a permanent, exclusive (even as to Licensee), and irrevocable right of access and reference to such regulatory approvals for Licensed Products containing any expression construct provided by Licensor to Licensee as part of the Licensed Technology in such country in the Field.

6.6.4 […***…];

6.6.5 Licensee shall pay all monies then-owed to Licensor under this Agreement; and

6.6.6 Each Receiving Party shall, at the other Party's request, return all Confidential Information of the Disclosing Party. Notwithstanding the foregoing, one copy may be kept by either Party for a record of that Party's obligations.

If termination is only with respect to a particular Licensed Indication for which Licensee exercised its Commercial Option, but not all Licensed Indications, then the provisions of this Section 6.6 shall only apply with respect to the terminated Licensed Indication(s), and this Agreement shall continue with respect to the non-terminated Licensed Indication(s).

6.7 Effects of Expiration Pursuant to Section 6.1.2. In the event of expiration pursuant to Section 6.1.2, each Receiving Party shall, at the other Party's request, return all Confidential Information of the Disclosing Party. Notwithstanding the foregoing, one copy may be kept by either Party for a record of that Party's obligations.

6.8 Survival. Licensee's obligation to pay all monies due and owed to Licensor under this Agreement which have matured as of the effective date of termination or expiration shall survive the termination or expiration of this Agreement. In addition, the provisions of Section 2.2 (Retained Rights), 2.3 (Government Rights), 2.5 (Licensee's Improvements), 3.6 (if this Agreement expires and there are any continuing obligations under the Existing Licenses applicable to Licensee's continuing activities following expiration), Article 3 (Consideration) (with respect to any final reports or to the extent any amounts are due but unpaid), Section 3.7 (Reports and Records), Section 3.9 (Taxes and Withholding), Article 5 (Confidentiality), Article 6 (Term and Termination) except for Section 6.5, Section 8.3 (Disclaimer of Warranties, Damages), Section 8.4 (Indemnification), Section 8.5 (Insurance), Article 9 (Use of Name), and Article 10 (Additional Provisions) shall survive such termination or expiration of this Agreement in accordance with their respective terms.

ARTICLE 7: PATENT MAINTENANCE; PATENT INFRINGEMENT

7.1 Prosecution of Licensed Patents. As between Licensor and Licensee, the Parties agree as follows:

7.1.1 Licensor shall have the sole right, but not the obligation, to Prosecute patent applications and issued patents within Licensed Patents, in Licensor's sole discretion and at its own expense. Subject to Section 7.1.3, following the first Grant Date under this Agreement, Licensor shall provide Licensee with a reasonable opportunity to review and provide comments in connection with the Prosecution of the Licensed Patents; and Licensor shall keep Licensee reasonably informed as to all material developments with respect to such Licensed Patents and shall supply to Licensee copies of material communications received and filed in connection with the Prosecution of such Licensed Patents.

7.1.2 Nothing in this Agreement obligates Licensor to continue to Prosecute any patent applications or issued patents, and Licensee acknowledges that Licensor shall have no obligation to undertake any inter-party proceedings, such as oppositions or interferences, or to undertake any re-examination or re-issue proceedings, in either case, with respect to the Licensed Patents.

7.1.3 Licensee acknowledges that the Trustees of the University of Pennsylvania controls Prosecution of the Licensed Patents, with Licensor having certain rights to review.

Licensee acknowledges and agrees that (a) the rights and obligations under this Section 7.1 are subject to the rights of Licensor's licensors under the Existing Licenses, and (b) Licensor's obligations under this Agreement only apply to the extent of Licensor's rights with respect to participation in Prosecuting the Licensed Patents under the Existing Licenses.

7.2 Infringement Actions Against Third Parties.

7.2.1 Licensee is responsible for notifying Licensor promptly of any infringement of Licensed Patents (other than Retained Rights or, if applicable, Excluded Rights) that may come to Licensee's attention. Licensee and Licensor shall consult one another in a timely manner concerning any appropriate response to the infringement.

7.2.2 As between Licensor and Licensee, […***…] shall have the first right, but not the obligation, to prosecute any such infringement […***…]. In any action to enforce any of the Licensed Patents, […***…], at the request and expense of […***…], shall cooperate to the fullest extent reasonably possible, including in the event that, if […***…] is unable to initiate or prosecute such action solely in its own name, […***…] shall join such action voluntarily and shall execute all documents necessary to initiate litigation to prosecute, maintain, and settle such action.

7.2.3 Following the first Grant Date under this Agreement, if […***…] elects not to pursue any infringement of a Licensed Patent, then, to the extent that a Licensed Product is covered by any such Licensed Patent and such Licensed Patent is being infringed by another product […***…] (such infringement, the "[…***…] Infringement"), […***…] shall have the second right, but not the obligation, to prosecute such […***…] Infringement with respect to such other product […***…], at […***…] own expense. In any such action to enforce any of the Licensed Patents, […***…], at the request and expense of […***…], shall cooperate to the fullest extent reasonably possible, including in the event that, if […***…] is unable to initiate or prosecute such action solely in its own name, […***…] shall join such action voluntarily and shall execute all documents necessary to initiate litigation to prosecute and maintain such action. In prosecuting any such […***…] Infringement, […***…] (a) shall not take any actions that would be detrimental to the Licensed Patents and […***…] rights with respect thereto […***…] […***…] and (b) shall not settle any such Competitive Infringement without the prior consent of Licensor.

7.2.4 Any recovery of damages by Licensor for any infringement prior to any Grant Date shall be […***…]. After the first Grant Date under this Agreement, (a) any recovery of damages by […***…] for any infringement other than a […***…] Infringement shall be […***…]; and (b) any recovery of damages by the Party undertaking enforcement or defense of a suit for […***…] Infringement shall be applied, as between Licensor and Licensee but subject to the obligations to Licensor's licensors under the Existing Licenses, first to reimburse each such Party for costs and expenses (including reasonable attorneys' fees and costs) incurred by such Party in connection with such suit, and the balance remaining, if any, from any such recovery shall be […***…].

7.2.5 Licensee acknowledges and agrees that (a) the rights and obligations under this Section 7.2 are subject to the rights of Licensor's licensors under the Existing Licenses

(including any consent or approval rights or rights to control or participate in any enforcement actions); and (b) Licensor's obligations under this Agreement only apply to the extent that Licensor has any rights with respect to enforcing the Licensed Patents under the Existing Licenses. Furthermore, Licensee acknowledges the following:

7.2.5.1 All monies recovered upon the final judgment or settlement of any action with respect to […***…] Infringement will also need to be allocated to Licensor's licensors under the Existing Licenses (a) to reimburse the costs and expenses (including reasonable attorneys' fees and costs) of such licensors, (b) to take into account the royalties payable to such licensors; and (c) to take into account the relative extent of such licensors' financial participation in such action, if applicable.

7.2.5.2 Licensor's licensors under the Existing Licenses retain the continuing right to intervene at their own expense and join Licensor or Licensee in any claim or suit for infringement of the Licensed Patents.

7.2.5.3 In any infringement of the Licensed Patents prosecuted by Licensors' licensors under the Existing Licenses, all financial recoveries will be […***…].

7.2.5.4 In any infringement of the Licensed Patents prosecuted by Licensor's licensors under the Existing Licenses, […***…] agrees, at the request and expense of such licensors, to cooperate to the fullest extent reasonably possible, to the same extent as though […***…] were prosecuting such suit (as provided in this Section 7.2, including Section 7.2.2).

7.2.5.5 The written consent of […***…] under the […***…] will be required (a) for any decision that would have a materially adverse effect on the validity, scope of patent claims, or enforceability of the Licensed Patents and (b) for any settlement or compromise of any infringement suit that would impose any obligations or restrictions on any of […***…], or grants any rights to the Licensed Patents other than rights that […***…].

7.3 Defense of Infringement Claims.

7.3.1 In the event Licensee or Licensor becomes aware that Licensee's or any of its Affiliates' or any Sublicensees' practice of the Licensed Patents is the subject of a claim for patent infringement by a Third Party, that Party shall promptly notify the other, and the Parties shall consider the claim and the most appropriate action to take. Licensee shall cause each of its Affiliates and each Sublicensee to notify Licensee promptly in the event such entity becomes aware that its practice of the Licensed Patents is the subject of a claim of patent infringement by another.

7.3.2 To the extent Licensor takes any action, Licensor (or its licensors under the Existing Licenses) shall have the right to require Licensee's reasonable cooperation in any such suit, upon written notice to Licensee; and Licensee shall have the obligation to participate upon Licensor's request, in which event, […***…]. Without Licensor's prior written permission, Licensee must not settle or compromise any such

suit in a manner that imposes any material obligations or restrictions on Licensor or any of its licensors under the Existing Licenses or grants any rights to the Licensed Patents other than rights that Licensee has the right to grant under this Agreement.

ARTICLE 8: WARRANTIES; INDEMNIFICATION

8.1 Warranty by Licensor. Licensor represents and warrants to Licensee as of the Execution Date:

8.1.1 Licensor has the right, power, and authority to enter into this Agreement and to grant to Licensee the rights specified in this Agreement;

8.1.2 This Agreement when executed shall become the legal, valid, and binding obligation of it, enforceable against it, in accordance with its terms;

8.1.3 There are no actions, suits, proceedings, or arbitrations pending or, to Licensor's knowledge, threatened against Licensor relating to the Licensed Technology that would impact activities under this Agreement;

8.1.4 Licensor has provided to Licensee true, correct, and complete copies of the Existing Licenses;

8.1.5 To Licensor's knowledge, the Licensed Patents are solely owned by the Trustees of the University of Pennsylvania;

8.1.6 Licensor has not received any written notice from any of its licensors under the Existing Licenses informing Licensor that there are any actions, suits, proceedings, or arbitrations pending against such licensors relating to the Licensed Patents that would impact activities under this Agreement; and

8.1.7 To Licensor's knowledge, the Existing Licenses are in full force and effect and Licensor is not in breach of any provisions thereof.

8.2 Warranty by Licensee. Licensee represents and warrants to Licensor as of the Execution Date that:

8.2.1 Licensee has the right, power, and authority to enter into this Agreement and to grant the rights granted by it hereunder;

8.2.2 This Agreement when executed shall become the legal, valid, and binding obligation of it, enforceable against it, in accordance with its terms;

8.2.3 Licensee has the ability and the resources, including financial resources, necessary to carry out its obligations under this Agreement; and

8.2.4 There are no actions, suits, proceedings, or arbitrations pending or, to Licensee's knowledge, threatened against Licensee that would impact activities under this Agreement.

8.3 Disclaimer of Warranties, Damages. EXCEPT AS SET FORTH IN SECTIONS 8.1 AND 8.2, THE LICENSED TECHNOLOGY, LICENSED PRODUCTS, AND ALL RIGHTS LICENSED BY EITHER PARTY TO THE OTHER UNDER THIS AGREEMENT ARE PROVIDED ON AN "AS IS" BASIS, AND NEITHER PARTY MAKES ANY REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, WITH RESPECT THERETO. BY WAY OF EXAMPLE BUT NOT OF LIMITATION, EXCEPT AS SET FORTH IN SECTIONS 8.1 AND 8.2, NEITHER PARTY MAKES ANY REPRESENTATIONS OR WARRANTIES, AND HEREBY DISCLAIMS ALL EXPRESS AND IMPLIED REPRESENTATIONS AND WARRANTIES, (i) OF COMMERCIAL UTILITY, ACCURACY, COMPLETENESS, PERFORMANCE, MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, VALIDITY OR ENFORCEABILITY OF ANY RIGHTS LICENSED BY EITHER PARTY TO THE OTHER, AND PROFITABILITY; OR (ii) THAT THE USE OF ANY RIGHTS GRANTED BY EITHER PARTY TO THE OTHER, INCLUDING ANY PRODUCTS RESULTING THEREFROM, WILL NOT INFRINGE ANY PATENT, COPYRIGHT, TRADEMARK, OR OTHER PROPRIETARY RIGHTS OF THIRD PARTIES. EXCEPT AS SET FORTH IN THIS AGREEMENT, NEITHER PARTY OR ANY OF SUCH PARTY'S DIRECT OR INDIRECT LICENSORS SHALL BE LIABLE TO THE OTHER PARTY, ITS SUCCESSORS OR ASSIGNS, OR ANY SUBLICENSEES OF EITHER PARTY, OR ANY THIRD PARTY WITH RESPECT TO: (a) ANY CLAIM ARISING FROM USE OF ANY OR ALL RIGHTS LICENSED UNDER THIS AGREEMENT OR FROM THE DEVELOPMENT, TESTING, MANUFACTURE, USE, OR SALE OF PRODUCTS ARISING THEREFROM; OR (b) ANY CLAIM FOR LOSS OF PROFITS, LOSS OR INTERRUPTION OF BUSINESS, OR FOR INDIRECT, SPECIAL, INCIDENTAL, PUNITIVE, OR CONSEQUENTIAL DAMAGES OF ANY KIND, INCLUDING ANY ARISING FROM OR RELATING TO ANY BREACH OF THIS AGREEMENT OR THE EXERCISE OF RIGHTS HEREUNDER, REGARDLESS OF ANY NOTICE OF SUCH DAMAGES. NOTHING IN THIS SECTION 8.3 IS INTENDED TO LIMIT OR RESTRICT THE INDEMNIFICATION RIGHTS OR OBLIGATIONS OF EITHER PARTY UNDER SECTION 8.4 OR TO LIMIT A PARTY'S LIABILITY FOR BREACHES OF ITS OBLIGATION REGARDING CONFIDENTIALITY UNDER ARTICLE 5.

8.4 Indemnification.

8.4.1 By Licensee. Licensee shall defend, indemnify, and hold harmless Licensor, its Affiliates, sublicensees, the licensors under the Existing Licenses, and their respective shareholders, members, partners, officers, trustees, faculty, students, contractors, agents, and employees (individually, a "Licensor Indemnified Party" and, collectively, the "Licensor Indemnified Parties") from and against any and all Third Party liability, loss, damage, action, claim, fee, cost, or expense (including attorneys' fees) (individually, a "Third Party Liability" and, collectively, the "Third Party Liabilities") suffered or incurred by the Licensor Indemnified Parties from claims of such Third Parties that result from or arise out of: […***…]; provided, however, that Licensee shall not be liable for claims based

on any breach by Licensor of the representations, warranties, or obligations of this Agreement or the gross negligence or intentional misconduct of any of the Licensor Indemnified Parties. Without limiting the foregoing, Licensee must defend, indemnify, and hold harmless the Licensor Indemnified Parties from and against any Third Party Liabilities resulting from:

(a) any […***…] or other claim of any kind related to the […***…] by a Third Party of a […***…] by Licensee, its Affiliates, any Sublicensees, their respective assignees, or vendors;

(b) any claim by a Third Party that the […***…]; and

(c) […***…] conducted by or on behalf of Licensee, its Affiliates, any Sublicensees, their respective assignees, or vendors relating to the Licensed Technology or Licensed Products, including any claim by or on behalf of a […***…].

8.4.2 By Licensor. Licensor shall defend, indemnify, and hold harmless Licensee, its Affiliates and Sublicensees and their respective shareholders, members, partners, officers, trustees, contractors, agents, and employees (individually, a "Licensee Indemnified Party" and, collectively, the "Licensee Indemnified Parties") from and against any and all Third Party Liabilities suffered or incurred by the Licensee Indemnified Parties from claims of such Third Parties that result from or arise out of: […***…]; provided, however, that Licensor shall not be liable for claims based on any breach by Licensee of the representations, warranties, or obligations of this Agreement or the gross negligence or intentional misconduct of any of the Licensor Indemnified Parties.

8.4.3 Indemnification Procedure. Each Party, as an indemnifying party (an "Indemnifying Party"), shall not be permitted to settle or compromise any claim or action giving rise to Third Party Liabilities in a manner (i) that imposes any restrictions or obligations on the indemnified party (an "Indemnified Party") or, if Licensee is the Indemnifying Party, on Licensor's licensors under the Existing Licenses, without the other Party's prior written consent, (ii) if Licensee is the Indemnifying Party, that grants any rights to the Licensed Technology or Licensed Products other than those Licensee has the right to grant under this Agreement without Licensor's prior written consent, or (iii) if Licensor is the Indemnifying Party, that grants any rights that are inconsistent with those granted to Licensee under this Agreement without Licensee's prior written consent. The Indemnifying Party shall be permitted to control any

litigation or potential litigation involving the defense of any claim subject to indemnification pursuant to this Section 8.4, including the selection of counsel, with the reasonable approval of the Indemnified Party. If an Indemnifying Party fails or declines to assume the defense of any such claim or action within […***…] after notice thereof, the Indemnified Party may assume the defense of such claim or action at the cost and risk of the Indemnifying Party, and any Third Party Liabilities related thereto shall be conclusively deemed a Third Party Liability of the Indemnifying Party. The indemnification rights of a Indemnified Party contained in this Agreement are in addition to all other rights which such Indemnified Party may have at law or in equity or otherwise. The Indemnifying Party will pay directly all Third Party Liabilities incurred for defense or negotiation of any claim hereunder or will reimburse the Indemnified Party for all documented Third Party Liabilities incident to the defense or negotiation of any such claim within […***…] after the Indemnifying Party's receipt of invoices for such fees, expenses, and charges.

8.5 Insurance. Within […***…] of the Execution Date, Licensee will procure and maintain insurance policies for the following coverages with respect to product liability, personal injury, bodily injury, and property damage arising out of Licensee's (and its Affiliates' and any Sublicensees') performance under this Agreement: (a) during the term of this Agreement, comprehensive general liability, including broad form and contractual liability, in a minimum amount of […***…] combined single limit per occurrence (or claim) and in the aggregate annually; (b) prior to the commencement of clinical trials involving Licensed Products and thereafter for a period of not less than […***…] (or such longer period as Licensee is required by applicable law to continue to monitor the participants in the clinical trial), clinical trials coverage in amounts that are reasonable and customary in the U.S. pharmaceutical industry, subject always to a minimum limit of […***…] combined single limit per occurrence (or claim) and in the aggregate annually; and (c) from […***…] of a Licensed Product until […***…] after the last sale of a Licensed Product, product liability coverage, in amounts that are reasonable and customary in the U.S. pharmaceutical industry, subject always to a minimum limit of […***…] combined single limit per occurrence (or claim) and in the aggregate annually. Licensee acknowledges that Licensor's licensors under the Existing Licenses may review periodically the adequacy of the minimum amounts of insurance for each coverage required by the Existing Licenses, and Licensor reserves the right to require Licensee to adjust the limits set forth in this Section 8.5 to conform to any adjustments made by Licensor's licensors under the Existing Licenses. The required minimum amounts of insurance do not constitute a limitation on Licensee's liability or indemnification obligations to the Licensor Indemnified Parties under this Agreement. The policies of insurance required by this Section 8.5 will be issued by an insurance carrier with an A.M. best rating of […***…] or better and will name Licensor as an additional insured with respect to Licensee's performance (and its Affiliates' and any Sublicensees') under this Agreement. Licensee will provide Licensor with insurance certificates evidencing the required coverage within […***…] after the Execution Date and the commencement of each policy period and any renewal periods. Each certificate will provide that the insurance carrier will notify Licensor in writing at least […***…] prior to the cancellation or material change in coverage. Licensee will cause all Sublicensees to comply with the terms of this Section 8.5 to the same extent as Licensee; provided that, with Licensor's prior written consent, a Sublicensee may self-insure all or parts of the limits described above.

ARTICLE 9: USE OF NAME

Licensee, its Affiliates, any Sublicensees, and all of its and their employees and agents must not use Licensor's, the Trustees of the University of Pennsylvania's, or SmithKline Beecham Corporation's name, seal, logo, trademark, or service mark (or any adaptation thereof) or the name, seal, logo, trademark, or service mark (or any adaptation thereof) of any of such entities' representative, school, organization, employee, or student in any way without the prior written consent of Licensor or such entity, as applicable; provided, however that Licensee may acknowledge the existence and general nature of this Agreement.

ARTICLE 10: ADDITIONAL PROVISIONS

10.1 Relationship. Nothing in this Agreement shall be deemed to establish a relationship of principal and agent between Licensee and Licensor, nor any of their agents or employees for any purpose whatsoever, nor shall this Agreement be construed as creating any other form of legal association or arrangement which would impose liability upon one Party for the act or failure to act of the other Party.

10.2 Assignment. The rights and obligations of Licensee and Licensor hereunder shall inure to the benefit of, and shall be binding upon, their respective permitted successors and assigns. Licensee may not assign this Agreement or any of its rights or obligations under this Agreement without the prior written consent of Licensor; provided, however, that Licensee may assign this Agreement, without Licensor's prior written consent, pursuant to a merger or sale of all or substantially all of the assets to which this Agreement relates; provided that, as part of any permitted assignment, (a) Licensee provides Licensor with notice of such assignment at least five business days prior to the effectiveness of such assignment, and (b) Licensee requires any such assignee to agree in writing to be legally bound by this Agreement to the same extent as Licensee and provides Licensor with a copy of such assignee undertaking. In addition, Licensee will provide Licensor with notice of any change of control (i.e., the acquisition by a person or group of "control" of Licensee, as defined in Section 1.1) of Licensee at least five business days prior to the effectiveness of such change of control. Licensor may assign this Agreement and its rights and obligations without the consent of Licensee. No assignment shall relieve the assigning Party of responsibility for the performance of any accrued obligations which it has prior to such assignment. Any attempted assignment by Licensee in violation of this Section 10.2 shall be null and void and of no legal effect.

10.3 Waiver. A waiver by either Party of a breach of any provision of this Agreement will not constitute a waiver of any subsequent breach of that provision or a waiver of any breach of any other provision of this Agreement.

10.4 Notices. Notices, payments, statements, reports, and other communications under this Agreement shall be in writing and shall be deemed to have been received as of the date received if sent by public courier (e.g., Federal Express), by Express Mail, receipt requested, or by facsimile (with a copy of such facsimile also sent by one of the other methods of delivery) and addressed as follows:

If for Licensor:

REGENXBIO Inc.
1701 Pennsylvania Avenue, NW
Suite 900
Washington, DC 20006
USA
Attn: Chief Executive Officer
Telephone: 202-785-7438
Facsimile: 202-785-7439

with a copy to:

REGENXBIO Inc.
1701 Pennsylvania Avenue, NW
Suite 900
Washington, DC 20006
USA
Attn: General Counsel
Telephone: 202-785-7438
Facsimile: 202-785-7439

If for Licensee:

Dimension Therapeutics, Inc.
840 Memorial Drive, 4th Floor
Cambridge, MA 02139
USA
Attn: President and CEO
Telephone: 617-231-2403
Facsimile: 617-231-2425

Either Party may change its official address upon written notice to the other Party.

General communications required under this Agreement (including notices under Sections 2.1, 2.4.2, 2.5.3, 2.6, 2.7.1, 3.6.2, 3.7, 4.2, 4.3, 4.4, 4.6, 7.1, 7.2, 7.3, 8.5, and 10.2 and notices of changes of address under this Section 10.4) may be sent by any of the means outlined in the first sentence of this Section 10.4 or a copy of the notice letter may be sent by electronic mail (without the requirement of a copy being sent by another means; provided that the receiving Party has confirmed receipt of such electronic mail); however, communications related to termination of the Penn Agreement, requests for disclosures of Confidential Information, breaches or termination of this Agreement, indemnification, and dispute resolution (including notices under Sections 2.8, 5.3, 6.2, 6.3, 6.4, 6.5, 8.4, and 10.6) must be sent by one of the means outlined in the first sentence of this Section 10.4.

10.5 Applicable Law. This Agreement shall be construed and governed in accordance with the laws of the State of New York, without giving effect to conflict of law provisions that may require the application of the laws of another jurisdiction. Subject to Section 10.6, the Parties hereby submit to the exclusive jurisdiction of and venue in the courts located in the State of New York with respect to any and all disputes concerning the subject of this Agreement.

10.6 Dispute Resolution. In the event of any controversy or claim arising out of or relating to this Agreement, the Parties shall first attempt to resolve such controversy or claim through good faith negotiations between senior executives of each Party with authority to resolve the dispute for a period of not less than […***…] following notification of such controversy or claim to the other Party. If such controversy or claim cannot be resolved by means of such negotiations during such period, then such controversy or claim shall be resolved by binding arbitration administered by the

American Arbitration Association ("AAA") in accordance with the Commercial Arbitration Rules of the AAA in effect on the date of commencement of the arbitration, subject to the provisions of this Section 10.6. The arbitration shall be conducted as follows:

10.6.1 The arbitration shall be conducted by three arbitrators, each of whom by training, education, or experience has knowledge of the research, development, and commercialization of biological therapeutic products in the United States. The arbitration shall be conducted in English and held in New York, New York.

10.6.2 In its demand for arbitration, the Party initiating the arbitration shall provide a statement setting forth the nature of the dispute, the names and addresses of all other parties, an estimate of the amount involved (if any), the remedy sought, otherwise specifying the issue to be resolved, and appointing one neutral arbitrator. In an answering statement to be filed by the responding Party within […***…] after confirmation of the notice of filing of the demand is sent by the AAA, the responding Party shall appoint one neutral arbitrator. Within […***…] from the date on which the responding Party appoints its neutral arbitrator, the first two arbitrators shall appoint a chairperson.

10.6.3 If a Party fails to make the appointment of an arbitrator as provided in Section 10.6.2, the AAA shall make the appointment. If the appointed arbitrators fail to appoint a chairperson within the time specified in Section 10.6.2 and there is no agreed extension of time, the AAA shall appoint the chairperson.

10.6.4 The arbitrators will render their award in writing and, unless all Parties agree otherwise, will include an explanation in reasonable detail of the reasons for their award. Judgment upon the award rendered by the arbitrators may be entered in any court having jurisdiction thereof, including in the courts described in Section 10.5. The arbitrators will have the authority to grant injunctive relief and other specific performance; provided that the arbitrators will have no authority to award damages in contravention of this Agreement, and each Party irrevocably waives any claim to such damages in contravention of this Agreement. The arbitrators will, in rendering their decision, apply the substantive law of the State of New York, without giving effect to conflict of law provisions that may require the application of the laws of another jurisdiction. The decision and award rendered by the arbitrators will be final and non-appealable (except for an alleged act of corruption or fraud on the part of the arbitrator).

10.6.5 The Parties shall use their reasonable efforts to conduct all dispute resolution procedures under this Agreement as expeditiously, efficiently, and cost-effectively as possible.

10.6.6 All expenses and fees of the arbitrators and expenses for hearing facilities and other expenses of the arbitration will be borne equally by the Parties unless the Parties agree otherwise or unless the arbitrators in the award assess such expenses against one of the Parties or allocate such expenses other than equally between the Parties. Each of the Parties will bear its own counsel fees and the expenses of its witnesses except to the extent otherwise provided in this Agreement or by applicable law.

10.6.7 Compliance with this Section 10.6 is a condition precedent to seeking relief in any court or tribunal in respect of a dispute, but nothing in this Section 10.6 will prevent a Party

from seeking equitable or other interlocutory relief in the courts of appropriate jurisdiction, pending the arbitrators' determination of the merits of the controversy, if applicable to protect the confidential information, property, or other rights of that Party or to otherwise prevent irreparable harm that may be caused by the other Party's actual or threatened breach of this Agreement.

10.7 No Discrimination. Licensee, its Affiliates, and any Sublicensees, in their respective activities under this Agreement, shall not discriminate against any employee or applicant for employment because of race, color, sex, sexual, or affectional preference, age, religion, national, or ethnic origin, handicap, or because he or she is a disabled veteran or a veteran (including a veteran of the Vietnam Era).

10.8 Compliance with Law. Licensee (and its Affiliates' and any Sublicensees') must comply with all prevailing laws, rules, and regulations that apply to its activities or obligations under this Agreement. Without limiting the foregoing, it is understood that this Agreement may be subject to United States laws and regulations controlling the export of technical data, computer software, laboratory prototypes, and other commodities, articles, and information, including the Arms Export Control Act as amended in the Export Administration Act of 1979 and that Licensee's obligations are contingent upon compliance with applicable United States export laws and regulations. The transfer of certain technical data and commodities may require a license from the cognizant agency of the United States Government and/or written assurances by Licensee that Licensee shall not export data or commodities to certain foreign countries without prior approval of such agency. Licensor neither represents that a license is not required nor that, if required, it will issue.

10.9 Entire Agreement. This Agreement embodies the entire understanding between the Parties relating to the subject matter hereof and supersedes all prior understandings and agreements, whether written or oral, including the provisions of Section 6.16 and Exhibit B of the Series A SPA; provided that this Agreement does not supersede any other confidentiality agreements or obligations between the Parties, and, for the avoidance of doubt, this Agreement does not supersede the 2013 License Agreement. For clarity, the rights and obligations of the Parties under this Agreement are separate from and in addition to those under the 2013 License Agreement, and nothing in this Agreement shall be construed as modifying or restricting the rights of either Party under the 2013 License Agreement. This Agreement may not be varied except by a written document signed by duly authorized representatives of both Parties.

10.10 Marking. Licensee, its Affiliates, and any Sublicensees shall mark any Licensed Product (or their containers or labels) made, sold, or otherwise distributed by it or them with any notice of patent rights necessary or desirable under applicable law to enable the Licensed Patents to be enforced to their full extent in any country where Licensed Products are made, used, sold, offered for sale, or imported.

10.11 Severability and Reformation. If any provision of this Agreement is held to be invalid or unenforceable by a court of competent jurisdiction, then such invalid or unenforceable provision will be automatically revised to be a valid or enforceable provision that comes as close as permitted by law to the Parties' original intent; provided that, if the Parties cannot agree upon such valid or enforceable provision, the remaining provisions of this Agreement will remain in full

force and effect, unless the invalid or unenforceable provisions are of such essential importance to this Agreement that it is to be reasonably assumed that the Parties would not have entered into this Agreement without the invalid or unenforceable provisions.

10.12 Further Assurances. Each Party hereto agrees to execute, acknowledge, and deliver such further instruments, and to do all other acts, as may be necessary or appropriate in order to carry out the purposes and intent of this Agreement.

10.13 Interpretation; Construction. The captions to the several Articles and Sections of this Agreement are included only for convenience of reference and shall not in any way affect the construction of, or be taken into consideration in interpreting, this Agreement. In this Agreement, unless the context requires otherwise, (a) the word "including" shall be deemed to be followed by the phrase "without limitation" or like expression; (b) references to the singular shall include the plural and vice versa; (c) references to masculine, feminine, and neuter pronouns and expressions shall be interchangeable; (d) the words "herein" or "hereunder" relate to this Agreement; (e) "or" is disjunctive but not necessarily exclusive; (f) the word "will" shall be construed to have the same meaning and effect as the word "shall"; (g) all references to "dollars" or "$" herein shall mean U.S. Dollars; (h) unless otherwise provided, all reference to Sections and exhibits in this Agreement are to Sections and exhibits of and in this Agreement; and (i) whenever this Agreement refers to a number of days, such number shall refer to calendar days unless business days are specified. Business days shall mean a day on which banking institutions in Washington, D.C. are open for business. Each Party represents that it has been represented by legal counsel in connection with this Agreement and acknowledges that it has participated in the drafting hereof. In interpreting and applying the terms and provisions of this Agreement, the Parties agree that no presumption will apply against the Party which drafted such terms and provisions.

10.14 Cumulative Rights and Remedies. The rights and remedies provided in this Agreement and all other rights and remedies available to either Party at law or in equity are, to the extent permitted by law, cumulative and not exclusive of any other right or remedy now or hereafter available at law or in equity. Neither asserting a right nor employing a remedy shall preclude the concurrent assertion of any other right or employment of any other remedy, nor shall the failure to assert any right or remedy constitute a waiver of that right or remedy.

10.15 Counterparts. This Agreement may be executed in one or more counterparts, each of which will be deemed an original, but all of which together will constitute one and the same instrument.

[**REMAINDER OF PAGE INTENTIONALLY LEFT BLANK**]

IN WITNESS WHEREOF, the Parties, intending to be legally bound, have caused this Option and License Agreement to be executed by their duly authorized representatives.

REGENXBIO INC.		DIMENSION THERAPEUTICS, INC.	
By:	/s/ Kenneth Mills	By:	/s/ Annalisa Jenkins
Name:	Kenneth Mills	Name:	Annalisa Jenkins
Title:	President & CEO	Title:	CEO Dimension

Exhibit A

Licensed Patents

App #	Title	Inventors	Nos.	Penn Docket #
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]

Exhibit B
Licensed Know-How

[To be completed pursuant to Section 2.1.3.4]

Exhibit C
Muscular Dystrophies

Duchenne Muscular Dystrophy (DMD) (Also known as Pseudohypertrophic)

Becker Muscular Dystrophy (BMD)

Emery-Dreifuss Muscular Dystrophy (EDMD)

Limb-Girdle Muscular Dystrophy (LGMD)

Facioscapulohumeral Muscular Dystrophy {FSH or FSHD) (Also known as Landouzy-Dejerine)

Myotonic Dystrophy (MMD) (Also known as DM or Steinert Disease)

Oculopharyngeal Muscular Dystrophy (OPMD)

Distal Muscular Dystrophy (DD) (Miyoshi)

Congenital Muscular Dystrophy (CMD)

Exhibit D
Licensed Indications

Licensed Indication	Grant Date	Excluded Rights

Exhibit E
Press Release

*** Confidential Treatment Requested ***

Exhibit F
Additional Licensor Representation and Warranty

Except as provided in the Availability Notice, Licensor represents and warrants as of the Grant Date for the applicable Licensed Indication that: to Licensor's knowledge, with respect to the license granted under Section 2.1.4 for such Licensed Indication, Licensor does not Control (through ownership or Control pursuant to the Existing Licenses) any patent or patent application (other than the Licensed Patents set forth on Exhibit A) as of the Effective Date that would necessarily be infringed by Licensee's practice of the Licensed Patents set forth on Exhibit A in connection with using, importing selling, and offering for sale of adeno-associated virus vectors claimed in such Licensed Patents for such Licensed Indication. If it is determined, in accordance with the procedure of this Exhibit F, that Licensor Controls (through ownership or Control pursuant to the Existing Licenses) a patent or patent application (other than the Licensed Patents) as of the Effective Date that would necessarily be infringed by Licensee's practice of the Licensed Patents set forth on Exhibit A in connection with using, importing selling, and offering for sale of adeno-associated virus vectors claimed in such Licensed Patents for such Licensed Indication, then Licensor shall include the applicable patent or patent application as a "Licensed Patent" hereunder with respect to such Licensed Indication but solely to the extent of the claim(s) that would necessarily be infringed by such practice of such Licensed Patents by Licensee, which inclusion shall be Licensee's sole remedy.

At any time after the Grant Date for such Licensed Indication and during the term of this Agreement for such Licensed Indication, Licensee may notify Licensor in writing of any such patent or patent application that Licensee believes should be included as a "Licensed Patent" pursuant to this Exhibit F. Such written notice shall identify the relevant patent or patent application and relevant claim(s) and shall explain briefly why Licensee, in good faith, believes it should be included as a "Licensed Patent." If Licensor does not agree with Licensee, Licensor shall have […***…] following Licensor's receipt of Licensee's written notice to notify Licensee that Licensor disputes the inclusion of such patent or patent application or the scope of the remedy; in which event, such dispute will be resolved in accordance with Section 10.6 of the Agreement. Upon the Parties' agreement (or a resolution, in favor of Licensee, of the dispute pursuant to Section 10.6), the applicable claim(s) of the applicable patent or patent application will be deemed a "Licensed Patent" hereunder with respect to the applicable Licensed Indication. For the avoidance of doubt, Licensor makes no representation or warranty under this Exhibit F as to any claim of (a) a patent or patent application covering Manufacturing Technology or (b) a patent or patent application that is not Controlled by Licensor pursuant to the Existing Licenses or pursuant to Licensor's ownership thereof, and Licensee acknowledges that (i) Manufacturing Technology claims of any patents or patent applications or (ii) claims of any patents or patent applications not Controlled by Licensor pursuant to the Existing Licenses or pursuant to Licensor's ownership thereof will not be added as "Licensed Patents" pursuant to the procedure set forth in this Exhibit F.

Exhibit 10.15

Execution Version

***Text Omitted and Filed Separately with the Securities and Exchange Commission
Confidential Treatment Requested Under
17 C.F.R. Sections 200.80(b)(4) and 240.24b-2

COLLABORATION AND LICENSE AGREEMENT

This COLLABORATION AND LICENSE AGREEMENT ("Agreement") is entered into as of June 18, 2014 ("Effective Date") by and between Dimension Therapeutics, Inc., a corporation organized under the laws of the State of Delaware, with offices at 1 Main Street, 13th Floor, Cambridge, MA 02142 ("Dimension"), and Bayer HealthCare LLC, a limited liability company organized under the laws of the State of Delaware, with offices at 455 Mission Bay Blvd South, San Francisco, CA 94158 ("Bayer"). Dimension and Bayer are hereinafter referred to individually as a "Party" and collectively as the "Parties."

WHEREAS, Dimension has been granted exclusive rights by its licensor, ReGenX Biosciences, LLC ("ReGenX") under certain patents and know-how which have been licensed to ReGenX from its upstream licensors, Glaxo SmithKline (as successor in interest to SmithKline Beecham Corporation, "GSK") and the Trustees of the University of Pennsylvania ("UPenn"), pertaining to various recombinant adeno-associated virus vectors and their use in gene therapy treatments for hemophilia;

WHEREAS, Dimension has expertise in the research, identification and early stage development of gene therapy treatments in humans;

WHEREAS, Bayer is a leading pharmaceutical company that has technology and expertise in developing and commercializing therapies for human genetic diseases, including hemophilia; and WHEREAS, the Parties desire to enter into a collaboration for the purpose of researching, developing and commercializing adeno-associated virus based gene therapy products for treatment of hemophilia A;

NOW, THEREFORE, in consideration of the promises and covenants contained in this Agreement, and intending to be legally bound, the Parties hereby agree as follows:

ARTICLE 1

DEFINITIONS

1.1 "[…***…] Expense Report" has the meaning set forth in Section 2.5.1.

1.2 "Affiliate" means any legal entity directly or indirectly controlling, controlled by, or under common control with another entity. For purposes of this Agreement, an entity shall be deemed to "control" another entity if it owns or controls, directly or indirectly, more than 50% of the outstanding voting securities of such other entity, or has the right to receive more than 50% of the profits or earnings of such other entity, or has the right to control the policy decisions of such other entity.

1.3 "Antihemophilic Factor" means the MAA-approved exogenous recombinant antihemophilic factor (i.e., rFVIII) labeled for use in the Field and administered by or on behalf of Bayer, its Affiliates or Sublicensees to a patient for prophylactic and non-interventional purposes.

1.4 "Biosimilar Treatment" means on a country-by-country basis, a treatment that is introduced in the applicable country in the Territory by an entity other than Bayer or a Sublicensee or their respective Affiliates, which (a) contains or incorporates a therapeutic or prophylactic agent that is the same or equivalent (by FDA, EMA or other applicable Regulatory Authority standards, on a country-by-country basis) to the Licensed GT Product; and (b) has been granted Regulatory Approval by an abridged procedure in reliance in whole or in part on (i) the prior Regulatory Approval in such country of the Licensed GT Product and Licensed Treatment, or (ii) the safety and efficacy data generated for the prior Regulatory Approval for such Licensed Treatment or Licensed GT Product.

1.5 "Business Day" means a day other than a Saturday, Sunday or any day on which commercial banks located in California, New Jersey, and Massachusetts are authorized or obligated by law to be closed.

1.6 "Calendar Quarter" means each three-month period or any portion thereof, beginning on January 1, April 1, July 1, and October 1.

1.7 "Change of Control" means, with respect to a Party (the "Acquired Entity"):

(a) any sale, exchange, transfer, or issuance to or acquisition in one transaction or a series of related transactions by one or more Third Parties of shares representing more than fifty percent (50%) of the aggregate ordinary voting power entitled to vote for the election of directors represented by the issued and outstanding stock of the Acquired Entity or any Affiliate that directly or indirectly controls the Acquired Entity, whether such sale, exchange, transfer, issuance or acquisition is made directly or indirectly, by merger or otherwise, or beneficially or of record;

(b) a merger, consolidation, reorganization, business organization, joint venture or similar transaction under applicable Law of the Acquired Entity with a Third Party in which the shareholders of the Acquired Entity or any Affiliate that directly or indirectly controls the Acquired Entity immediately prior to such transaction do not continue to hold immediately following the closing of such transaction at least fifty percent (50%) of the aggregate ordinary voting power entitled to vote for the election of directors represented by the issued and outstanding stock of the entity surviving or resulting from such transaction; or

(c) a sale or other disposition of all or substantially all of the assets of the Acquired Entity to one or more Third Parties in one transaction or a series of related transactions.

For purposes of clarity, the term "Change of Control," with respect to a Party, is not intended to include: (i) an underwritten public offering of Dimension's common stock pursuant to a Registration Statement on Form S-1 under the 1933 Act, as amended; or (ii) any sale of shares of capital stock of a Party, in a single transaction or series of related transactions, principally for bona fide equity financing purposes in which such Party issues new securities solely to institutional investors for cash or the cancellation or conversion of indebtedness of such Party or a combination thereof for the purpose of financing the operations and business of such Party.

1.8 "Commercialization" or "Commercialize" means any and all activities directed to the marketing, promotion, offering for sale and sale of a pharmaceutical or therapeutic product, both, to the extent permitted by law, before Regulatory Approval has been obtained, and after, and all commercial manufacturing activities, as well as any post-Regulatory Approval clinical trials. When used as a verb, "to Commercialize" and "Commercializing" means to engage in Commercialization and "Commercialized" has a corresponding meaning.

1.9 "Commercially Reasonable Efforts" means: (a) with respect to Dimension's obligation under this Agreement to research and develop GT Products in the Field, the level of efforts normally used by a similarly situated biopharmaceutical company in meeting the objective(s) set forth in the Research Plan; and (b) with respect to Bayer's obligation under this Agreement to Commercialize a Licensed GT Product and Licensed Treatments, the level of efforts and resources normally used by Bayer for a similar product owned or controlled by it of similar market potential at a similar stage in the development or life of such product, taking into account issues of safety, efficacy, product profile, the competitiveness of the marketplace, the proprietary position of the product, the regulatory structure involved, profitability of the product and other relevant commercial factors.

1.10 "Compound/Vector" means any gene transfer agent that contains a gene that expresses either (a) the Factor VIII protein, or (b) any variant of the Factor VIII protein (*e.g.*, […***…]).

1.11 "Confidential Information" means and includes all technical information, inventions, developments, discoveries, software, Know-How, methods, techniques, formulae, animate and inanimate materials, data, processes, finances, business operations or affairs, and other proprietary ideas, whether or not patentable or copyrightable, of either Party that are (a) marked or otherwise identified by the Disclosing Party as confidential or proprietary at the time of disclosure in writing; or (b) if disclosed orally, visually, or in another non-written form, identified by the Disclosing Party as confidential at the time of disclosure; or (c) if not marked as provided in clause (a) or otherwise identified as provided in clause (b), would reasonably be understood by a Third Party receiving such information as being confidential or proprietary in nature. The Parties acknowledge that (i) the terms and conditions of this Agreement and (ii) the records and reports referred to in Section 6.5 will be deemed the Confidential Information of both Parties, regardless of whether such information is marked or identified as confidential. In addition, information provided to Bayer pursuant to the provisions of Section 10.2 will be deemed the Confidential Information of Dimension, regardless of whether such information is marked or identified as confidential. Notwithstanding the foregoing, Confidential Information

will not include the following, in each case, to the extent evidenced by competent written proof of the Receiving Party:

1.11.1 information that was already known to the Receiving Party other than under an obligation of confidentiality at the time of disclosure by the Disclosing Party;

1.11.2 information that was generally available to the public or otherwise part of the public domain at the time of its disclosure to the Receiving Party;

1.11.3 information that became generally available to the public or otherwise part of the public domain after its disclosure, other than through any act or omission of the Receiving Party in breach of this Agreement;

1.11.4 information that is independently discovered or developed by the Receiving Party without the use of Confidential Information of the Disclosing Party; or

1.11.5 information that was disclosed to the Receiving Party, other than under an obligation of confidentiality, by a Third Party who had no obligation to the Disclosing Party not to disclose such information to others.

1.12 "Control" or "Controlled" means with respect to any Know-How, Patent Rights or other intellectual property right, that a Party has a license (other than a license granted to such Party under this Agreement) to such Know-How, Patent Rights or other intellectual property right and, in each case, has the ability to grant to the other Party access, a license, or a sublicense (as applicable) to the foregoing on the terms and conditions set forth in this Agreement without violating the terms of any agreement or other legally enforceable arrangement with any Third Party.

1.13 "Controlled Affiliate" means, as to any Party, an Affiliate under the direct or indirect control of such Party, within the meaning of Section 1.2.

1.14 "Controlling Affiliate" means, as to any Party, an Affiliate that directly or indirectly controls such Party within the meaning of Section 1.2.

1.15 "Cost Overrun" has the meaning set forth in Section 2.5.3.

1.16 "Demonstration of Clinical POC" means that the criteria set forth in Exhibit E have been met, as determined by the Parties in accordance with Section 2.11.4.

1.17 "Dimension Know-How" means any Know-How that (a) is Controlled by Dimension or any of its Controlled Affiliates as of the Effective Date or comes into the Control of Dimension or any of its Controlled Affiliates after the Effective Date and at any time during the term of this Agreement (other than through the grant of a license by Bayer hereunder), (b) is reasonably necessary or useful for the development, manufacture or Commercialization of Licensed GT Products, Licensed Treatments, or for Bayer to perform its obligations under this Agreement, and (c) is neither (i) Sublicensed Know-How, nor (ii) any Manufacturing Technology which is other than […***…] Know-How, and that comes into the Control of

Dimension under the ReGenX Agreement or another agreement with ReGenX. "Dimension Know-How" includes but is not limited to all biological, chemical, structure-activity relationship, pharmacological, toxicological, manufacturing, preclinical and clinical information relating to Licensed GT Products or the Compound/Vector used in such product. For the avoidance of doubt, Dimension Know-How includes Dimension's interest in the Joint Inventions, but does not include any Patent Rights. It is expressly understood that, in the event of a Change of Control of Dimension, the Dimension Know-How shall not include any Know-How that is owned or controlled by a Controlling Affiliate and (i) existing prior to the closing of such Change of Control, or (ii) developed by or on behalf of such Controlling Affiliate after such Change of Control without the use of the Dimension Know-How in existence prior to the closing of such Change of Control, or (iii) developed by or on behalf of such Controlling Affiliate after such Change of Control and not directly related to any Licensed GT Product or any Compound/Vector used therein. It is understood that the burden shall be on Dimension to establish that the foregoing exclusions apply, and such exclusions shall apply only if the Controlling Affiliate remains a separate legal entity to Dimension.

1.18 "Dimension Manufacturing Patents" means all Patent Rights that (a) are not Sublicensed Patents, (b) come into the ownership or Control of Dimension or its Controlled Affiliates after the Effective Date and during the term of this Agreement (other than through the grant of a license by Bayer hereunder), and (c) claim inventions relating to the process of manufacture of any Licensed GT Product, Licensed Treatment or any Compound/Vector, which inventions were not generated in the conduct of the manufacturing development set forth in the Research Plan, but were generated by or on behalf of Dimension prior to Bayer's submission of the first MAA for a Licensed GT Product. It is expressly understood that in the event of a Change of Control of Dimension, the Dimension Manufacturing Patents shall not include any Patent Rights owned or controlled by a Controlling Affiliate and (i) existing prior to the closing of such Change of Control of Dimension, (ii) existing after the closing of such Change of Control and claiming inventions made by or on behalf of such Controlling Affiliate prior to the closing of such Change of Control, (iii) claiming only inventions made after such Change of Control without the use of the Dimension Know-How in existence prior to the closing of such Change of Control, or (iv) claiming only inventions made after such Change of Control and not directly related to the Licensed Treatment, Licensed GT Product or the Compound/Vector used therein. It is understood that the burden shall be on Dimension to establish that the foregoing exclusions apply, and such exclusions shall apply only if the Controlling Affiliate remains a separate legal entity to Dimension.

1.19 "Dimension Patents" means all Patent Rights that (a) are not Sublicensed Patents, (b) are not Dimension Manufacturing Patents, (c) are owned or Controlled by Dimension or its Controlled Affiliates as of the Effective Date or that come into the ownership or Control of Dimension or its Controlled Affiliates after the Effective Date and during the term of this Agreement (other than through the grant of a license by Bayer hereunder), and (d) cover (i) the development, use or Commercialization of any Licensed GT Product, Licensed Treatment or any Compound/Vector used therein or (ii) the manufacture of any Licensed GT Product, Licensed Treatment or any Compound/Vector used therein to the extent such Patent Rights cover inventions that were generated in the conduct of the manufacturing development as set forth in the Research Plan. For the avoidance of doubt, Dimension Patents include Dimension's interest

in the Joint Patents. Dimension Patents as of the Effective Date are listed in Exhibit A. It is expressly understood that in the event of a Change of Control of Dimension, the Dimension Patents shall not include any Patent Rights owned or controlled by a Controlling Affiliate and (i) existing prior to the closing of such Change of Control of Dimension, (ii) existing after the closing of such Change of Control and claiming inventions made by or on behalf of such Controlling Affiliate prior to the closing of such Change of Control, (iii) claiming only inventions made after such Change of Control without the use of the Dimension Know-How in existence prior to the closing of such Change of Control, or (iv) claiming only inventions made after such Change of Control and not directly related to the Licensed Treatment, Licensed GT Product or the Compound/Vector used therein. It is understood that the burden shall be on Dimension to establish that the foregoing exclusions apply, and such exclusions shall apply only if the Controlling Affiliate remains a separate legal entity to Dimension.

1.20 "Disclosing Party" has the meaning set forth in Section 8.1.

1.21 "Estimated Quarterly Payment" has the meaning set forth in Section 2.5.1.

1.22 "Existing Licenses" means the GSK Agreement and Penn Agreement.

1.23 "FDA" means the United States Food and Drug Administration, or a successor agency in the United States with responsibilities comparable to those of the United States Food and Drug Administration.

1.24 "Field" means any and all human therapeutic uses to treat and diagnose hemophilia A (and expressly not hemophilia B or any other form of hemophilia other than hemophilia A).

1.25 "First Commercial Sale" means, on a country-by-country basis (a) the first commercial sale of a Licensed Treatment by Bayer, its Sublicensees or their respective Affiliates to a person or entity who is not Bayer, its Sublicensees or their respective Affiliates in such country after grant of Regulatory Approval in the applicable country or jurisdiction, provided that where such a first commercial sale has occurred in a country for which pricing approval is necessary for widespread sale, then such sale shall not be deemed a First Commercial Sale until such pricing approval has been obtained; or (b) any compassionate use or named patient basis sale in such country, following the date upon which cumulative Net Sales (across all countries in the Territory) received from any compassionate use or named patient program by Bayer, its Affiliate or Sublicensees equals […***…], provided the Licensed Treatment Administration Sales and Licensed Treatment Monitoring Sales with respect to the Licensed GT Products administered pursuant to such programs is greater than the fully loaded costs of such Licensed GT Products. For the avoidance of doubt, supply of Licensed GT Product as samples or to patients for clinical trials or other similar purposes shall not be considered a First Commercial Sale.

1.26 "GSK Agreement" means that certain License Agreement entered into between ReGenX and GSK, effective on March 6, 2009, as amended by that certain Amendment to License Agreement dated April 15, 2009, and as amended from time to time.

1.27 "GT Product" means:

(a) a pharmaceutical product or medical therapy for repairing, modulating the expression of, or inserting a functional version of, the Factor VIII protein but not any other target or locus, which product or therapy (1) contains or employs at least one Compound/Vector and (2) does not contain or employ any other gene or variant of such gene that is other than the Factor VIII protein or a variant of the Factor VIII protein; or

(b) a pharmaceutical product or medical therapy that contains or employs a human cell or tissue made using a product or therapy described in (a).

1.28 "IND" means (a) an Investigational New Drug Application as defined in the U.S. Federal Food, Drug, and Cosmetic Act, as amended, and regulations promulgated thereunder or any successor application or procedure required to initiate clinical testing of a GT Product in humans in the United States; (b) a counterpart of an Investigational New Drug Application that is required in any other country or regulatory jurisdiction other than the United States before beginning clinical testing of the GT Product in humans in such country or regulatory jurisdiction; and (c) all supplements and amendments to any of the foregoing.

1.29 "Joint Inventions" has the meaning set forth in Section 10.1.

1.30 "Joint Patents" has the meaning set forth in Section 10.1.

1.31 "Joint Project Team" or "JPT" has the meaning set forth in Section 4.3.

1.32 "Joint Research and Development Committee" or "JRDC" means the research and development oversight committee comprised of representatives of Dimension and Bayer, as further described in Section 4.2.

1.33 "Joint Steering Committee" or "JSC" means the oversight committee comprised of two (2) representatives each of Dimension and Bayer, as further described in Section 4.1.

1.34 "Know-How" means any and all ideas, information, know-how, data, research results, writings, inventions, discoveries, and other technology (including any proprietary materials), whether or not patentable or copyrightable.

1.35 "Laws" means all laws, statutes, rules, regulations, ordinances and other pronouncements having the effect of law of any federal, national, multinational, state, provincial, county, city or other political subdivision, domestic or foreign.

1.36 "Licensed Back Improvements" means any patentable modifications or improvements developed by Bayer, any of its Affiliates, or any Sublicensees to any vector that is the subject of a claim within the Licensed Patents.

1.37 "Licensed GT Product" has the meaning set forth in Section 2.11.

1.38 "Licensed Know-How" means the Dimension Know-How and the Sublicensed Know-How.

1.39 "Licensed Patents" means the Dimension Patents and the Sublicensed Patents.

1.40 "Licensed Technology" means, collectively, the Licensed Patents and the Licensed Know-How.

1.41 "Licensed Treatment" means any (a) Licensed GT Product in any and all modes of administration, presentations, formulations and dosages, that either (i) the manufacture, use, sale, offer for sale, or import of which is covered by, or which, in the absence of the licenses granted pursuant to this Agreement, would infringe, at least one Valid Claim of a Sublicensed Patent or Dimension Patent, in the country of manufacture, use, sale, offer for sale, or import; or (ii) is generated through the use of Sublicensed Know-How or Dimension Know-How; and/or (b) service with respect to the administration to patients of any Licensed GT Product described in clause (a)(i) or (a)(ii) above in this Section 1.41; and/or (c) service with respect to the monitoring as to the effectiveness or safety in patients of any Licensed GT Product described in clause (a)(i) or (a)(ii) above in this Section 1.41.

1.42 "Licensed Treatment Administration Sales" means, with respect to a given patient in the Field to whom a Licensed Treatment is administered, the gross amount invoiced by Bayer, its Affiliate or Sublicensee to Third Parties, and recognized in their respective accounting books as income, for the initial administration of such Licensed Treatment to such patient.

1.43 "Licensed Treatment Monitoring Sales" means, with respect to a given patient in the Field to whom a Licensed Treatment has been administered, the gross amounts invoiced to Third Parties by Bayer, its Affiliates or Sublicensees on or after receipt of the Licensed Treatment Administration Sale, and recognized in their respective accounting books as income, for either services rendered in the monitoring of such patient, and/or the continuing effectiveness of the Licensed GT Product with respect to such patient.

1.44 "Licensed Treatment Sales" means with respect to a given period, all Licensed Treatment Administration Sales and all Licensed Treatment Monitoring Sales during such period, […***…]. For illustrative purposes only, Exhibit B sets forth examples for calculating Licensed Treatment Sales based on Licensed Treatment Administration Sales, Licensed Treatment Monitoring Sales, and any Post-Administration Antihemophilic Factor administered.

1.45 "MAA" means either a New Drug Application filed with the FDA as described in 21 C.F.R. § 314, a Biological License Application (BLA) pursuant to 21 C.F.R. § 601.2, or any equivalent or any corresponding application in any country or regulatory jurisdiction other than the United States.

1.46 "Major Market Country" means […***…].

1.47 "Manufacturing Technology" means any and all Patent Rights, Know-How, and all intellectual property rights associated therewith, and including all tangible embodiments thereof, that are necessary or useful for the manufacture of any Licensed GT Product or

Compound/Vector used therein, or research or commercial reagents related thereto, including manufacturing processes, technical information relating to the methods of manufacture, protocols, standard operating procedures, batch records, assays, formulations, quality control data, specifications, scale up, any and all improvements, modifications, and changes thereto, and any and all activities associated with such manufacture. Any and all chemistry, manufacturing, and controls (CMC), drug master files (DMFs), or similar materials provided to regulatory authorities and the information contained therein are deemed Manufacturing Technology.

1.48 "Net Sales" means, with respect to a given period, the Licensed Treatment Sales made during such period less the following deductions that are directly attributable to Licensed Treatment Administration Sales or, to the extent applicable, any Licensed Treatment Monitoring Sales:

1.48.1 […***…];

1.48.2 […***…] upon the sale of a Licensed GT Product and […***…];

1.48.3 […***…] in connection with the Licensed Treatment Administration Sales;

1.48.4 […***…] of a Licensed GT Product; and

1.48.5 […***…] in connection with Licensed Treatment Administration Sales.

Sales between and among Bayer and its Affiliates or Sublicensees of Licensed GT Products shall be excluded from the computation of Net Sales, except where […***…], but Net Sales shall include […***…].

For the purpose of calculating Net Sales, the Parties recognize that: (a) […***…]; and (b) in such cases, […***…].

In the event the Licensed GT Product is sold […***…], Net Sales for such […***…]. If, on a country-by-country basis, […***…], then Net Sales will be […***…]. If, on a country-by-country basis, […***…].

[…***…] shall not be considered in determining Net Sales; provided, however, that […***…].

All amounts used to calculate Licensed Treatment Sales shall be applied in accordance with IFRS, […***…].

1.49 "Operating Plan" has the meaning assigned to it in Section 2.3.1.

1.50 "Patent Rights" means issued patents and pending patent applications in any country or region, including all provisional, non-provisionals, substitutions, continuations, continuations-in-part, divisionals, renewals and all patents granted thereon, and all reissues,

reexaminations, extensions, confirmations, revalidations, registrations and patents of addition thereof, including supplementary protection certificates.

1.51 "Penn Agreement" means that certain License Agreement entered into between ReGenX and UPenn, effective on February 24, 2009, as amended by that letter agreement dated March 6, 2009, and as amended from time to time.

1.52 "Phase II/III Trial" means a human clinical trial of a Licensed GT Product according to 21 C.F.R. 312.21(b) and (c) (or their successor regulations or any equivalent regulation with respect to jurisdictions outside of the United States);

1.53 "Pivotal Clinical Trial" means a human clinical trial of a Licensed GT Product and/or Licensed Treatment (a) […***…] or (b) the Phase III portion (as defined in the protocol) of a Phase II/III Trial or other similar designation as approved by the FDA, or the corresponding regulations outside the U.S.

1.54 "Post-Administration Antihemophilic Factor" […***…].

1.55 "Proof of Concept Trial" or "POC Trial" means the Phase I human proof of concept trial in patients for a GT Product as set forth in, and conducted pursuant to, the Research Plan.

1.56 "Prosecute" means preparation, filing, and prosecuting patent applications and maintaining patents, including any reexaminations, reissues, inter party's reviews, post-grant reviews, oppositions, and interferences.

1.57 "Receiving Party" has the meaning set forth in Section 8.1.

1.58 "ReGenX Agreement" means that certain License Agreement entered into between Dimension and ReGenX, effective on October 31, 2013, as amended from time to time.

1.59 "ReGenX Improvements" means any patent or patent application that meets all of the following criteria:

(a) is directed to any of: the composition of recombinant adeno-associated virus vectors, methods of use of such vectors, or methods of developing such vectors, but, in each case, only to the extent of such claims; and

(b) is reasonably necessary for any of: the use, sale, offer for sale, or import of Licensed Products in the Field (as such capitalized terms are defined in the ReGenX Agreement);

provided that "ReGenX Improvements" will not include any Manufacturing Technology.

1.60 "Regulatory Approval" means, with respect to particular country or territory, the approval of the MAA or similar approval required to sell a Licensed GT Product and/or Licensed Treatment in such country or territory, including, where required by applicable Law, pricing and reimbursement approval.

1.61 "Regulatory Authority" means any country, federal, supranational, state or local regulatory agency, department, bureau or other governmental or regulatory authority having the administrative authority to regulate the development or marketing of pharmaceutical products in any country or other jurisdiction, and includes the FDA in the US and the European Medicines Agency in the EU.

1.62 "Research Budget" means the budget attached to this Agreement as Exhibit D-3, as may be amended from time to time as provided for in this Agreement, and covering […***…].

1.63 "Research Plan" means the research plan addressing the activities to be performed by Dimension during the Research Term through completion of the POC Trial, as set forth in Section 2.3, and as such research plan may be amended from time to time. The Research Plan shall contain (a) a description of the process for identifying the criteria for selecting GT Products as potential clinical candidates, […***…], (b) a description of the specific activities to be performed by Dimension, including the pre-clinical and regulatory work necessary to commence the POC Trial and clinical work necessary for the completion of the POC Trial, (c) the primary and secondary endpoints of the POC Trial, (d) manufacturing / CMC development, and (e) projected timelines for completion of the described activities.

1.64 "Research Program" means the research collaboration between the Parties, under the direction and oversight of the JRDC, aimed at the discovery of one or more suitable Licensed GT Products for hemophilia A and moving such Licensed GT Products forward to completion of a POC Trial, pursuant to the Research Plan during the Research Term.

1.65 "Research Term" means the period following the Effective Date for Dimension to conduct and complete the Research Plan, unless earlier terminated as provided under Section 2.2 of this Agreement.

1.66 "Retained Rights" has the meaning set forth in Section 5.3.

1.67 "Royalty Term" has the meaning set forth in Section 6.4.2.

1.68 "Sublicensed Know-How" means any Know-How that (a) is Controlled by Dimension as of the Effective Date or that comes into the Control of Dimension after the Effective Date and during the term of this Agreement, (b) is licensed to Dimension under the ReGenX Agreement, and (c) is reasonably necessary for the use, sale, offer for sale, or import of Licensed GT Products in the Field; provided that "Sublicensed Know-How" will not include any Manufacturing Technology, other than […***…] Know-How, that comes into the Control of Dimension under the ReGenX Agreement and which otherwise meets the foregoing criteria; and provided further that "Sublicensed Know-How" does not include any Patent Rights.

1.69 "Sublicensed Patents" means (a) the Patent Rights listed in Exhibit A, and (b) all other Patent Rights that cover or claim any Licensed GT Product or Licensed Treatment or component thereof, or use thereof in the Field, and that (i) are Controlled by Dimension as of the Effective Date or that come into the Control of Dimension after the Effective Date and during the

* The specific required criteria known as […***…].

term of this Agreement, and (ii) are licensed to Dimension under the ReGenX Agreement, provided that "Sublicensed Patents" will not include any claim of a patent or patent application owned or controlled by ReGenX covering any Manufacturing Technology.

1.70 "Sublicensed Technology" means, collectively, the Sublicensed Patents and Sublicensed Know-How.

1.71 "Sublicensee" means any Third Party or Affiliate to whom Bayer grants a sublicense of some or all of the rights granted to Bayer under this Agreement as permitted by this Agreement.

1.72 "Territory" means the entire world.

1.73 "Third Party" means any person or entity other than a Party to this Agreement or Affiliates of a Party to this Agreement.

1.74 "[…***…] Know-How" means unpatented Know-How that, as of October 30, 2013, (a) is Controlled by ReGenX pursuant to the Existing Licenses or pursuant to ReGenX's ownership thereof, and (b) is directed […***…]; provided that, notwithstanding the scope of the license grant in Section 5.1(a), any rights granted to Bayer under this Agreement with respect to the […***…] Know-How will be limited to use of such Know-How in the Field.

1.75 "Valid Claim" means a claim of an issued and unexpired patent (including any patent claim the term of which is extended by any extension, supplementary protection certificate, patent term restoration, or the like) included within the Sublicensed Patents or Dimension Patents or a claim of a pending patent application included within the Sublicensed Patents or Dimension Patents, which has not lapsed, been abandoned, been held revoked, or been deemed unenforceable or invalid by a non-appealable decision or an appealable decision from which no appeal was taken within the time allowed for such appeal of a court or other governmental agency of competent jurisdiction and, in the case of a pending application, that has been pending for less than […***…] years from the priority date of the claim.

ARTICLE 2

RESEARCH AND DEVELOPMENT PROGRAM

2.1 Collaboration Overview. Dimension and Bayer shall collaborate for the purpose of researching and developing, until conclusion of a POC Trial to be conducted by Dimension of at least one GT Product for use in the Field based initially on the […***…] vector, which Bayer shall, post POC Trial, have the exclusive right to further develop, seek Regulatory Approval for, and if successful, Commercialize in the Territory. To that end, under the oversight of the JSC and JRDC, Dimension will be responsible for performing those research and development activities set forth in the Research Plan, and subject to any limitations set forth in Section 2.5, Bayer shall fund Dimension's efforts under the Research Plan in accordance with the Research Budget. Following completion of the POC Trial, Bayer will be solely responsible, at its own

cost, for performing all further development and Commercialization activities for each Licensed GT Product in the Field and in the Territory.

2.2 Responsibilities of the Parties during the Research Term.

2.2.1 During the Research Term and subject to the oversight of the JRDC, Dimension shall be solely responsible for carrying out the tasks, until completion of and including the conduct of the POC Trial, as set forth in the Research Plan. Dimension shall use Commercially Reasonable Efforts in the performance of its obligations under the Research Plan during the Research Term. Upon request by Dimension, Bayer shall provide reasonable consulting and technical support in order to assist Dimension in carrying out its Research Program obligations. Bayer shall pay the costs and expenses described in the Research Budget as provided in Section 2.5.

2.2.2 Notwithstanding the foregoing, (a) to the extent the data from any studies conducted prior to the conduct of the POC Trial, or the requirements of any Regulatory Authority, result in the Parties mutually agreeing, through the JSC, to terminate early the Research Plan (and not to proceed under Section 2.11.2), or (b) where Dimension, as the holder of the IND, is required by Regulatory Authorities in the U.S. or E.U. to terminate the further clinical development of all Licensed GT Products (provided that Dimension has exerted Commercially Reasonable Efforts to modify the Research Plan (consistent with Section 2.3.2) to comply with the requirements of Regulatory Authorities), the Parties shall not proceed under Section 2.11.2, and the Research Term will terminate early and the Parties will agree to wind up the conduct of the activities under the Research Plan in an orderly fashion.

2.3 Research Plan, Research Budget, and Operating Plans.

2.3.1 Plans. The overall Research Plan is set forth in Exhibit D-1 and the Research Budget is set forth in Exhibit D-3. Within […***…] after the Effective Date, or longer as agreed by the Parties, the Parties shall develop and finalize a detailed operating plan for carrying out the activities set forth in the Research Plan over the ensuing […***…], which such operating plan shall contain the description, time-line and portion of the Research Budget covering such activities (the "Operating Plan"). Such Operating Plan shall be consistent with the terms of this Agreement, the Research Plan and the Research Budget and shall be attached hereto as Exhibit D-2 and form a part of this Agreement. In the event of an inconsistency between the Research Plan, Operating Plan and this Agreement, the terms of this Agreement will prevail and in the event of an inconsistency between the Research Plan and an Operating Plan, the terms of the Research Plan will prevail, unless otherwise agreed in writing by the Parties.

2.3.2 Amendments and Revisions to Operating Plan and Research Plan. During the Research Term, (a) Dimension shall provide the JRDC with […***…] written reports describing the progress made against the goals set forth in the Operating Plan, and (b) the JRDC shall on a […***…] basis review and update the Operating Plan, and make necessary amendments (including any increase in the Research Budget) for the Research Plan activities to be covered in the upcoming […***…], consistent with Sections 2.3.3, 2.3.4, and 2.3.5. On […***…] basis, the JRDC shall review and update as needed the then-current Research Plan.

Any amendments or modifications to the Research Plan and any Operating Plan shall require the approval of the JRDC (and the JSC, as applicable) and shall be subject to the applicable terms of this Agreement, and the JRDC shall be required to formally document updates to the Research Plan and Operating Plan as part of the agreed upon and accepted minutes of the […***…] meetings of the JRDC.

2.3.3 Minor Amendments to the Research Budget. In the course of its […***…] review of the Operating Plan, either Party may propose to the JRDC amendments to the then-current annual Research Budget associated with such Operating Plan, to reflect actual costs or minor changes to the Research Plan, and the terms of Section 4.1.4 shall apply to any final decision related to such amendment; provided, however, that if any such proposed amendment to the Research Budget causes the then-current annual Research Budget to increase by more than […***…], such amendment to the Research Budget shall require the unanimous approval of the JSC in accordance with Section 2.3.4.

2.3.4 Major Amendments to the Research Budget. The Parties agree and acknowledge that (a) the Research Budget as of the Effective Date represents the good faith estimate of the Parties as to the costs of the activities set forth in the Research Plan, and the extent of activities to be included within the Research Plan itself, (b) subject to Section 2.3.5, such Research Budget is based upon certain assumptions, including but not limited to regulatory requirements, pre-clinical testing, manufacturing requirements, and clinical development activities, as such assumptions are further set forth in Exhibit D-3; and (c) changes to the Research Plan likely will be required where any material changes to such assumptions and/or the activities to be conducted under the Research Plan are agreed upon by the Parties. Accordingly, the Parties agree that any increase to the Research Budget of more than […***…], shall require the unanimous approval of the JSC, and that unless and until such approval is obtained (i) […***…] shall not be obligated to fund any amount over the expense caps set forth in the then-current agreed upon Research Budget; and (ii) […***…] shall not be required to undertake any activities that are not funded fully by the then-current agreed upon Research Budget due to a change in assumptions underlying such activities and their associated costs, or due to any expansion of the scope or nature of any such activity.

2.3.5 Assumptions in the Research Budget. In addition to any amendments to the Research Budget permitted under Section 2.3.3 or 2.3.4, on […***…] basis through the JRDC, the Parties shall in good faith review the assumptions in the then-current Research Budget and make any appropriate adjustments to such assumptions. Such adjustments by the Parties will at a minimum take into account: any changes in regulatory requirements that may impact clinical development activities, including but not limited to, the number of patients and duration of treatment of the clinical studies set forth in the Research Plan, or the cost per patient; and any unanticipated issues in manufacturing process development. The JRDC shall formally document any such updates to the assumptions in the Research Budget as part of the agreed upon and accepted minutes of the […***…] meetings of the JRDC, and shall prepare and approve a revised Research Budget reflecting such agreed upon revised assumptions.

2.3.6 Uncertainty Regarding Certain Costs. The Parties recognize that, notwithstanding Sections 2.3.4 and 2.3.5, significant uncertainty exists as of the Effective Date

with respect to the good faith estimate and assumptions in the Research Budget regarding (a) costs associated with clinical process transfer and manufacturing of clinical supplies by Dimension's contract manufacturer, and (b) costs for the conduct of the POC Trial, and the Parties agree to use good faith efforts to manage and provide for such costs including prompt adjustments to the Research Budget as necessary once greater clarity regarding such costs is obtained. The provisions of Section 2.3.4 shall apply if such adjustments result in the Research Budget increasing by more than […***…].

2.4 Subcontractors. Dimension may engage any consultant, subcontractor, or other vendor conducting Dimension's obligations under the Research Plan (each, a "Subcontractor") to perform any work under the Research Program; provided that all such engagements and any contracts related to such engagements are subject to prior approval by the JRDC, to the extent not already approved as part of and named within the Research Plan or any Operating Plan. Such contracts shall include provisions, including intellectual property provisions, adequate for Bayer to enjoy the licenses granted hereunder as though Dimension had performed the contracted work. To facilitate approval by the JRDC, Dimension shall identify each Subcontractor, the activities proposed to be performed by such Subcontractor and the budget for such activities. The JRDC in its discretion may request a copy of the proposed contract with the Subcontractor prior to approving such contract. Dimension shall be solely responsible for the management of its permitted Subcontractors. Any agreement with a permitted Subcontractor pertaining to the Research Program shall be consistent with the provisions of this Agreement. Dimension shall ensure that no consultant, subcontractor or other vendor it instructs in connection with the Research Plan is or has been debarred by the FDA (or other Regulatory Authority outside the US) pursuant to its authority under Sections 306(a) and (b) of the U.S. Food, Drug, and Cosmetic Act (21 U.S.C. §335(a) and (b)) (or analogous provisions outside the US), or is the subject of any investigation or proceeding which may result in such debarment by the FDA (or other Regulatory Authority in countries outside the US).

2.5 Funding of Research.

2.5.1 Payment to Dimension. […***…] Dimension will estimate the total costs and expenses expected to be incurred during such […***…] in performing the activities under the Research Plan, which estimate will be consistent with the applicable Operating Plan and Research Budget. Dimension will then provide an invoice to Bayer […***…], which invoice shall be for […***…] costs and expenses expected to be incurred for such […***…]. Bayer will pay such invoice (an "Estimated […***…] Payment") within […***…] of receipt. Within […***…] following the end of each […***…], Dimension will provide Bayer with a report containing an account of tasks actually performed and the costs and expenses actually incurred during such […***…] (the "[…***…] Expense Report"). Such report will specify in reasonable detail all costs and expenses incurred during such […***…] and an invoice for such costs and expenses shall accompany the […***…] Expense Report. Bayer shall pay such invoices within […***…] of their receipt by Bayer. The foregoing mechanism will be used, with appropriate adjustments, in respect of calendar year 2014, with the initial estimated total costs and expenses expected to be incurred during the remainder of 2014, together with invoice, submitted by Dimension within […***…] of the Effective Date.

Invoices will be sent to Bayer at the following address:

Bayer HealthCare
Pharma West Coast
Attn: Frederick Roepke
PO Box 416
Pittsburgh PA 15230 USA

2.5.2 Annual True-Up. Within […***…] of the end of the applicable […***…] the Parties will reconcile the costs and expenses set forth in […***…] Expense Reports presented by Dimension in respect of the applicable […***…] ("Total Actual Expenses") with the sum of the costs and expenses paid by Bayer in respect of the first […***…] Expense Reports plus the Estimated […***…] Payment ("Actual Plus Estimated Expenses"). If the Parties determine that the Actual Plus Estimated Expenses exceed Total Actual Expenses, then the amount of such excess will be credited against the amount due by Bayer in respect of the first […***…] of the following […***…] (or, if no such payment is anticipated, refunded by Dimension to Bayer within […***…] of such determination). If the Parties determine that Total Actual Expenses exceed Actual Plus Estimated Expenses, but that such actual costs and expenses are nonetheless within […***…] of the then-current Research Budget for the applicable […***…], then Bayer will include the excess amount owed to Dimension with the amount due by Bayer in respect of the first […***…] of the next […***…] (or, if no such payment is anticipated, paid by Bayer to Dimension upon receipt of an invoice under the following payment timing terms: if the invoice is received by Bayer at the above address prior to […***…], then payment shall be made by the […***…] in which the invoice was received. If the invoice is received by Bayer at the above address after the […***…], then the payment shall be made by the […***…] in which the invoice was received).

2.5.3 Cost Overruns. If the Parties determine that Total Actual Expenses exceed Actual Plus Estimated Expenses, and such Total Actual Expenses are greater than […***…] of the then-current Research Budget for the applicable […***…] (such excess over such percentage, a "Cost Overrun"), then Bayer shall have no obligation to pay the Cost Overrun unless Dimension obtains Bayer's consent. If consent is provided, Bayer will pay the excess amount to Dimension; provided, however, if at the conclusion of the Research Plan, the actual amount expended by Bayer, including the Cost Overruns, is greater than the overall cap set forth in the then-current Research Budget, Dimension shall reimburse Bayer the amount of such Cost Overruns in excess of such cap within […***…] of receipt by Dimension of the next Milestone Payment stated in Section 6.2, if such Milestone Event is achieved. In addition, Dimension agrees that where it anticipates during a given […***…] that its actual costs and expenses will likely result in a Cost Overrun for such […***…], Dimension will give notice promptly to Bayer of such anticipated Cost Overrun. […***…].

2.5.4 Expense Records. Dimension shall maintain complete and accurate books, records and accounts used for the determination of all costs and expenses incurred in connection with the performance of its obligations under the Research Plan and in accordance with the Research Budget, in sufficient detail to confirm the accuracy of any payments required under this Agreement, which books, records and accounts will be retained by Dimension for

[…***…] after creation thereof, or longer as is required by applicable Law. Such books, records and accounts shall be kept in accordance with Dimension's then-current accounting procedures. Bayer shall have the right, during normal business hours and upon reasonable advance notice, to review and copy all such records maintained by Dimension.

2.5.5 Currency. All payments made under this Section 2.5 will be payable in US Dollars.

2.6 Bayer's Expenses. Bayer shall be solely responsible for its own costs and expenses incurred in conducting any activities under the Research Plan or otherwise in support of the Research Program.

2.7 Pre-Clinical and Clinical Supplies. As part of the Research Plan, Dimension shall be responsible for manufacturing or having manufactured sufficient supplies of GT Products and any Compounds/Vectors needed in the conduct of its activities under the Research Plan.

2.8 Regulatory Matters. Dimension shall be responsible for, and shall compile, submit and have ownership of, all INDs for any GT Product or component thereof, necessary in order to conduct its activities under the Research Plan, including the POC Trial. Dimension shall provide to Bayer a copy of all written substantive communications from and with any Regulatory Authority involving a regulatory submission for a GT Product or any Compound/Vector or any other component thereof sufficiently in advance, where feasible, to enable Bayer to have a meaningful opportunity to provide input on the content of such submission and, if requested by Bayer, to participate in scientific advice meetings with the Regulatory Authority related to the GT Product. Following the conduct of the POC Trial and a GT Product becoming a Licensed GT Product, Dimension shall assign and transfer to Bayer, at Bayer's expense, any and all such INDs. Any orphan designation for the Licensed GT Product and/or the Field for which Dimension has filed or intends to file an IND will be in the name of Bayer or one of its Affiliates.

2.9 Materials. To facilitate the conduct of the Research Plan activities, either Party may provide to the other Party, free of charge, certain biological materials or chemical compounds owned by or licensed to the supplying Party for use by the other Party (such materials or compounds and any progeny and derivatives thereof, collectively, "Materials"). All such Materials shall remain the sole property of the supplying Party, shall be used only in the fulfillment of obligations or exercise of rights under this Agreement and solely under the control of the receiving Party, shall not be used or delivered to or for the benefit of any Third Party without the prior written consent of the supplying Party, and shall not be used in research or testing involving human subjects, unless expressly agreed.

2.10 Research Records and Reports. Dimension shall maintain complete, current and accurate records and laboratory notebooks of all activities it conducts under the Research Program, and all data and other information resulting from such activities. Such records shall reflect all work done and results achieved in the performance of the Research Program in good scientific manner (including in accordance with applicable GLP, GMP and GCP, where appropriate in conformance with the Research Plan) as appropriate for regulatory and patent

purposes. Bayer shall have the right, during normal business hours and upon reasonable advance notice, to review and copy all such records maintained by Dimension and to obtain access to the originals to the extent necessary or useful for regulatory and patent purposes.

2.11 Licensed GT Products; Demonstration of Clinical POC.

2.11.1 Designation. The Parties intend that during the Research Term and under the Research Plan, Dimension will discover and develop […***…] GT Produc[…***…] and complete a POC Trial for […***…] GT Product, which […***…] GT Product, upon completion (successful or not) of such POC Trial, shall be deemed a "Licensed GT Product" after which point, Bayer's licenses set forth in Section 5.1 shall apply, and Bayer shall have sole responsibility for further development, manufacture and Commercialization of such Licensed GT Product.

2.11.2 Failure to Achieve POC. In the event […***…] Licensed GT Product is the subject of a POC Trial, but fails to achieve Demonstration of Clinical POC (as determined pursuant to Section 2.11.4), at Bayer's discretion and request, the Parties shall amend the Research Plan and Research Budget to add activities to identify and develop […***…] GT Product and conduct a POC Trial for such […***…] GT Product (the "Backup Product") and as needed, extend the then-current Research Term to conduct such activities. Such Backup Product, upon completion of its POC Trial, shall also become a Licensed GT Product, subject to the license grants set forth in Section 5.1, and the Parties shall determine if such Backup Product achieves Demonstration of Clinical POC pursuant to Section 2.11.4.

2.11.3 Follow On Products. If notwithstanding Demonstration of Clinical POC for […***…] Licensed GT Product or […***…] Backup Product, Bayer requests, at any time prior to Bayer's submission of the first MAA for a Licensed GT Product, that an additional GT Product also be identified and made the subject of an additional POC Trial, the Parties shall discuss in good faith such request, and if mutually agreed, shall either modify the then-current Research Plan and Research Budget to include such activities or (if no Research Plain remains in place) agree a new Research Plan and Research Budget, and […***…], and as necessary the Parties shall extend the Research Term reinstate a Research Term to accommodate such activities, and any such additional GT Product as to which such an additional POC Trial is conducted would be deemed also a Licensed GT Product and subject to Bayer's license grants set forth in Section 5.1.

2.11.4 Determination of Demonstration of Clinical POC. The process for determining achievement of Demonstration of Clinical POC for a Licensed GT Product shall be as set forth in this Section 2.11.4. Following completion of the POC Trial for the Licensed GT Product (or, if applicable, the Backup Product), Dimension will present the results of such trial, and all other relevant data, to the JSC and the JSC will act in good faith to apply the criteria set forth in Exhibit E to such data and results and determine if such criteria for Demonstration of Clinical POC have been met. If the JSC determines that such criteria have been met, then Demonstration of Clinical POC will be deemed to have been achieved and Dimension will invoice Bayer for the applicable milestone payment as set forth and in accordance with Section 6.2. If the JSC determines that such criteria in Exhibit E have not been met with respect to the

initial Licensed GT Product then the Parties may proceed in accordance with Section 2.11.2. In the event of any disagreement within the JSC on the application of the criteria set forth in Exhibit E, and/or whether Demonstration of Clinical POC has been achieved, the Parties shall within […***…] of the meeting of the JSC in which it was unable to so determine such achievement, identify and appoint a mutually agreed upon independent industry expert (the "Expert"). In such case, each Party shall provide the Expert with the relevant data as well as a briefing document setting forth specific detailed reasons underlying such Party's position, and the Expert shall within an additional […***…] following his appointment, apply the criteria and make the determination, in a writing stating his reasons for such position, of whether Demonstration of Clinical POC has been achieved, which determination shall be final and binding on the Parties. All costs associated with identifying and utilizing such Expert shall be borne equally by the Parties. Following a positive determination by the Expert that Demonstration of Clinical POC has been achieved, Dimension will invoice Bayer for the applicable milestone payment as set forth and in accordance with Section 6.2. For the avoidance of doubt, in determining the achievement of Demonstration of Clinical POC hereunder, either by the JSC or the Expert, the criteria stated in Exhibit E shall be strictly applied and shall not be modified in any way. No opinion as to materiality or relevance of any of the results or data (including their applicability to any particular patient) shall replace or modify the specific figures and other criteria expressly stated in Exhibit E. Furthermore, the Expert shall make his decision based on the data and briefing documents submitted to him. If he is unable to make a decision without additional information or data, Demonstration of Clinical POC will be deemed not to have been achieved.

2.12 Transfer of Technology. Promptly after completion of the POC Trial, Dimension shall, […***…], conduct all necessary technology transfer (including Materials) to Bayer as reasonably necessary for Bayer to practice the licenses granted under Section 5.1 with respect to such Licensed GT Product.

2.13 Completion of the POC Trial. Wherever used in this Agreement the expression "completion of the POC Trial" shall occur when data base is locked per protocol, which means that all CRFs have been entered and audit has cleared all those entries.

ARTICLE 3

LATER STAGE DEVELOPMENT AND COMMERCIALIZATION

3.1 General Responsibilities. Following completion of the POC Trial with respect to a Licensed GT Product, Bayer shall be solely responsible for (i) the planning and conduct of all later development of such Licensed GT Product in the Field in the Territory, (ii) all regulatory submissions and approvals (including all INDs and MAAs) for such Licensed GT Product and interactions with regulatory authorities, (iii) the selection of the countries in the Territory in which Bayer will pursue and maintain Regulatory Approvals, including at a minimum the U.S. and at least […***…] Major Market Countr[…***…]; and (iv) Commercialization of such Licensed GT Product in the Territory, all at its sole expense.

3.2 Development Activities.

3.2.1 Bayer's Efforts. Following completion of the POC Trial with respect to a Licensed GT Product, Bayer, itself or through one or more Affiliates or Sublicensees, shall use Commercially Reasonable Efforts to conduct a Pivotal Trial and such other clinical development activities as are required to obtain Regulatory Approval in the U.S. and at least […***…] Major Market Countr[…***…] in the Territory for the Licensed GT Product. Bayer shall ensure that no consultant, subcontractor or other vendor it instructs in connection with such development is or has been debarred by the FDA (or other Regulatory Authority outside the U.S.) pursuant to its authority under Sections 306(a) and (b) of the U.S. Food, Drug, and Cosmetic Act (21 U.S.C. §335(a) and (b)) (or analogous provisions outside the U.S.), or is the subject of any investigation or proceeding which may result in such debarment by the FDA (or other Regulatory Authority in countries outside the U.S.).

3.2.2 Regulatory Submissions and Approvals. Bayer shall be solely responsible for filing for and shall own all Regulatory Approvals and submissions therefor. To the extent permitted by applicable Laws, Bayer shall permit Dimension to attend in an observatory capacity only all meetings with Regulatory Authorities in the U.S., to the extent related to a Licensed GT Product, including, but not limited to, all in-person meetings and all telephone conferences.

3.2.3 Updates. Bayer shall update the JSC on its progress in obtaining Regulatory Approval of the Licensed GT Product, including providing to the JSC in advance of its meeting a written summary (which may be in presentation style) that includes sufficient detail for Dimension's representatives to understand the activities planned by Bayer and Bayer's anticipated timelines for performing such activities, and any material interactions with Regulatory Authorities. In addition, each Party shall immediately notify the other of any information it receives regarding any threatened or pending action, inspection or communication by or from any Third Party, including a Regulatory Authority, that may materially affect the development, manufacturing, Commercialization or regulatory status of a Licensed GT Product.

3.2.4 PV Agreement. If requested by Bayer the Parties will enter into an Agreement setting forth the specific procedures to be used by the Parties to coordinate the investigation and exchange of reports of adverse drug experiences and product complaints with respect to Licensed GT Products to ensure timely communication to Regulatory Authorities and compliance with Laws.

3.3 Commercialization.

3.3.1 Responsibilities. Bayer will have the exclusive right to conduct, and be solely responsible for, all aspects of the Commercialization of Licensed GT Products in the Field in the Territory, including: (a) developing and executing a commercial launch and pre-launch plan, (b) negotiating with applicable governmental authorities regarding the price and reimbursement status of Licensed GT Products; (c) marketing and promotion; (d) booking sales and distribution and performance of related services; (e) handling all aspects of order processing, invoicing and collection, inventory and receivables; and (f) providing customer support, including handling medical queries, and performing other related functions. As between the Parties, Bayer shall bear all of its costs and expenses incurred in connection with such Commercialization activities.

3.3.2 Compliance. Bayer shall be responsible for conforming its practices and procedures to applicable Laws relating to the marketing, detailing and promotion of Licensed GT Products and/or Licensed Treatments in the Territory.

3.4 Manufacturing Assistance. From and after completion of the POC Trial, Bayer shall be responsible for the manufacture of the Licensed GT Products for clinical or commercial use, including any process development and scale up. Notwithstanding the foregoing, in sufficient advance of any Phase II/III Trial by Bayer (including prior to completion of the POC Trial), Dimension and Bayer shall meet and discuss and, if Bayer considers it appropriate, engage ReGenX and any other necessary Third Parties for purposes of developing processes necessary to enable Bayer's commercial manufacturing of the Licensed GT Product for use in the Field.

ARTICLE 4

GOVERNANCE

4.1 Joint Steering Committee.

4.1.1 Formation and Dissolution. The JSC shall be formed as soon as possible, but no later than […***…] following the Effective Date of this Agreement and, unless otherwise agreed by the Parties, shall dissolve at the time of initial Regulatory Approval in the U.S., or earlier should Dimension elect to discontinue the JSC following Demonstration of Clinical POC. The JSC shall be comprised of […***…] representatives from each Party. If mutually agreed by the JSC members on a case-by-case basis, the JSC may invite other non-members to participate in the discussions and meetings of the JSC, provided that such participants shall have no voting authority at the JSC. Each Party may substitute its representative from time-to-time effective only upon the consent of the other Party, not to be unreasonably withheld. The JSC shall have no permanent chairman.

4.1.2 Responsibilities. The JSC shall be responsible for overseeing the overall collaboration established under this Agreement, and to that end, for (i) creating and maintaining a collaborative work environment within and among the Parties, and (ii) addressing any disputes as they may arise in the JRDC and (iii) determining whether Demonstration of Clinical POC has been achieved, and (iv) unless otherwise specified, serving as the initial point of contact to resolve any disputes between the Parties. The JSC will have solely the powers assigned to it in this Article 4 and elsewhere expressly in this Agreement, and will not have any power to amend, modify, or waive compliance with this Agreement.

4.1.3 Meetings. The JSC shall meet in person or by teleconference not less than […***…] during the Research Term, and thereafter, once […***…] until dissolution. Meetings of the JSC shall be alternately hosted by the Parties on such dates and at such times, places and format (*i.e.* whether the meeting will be in person or by teleconference) as agreed to by the members of the JSC; *provided*, that at least one meeting in each calendar year during the Research Term shall be in person. Dimension shall host the first meeting of the JSC at a mutually agreeable time and place no later than […***…] from the Effective Date of this

Agreement. Each Party shall be responsible for all its own expenses relating to attendance at or participation in JSC meetings. The representatives shall alternate acting as chairman of each meeting, and in that capacity shall be responsible for sending out in advance the agenda for any such meeting and minuting the results of such meeting for review and approval within […***…] after each JSC meeting. Such minutes shall be deemed approved unless one or more members of the JSC objects to the accuracy of such minutes within […***…] of receipt. For the avoidance of doubt, the chairman shall have no casting vote. Meetings of the JSC shall be effective only if at least one (1) representative of each Party is present or participating in such meeting.

4.1.4 Decision-Making. The JSC will strive to reach consensus in all decisions before it. The representative from each Party will have one (1) vote on behalf of that Party. The representatives serving on the JSC shall use good faith efforts to seek consensus in the JSC's decision making process and to make decisions that are consistent with the then existing Operating Plan and Research Plan. In the event such consensus is not obtained within […***…] of the JSC reviewing and discussing an issue, (a) until completion of the POC Trial Dimension's representative shall have final say with respect to any decision involving any amendment to, or the conduct of any activities under, the Research Plan, Research Budget, or any Operating Plan; provided that Dimension's representatives shall not have the right in the exercise of such final say to amend, revise or extend the Research Plan or Research Budget in a manner that (i) changes the primary and secondary endpoints of the POC Trial; (ii) imposes any material additional obligations on Bayer or (iii) results in any Cost Overrun or increases the overall Research Budget by more than […***…] of the then-current Research Budget; and (b) […***…] representative shall have the final say with respect to any decision involving development activities as outlined in Section 3.2, or Commercialization as outlined in Section 3.3, or any manufacture of Licensed GT Products following completion of the POC Trial. For clarity, the determination of whether Demonstration of Clinical POC has been achieved for a Licensed GT Product will be in accordance with Section 2.11.4. Following Demonstration of Clinical POC the JSC will function primarily as an information exchange forum and the existence of the JSC and Bayer's participation therein does not affect any decision-making discretion or right that Bayer otherwise possesses under this Agreement,

4.2 Joint Research and Development Committee.

4.2.1 Formation. The Parties shall form a Joint Research and Development Committee as soon as possible after the Effective Date, but no later than […***…] following the Effective Date of this Agreement. The JRDC shall be comprised of an equal number of representatives from each Party. If mutually agreed by all JRDC members, the JRDC may invite non-members (including ReGenX personnel) to participate in the discussions and meetings of the JRDC, provided that such participants shall have no voting authority at the JRDC. Each Party shall notify the other Party in writing of its initial representatives to the JRDC within […***…] after the Effective Date, and may substitute one or more representatives from time-to-time effective upon written notice to the other Party, provided that such representatives are suitably qualified and experienced for the tasks and responsibilities to be fulfilled. A designated representative of Dimension will be the chairman of the JRDC, and in such capacity, he/she shall be responsible for setting the agenda for meetings of the JRDC, with input from the other

members, and for conducting the meetings of the JRDC. Except as stated above the chairman will have no casting vote.

4.2.2 Responsibilities. The JRDC shall be responsible for oversight of the conduct of research and development under the Research Plan during the Research Term. In addition to the foregoing general responsibilities, the JRDC shall in particular:

(a) Review, discuss and approve any proposed Operating Plan or the Research Budget and timelines in the Research Plan and under each Operating Plan, or amendments thereto,

(b) manage the overall strategy for the research and development of potential Licensed GT Products under the Research Plan

(c) prioritize GT Products for further research and development under the Research Plan,

(d) determine criteria to be set forth in the Research Plan for selection of a development candidate with respect to a GT Product, and whether such criteria have been met,

(e) make decisions on whether and how to continue activities under the Research Plan at each decision point set forth in such Research Plan, based on the then-available data and results and consistent with the criteria set forth in such Research Plan,

(f) oversee Dimension's efforts to obtain any and all requisite INDs with respect to any development candidate GT Products,

(g) perform such other functions as appropriate to further the purposes of the Research Program, as expressly set forth in this Agreement or as determined by the Parties in writing,

(h) be responsible for ensuring the submission of clinical trial information by Dimension, as sponsor, to relevant public databases (e.g. ClinicalTrials.gov) when legally required and ensuring consistency between all postings. In addition (and at a minimum), the JRDC will ensure compliance with the requirements of the latest version of "Joint Position on the Disclosure of Clinical Trial Information via Clinical Trial Registries and Databases" as defined by IPFMA, PhRMA, EFPIA, and JAMA will be followed for all trials globally; and

(i) agree on a publication strategy based on the Parties' normal practices and policies.

The JRDC will have solely the powers assigned to it in this Article 4 and elsewhere expressly in this Agreement, and will not have any power to amend, modify, or waive compliance with this Agreement.

4.2.3 Meetings. The JRDC shall meet at least […***…] per Calendar Quarter, unless the Parties mutually agree in writing to a different frequency for such meetings. Either Party may also call a special meeting of the JRDC (by videoconference or teleconference) by at least […***…] prior written notice to the other Party in the event such Party reasonably believes that a significant matter must be addressed prior to the next regularly scheduled meeting, and such Party shall provide the JRDC, no later than […***…] prior to the special meeting, with materials reasonably adequate to enable an informed decision. No later than […***…] prior to any meeting of the JRDC, the chairperson of the JRDC shall prepare and circulate an agenda for such meeting; provided, however, that either Party may propose additional topics to be included on such agenda, either prior to or in the course of such meeting. The JRDC may meet in person, by videoconference or by teleconference, provided, however, at least […***…] shall be in person unless the Parties mutually agree in writing to waive such requirement in lieu of a videoconference or teleconference. In-person JRDC meetings shall be held at locations alternately selected by Dimension and by Bayer. Each Party shall bear the expense of its respective JRDC members' participation in JRDC meetings. Meetings of the JRDC shall be effective only if at least one (1) representative of each Party is present or participating in such meeting. The chairperson of the JRDC shall be responsible for preparing reasonably detailed written minutes of all JRDC meetings that reflect, without limitation, all material decisions made at such meetings. The JRDC chairperson shall send draft meeting minutes to each member of the JRDC for review and approval within […***…] after each JRDC meeting. Such minutes shall be deemed approved unless one or more members of the JRDC objects to the accuracy of such minutes within […***…] of receipt.

4.2.4 Decision-Making. The JRDC will strive to reach consensus in all decisions before it. The representatives from each Party will have, collectively, one (1) vote on behalf of that Party. The representatives serving on the JRDC shall use good faith efforts to seek consensus in the JRDC's decision making process. In the event such consensus is not obtained within […***…] of the JRDC reviewing and discussing an issue, the matter may be referred by either Party to the JSC for resolution, in which forum Dimension's representatives shall have the final say with respect to such decision or dispute; provided that Dimension's representatives shall not have the right in the exercise of such final say to amend, revise or extend the Research Plan in a manner that (i) imposes any material additional obligations on […***…] or (ii) results in any Cost Overrun.

4.2.5 Discontinuation of the JRDC. The JRDC shall continue to exist until the first to occur of (a) expiration of the Research Term, or (b) the Parties mutually agreeing to disband the JRDC. After the JRDC is disbanded, any decisions previously within its purview shall be decisions between the Parties, but governed by the decision making rules set forth in Section 4.2.4 as they apply to a Party's representatives on the JRDC.

4.3 Joint Project Team. Within […***…] following dissolution of the JSC, the Parties agree to form a joint project team (the "Joint Project Team" or "JPT"). The JPT's purpose will be to facilitate the exchange of information with respect to (a) the commercialization, including reimbursement strategies, regarding the Licensed GT Product and Licensed Treatment and Dimension's gene therapy products, in particular, in the field of Hemophilia B, and (b) the continued clinical development of the Licensed GT Product post

Regulatory Approval. The JPT shall meet at least every […***…] either telephonically or in person, unless the Parties mutually agree in writing to a different frequency for such meetings. For clarity, the JPT functions primarily as an information exchange forum and does not affect any decision-making discretion or right that Bayer otherwise possesses under this Agreement.

4.4 Alliance Manager. Each of Dimension and Bayer shall appoint a representative who possesses a general understanding of clinical, regulatory, manufacturing and marketing issues to act as its Alliance Manager ("Alliance Manager"). Each Alliance Manager will be responsible for:

(a) coordinating the various functional activities of Dimension and Bayer, as described in this Agreement;

(b) providing single-point communication for seeking consensus both within the respective Party's organization and with the other Party's organization regarding key issues, as appropriate, including facilitating review of external corporate communications; and

(c) identifying and raising cross-Party and/or cross-functional disputes to the appropriate committee or management in a timely manner.

ARTICLE 5

LICENSE GRANT; EXCLUSIVITY; NEGOTIATION RIGHTS

5.1 License Grant. Subject to the terms and conditions of this Agreement, including the Retained Rights, Dimension hereby grants to Bayer (a) an exclusive (even as to Dimension), sublicensable (as provided in Section 5.6 only), non-transferable (except as provided in Section 13.2), royalty-bearing license, under the Licensed Technology to make, have made, use, administer, monitor, import, sell, and offer for sale Licensed GT Products and Licensed Treatments, solely in the Field; and (b) a non-exclusive, sublicensable, non-transferable (except as provided in Section 13.2), […***…] license under Dimension Manufacturing Patents to manufacture or have manufactured Licensed GT Product, Licensed Treatment or any Compound/Vector used therein, solely in the Field.

5.2 Upstream Retained Rights for Hemophilia A. Notwithstanding the licenses granted in Section 5.1, Bayer acknowledges and agrees that, ReGenX's direct and indirect licensors retain the following rights: to the extent any Sublicensed Technology pertains to recombinant adeno-associated virus serotype 8, an exclusive, sublicensable right to make, have made, use, sell, offer for sale, and import products for the treatment of hemophilia A.

5.3 Other Retained Rights. Except for the rights and licenses specified in Section 5.1, no license or other rights are granted to Bayer under any intellectual property of Dimension or ReGenX, whether by implication, estoppel, or otherwise, whether, in the case of ReGenX, any such intellectual property dominates or is dominated by the Licensed Technology. Notwithstanding anything to the contrary in this Agreement, Dimension may use and permit

others to use the Licensed Technology for any research, development, commercial, or other purposes, outside of the Field. Dimension shall use reasonable efforts and impose conditions on any of its licensees to whom it grants rights outside the Field to prevent use (intentional or unintentional) of the Licensed Technology inside the Field. Without limiting the foregoing, and notwithstanding anything in this Agreement to the contrary, Bayer acknowledges and understands that ReGenX and its direct and indirect licensors retain the rights under the Sublicensed Technology set forth in Exhibit C (individually and collectively, the "Retained Rights").

5.4 Regained Rights. The Parties acknowledge that the Retained Rights with respect to hemophilia A set forth in Section 5.2 are excluded from this Agreement because of currently existing rights granted by ReGenX to other licensees or Third Parties. If ReGenX (and subsequently Dimension, pursuant to the ReGenX Agreement) regains the rights described in Section 5.2, following Dimension's receipt of notification from ReGenX of such event, Dimension will notify Bayer of same, together with a description of the rights granted or regained, in which case, such rights will no longer be considered Retained Rights, and the license granted to Bayer under Section 5.1(a) with respect to Sublicensed Technology will no longer be subject to such Retained Rights.

5.5 Government Rights. Bayer acknowledges that, pursuant to Title 35 of the United States Code, Sections 200-204, the United States government may retain certain rights in intellectual property contained within the Sublicensed Technology if it has been funded in whole or part under any contract, grant, or similar agreement with a federal agency. The license grant hereunder is expressly subject to any applicable United States government rights, including any applicable requirement that products resulting from such intellectual property sold in the United States must be substantially manufactured in the United States absent, with respect to such manufacturing requirement, a waiver of such requirement obtained from the applicable governmental agency. At Bayer's request Dimension will assist Bayer and provide necessary documentation and support in order to obtain such a waiver.

5.6 Sublicensing.

5.6.1 Right to Sublicense. The licenses granted pursuant to Section 5.1 are sublicensable (a) by Bayer to any Affiliates without prior consent by Dimension, or (b) by Bayer to any Third Parties upon Dimension's prior written consent (such consent not to be unreasonably withheld); provided that any such sublicense (to an Affiliate or to a Third Party) must comply with the provisions of this Section 5.6 (including Section 5.6.2). The use, marketing and sale of Licensed Treatment by Bayer's Affiliates shall be deemed to be use, marketing and sale by Bayer and shall not require a sublicense.

5.6.2 Conditions. The right to sublicense granted to Bayer under this Agreement is subject to the following conditions as they relate to sublicenses of the Sublicensed Technology:

(a) Bayer may only grant sublicenses to Third Parties through multiple tiers pursuant to a written sublicense agreement with the Sublicensee.

Dimension must receive written notice as soon as practicable following execution of any such sublicenses with Third Parties.

(b) In each sublicense agreement, the Sublicensee must be required to comply with the terms and conditions of this Agreement to the same extent as Bayer has agreed and, in each sublicense agreement with a Third Party, must acknowledge that ReGenX is an express third party beneficiary of such terms and conditions under such sublicense agreement; provided that nothing shall prevent Bayer from granting sublicenses of more limited scope than Bayer's rights, *e.g.*, in a more limited territory, field of use, or

(c) The official language of any sublicense agreement with a Third Party shall be English.

(d) Within […***…] after entering into a sublicense with a Third Party, Dimension must receive a copy of the sublicense written in the English language for Dimension's records and to share with ReGenX and its licensors under the Existing Licenses. The copy of the sublicense may be redacted to exclude confidential information of the applicable Sublicensee or of Bayer to the extent not relevant to Dimension or ReGenX, but such copy shall not be redacted to the extent that it impairs Dimension's (or ReGenX's or any of its licensors') ability to ensure compliance with this Agreement.

(e) With respect to sublicense agreements with Affiliates, Bayer shall notify /Dimension of the identity of all such Affiliates to which a sublicense is granted, and upon any request of ReGenX, shall provide to ReGenX a copy of such sublicense, in English, within […***…], for ReGenX to send GSK and UPenn.

(f) Notwithstanding subsections (d) and (e) above, Bayer acknowledges and agrees that in the event any of ReGenX's licensors under the Existing Licenses have a contractual right to require, and do require, a complete, unredacted copy of Bayer's sublicense agreement granted under this Section 5.6, then Bayer will provide such complete, unredacted copy.

5.6.3 Bayer's execution of a sublicense agreement will not relieve Bayer of any of its obligations under this Agreement. Bayer is and shall remain primarily liable to Dimension for all of Bayer's duties and obligations contained in this Agreement and for any act or omission of an Affiliate or Sublicensee that would be a breach of this Agreement if performed or omitted by Bayer, and Bayer will be deemed to be in breach of this Agreement as a result of such act or omission.

5.7 Bayer's Improvements.

5.7.1 Grant Back. Bayer hereby grants to Dimension a non-exclusive, worldwide, […***…], transferable, sublicensable, irrevocable, perpetual license:

(a) to use any Licensed Back Improvements (and any intellectual property rights with respect thereto) consummate in scope to the Retained Rights; and

(b) to practice the Licensed Back Improvements (and any intellectual property rights with respect thereto) in connection with any recombinant adeno-associated virus vectors, including the right to research, develop, make, have made, use, offer for sale, and sell products and services; provided that, during the term of this Agreement, Dimension and its sublicensees shall have no right under the license in this Section 5.7.1(b) to practice the Licensed Back Improvements in the Field except as necessary to carry out Dimension's obligations hereunder..

5.7.2 Notice. Bayer agrees to provide prompt notice to Dimension upon the filing of any patent application covering any Licensed Back Improvement, together with a reasonably detailed description of or access to such Licensed Back Improvement to permit the practice of any such invention or improvement.

5.8 ReGenX Improvements. Dimension agrees to provide notice to Bayer promptly following receipt of notice from ReGenX of the filing of any patent application covering any ReGenX Improvement, together with such description of or access to such ReGenX Improvement as is received by Dimension from ReGenX to permit the practice of any such improvement. Upon Dimension's receipt of notice from ReGenX of the filing of any patent application covering any ReGenX Improvement, Sublicensed Patents in Exhibit A attached hereto will be modified to add such patent application.

5.9 Covenants Related to ReGenX Agreement. During the term of this Agreement, without the prior written consent of Bayer Dimension agrees not to exercise its right to terminate and will not amend the ReGenX Agreement if such termination or amendment would materially or adversely alter the rights of Bayer under this Agreement. In addition, Dimension agrees that it shall not agree to any exercise by ReGenX of its right to terminate the Existing Licenses without first consulting with and obtaining the consent of, Bayer, except to the extent any such termination is in part and relates only to Sublicensed Technology uses outside the Field […***…].

5.10 Third Party Beneficiary. Bayer agrees and acknowledges that ReGenX is an express third party beneficiary of the terms and conditions of this Agreement as they relate to the terms and conditions of the ReGenX Agreement.

5.11 Exclusivity.

5.11.1 Dimension. Dimension hereby covenants that Dimension shall not, alone or in collaboration with a Third Party, (a) during the Research Term conduct clinical development of, and (b) during the term of this Agreement Commercialize, […***…], other than the Compounds/Vectors, GT Products and Licensed GT Products in accordance with the provisions of this Agreement.

5.11.2 Bayer. Bayer hereby covenants that (a) during the term of this Agreement, and (b) for a period of […***…] after termination of this Agreement if terminated by Bayer for convenience pursuant to Section 9.2, Bayer and its Affiliates, either on their own or in collaboration with a Third Party, shall not conduct clinical development of or Commercialize […***…], other than the Licensed GT Products or any Compound/Vector used therein under this

5.12 Hemophilia B Program.

5.12.1 Dimension's Rights. Bayer acknowledges and understands that Dimension intends to develop and, if successful, Commercialize one or more gene therapy treatments for hemophilia B utilizing the Sublicensed Technology (the "Hemophilia B Program"). Subject to Dimension's obligations under Sections 5.12.2 and 5.12.3, as between the Parties, Dimension shall have all rights, and be solely responsible for […***…], to (i) pursue any such development or Commercialization activities with respect to such Hemophilia B Program and any products arising therefrom, (ii) enter into any licensing, asset sale, distribution, collaboration or other similar arrangements with any Third Party with respect to such Hemophilia B Program, or (iii) elect to terminate and not pursue any such Hemophilia B Program and revert such rights, as and to the extent required, to ReGenX pursuant to the ReGenX Agreement.

5.12.2 Right of First Notice. If, during the period commencing on […***…] and ending on […***…] ("Notice Period"), Dimension elects for the first time to enter into discussions with a Third Party for rights to develop and Commercialize (or just to Commercialize) products arising out of its Hemophilia B Program in any country of the Territory, Dimension shall provide Bayer with […***…], and Bayer will have a period of […***…] in which to inform Dimension of its potential interest in negotiating for such rights (the "Expression of Interest Notice"). Dimension shall review any such Expression of Interest Notice […***…], and […***…]. Nothing in this Section 5.12.2 shall obligate Dimension or Bayer to enter into any license or other arrangement with respect to the Hemophilia B Program. For clarity, Dimension's obligation to provide written notice to Bayer under this Section 5.12.2 shall only apply […***…].

5.12.3 Rights Post POC Trial. If, after […***…], Bayer desires to enter into negotiations with Dimension with respect to obtaining rights to develop and Commercialize products arising out of its Hemophilia B Program in any country of the Territory, it shall have the one-time right to so notify Dimension in writing, and upon receipt of such notice Dimension shall, within […***…], notify Bayer in writing whether and to what extent Dimension still retains such rights to the Hemophilia B Program in the Territory (the "Availability Notice"), and upon receipt of such Availability Notice, Bayer may elect to deliver to Dimension, within […***…], a notice of its interest in entering into negotiations with Dimension for a license to such then-remaining rights held by Dimension (the "Negotiation Notice"). Upon receipt of such Negotiation Notice, Dimension and Bayer shall negotiate in good faith the terms of such a potential license agreement for such then-remaining rights, for a period of […***…] (or longer or fewer, to the extent the Parties agree to extend or terminate such discussions mutually) a term sheet or letter of intent with the level of detail similar to that of the term sheet exchanged between the Parties with respect to this Agreement and the Licensed GT Products, and

Dimension shall not enter into any license or other arrangement with a Third Party for such rights until the lapse of such […***…] period. Nothing in this Section 5.12.3 shall obligate Dimension or Bayer to enter into any license or other arrangement with respect to the Hemophilia B Program.

5.12.4 Consultation. Without limiting Sections 5.12.2 and 5.12.3, the Parties agree to consult with one another within the JSC and the JPT, and to the extent they determine, each in its sole discretion and to the extent allowed by applicable Law, that coordinating and communicating to one another with respect to their development, regulatory and Commercialization activities in the Field and in the field of hemophilia B gene therapy treatments, would be likely to have a positive impact on the advancement of the regulatory pathway and Commercialization of gene therapy treatments for hemophilia generally.

ARTICLE 6

CONSIDERATION

6.1 License Fee. In consideration of the licenses granted to Bayer under Section 5.1, Bayer shall pay to Dimension a non-refundable, non-creditable license fee of Twenty Million Dollars ($20,000,000) within […***…] of receipt of an invoice therefor, which such invoice may be delivered to Bayer on or after the Effective Date.

6.2 Development and Commercial Milestone Payments. Bayer shall make the following one-time development milestone payments to Dimension in connection with the first achievement by Bayer or its Affiliates or Sublicensees of the following development and commercial events. Bayer shall pay to Dimension the applicable amount within […***…] of receipt of an invoice issued no earlier than the date of such achievement. Dimension shall provide written notice to Bayer of the occurrence of any of the […***…] milestones set forth below, and Bayer shall provide written notice to Dimension of the occurrence of any of the […***…] milestones, in each case no later than […***…] following the occurrence of the relevant milestone. The […***…] milestone, "[…***…]," shall be determined as set forth in Section 2.11.4.

No.	Development Milestone Event	Milestone Payment
1	[…***…]	[…***…]
2	[…***…]	[…***…]
3	[…***…]	[…***…]
4	[…***…]	[…***…]
5	[…***…]	[…***…]
6	[…***…]	[…***…]
7	[…***…]	[…***…]
8	[…***…]	[…***…]
	Total	[…***…]

† The specific required criteria known as "D4" are, as of the Effective Date, set forth in that certain email communication from Bayer to Dimension dated April 30, 2014.

Each milestone payment is payable […***…], regardless of the number of times the corresponding event is achieved by a Licensed GT Product and/or Licensed Treatment and regardless of the number of Licensed GT Products and/or Licensed Treatments to achieve such event. Under no circumstances shall Bayer be obligated to pay Dimension more than […***…] pursuant to this Section 6.2.

For the avoidance of doubt, the Parties acknowledge and agree that, (a) with respect to Milestone […***…] above, in the event that some but not all of the criteria for […***…] are met for a Licensed Product and/or Licensed Treatment, such that there is no current achievement of […***…] as defined, then to the extent the subsequent milestone event (i.e., Milestone […***…]) is achieved at a later date for such Licensed Product and/or Licensed Treatment, […***…] shall be deemed to have occurred at such later date and the corresponding milestone payments for both Milestone […***…] and Milestone […***…] shall be paid together; and (b) if the […***…], then all development milestone events relating to […***…] shall be deemed to have been met. To that end, if for any reason, any such related milestone payments have not been made, such milestone payments shall be due and owing upon […***…]. For example: if […***…] and any of Milestone Events […***…] or […***…] have not been paid for any reason, all such unpaid milestones shall be paid together with the payment of the milestone payment for the achievement of development Milestone Event […***…].

6.3 Sales Milestones. Bayer shall make the following one-time sales milestone payments to Dimension when the aggregate annual Net Sales of all Licensed Treatments in all countries in the Territory by Bayer and its Affiliates and Sublicensees in a calendar year first reach the amount specified below. Bayer shall pay to Dimension such amount within […***…] following receipt of an invoice issued no earlier than the date of Bayer's notice of such achievement. Bayer shall provide written notice to Dimension within […***…] in which such event is achieved for the first time.

Sales Milestone Event	**Milestone Payment**
[…***…]	[…***…]
[…***…]	[…***…]
[…***…]	[…***…]
Total	[…***…]

Under no circumstances shall Bayer be obligated to pay Dimension more than […***…] pursuant to this Section 6.3. For the avoidance of doubt, more than one of the foregoing milestones with respect to the relevant aggregate Net Sales may occur in any given calendar year. For illustrative purposes only, […***…].

6.4 Royalties.

6.4.1 Royalty Rates. Bayer shall pay to Dimension during the Royalty Term royalties on aggregate annual Net Sales of all Licensed Treatments in the Field in the Territory, as calculated by multiplying the applicable royalty rate below by the corresponding amount of incremental Net Sales of all such Licensed Treatments in the Territory in each calendar year:

Aggregate Annual Net Sales	Royalty Percentage
[…***…]	[…***…]%
[…***…]	[…***…]%
[…***…]	[…***…]%

6.4.2 Royalty Term. Bayer's obligation hereunder for payment of a royalty under this Section 6.4 on the Net Sales of Licensed Treatments in a given country will commence on the First Commercial Sale of such Licensed Treatment, and end on a Licensed Treatment-by-Licensed Treatment and country-by-country basis upon the later to occur of: (a) the date when […***…] (b) […***…] from the date of First Commercial Sale of the Licensed Treatment (the "Royalty Term").

6.4.3 Biosimilar Treatment. Upon entry of one or more Biosimilar Treatments in a country in the Territory, and where the total number of patients in such country receiving Biosimilar Treatments as their initial treatment reaches, in […***…], a market share of […***…] or greater of the total number of patients in such country receiving as their initial treatment, either Licensed Treatment or a Biosimilar Treatment (the "Biosimilar Market Trigger Event"), the Net Sales of Licensed Treatments in such country shall be reduced […***…] before including same into total Net Sales in all countries in the Territory for the purpose of calculating the applicable royalty rates set forth in this Section 6.4. It is expressly understood and agreed, however, that (a) no such deduction to Net Sales shall apply to a Licensed Treatment (or its associated Licensed Treatment Monitoring Sales) to the extent the Licensed Treatment Administration Sale of such Licensed Treatment in such country occurred […***…], and (b) such reduction shall cease in the event the foregoing […***…] or greater market share condition is no longer satisfied in such country. All such determinations of patients shall be based upon a mutually acceptable calculation method using market share data provided by a reputable and mutually agreed upon provider, such as IMS Health, or similar data provider in countries where IMS Health is not operating.

6.4.4 Royalty Stacking. If Bayer reasonably determines in good faith that it is necessary to obtain either (i) a license from one or more Third Parties to make, have made, use, sell, offer to sell and/or import Licensed GT Products in the Field in one or more countries in the Territory, which such license is for a patent reasonably believed by Bayer to dominate one or more claims of Licensed Patents in existence as of the Effective Date and covering the Licensed GT Product, or (ii) a license under one or more process patents to make or have made the Licensed GT Product, and where, but for such license, Bayer would not be lawfully able to manufacture the Licensed GT Product, then in either or both cases, the amount of Bayer's royalty payments under Section 6.4 with respect to Net Sales for such Licensed GT Product for a given period shall be reduced by […***…] of the amount of the payments paid under such other license(s) for that same period; provided that such Third Party payments are attributable to sales made by Bayer or its Affiliates or Sublicensees that are used in the calculation of Net Sales on

which Bayer's royalty payment obligation to Dimension is based. Notwithstanding the foregoing, the adjustment of royalties under this Section 6.4.4 will in no event reduce the royalty rate to less than […***…] of the applicable rate set forth in Section 6.4.1.

6.4.5 ReGenX Obligations. […***…] shall be responsible for any and all payments owed to ReGenX pursuant to the ReGenX Agreement.

6.5 Reports and Records.

6.5.1 Bayer must deliver to Dimension within […***…] after the end of each […***…] after the First Commercial Sale of a Licensed Treatment a report setting forth the calculation of the royalties due to Dimension for such […***…], including:

(a) Number of Licensed Treatments included within Net Sales, listed by

(b) Licensed Treatment Sales and Net Sales of Licensed Treatments listed by country;

(c) Royalties owed to Dimension, listed by category.

6.5.2 Upon receipt of an invoice, Bayer shall pay the royalties due under Section 6.4. If invoices are received by Bayer at the below address by […***…], then payments shall be made by the […***…]. If invoices are received by Bayer at the below address after […***…], then payments shall be made by […***…].

6.5.3 Bayer shall maintain and require its Affiliates and all Sublicensees to maintain, complete and accurate books and records that enable the royalties, fees, and payments payable under this Agreement to be verified. The records must be maintained for (a) […***…] with respect to Bayer and its Sublicensees, and (b) […***…] with respect to Bayer's Affiliates, in each case after the submission of each report under Article 6. No more frequently than once during each calendar year during the term of this Agreement and the […***…] period thereafter, Bayer will permit Dimension's (or as applicable, ReGenX's or its licensors under the Existing Licenses) auditors from any auditing firm to which Bayer has no reasonable objection, and with at least […***…] advance notice at any time during normal business hours, accompanied at all times, to inspect, audit and copy reasonable amounts of relevant accounts and records of Bayer and its Affiliates and reports submitted to Bayer and its Affiliates from Sublicensees, for the sole purpose of verifying the accuracy of the calculation of payments to Dimension pursuant to this Section 6.5. The accounts, records and reports related to any particular period of time may only be audited one time under this Section 6.5. Dimension will cause its auditors not to provide Dimension with any copies of such accounts, records or reports and not to disclose to Dimension any information other than information relating solely to the accuracy of the accounting and payments made by Bayer pursuant to this Section. Dimension will cause its auditors to promptly provide a copy of their report to Bayer. If such audit determines that payments are due to Dimension, Bayer will, following receipt of an invoice, pay to Dimension any such additional amounts within […***…] after the date on which such

auditor's written report is delivered to Bayer and Dimension, unless such audit report is disputed by Bayer, in which case the dispute will be resolved in accordance with Section 13.6. If such audit determines that Bayer has overpaid any amounts to Dimension, Dimension will refund any such overpaid amounts to Bayer within […***…] after the date on which such auditor's written report is delivered to Bayer and Dimension. Any such inspection of records will be at Dimension's expense unless such audit discloses a deficiency in the payments made by Bayer (whether for itself or on behalf of its Affiliates) of more than […***…] of the aggregate amount payable for the relevant period, in which case Bayer will bear the cost of such audit. Notwithstanding anything to the contrary in and without limiting the foregoing, Bayer acknowledges and agrees that it may also be subject to the separate access or audit rights of ReGenX's licensors in accordance with the terms of the Existing Licenses, and if such a licensor exercises such access or audit rights, the provisions of Section 3.5.4 of the ReGenX Agreement will govern, unless such licensor otherwise consents to applying the provisions of this Section 6.5.3. Dimension acknowledges the disruption and effort required to provide information to be disclosed during an audit, and Dimension shall endeavor to avoid multiple audits covering the same audit period. Without prejudice to the foregoing, Dimension shall not conduct an audit of any period for which ReGenX or any of the licensors under the Existing Licenses have already conducted an audit or have given notice that they intend to conduct such an audit. In addition, Dimension shall enforce any rights it has under the ReGenX Agreement to limit the scope of any audit that might be demanded pursuant to the ReGenX Agreement.

6.6 Payment Currency, Interest.

6.6.1 Payment Address. All invoices shall be sent to the following address:

Bayer HealthCare
Pharma West Coast
Attn: […***…]
PO Box 416
Pittsburgh PA 15230
USA

6.6.2 Payments made by Wire Transfer. All payments made to Dimension under the Agreement shall be made by wire transfer to the following bank account, or such other bank account as notified by Dimension to Bayer from time to time:

Domestic Wire Transfer (originating in the U.S.):
[…***…]
[…***…]
[…***…]
[…***…]
[…***…]

International Wire Transfer:
[…***…]
[…***…]

[…***…]
[…***…]
[…***…]
[…***…]

6.6.3 All dollar amounts referred to in this Agreement are expressed in United States dollars. All payments to Dimension under this Agreement must be made in United States dollars.

6.6.4 Net Sales made in currencies other than USD will be converted into USD using the average exchange rate for the applicable […***…] as for Bayer's internal accounting and reporting process consistently applied, which in any event shall comply with 1FRS.

6.6.5 Any payments due under the Agreement shall be due on such date as specified in the Agreement. Any failure by Bayer to make a payment by the date when due shall obligate Bayer to pay interest on the due payment to Dimension. The interest period shall commence on the due date (inclusive) and end on the payment date (exclusive). Interest shall be calculated based on the actual number of days in the interest period divided by 360. The interest rate shall be equal to […***…], plus a premium of one percentage point, or shall be equal to an interest rate according to local legal provisions, whatever is lower.

6.6.6 All payments by Bayer to Dimension for funding of the Research Program are as set forth in and will be in accordance with Section 2.5.

6.7 Withholding Tax. The Parties agree to cooperate with one another and use reasonable efforts to reduce or eliminate tax withholding or similar obligations in respect of royalties, milestone payments, and other payments made by Bayer to Dimension under this Agreement. Any Party required to make a payment under this Agreement shall be entitled to deduct and withhold from the amount payable the tax for which the paying Party is liable under any provision of applicable tax law. No deduction shall be made or a reduced amount shall be deducted if the paying Party is timely furnished by payee with all documents required for the application of a zero or reduced rate according to the respective Double Taxation Treaty. Any withheld tax shall be treated as having been paid by paying Party to payee for all purposes of this Agreement, provided that each Party shall provide the other with reasonable assistance to enable the recovery, as permitted by applicable Laws, of such withholding taxes, such recovery to be for the benefit of the Party bearing such withholding tax. Paying Party shall timely forward the tax receipts certifying the payments of withholding tax on behalf of payee. Any assignment of this Agreement by paying Party which causes a higher withholding tax rate than would be applicable without the assignment shall be borne by paying Party. If paying Party failed to deduct withholding tax but is still required by applicable tax law to pay withholding tax on account of payee to the tax authorities, payee shall assist paying Party with regard to all procedures required in order to obtain reimbursement by tax authorities or, in case tax authorities will not reimburse withholding tax to paying Party, payee will immediately refund the tax amount.

6.8 Value Added Tax. All agreed consideration is exclusive of Value Added Tax ("VAT"). VAT applies and shall be invoiced additionally according to the applicable VAT law

and shall be paid to Dimension, if payable by Dimension to the respective tax authority and after receipt of a correct invoice in accordance with the applicable VAT law.

ARTICLE 7

DILIGENCE

7.1 Diligence Obligations. Bayer will use Commercially Reasonable Efforts to develop, Commercialize, market, promote, and sell at least one Licensed GT Product or Licensed Treatment in the Field in the US and the Major Market Countries.

7.2 Development Plans. The Parties acknowledge that pursuant to the ReGenX Agreement, Dimension is required to provide ReGenX with a development plan and budget covering the […***…] of development activities with respect to the Licensed GT Product and Licensed Treatment, and to provide […***…] updates to such development plan and budget. Bayer agrees to cooperate with Dimension in the provision of information in meeting Dimension's obligation under the ReGenX Agreement, and such cooperation may include sharing a copy of the Research Plan (or portions thereof) with ReGenX, answering follow up questions ReGenX may have, or providing certain information regarding the later stage clinical development and regulatory activities by Bayer and its Affiliates and Sublicensees following the POC Trial.

7.3 Development Reporting. Within […***…] of […***…] during the term of this Agreement, Bayer shall provide Dimension with written progress reports through the JSC and JPT, setting forth in reasonable detail the progress of the development, evaluation, testing, and commercialization of each Licensed GT Product and Licensed Treatment. Bayer will also notify Dimension within […***…] of the First Commercial Sale by Bayer, its Affiliates, or any Sublicensees of each Licensed Treatment. Such a report ("Development Progress Report"), setting forth the current stage of development of Licensed GT Products, shall include:

7.3.1 Date of Development Progress Report and time covered by such report;

7.3.2 Major activities and accomplishments completed by Bayer, its Affiliates, and any Sublicensees relating directly to the Licensed GT Product since the last Development Progress Report;

7.3.3 Significant research and development projects relating directly to the Licensed GT Product currently being performed by Bayer, its Affiliates, and any Sublicensees and projected dates of completion;

7.3.4 Development activities anticipated for the next […***…];

7.3.5 Projected total development remaining before product launch of each Licensed Treatment; and

7.3.6 Summary of significant development efforts using the Sublicensed Technology being performed by Third Parties, including the nature of the relationship between Bayer and such Third Parties.

7.4 Confidential Information. The Parties agree that Development Progress Reports shall be deemed Bayer's Confidential Information; provided that Dimension may share a copy of such reports with ReGenX and with ReGenX's licensors under the Existing Licenses, subject to obligations of confidentiality.

7.5 Improvements. Simultaneously with the Development Progress Report, Bayer shall deliver a detailed description of any Licensed Back Improvements, if not previously provided.

ARTICLE 8

CONFIDENTIALITY

8.1 Treatment of Confidential Information. Each Party, as a receiving party (a "Receiving Party"), agrees that it will (a) treat Confidential Information of the other Party (the "Disclosing Party") as strictly confidential; (b) not disclose such Confidential Information to Third Parties without the prior written consent of the Disclosing Party, except as may be permitted in this Agreement; provided that any disclosure permitted hereunder be under confidentiality agreements with provisions at least as stringent as those contained in this Agreement; and (c) not use such Confidential Information for purposes other than those authorized expressly in this Agreement. The Receiving Party agrees to ensure that its employees who have access to Confidential Information of the other Party are obligated in writing to abide by confidentiality obligations at least as stringent as those contained under this Agreement. Dimension shall also maintain Licensed Know-How as confidential to the extent that it relates solely to the Field, subject to the provisions of this Article 8.

8.2 Public Announcements.

8.2.1 The Parties agree they will each issue a press release in a form as outlined in Exhibit F and at such time as is agreed upon by the Parties. Except as provided in Section 8.2.3, Section 8.3 and Section 8.4, any other press releases by either Party with respect to the other Party or any other public disclosures concerning the existence of or terms of this Agreement shall be subject to review and approval by the other Party.

8.2.2 After release of such agreed upon press release, if either Party desires to make a public announcement concerning the material terms of this Agreement or any activities hereunder, such Party shall give reasonable prior advance notice of the proposed text of such announcement to the other Party for its prior review and approval (except as otherwise provided herein), which approval shall not be unreasonably withheld or delayed, except that in the case of a press release or governmental filing determined by such Party, based on advice of counsel, to be required by law, the disclosing Party shall provide the other Party with such advance notice as it reasonably can and shall not be required to obtain approval therefor. Neither Party shall be

required to seek the permission of the other Party to repeat any information that has already been publicly disclosed by such Party, or by the other Party, in accordance with this Section 8.2, provided such information remains accurate as of such time.

8.2.3 The Parties acknowledge that either or both Parties may be obligated to file under applicable Laws a copy of this Agreement with the U.S. Securities and Exchange Commission or other governmental authorities both in the US and elsewhere. Each Party shall be entitled to make such a required filing, provided that it requests confidential treatment of the confidential commercial terms and sensitive technical terms hereof and thereof to the extent such confidential treatment is reasonably available to such Party. In the event of any such filing, each Party will provide the other Party with a copy of this Agreement marked to show provisions for which such Party intends to seek confidential treatment and shall reasonably consider and incorporate the other Party's reasonable comments thereon to the extent consistent with the legal requirements, with respect to the filing Party, governing disclosure of material agreements and material information that must be publicly filed.

8.3 Authorized Disclosure. Notwithstanding the provisions of Section 8.1 or 8.2, either Party may disclose Confidential Information of the other Party, or make such a disclosure of the existence of and/or terms of this Agreement:

8.3.1 to any Affiliates, legal advisors, accountants, and, in each case whether actual or bona fide potential, to collaboration partners (such as CMOs, CROs and other vendors providing services relating to the subject matter of the Agreement), licensees, acquirers, investors, lenders, and other potential financing sources; provided that, in each case, such recipient of Confidential Information is obligated to keep such information confidential on terms no less stringent than those set forth in this Agreement.

8.3.2 if such disclosure is reasonably necessary (i) for filing or prosecuting Patent Rights as contemplated by this Agreement; (ii) to comply with the requirements of regulatory authorities with respect to obtaining and maintaining Regulatory Approval of a Licensed GT Product or Licensed Treatment; or (iii) for prosecuting or defending litigation;

8.3.3 such disclosure is reasonably necessary or desirable to comply with applicable Laws, including regulations promulgated by applicable security exchanges, court order, administrative subpoena or order;

8.3.4 in connection with Bayer's development, manufacture or Commercialization of the Licensed GT Products or Licensed Treatment in the Field in the Territory, including, without limitation, to existing or potential distributors, service providers, Sublicensees, Affiliates, or collaboration partners, contractors or investigators, under substantially the same confidentiality obligations as are set forth herein, except that the confidentiality obligations shall have a term of at least […***…]; or

8.3.5 such disclosure is to ReGenX and its licensors solely as required under the terms of, and subject to, the ReGenX Agreement, and under the condition that ReGenX does not

disclose Confidential Information to others (except as may be required under the Existing Licenses).

8.4 Compelled Disclosure. In the event that the Receiving Party receives service of legal process that purports to compel disclosure of the Disclosing Party's Confidential Information or becomes obligated by Law to disclose the Confidential Information of the Disclosing Party or the existence of or terms of this Agreement to any governmental authority, the Receiving Party shall promptly notify the Disclosing Party, so that the Disclosing Party may seek an appropriate protective order or other remedy with respect to narrowing the scope of such requirement and/or waive compliance by the Receiving Party with the provisions of this Agreement. The Receiving Party will provide the Disclosing Party with reasonable assistance in obtaining such protective order or other remedy. If, in the absence of such protective order or other remedy, the Receiving Party is nonetheless required by Law to disclose the existence of or terms of this Agreement or other Confidential Information of the Disclosing Party, the Receiving Party may disclose such Confidential Information without liability hereunder; provided that the Receiving Party shall furnish only such portion of the Confidential Information that is legally required to be disclosed and only to the extent required by Law.

8.5 Term of Confidentiality. The obligations of this Article 8 shall continue for a period of […***…] following the expiration or termination of this Agreement.

ARTICLE 9

TERM AND TERMINATION

9.1 Term of Agreement. This Agreement, unless sooner terminated as provided in this Agreement, expires upon the expiration of the Royalty Term. Upon expiration of this Agreement (but not early termination), (a) Bayer's license to Licensed Know-How under Section 5.1 will become non-exclusive, perpetual, irrevocable, […***…] with respect to the Dimension Know-How and Sublicensed Know-How, provided that with respect to Sublicensed Know-How such license will remain limited to the Field and subject to the Retained Rights, and (b) Bayer's license to Dimension Manufacturing Patents under Section 5.1(b) will become perpetual.

9.2 Bayer's Right to Terminate for Convenience. At any time Bayer may, upon […***…] prior written notice to Dimension, terminate this Agreement for any reason. In exercising such termination right, Bayer may terminate the Agreement in its entirety or, if desired, Bayer may specify in the written notice that this Agreement is terminating only with respect to one or more country within the Territory; provided, however, that, should Bayer terminate with respect to both the U.S. and all Major Market Countries, this Agreement will terminate in its entirely unless otherwise agreed by the Parties.

9.3 Bayer's Right to Terminate for Safety. In the event that, following the POC Trial, Bayer makes a good faith determination in accordance with its standard practices and procedures for such determinations that there is a material safety issue with respect to the Licensed GT Product in the Field in the Territory Bayer may terminate this Agreement upon […***…] notice.

9.4 Bayer's Right to Terminate for Failure to achieve Demonstration of Clinical POC. If the initial Licensed GT Product or the Backup Product fails to achieve Demonstration of Clinical POC Bayer may, within […***…] of being notified of such failure, upon […***…] notice, terminate this Agreement.

9.5 Termination for Breach. Dimension may terminate this Agreement if Bayer is late in paying to Dimension any milestones or royalties, fees or any other monies due under this Agreement, and Bayer does not pay Dimension in full within […***…] upon written demand from Dimension, which termination shall be effective immediately upon the expiration of such […***…] cure period, provided that no demand will be issued prior to expiration of the due date for payment, and provided further that Bayer is not disputing on a bona fide basis that a payment is due. Either Party may terminate this Agreement, if the other Party materially breaches (other than nonpayment) this Agreement and does not cure such material breach within […***…] after written notice of the breach, which termination shall be effective immediately upon the expiration of such […***…] cure period. Notwithstanding the foregoing, if the default is not reasonably capable of being cured within the […***…] cure period by the defaulting Party and such defaulting Party is making a good faith effort to cure such default, the cure period shall be extended by no more than […***…]. Bayer acknowledges and understands that: (a) in the event the nature of a breach by Bayer causes Dimension (as a sublicensor hereunder) to be in breach of the ReGenX Agreement, the applicable cure periods as set forth in the ReGenX Agreement are shorter than those set forth in this Section 9.5; and further, (b) with respect to such breach by Bayer described in (a), Dimension shall not be responsible for any termination by ReGenX through exercise of ReGenX's termination right under the ReGenX Agreement, where such termination occurs prior to the […***…] cure period given to Bayer above. For the avoidance of doubt, Bayer shall not be liable or otherwise responsible to Dimension for any loss, costs, expenses, damages or liability of any kind arising from a breach or termination of the ReGenX Agreement attributable to Bayer's exercise of its rights under this Agreement. The right of either Party to terminate this Agreement as herein above provided shall not be affected in any way by its waiver of, or failure to take action with respect to, any previous default.

9.6 Patent Challenge. Dimension may terminate this Agreement if Bayer or any of its Affiliates institutes a Patent Challenge. Such termination will be effective […***…] after written notice from Dimension to Bayer unless within such […***…] Bayer or its Affiliates causes such Patent Challenge to terminate. "Patent Challenge" means […***…].

9.7 Termination for Insolvency.

9.7.1 Dimension may terminate this Agreement, effective immediately upon written notice to Bayer, if Bayer or any of its Controlling Affiliates experiences any Trigger Event.

9.7.2 Bayer shall include in each sublicense agreement entered into with a Sublicensee a right of Bayer to terminate such sublicense agreement if such Sublicensee experiences any event corresponding to a Trigger Event; and Bayer shall terminate the sublicense agreement, effective immediately upon written notice to the Sublicensee, if the Sublicensee experiences any such event.

9.7.3 For purposes of this Section 9.7, "Trigger Event" means any of the following (provided they are not for purposes of reorganization): (a) if Bayer (i) becomes insolvent, becomes bankrupt, or generally fails to pay its debts as such debts become due, (ii) is adjudicated insolvent or bankrupt, (iii) admits in writing its inability to pay its debts, (iv) suffers the appointment of a custodian, receiver, or trustee for it or its property and, if appointed without its consent, is not discharged within […***…], (v) makes an assignment for the benefit of creditors, or (vi) suffers proceedings being instituted against it under any law related to bankruptcy, insolvency, liquidation, or the reorganization, readjustment, or release of debtors and, if contested by it, not dismissed or stayed within […***…]; or (b) the calling by Bayer of a meeting of its creditors with a view to arranging a composition or adjustment of its debts. Bayer acknowledges and understands that: (1) the timing periods in (iv) and (vi) above differ from those set forth in the definition of "Trigger Event" in Section 6.4.3 of the ReGenX Agreement, which are […***…] and […***…], respectively, and (2) in the event such difference causes Dimension (as a sublicensor hereunder) to be in breach of the ReGenX Agreement, Dimension shall not be responsible for any termination by ReGenX through exercise of ReGenX's termination right under the ReGenX Agreement, where the termination is due to such difference. Bayer shall not be liable or otherwise responsible to Dimension for any loss, costs, expenses, damages or liability of any kind arising from a breach or termination of the ReGenX Agreement due to such difference or otherwise attributable to Bayer's exercise of its rights under this Agreement.

9.8 Applicability of Section 365(n) of the Bankruptcy Code. In the event either Party becomes a debtor under Title 11 of the U.S. Code, this Agreement shall be deemed to be, for purposes of Section 365(n) of Title 11, a license to "Intellectual Property" as defined therein and the other Party and its Affiliates, and each of their successors and assigns as licensees shall have the rights and elections as specified in Section 365(n) of Title 11 of the U.S. Code. Without limiting the foregoing, upon termination of this Agreement by a trustee or executor of either Party which has rejected this Agreement pursuant to any non-contractual rights afforded to it by applicable bankruptcy law and/or a U.S. or foreign bankruptcy court or other tribunal of competent jurisdiction, all rights and licenses herein granted to the other Party shall nonetheless continue in full force and effect in accordance with the terms of this Agreement.

9.9 Effects of Termination. The effect of termination by Bayer pursuant to Sections 9.2, 9.3, or 9.4 and by either Party, as applicable, under Sections 9.5 or 9.7, or by Dimension pursuant to Section 9.6 shall be as follows:

9.9.1 The licenses and sublicenses granted by Dimension hereunder shall terminate, and Bayer, its Affiliates, and (unless the sublicense agreement is assigned pursuant to Section 9.9.2) all Sublicensees shall cease to make, have made, use, import, sell, and offer for sale all Licensed GT Products and shall cease to otherwise practice the Licensed Technology; provided that Bayer, its Affiliates, and Sublicensees, shall have the right to continue to sell their existing inventories of Licensed GT Products for a period not to exceed […***…] after the effective date of such termination, and provided also that Bayer, its Affiliates and Sublicensees shall have the right to continue to supply Licensed GT Products or support any Licensed Treatment to the extent required by any Regulatory Authority, but in each case subject to any payment obligations to Dimension under Article 6;

9.9.2 Bayer shall have the right to assign to Dimension any or all sublicenses granted to Third Parties to the extent of the rights licensed to Bayer hereunder and sublicensed to the Sublicensee; provided that (i) prior to such assignment, Bayer shall advise Dimension whether such Sublicensee is then in full compliance with all terms and conditions of its sublicense and continues to perform thereunder, and, if such Sublicensee is not in full compliance or is not continuing to perform, Dimension may elect not to have such sublicense assigned; and (ii) such assignment shall be subject to Dimension not being liable to such Sublicensee with respect to any obligations of Bayer to the Sublicensee that are not consistent with, or not required by, Dimension's obligations to Bayer under this Agreement; and all sublicenses not requested to be assigned to Dimension shall terminate;

9.9.3 If termination is by Bayer pursuant to Section 9.2, 9.3 or 9.4, or by Dimension pursuant to Section 9.5, 9.6, or 9.7:

(a) if, at the time of such termination, there are any ongoing clinical trials with respect to Licensed GT Products in the Field, the Parties shall, at Dimension's option, negotiate in good faith and adopt a plan to wind-down such trial activities in an orderly fashion or, at Dimension's election, promptly transition such development activities to Dimension or its designee, with due regard for patient safety and the rights of any subjects that are participants in any clinical trials of the Licensed GT Products and take any actions Dimension deems reasonably necessary or appropriate to avoid any human health or safety problems and in compliance with all applicable Laws; and

(b) Bayer shall grant, and hereby grants (effective only upon any such termination of this Agreement), to Dimension a non-exclusive, perpetual, irrevocable, worldwide, […***…], transferable, sublicensable license to any Licensed Back Improvements, for use by Dimension and ReGenX for the research, development, and commercialization of products in any therapeutic indication.

9.9.4 If termination is by Bayer pursuant to Section 9.2:

(a) Bayer shall grant, and hereby grants (effective only upon any such termination of this Agreement), to Dimension an exclusive (even as to Bayer), worldwide, […***…], transferable, perpetual, irrevocable license, with the right to grant sublicenses, under the Bayer Technology to make, have made, use, import, sell, and offer for sale the Licensed GT Products or any Licensed Treatments as they were being developed or Commercialized at the time of termination, solely in the Field. For this purpose, the "Bayer Technology" means Bayer's patents, Know-How, and other intellectual property that are improvements or modifications to or that are based on or derived in whole or in part from or that otherwise relate to any Licensed Technology to the extent such patents, Know-How (including all data and regulatory submissions), or other intellectual property pertains to the Licensed GT Products or Licensed Treatments that were being developed or Commercialized by Bayer at the time of

termination. To effectuate such license, upon any such termination of this Agreement, Bayer will promptly disclose to Dimension all Bayer Technology not already known to Dimension;

(b) Bayer will transfer to Dimension ownership of any Regulatory Approvals then in Bayer's, its Affiliates', or any Sublicensee's (to the extent a sublicense is terminated and not assigned) name related to the Licensed GT Products as then being developed or Commercialized containing any expression construct provided by Dimension to Bayer as part of the Licensed Technology and notify the appropriate regulatory authorities and take any other action reasonably necessary to effect such transfer of ownership; and

(c) At Dimension's request Bayer shall transfer any biological materials or compounds that Bayer has manufactured or had manufactured relating to the Licensed GT Product or Licensed Treatment and that is in Bayer's possession as at the date of termination. Dimension shall pay for such materials and compounds at cost, without any markup.

9.9.5 The Parties acknowledge and agree that, if the GSK Agreement is terminated as described in Section 6.5 of the GSK Agreement, then, as provided in Section 6.5.2 thereof, ReGenX will assign the ReGenX Agreement to the licensor of the GSK Agreement to the extent the ReGenX Agreement is related solely to the rights and products licensed to ReGenX under the GSK Agreement.

9.9.6 Each Receiving Party shall, at the other Party's request, return all Confidential Information and any remaining Materials of the Disclosing Party. Notwithstanding the foregoing, one copy of such Confidential Information may be kept by either Party for a record of that Party's obligations.

If termination is only with respect to a particular country or region within the Territory, but not all countries, then the provisions of this Section 9.9 shall only apply with respect to the terminated country(ies), and this Agreement shall continue with respect to the non-terminated countries.

9.10 Survival. Bayer's obligation to pay all monies due and owed to Dimension under this Agreement which have matured as of the effective date of termination or expiration shall survive the termination or expiration of this Agreement. In addition, the provisions of Sections 5.11.2 (Exclusivity: Bayer), 9.1 (Term of Agreement), 9.8 (Applicability of Section 365(n) of the Bankruptcy Code), 9.9 (Effects of Termination), 9.10 (Survival), 10.1 (Ownership of Inventions), 11.4 (Disclaimer of Warranties, Damages), and 11.5 (Indemnification), and Articles 1 (Definitions), 6 (Consideration)(but only in respect of payments that have accrued and become payable prior to the effective date of termination), 8 (Confidentiality), 12 (Use of Name) and 13 (Additional Provisions) shall survive such termination or expiration of this Agreement in accordance with their respective terms.

ARTICLE 10

PATENT MAINTENANCE; PATENT INFRINGEMENT

10.1 Ownership of Inventions. Each Party shall own all Know-How generated solely by it and its Affiliates and their respective employees, agents and independent contractors in the course of conducting such Party's activities under this Agreement ("Sole Inventions") and any Patent Rights arising therefrom (the "Bayer Patents" in the case of Bayer's Sole Inventions). All Know-How generated jointly by employees, Affiliates, agents, or independent contractors of each Party in the course of performing activities under this Agreement (collectively, "Joint Inventions"), and all Patent Rights contained within such Joint Inventions (collectively, "Joint Patents"), shall be owned jointly by the Parties in accordance with joint ownership interests of co-inventors under U.S. patent laws (that is, each Party shall have full rights to license, assign and exploit such Joint Inventions (and any patents arising therefrom) anywhere in the world, without any requirement of gaining the consent of, or accounting to, the other Party), subject to the covenants and licenses granted herein and subject to any other intellectual property held by such other Party. For purposes of determining whether Inventorship shall be a Sole Invention or a Joint Invention under this Agreement, inventorship shall be determined in accordance with U.S. patent laws.

10.2 Disclosure of Inventions. Dimension shall promptly disclose to Bayer all Sole Inventions, and each Party shall promptly disclose to the other Party any Joint Inventions, including any invention disclosures or similar documents submitted to it by its employees, agents or independent contractors describing such inventions, and all other information relating to such inventions to the extent necessary or useful for the preparation, filing and maintenance of any Patent Rights with respect to such inventions.

10.3 Prosecution of Dimension Patents. As between Dimension and Bayer, the Parties agree as follows:

10.3.1 Dimension shall have the sole right to Prosecute patent applications and issued patents within Dimension Patents in Dimension's sole discretion and at its own expense. Dimension shall provide Bayer with a reasonable opportunity to review and provide comments in connection with the Prosecution of the Dimension Patents; and Dimension shall keep Bayer reasonably informed as to all material developments with respect to such Dimension Patents and shall supply to Bayer copies of material communications received and filed in connection with the Prosecution of such Dimension Patents.

10.3.2 Dimension agrees to Prosecute any patent applications or issued patents within the Dimension Patents in good faith. If Dimension decides not to file, to abandon or not to maintain any of such Dimension Patents, in each case where a claim may cover a Licensed GT Product or GT Product, then Dimension shall provide Bayer with […***…] prior written notice of such decision (or such other longer period of time reasonably necessary to allow Bayer to assume such responsibilities, at the sole discretion of Dimension). In such event, Bayer shall have the right, at its option, to the extent Dimension is permitted by obligations owed to Third Parties, to have assigned to it the said Dimension Patents. If assignment is not possible, Bayer

shall have a non-exclusive, perpetual, irrevocable, royalty-free license with respect to those Dimension Patents. In either case (assignment or non-exclusive license) the Patent Rights will cease to be Dimension Patents.

10.4 Prosecution of Joint Patents. As between Dimension and Bayer, the Parties agree as follows:

10.4.1 Dimension shall have the sole right to Prosecute patent applications and issued patents within Joint Patents in Dimension's discretion and at its own expense. Dimension shall provide Bayer with a reasonable opportunity to review and provide comments in connection with the Prosecution of the Joint Patents; and Dimension shall keep Bayer reasonably informed as to all material developments with respect to such Joint Patents and shall supply to Bayer copies of material communications received and filed in connection with the Prosecution of such Joint Patents.

10.4.2 Dimension agrees to Prosecute any patent applications or issued patents within the Joint Patents in good faith. If Dimension decides not to file, to abandon or not to maintain any of such Joint Patents, then Dimension shall provide Bayer with […***…] prior written notice of such decision (or such other longer period of time reasonably necessary to allow Bayer to assume such responsibilities, at the sole discretion of Dimension). In such event, Bayer shall have the right, at its option, to have assigned to it Dimension's interest in such Joint Patents, and such Patent Rights shall cease to be Dimension Patents.

10.5 Prosecution of Bayer Patents. As between Dimension and Bayer, the Parties agree as follows:

10.5.1 Bayer shall have the sole right to Prosecute patent applications and issued patents within Bayer Patents in Bayer's sole discretion and at its own expense. Bayer shall provide Dimension with a reasonable opportunity to review and provide comments in connection with the Prosecution of the Bayer Patents; and Bayer shall keep Dimension reasonably informed as to all material developments with respect to such Bayer Patents and shall supply to Dimension copies of material communications received and filed in connection with the Prosecution of such Bayer Patents.

10.5.2 Bayer agrees to Prosecute any patent applications or issued patents within the Bayer Patents in good faith. If Bayer decides not to file, to abandon or not to maintain any of such Bayer Patents that claim only a Licensed GT Product or GT Product and no other product or component thereof, then Bayer shall provide Bayer with […***…] prior written notice of such decision (or such other longer period of time reasonably necessary to allow Dimension to assume such responsibilities, at the sole discretion of Bayer). In such event, Dimension shall have the right, at its option, to control the filing, prosecution and/or maintenance of any such Bayer Patents, at its own expense, and the Parties shall have the rights with respect to such Bayer Patents as set forth in Section 10.5.1 (with the Parties' roles reversed).

10.6 Prosecution of Sublicensed Patents. Bayer acknowledges and agrees that, in accordance with the terms of the ReGenX Agreement:

10.6.1 ReGenX retains the sole right to Prosecute patent applications and issued patents within the Sublicensed Patents, in ReGenX's sole discretion. Subject to Section 10.6.3, and subject to ReGenX providing Dimension with a reasonable opportunity to review and provide comments in connection with the Prosecution of the Sublicensed Patents, Dimension shall provide Bayer with same, to the extent such Sublicensed Patents cover or claim the Licensed GT Products in the Field; and Dimension shall keep Bayer reasonably informed as to all material developments with respect to such Sublicensed Patents and shall supply to Bayer copies of material communications received from ReGenX and filed in connection with the Prosecution of such Sublicensed Patents.

10.6.2 Bayer acknowledges that […***…] has no obligation to undertake any inter-party proceedings, such as oppositions or interferences, or to undertake any re-examination or re-issue proceedings, in either case, with respect to the Sublicensed Patents.

10.6.3 Bayer acknowledges that the University of Pennsylvania controls Prosecution of the Sublicensed Patents under the Penn Agreement, with ReGenX having certain rights to review.

10.7 Product Infringement Actions Against Third Parties.

10.7.1 Notification. If either Party becomes aware of any existing or threatened infringement of any Dimension Patent, Bayer Patent or Sublicensed Patent by the manufacture, use or sale of a gene therapy product for use in the Field (a "Product Infringement"), it shall promptly notify the other Party in writing to that effect, and the Parties will consult with each other regarding any actions to be taken with respect to such Product Infringement.

10.7.2 Dimension Patents (including Joint Patents). As between Dimension and Bayer, the Parties agree as follows:

10.7.2.1 […***…] shall have the first right, but not the obligation, to prosecute any Product Infringement of those Dimension Patents (including Joint Patents) in each case that claim […***…] (the "[…***…] Patents") at its own expense. In any action to enforce any of such […***…] Patents, […***…], at the request and […***…], shall […***…], including in the event that, […***…].

10.7.2.2 If […***…] elects not to pursue any infringement of a […***…] Patent, […***…] shall have the second right, but not obligation, to prosecute such Product Infringement of such […***…] Patents, at […***…]. In any such action to enforce any of the […***…] Patents, […***…], at the request and […***…], shall […***…]. In prosecuting any such Product Infringement, […***…].

10.7.2.3 […***…] shall have the right, but not the obligation, to prosecute any infringement of those Dimension Patents (including Joint Patents) that are not […***…] Patents (the "[…***…] Patents") in its sole discretion. If […***…] elects not to pursue any infringement of a […***…] Patent in a country in the Territory, provided that such […***…] Patent is […***…],[…***…] shall have the second right, but not the obligation, to prosecute a

Product Infringement of such […***…] Patent, at […***…] expense, in such country. If any Third Parties also have licenses under such […***…] Patents, […***…] shall take account of such Third Party rights in exercising its rights hereunder, and shall take […***…]. In any such action by […***…] to enforce any of the […***…] Patents, […***…], at the request and expense of […***…], shall […***…], including in the event that, […***…].

10.7.2.4 Any recovery of damages by Bayer or Dimension for any Product Infringement pursuant to this Section 10.7.2 shall be applied, as between Dimension and Bayer, first to reimburse each such Party for costs and expenses (including reasonable attorneys' fees and costs) incurred by such Party in connection with such suit, second, compensatory damages will be […***…], and the balance remaining, if any, from any such recovery shall be […***…].

10.7.3 Enforcement of Joint Patents in […***…]. As between Dimension and Bayer, the Parties agree as follows:

10.7.3.1 […***…] shall have the first right, but not obligation, to prosecute any infringement of Joint Patents that is […***…], at […***…] expense. In any action to enforce any of such Joint Patents, […***…], at the request and […***…], shall […***…].

10.7.3.2 If […***…] elects not to pursue any such infringement of a Joint Patent, then […***…] shall have the second right, but not obligation, to prosecute such infringement of the Joint Patent, at […***…]. In any such action to enforce any of the Joint Patents, […***…], at the request […***…], shall […***…], including in the event that, […***…].

10.7.3.3 Any recovery of damages by the Party undertaking enforcement or defense of a suit for infringement of a Joint Patent under this Section 10.7.3 shall be applied, as between Bayer and Bayer, first to reimburse each such Party for costs and expenses (including reasonable attorneys' fees and costs) incurred by such Party in connection with such suit, second, compensatory damages will be […***…], and the balance remaining, if any, from any such recovery shall be […***…].

10.7.4 Sublicensed Patents. Bayer acknowledges and agrees that, in accordance with the ReGenX Agreement:

10.7.4.1 Bayer understands and acknowledges that pursuant to the ReGenX Agreement, […***…] has the first right, but not the obligation, to prosecute any infringement of Sublicensed Patents at […***…]. In any action to enforce any of the Sublicensed Patents, […***…], at the request and expense of […***…], shall […***…], including in the event that, […***…].

10.7.4.2 If […***…] elects not to pursue any infringement of a Sublicensed Patent and such Sublicensed Patent is being infringed by […***…], then as between […***…] shall have the first right […***…], but not obligation, to prosecute such

[…***…] with respect to such […***…], at […***…] expense. In any such action to enforce any of the Sublicensed Patents, […***…], at the request […***…], shall […***…], including in the event that […***…]. In prosecuting any such […***…].

10.7.4.3 Any recovery of damages by […***…] for any infringement other than a […***…] shall be retained […***…]. Any recovery of damages by the Party undertaking enforcement or defense of a suit for […***…] shall be applied, as between […***…], first to reimburse each such Party for costs and expenses (including reasonable attorneys' fees and costs) incurred by such Party in connection with such suit, and the balance remaining, if any, from any such recovery shall be, […***…].

10.7.4.4 Bayer acknowledges and agrees that […***…] obligations under the ReGenX Agreement to enforce any Sublicensed Patents […***…], and that […***…] retain the […***…] right to […***…], all as set forth in the ReGenX Agreement and the Existing Licenses. Dimension will […***…] under the ReGenX Agreement if reasonably requested by Bayer.

10.8 Defense of Infringement Claims.

10.8.1 In the event Bayer or Dimension becomes aware that Bayer's or any of its Affiliates' or any Sublicensees' practice of any invention claimed in the Sublicensed Patents or Dimension Patents is the subject of a claim of infringement of any patent owned by a Third Party, that Party shall promptly notify the other, but Bayer shall have exclusive right to take action to defend or abate any such claim brought against Bayer or any of its Affiliates or Sublicensees, and shall do so at its own expense and subject to Section 10.8.2.

10.8.2 Without Dimension's prior written permission, Bayer must not settle or compromise any such suit in a manner that imposes any material obligations or restrictions on ReGenX or any of its direct or indirect licensors under the Existing Licenses or grants any rights to the Sublicensed Patents or Dimension Patents other than rights that Bayer has the right to grant under this Agreement.

ARTICLE 11

WARRANTIES; INDEMNIFICATION

11.1 Mutual Representations and Warranties. Each Party hereby represents and warrants to the other Party as follows:

11.1.1 Corporate Existence. As of the Effective Date, it is a company or corporation duly organized, validly existing, and in good standing under the Laws of the jurisdiction in which it is incorporated.

11.1.2 Corporate Power, Authority and Binding Agreement. As of the Effective Date, (i) it has the corporate power and authority and the legal right to enter into this Agreement and perform its obligations hereunder; (ii) it has taken all necessary corporate action on its part required to authorize the execution and delivery of this Agreement and the performance of its

obligations hereunder; and (iii) this Agreement has been duly executed and delivered on behalf of such Party, and constitutes a legal, valid, and binding obligation of such Party that is enforceable against it in accordance with its terms.

11.2 Additional Representations and Warranties of Dimension. Dimension represents and warrants as of the Effective Date and, as applicable, covenants to Bayer as follows:

11.2.1 Title; Control; Encumbrances. Dimension has not granted any Third Party any rights under any Licensed Patents in existence as of the Effective Date, and to Dimension's knowledge, all Licensed Know-How in existence as of the Effective Date is free and clear from any mortgages, pledges, liens, security interests, conditional and installment sale agreements, encumbrances, charges or claims of any kind (subject to the rights retained by ReGenX in the ReGenX Agreement). Dimension has the full and legal rights and authority to license to Bayer the Licensed Technology in the manner set forth in this Agreement;

11.2.2 Inventorship. To Dimension's knowledge, the inventorship of each Licensed Patent is properly identified on each such patent;

11.2.3 Good Standing. To Dimension's knowledge, all official fees, maintenance fees and annuities for the Licensed Patents have been paid and all administrative procedures with Governmental Authorities have been completed for the Licensed Patents such that the Licensed Patents are subsisting and in good standing;

11.2.4 Duty of Disclosure. Dimension has complied with and, to Dimension's knowledge ReGenX has complied with, the U.S. PTO duty of disclosure respecting the prosecution of all of Dimension Patents and, in the case of ReGenX, the Sublicensed Patents;

11.2.5 Notice of Infringement/Misappropriate. Dimension has not received any written notice from any Third Party asserting or alleging, nor does Dimension have any knowledge of any basis for any assertion or allegation, that any research, manufacture or development of GT Products by Dimension prior to the Effective Date infringed or misappropriated the intellectual property rights of such Third Party;

11.2.6 No Conflicts. Dimension has not entered, and shall not enter, into any agreement with any Third Party that is in conflict with the rights granted to Bayer under this Agreement, and has not taken any action that would in any way prevent it from granting the rights granted to Bayer under this Agreement, or that would otherwise materially conflict with or adversely affect Bayer's rights under this Agreement;

11.2.7 Third Party Technology. To Dimension's knowledge, (i) the manufacture, development and Commercialization of Licensed GT Products, as contemplated by Dimension as of the Effective Date, will not infringe or misappropriate any intellectual property rights of a Third Party, and (ii) there are no pending Third Party patent applications that, if issued with the published or currently pending claims, would be infringed by the manufacture, development or Licensed GT Products or any components thereof, as contemplated by Dimension as of the Effective Date; provided, however, that Dimension makes no representation in this Section

11.2.7 with respect to any formulation or delivery system that may be used for a Licensed Treatment;

11.2.8 Third Party Infringement. To Dimension's knowledge, no Third Party is infringing or has infringed any Licensed Patents or has misappropriated any Licensed Know-How;

11.2.9 No Proceeding. There are no pending, or, to Dimension's knowledge, no threatened, adverse actions, suits or proceedings (including interferences, reissues, re-examinations, cancellations or oppositions) against Dimension involving the Licensed Patents;

11.2.10 ReGenX Agreement.

11.2.10.1 Dimension represents and warrants to Bayer that it has provided to Bayer a true, correct and complete copy thereof, but for redaction of (a) the royalty rates, (b) any other payment amounts, (c) certain terms not essential in determining the extent of the grant of rights to Bayer hereunder or that Bayer, as a prudent pharmaceutical company, might reasonably consider relevant in determining whether to enter into this Agreement on the terms and conditions contained herein, as such agreement is in effect as of the Effective Date.

11.2.10.2 Dimension represents and warrants to Bayer that, as of the Effective Date the ReGenX Agreement is in full force and effect, and that Dimension is not in breach of, nor do any circumstances exist upon which ReGenX might claim that Dimension is in breach of, the ReGenX Agreement; provided, however, despite Dimension's material compliance with the ReGenX Agreement, certain provisions under this Agreement, including without limitation the timing provisions in Sections 6.5 and 9.5 and the definition in Section 9.7.3, are different from and not technically in compliance with the terms of the ReGenX Agreement, and accordingly, Bayer acknowledges and understands that any breach by Dimension, or termination by ReGenX, of the ReGenX Agreement resulting from such differences shall not constitute a breach of this Section 11.2.10.2 and of Section 11.2.10.3. For the avoidance of doubt, Dimension is not relieved of its obligations under this Agreement because compliance with or fulfillment of such obligations may give rise to a breach of the ReGenX Agreement.

11.2.10.3 Dimension further covenants and agrees that (a) it will take all steps necessary to maintain in full force and effect, the ReGenX Agreement for the term thereof (b) it will not assign (except to an Affiliate or an assignment to a Third Party to which this Agreement has been assigned as permitted under Section 13.2, amend, restate, terminate in whole or in part, or otherwise modify the ReGenX Agreement in any way that adversely affects Bayer's rights under this Agreement without the prior written consent of Bayer; (c) it will provide Bayer with prompt notice of any claim of a breach under the ReGenX Agreement or notice of termination of the ReGenX Agreement made by either Dimension or ReGenX (or any party acting on behalf of such counterparty); (d) it will promptly send to Bayer copies of all other material correspondence to or from the counterparty to such ReGenX Agreement; and (e) it will enforce its rights under the ReGenX to the extent necessary to maintain Bayer's rights hereunder.

11.3 Mutual Covenants.

11.3.1 No Debarment. In the course of the development of Licensed GT Products and Licensed Treatments, neither Party shall use any employee or consultant who has been debarred by any regulatory authority or, to such Party's knowledge, is the subject of debarment proceedings by a regulatory authority. Each Party shall notify the other Party promptly upon becoming aware that any of its employees or consultants who are involved with the development of Licensed GT Products and Licensed Treatments hereunder has been debarred or is the subject of debarment proceedings by any regulatory authority.

11.3.2 Compliance. Each Party and its Affiliates shall comply in all material respects with all applicable Laws in the development and Commercialization of GT Products, Licensed GT Products and Licensed Treatments and performance of its obligations under this Agreement, including, to the extent applicable to such Party and its activities hereunder, the statutes, regulations and written directives of the FDA, the EMA and any regulatory authority having jurisdiction in the Territory, the FD&C Act, the Prescription Drug Marketing Act, the Federal Health Care Programs Anti-Kickback Law, 42 U.S.C. 1320a-7b(b), the statutes, regulations and written directives of Medicare, Medicaid and all other health care programs, as defined in 42 U.S.C. § 1320a-7b(f), and the Foreign Corrupt Practices Act of 1977, each as may be amended from time to time.

11.4 Disclaimer of Warranties, Damages. EXCEPT AS SET FORTH IN SECTIONS 11.1 AND 11.2, THE LICENSED TECHNOLOGY, LICENSED GT PRODUCTS, LICENSED TREATMENTS, AND ALL RIGHTS LICENSED BY EITHER PARTY TO THE OTHER UNDER THIS AGREEMENT ARE PROVIDED ON AN "AS IS" BASIS, AND NEITHER PARTY MAKES ANY REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, WITH RESPECT THERETO. BY WAY OF EXAMPLE BUT NOT OF LIMITATION, EXCEPT AS SET FORTH IN SECTIONS 11.1 AND 11.2, NEITHER PARTY MAKES ANY REPRESENTATIONS OR WARRANTIES, AND HEREBY DISCLAIMS ALL EXPRESS AND IMPLIED REPRESENTATIONS AND WARRANTIES, (i) OF COMMERCIAL UTILITY, ACCURACY, COMPLETENESS, PERFORMANCE, MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, VALIDITY OR ENFORCEABILITY OF ANY RIGHTS LICENSED BY EITHER PARTY TO THE OTHER, AND PROFITABILITY; OR (ii) THAT THE USE OF ANY RIGHTS GRANTED BY EITHER PARTY TO THE OTHER, INCLUDING ANY PRODUCTS RESULTING THEREFROM, WILL NOT INFRINGE ANY PATENT, COPYRIGHT, TRADEMARK, OR OTHER PROPRIETARY RIGHTS OF THIRD PARTIES. EXCEPT AS SET FORTH IN THIS AGREEMENT, NEITHER PARTY OR ANY OF SUCH PARTY'S DIRECT OR INDIRECT LICENSORS SHALL BE LIABLE TO THE OTHER PARTY, ITS SUCCESSORS OR ASSIGNS, OR ANY SUBLICENSEES OF EITHER PARTY, OR ANY THIRD PARTY WITH RESPECT TO: (a) ANY CLAIM ARISING FROM USE OF ANY OR ALL RIGHTS LICENSED UNDER THIS AGREEMENT OR FROM THE DEVELOPMENT, TESTING, MANUFACTURE, USE, OR SALE OF PRODUCTS ARISING THEREFROM; OR (b) ANY CLAIM FOR LOSS OF PROFITS, LOSS OR INTERRUPTION OF BUSINESS, OR FOR INDIRECT, SPECIAL, INCIDENTAL, PUNITIVE, OR CONSEQUENTIAL DAMAGES OF ANY KIND, INCLUDING ANY ARISING FROM OR RELATING TO ANY BREACH OF THIS AGREEMENT OR THE EXERCISE OF RIGHTS

HEREUNDER, REGARDLESS OF ANY NOTICE OF SUCH DAMAGES. NOTHING IN THIS SECTION 11.4 IS INTENDED TO LIMIT OR RESTRICT THE INDEMNIFICATION RIGHTS OR OBLIGATIONS OF EITHER PARTY UNDER SECTION 11.5 OR TO LIMIT A PARTY'S LIABILITY FOR BREACHES OF ITS OBLIGATION REGARDING CONFIDENTIALITY UNDER ARTICLE 8.

11.5 Indemnification.

11.5.1 By Bayer. Bayer shall defend, indemnify, and hold harmless Dimension, its Affiliates, ReGenX and the licensors under the Existing Licenses, and their respective shareholders, members, partners, officers, trustees, faculty, students, contractors, agents, and employees (individually, a "Dimension Indemnified Party" and, collectively, the "Dimension Indemnified Parties") from and against any and all Third Party liability, loss, damage, action, claim, fee, cost, or expense (including attorneys' fees) (individually, a "Third Party Liability" and, collectively, the "Third Party Liabilities") suffered or incurred by the Dimension Indemnified Parties from claims of such Third Parties that result from or arise out of: (i) the research, development, testing, use, manufacture, promotion, sale, or other disposition of any Licensed Technology or Licensed GT Products by Bayer, its Affiliates, any Sublicensees, their respective assignees, or vendors acting on behalf of any of the foregoing; (ii) any breach by Bayer (or its Affiliates or any Sublicensees) of its representations, warranties, or obligations of this Agreement; and (iii) Bayer's gross negligence or intentional misconduct or that of Bayer's Affiliates or Sublicensees; provided, however, that Bayer shall not be liable for claims based on any breach by Dimension of its representations, warranties, or obligations of this Agreement or the gross negligence or intentional misconduct of any of the Dimension Indemnified Parties. Without limiting the foregoing, but subject to the proviso contained in the preceding sentence, Bayer must defend, indemnify, and hold harmless the Dimension Indemnified Parties from and against any Third Party Liabilities resulting from:

(a) any product liability or other claim of any kind related to the use by a Third Party of a Licensed GT Product that was manufactured, sold, or otherwise disposed of by Bayer, its Affiliates, any Sublicensees, their respective assignees, or vendors;

(b) any claim by a Third Party that the practice of the Licensed Technology, or the design, composition, manufacture, use, sale, or other disposition of any Licensed Treatment infringes or violates any patent, copyright, trade secret, trademark, or other intellectual property right of such Third Party; and

(c) clinical trials or studies conducted by or on behalf of Bayer, its Affiliates, any Sublicensees, their respective assignees, or vendors relating to the Licensed Treatment or Licensed GT Products, including any claim by or on behalf of […***…] of any such clinical trial or study.

For the avoidance of doubt, the indemnities granted by Bayer shall not apply in respect of any activities conducted following the exercise by Dimension of its rights under Section

11.5.2 By Dimension. Dimension shall defend, indemnify, and hold harmless Bayer, its Affiliates and Sublicensees and their respective shareholders, members, partners, officers, trustees, contractors, agents, and employees (individually, a "Bayer Indemnified Party" and, collectively, the "Bayer Indemnified Parties") from and against any and all Third Party Liabilities suffered or incurred by the Bayer Indemnified Parties from claims of such Third Parties that result from or arise out of: (i) the research, development, testing, use, manufacture, promotion, sale, or other disposition of any GT Product, Compound/Vector or any product outside the Field or within the scope of the Retained Rights by Dimension, ReGenX or its Affiliates and their respective licensees or sublicensees, assignees, or vendors acting on behalf of any of the foregoing; (ii) any breach by Dimension (or its Affiliates) of its representations, warranties, or obligations of this Agreement; and (iii) Dimension's gross negligence or intentional misconduct or that of ReGenX or Dimension's or ReGenX's respective Affiliates, licensees and sublicensees; provided, however, that Dimension shall not be liable for claims based on any breach by Bayer of its representations, warranties, or obligations of this Agreement or the gross negligence or intentional misconduct of any of the Bayer Indemnified Parties.

11.5.3 Indemnification Procedure. Each Party, as an indemnifying party (an "Indemnifying Party"), shall not be permitted to settle or compromise any claim or action giving rise to Third Party Liabilities in a manner (i) that imposes any restrictions or obligations on the indemnified party (an "Indemnified Party") or, if Bayer is the Indemnifying Party, on ReGenX or its licensors under the Existing Licenses, without the other Party's prior written consent, (ii) if Bayer is the Indemnifying Party, that grants any rights to the Licensed Technology or Licensed GT Products other than those Bayer has the right to grant under this Agreement without Dimension's prior written consent, or (iii) if Dimension is the Indemnifying Party, that grants any rights that are inconsistent with those granted to Bayer under this Agreement without Bayer's prior written consent. The Indemnified Party shall notify the Indemnifying Party within […***…] of becoming aware of any claim or claims asserted or threatened against the Indemnified Party that could give rise to a right of indemnification under this Agreement, provided however that the failure to give such notice shall not relieve the Indemnifying Party of its indemnity obligation hereunder except to the extent that such failure materially prejudices its rights hereunder. The Indemnifying Party shall be permitted to control any litigation or potential litigation involving the defense of any claim subject to indemnification pursuant to this Section 11.5, including the selection of counsel. The Indemnified Party shall keep the Indemnifying Party apprised of all material developments with respect to the claim and promptly provide the Indemnifying Party with copies of all correspondence and documents exchanged by the Indemnified Party and the opposing party(ies) to such litigation. The Indemnified Party may not compromise or settle such litigation without the prior written consent of the Indemnifying Party, such consent not to be unreasonably withheld or delayed. The indemnification rights of a Indemnified Party contained in this Agreement are in addition to all other rights which such Indemnified Party may have at law or in equity or otherwise. The Indemnifying Party will pay directly all Third Party Liabilities incurred for defense or negotiation of any claim hereunder or will reimburse the Indemnified Party for all documented Third Party Liabilities incident to the defense or negotiation of any such claim within […***…] after the Indemnifying Party's receipt of invoices for such fees, expenses, and charges.

11.6 Insurance. Within […***…] of the Effective Date, each Party will procure and maintain product liability insurance policies during the term of the Agreement for claims related to bodily injury or death caused by the Licensed GT Products. In lieu of insurance coverage described in the preceding sentence, Bayer shall have the right to undertake a program of self-insurance to cover the obligations hereunder, with financial protection comparable to that arranged by it for its own protection with regard to other products in its portfolio. Prior to […***…], and thereafter for a period required by applicable Law in order to continue to monitor the participants in the clinical trial, clinical trials coverage will be arranged in amounts that are reasonable and customary in the location where the clinical trial is being conducted. Such insurance coverage will be arranged by Dimension if it is the sponsor of the applicable clinical trial and shall be arranged by Bayer if it is the sponsor of the applicable clinical trial.

ARTICLE 12

USE OF NAME

Except as permitted by this Agreement, Bayer, its Affiliates, any Sublicensees, and all of its and their employees and agents must not use ReGenX's and, to the extent relating to the subject matter of this Agreement, the University of Pennsylvania's and SmithKline Beecham Corporation's, name, seal, logo, trademark, or service mark (or any adaptation thereof) or the name, seal, logo, trademark, or service mark (or any adaptation thereof) of any of such entities' representative, school, organization, employee, or student in any way without the prior written consent of Dimension or such entity, as applicable; provided, however that Bayer may acknowledge the existence and general nature of this Agreement. The foregoing limitations shall apply *mutatis mutandis*, to Dimension's use of Bayer's or its Affiliates or Sublicensees name, logo, seal, trademark or service marks.

ARTICLE 13

ADDITIONAL PROVISIONS

13.1 Relationship. Nothing in this Agreement shall be deemed to establish a relationship of principal and agent between Bayer and Dimension, nor any of their agents or employees for any purpose whatsoever, nor shall this Agreement be construed as creating any other form of legal association or arrangement which would impose liability upon one Party for the act or failure to act of the other Party.

13.2 Assignment. Subject to Sections 13.2.1 through 13.2.6 below, this Agreement will be binding upon and inure to the benefit of the Parties hereto and their respective successors and permitted assigns, each of which such successors and permitted assigns will be deemed to be a Party hereto for all purposes hereof.

13.2.1 Subject to Section 13.2.2 and 13.2.3, no Party may assign, delegate or otherwise transfer either this Agreement or any of its rights, interests, or obligations hereunder without the prior written approval of the other Party.

13.2.2 Notwithstanding Section 13.2.1 each Party, upon providing the other Party written notice, may without the consent of the other Party, (i) assign any or all of its rights and interests hereunder to one or more of its Affiliates, (ii) designate one or more of its Affiliates to perform its obligations hereunder, in each case, so long as the assigning Party is not relieved of any liability hereunder and so long as any such Affiliate remains such Party's Affiliate; provided, however, that such Affiliate assignee(s) provide the other Party with written acknowledgement of and agreement to the assigning Party's obligations under the Agreement that were assigned to it.

13.2.3 Notwithstanding Section 13.2.1 each Party (or its permitted successive assignees or transferees hereunder), upon providing the other Party prior written notice (at least […***…] prior to the effectiveness of such assignment), may without the consent of the other Party, assign or transfer this Agreement as a whole to an entity that succeeds to all or substantially all of the business or assets of such Party related to the subject matter of this Agreement, so long as the assigning Party is not relieved of any liability hereunder and such assignment is a Qualified Assignment.

13.2.4 For the purposes of this Agreement, a "Qualified Assignment" means any transaction that:

(a) is made in compliance with Law, including securities, tax and corporation laws;

(b) includes the assignee's written acknowledgement (to the assigning Party) of and agreement to assume all of the assigning Party's obligations under the Agreement;

(c) is made to an assignee that is, and will be after giving effect to the relevant assignment, Solvent;

(d) is made to an assignee that is not subject at the time of such assignment to any order, decree or petition providing for (i) the winding-up or liquidation of such person, (ii) the appointment of a receiver over the whole or part of the assets of such person or (iii) the bankruptcy or administration of such person;

(e) is not a voidable fraudulent conveyance;

(f) is made to an assignee that is at the time of such assignment not debarred under 21 U.S.C. §30 or under investigation or threatened to be debarred under 21 U.S.C. §30; and

(g) will not cause a material increase in taxes, costs or expenses to the non-assigning Party (unless the assigning Party or the assignee has agreed to compensate the non-assigning Party for the same).

13.2.5 Notwithstanding Sections 13.2.1 through 13.2.4 above, (i) each Party may at any time assign its rights, interests and obligations provided for hereunder to any person by merger or in the course of a Change of Control; or (ii) with the prior written consent of the other Party.

13.2.6 For purposes of this Section 13.2, "Solvent" means, with respect to any entity as on any date of determination, that as of such date, (i) the value of the assets of such entity is greater than the total amount of liabilities (including contingent and unliquidated liabilities) of such entity, (ii) such entity is able to pay all liabilities of such entity as such liabilities mature and (iii) such entity does not have unreasonably small capital (taking into account such entity's obligations hereunder). In computing the amount of contingent or unliquidated liabilities at any time, such liabilities shall be computed at the amount that, in light of all the facts and circumstances existing at such time, represent the amount that can reasonably be expected to become an actual or matured liability. In computing the value of the assets of an entity, the value shall be determined in the context of current facts and circumstances affecting such entity.

13.3 Waiver. A waiver by either Party of a breach of any provision of this Agreement will not constitute a waiver of any subsequent breach of that provision or a waiver of any breach of any other provision of this Agreement.

13.4 Notices. Notices, payments, statements, reports, and other communications under this Agreement shall be in writing and shall be deemed to have been received as of the date received if sent by public courier (*e.g.*, Federal Express), by Express Mail, receipt requested, or by facsimile (with a copy of such facsimile also sent by one of the other methods of delivery) and addressed as follows:

If for Dimension:

Dimension Therapeutics, Inc.
1 Main Street, 13th Floor
Cambridge, MA 02142
USA
Attn: President and CEO
Facsimile: […***…]

with a copy (which shall not constitute notice) to:

Cooley LLP
3175 Hanover Street
Palo Alto, CA 94304
USA
Attn: Barbara A. Kosacz, Esq.
Facsimile: […***…]

If for Bayer:

Bayer HealthCare LLC
455 Mission Bay Boulevard South
San Francisco, CA 94158
Attn: Alliance Manager
Facsimile: […***…]

with a copy to:

Bayer HealthCare LLC
800 DwightWay
Berkeley 94710
Attn: Law & Patents

Either Party may change its official address upon written notice to the other Party.

13.5 Applicable Law. This Agreement shall be construed and governed in accordance with the laws of the State of New York, without giving effect to conflict of law provisions that may require the application of the laws of another jurisdiction. Subject to Section 13.6, the Parties hereby submit to the exclusive jurisdiction of and venue in the federal courts located in the State of New York with respect to any and all disputes concerning the subject of this Agreement.

13.6 Dispute Resolution. In the event of any controversy or claim arising out of or relating to this Agreement, the Parties shall first attempt to resolve such controversy or claim through good faith negotiations between senior executives of each Party with authority to resolve the dispute for a period of not less than […***…] following notification of such controversy or claim to the other Party. If such controversy or claim cannot be resolved by means of such negotiations during such period, then such controversy or claim shall be resolved by binding arbitration administered by the American Arbitration Association ("AAA") in accordance with the Commercial Arbitration Rules of the AAA (including the ICDR Rules relating to discovery) in effect on the date of commencement of the arbitration, subject to the provisions of this Section 13.6. The arbitration shall be conducted as follows:

13.6.1 The arbitration shall be conducted by three arbitrators, each of whom by training, education, or experience has knowledge of the research, development, and commercialization of biological therapeutic products in the United States. The arbitration shall be conducted in English and held in New York, New York.

13.6.2 In its demand for arbitration, the Party initiating the arbitration shall provide a statement setting forth the nature of the dispute, the names and addresses of all other parties, an estimate of the amount involved (if any), the remedy sought, otherwise specifying the issue to be resolved, and appointing one neutral arbitrator. In an answering statement to be filed by the responding Party within […***…] after confirmation of the notice of filing of the demand is sent by the AAA, the responding Party shall appoint one neutral arbitrator. Within […***…] from the date on which the responding Party appoints its neutral arbitrator, the first two arbitrators shall appoint a chairperson.

13.6.3 If a Party fails to make the appointment of an arbitrator as provided in Section 13.6.2, the AAA shall make the appointment. If the appointed arbitrators fail to appoint a chairperson within the time specified in Section 13.6.2 and there is no agreed extension of time, the AAA shall appoint the chairperson.

13.6.4 The arbitrators will render their award in writing and, unless all Parties agree otherwise, will include an explanation in reasonable detail of the reasons for their award. Judgment upon the award rendered by the arbitrators may be entered in any court having jurisdiction thereof, including in the courts described in Section 13.5. The arbitrators will have the authority to grant injunctive relief and other specific performance; provided that the arbitrators will have no authority to award damages in contravention of this Agreement, and each Party irrevocably waives any claim to such damages in contravention of this Agreement. The arbitrators will, in rendering their decision, apply the substantive law of the State of New York, without giving effect to conflict of law provisions that may require the application of the laws of

another jurisdiction. The decision and award rendered by the arbitrators will be final and non-appealable (except for an alleged act of corruption or fraud on the part of the arbitrator).

13.6.5 The Parties shall use their reasonable efforts to conduct all dispute resolution procedures under this Agreement as expeditiously, efficiently, and cost-effectively as possible.

13.6.6 All expenses and fees of the arbitrators and expenses for hearing facilities and other expenses of the arbitration will be borne equally by the Parties unless the Parties agree otherwise or unless the arbitrators in the award assess such expenses against one of the Parties or allocate such expenses other than equally between the Parties. Each of the Parties will bear its own counsel fees and the expenses of its witnesses except to the extent otherwise provided in this Agreement or by applicable Law.

13.6.7 Compliance with this Section 13.6 is a condition precedent to seeking relief in any court or tribunal in respect of a dispute, but nothing in this Section 13.6 will prevent a Party from seeking equitable or other interlocutory relief in the courts of appropriate jurisdiction, pending the arbitrators' determination of the merits of the controversy, if applicable to protect the confidential information, property, or other rights of that Party or to otherwise prevent irreparable harm that may be caused by the other Party's actual or threatened breach of this Agreement.

13.7 No Discrimination. Both Parties and their respective Affiliates, and any Sublicensees, agents, contractors and licensees, in their respective activities under this Agreement, shall not discriminate against any employee or applicant for employment because of race, color, sex, sexual, or affectional preference, age, religion, national, or ethnic origin, handicap, or because he or she is a disabled veteran or a veteran (including a veteran of the Vietnam Era).

13.8 Compliance with Law. Both Parties (and their respective Affiliates and any Sublicensees, agents, contractors and licensees) must comply with all prevailing laws, rules, and regulations that apply to its activities or obligations under this Agreement. Without limiting the foregoing, it is understood that this Agreement may be subject to United States laws and regulations controlling the export of technical data, computer software, laboratory prototypes, and other commodities, articles, and information, including the Arms Export Control Act as amended in the Export Administration Act of 1979 and that Bayer's obligations are contingent upon compliance with applicable United States export laws and regulations. The transfer of certain technical data and commodities may require a license from the cognizant agency of the United States Government and/or written assurances by Bayer that Bayer shall not export data or commodities to certain foreign countries without prior approval of such agency. Dimension neither represents that a license is not required nor that, if required, it will issue.

13.9 Entire Agreement. This Agreement embodies the entire understanding between the Parties relating to the subject matter hereof and supersedes all prior understandings and agreements, whether written or oral. All "Confidential Information" disclosed by Dimension to […***…] will be deemed "Confidential Information" under this Agreement (unless and until it

falls within one of the exclusions set forth in Section 1.11). This Agreement may not be varied except by a written document signed by duly authorized representatives of both Parties.

13.10 Marking. Bayer, its Affiliates, and any Sublicensees shall mark any Licensed GT Product (or their containers or labels) made, sold, or otherwise distributed by it or them with any notice of patent rights necessary or desirable under applicable Law to enable the Sublicensed Patents and Dimension Patents to be enforced to their full extent in any country where Licensed GT Products are made, used, sold, offered for sale, or imported.

13.11 Severability and Reformation. If any provision of this Agreement is held to be invalid or unenforceable by a court of competent jurisdiction, then such invalid or unenforceable provision will be automatically revised to be a valid or enforceable provision that comes as close as permitted by law to the Parties' original intent; provided that, if the Parties cannot agree upon such valid or enforceable provision, the remaining provisions of this Agreement will remain in full force and effect, unless the invalid or unenforceable provisions are of such essential importance to this Agreement that it is to be reasonably assumed that the Parties would not have entered into this Agreement without the invalid or unenforceable provisions.

13.12 Further Assurances. Each Party hereto agrees to execute, acknowledge, and deliver such further instruments, and to do all other acts, as may be necessary or appropriate in order to carry out the purposes and intent of this Agreement.

13.13 Interpretation; Construction. The captions to the several Articles and Sections of this Agreement are included only for convenience of reference and shall not in any way affect the construction of, or be taken into consideration in interpreting, this Agreement. In this Agreement, unless the context requires otherwise, (a) the word "including" shall be deemed to be followed by the phrase "without limitation" or like expression; (b) references to the singular shall include the plural and vice versa; (c) references to masculine, feminine, and neuter pronouns and expressions shall be interchangeable; (d) the words "herein" or "hereunder" relate to this Agreement; (e) "or" is disjunctive but not necessarily exclusive; (f) the word "will" shall be construed to have the same meaning and effect as the word "shall"; (g) all references to "dollars" or "$" herein shall mean U.S. Dollars; (h) unless otherwise provided, all reference to Sections and exhibits in this Agreement are to Sections and exhibits of and in this Agreement; and (i) whenever this Agreement refers to a number of days, such number shall refer to calendar days unless business days are specified. Each Party represents that it has been represented by legal counsel in connection with this Agreement and acknowledges that it has participated in the drafting hereof. In interpreting and applying the terms and provisions of this Agreement, the Parties agree that no presumption will apply against the Party which drafted such terms and provisions.

13.14 Cumulative Rights and Remedies. The rights and remedies provided in this Agreement and all other rights and remedies available to either Party at law or in equity are, to the extent permitted by law, cumulative and not exclusive of any other right or remedy now or hereafter available at law or in equity. Neither asserting a right nor employing a remedy shall preclude the concurrent assertion of any other right or employment of any other remedy, nor shall the failure to assert any right or remedy constitute a waiver of that right or remedy.

13.15 Counterparts. This Agreement may be executed in one or more counterparts, each of which will be deemed an original, but all of which together will constitute one and the same instrument.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

IN WITNESS WHEREOF, the Parties, intending to be legally bound, have caused this Collaboration and License Agreement to be executed by their duly authorized representatives.

DIMENSION THERAPEUTICS, INC		BAYER HEATHCARE, LLC	
By:	/s/ Thomas R. Beck	By:	/s/ Habib Dable
Name:	Thomas R. Beck	Name:	Habib Dable
Title:	President and CEO	Title:	EVP, Global Head, Specialty Medicine

Exhibit A
Sublicensed Patents & Dimension Patents

Sublicensed Patents:

App #	Title	Inventors	Nos.	Penn Docket #
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]

Dimension Patents: […***…]

Exhibit B
Licensed Treatment Sales

The following are examples (not intended to be exhaustive) of the calculation of Licensed Treatment Sales. In principle the Parties have agreed upon two payment mechanisms for the commercialization of Licensed Treatments; these are:

1. Annuity Payment Scheme (the figures mentioned below are hypothetical and do not reflect actual or anticipated prices):
   - […***…]
   - […***…]
   - […***…]
   - […***…]
   - […***…]

   Table 1: […***…] (which rolls up into the definition of Net Sales) for purposes of determining royalty payments to Dimension in relation to the amount of […***…] figures picked at random (and represent an example only):

Retail price of […***…] (as a % of Licensed Treatment Monitoring Sales for such patient)	% of […***…] Licensed Treatment Monitoring Sales to be included in Licensed Treatment Sales/Net Sales for royalty purposes
[…***…]	[…***…]
[…***…]	[…***…]
[…***…]	[…***…]
[…***…]	[…***…]
[…***…]	[…***…]

2. One-time (lump sum) Payment Scheme:

   - […***…]
   - […***…]
   - […***…]
   - […***…]

Exhibit C
Sublicensed Technology Retained Rights

Bayer acknowledges and understands that ReGenX and its direct and indirect licensors under the Existing Licenses retain certain rights under the Sublicensed Technology, whether inside or outside the Field, as further set forth below:

1. Retained Rights. ReGenX's direct and indirect licensors retain the following rights with respect to the Sublicensed Technology:

   (a) A non-exclusive, sublicensable right under the Sublicensed Technology to make, have made, use, sell, offer to sell, and import products that deliver RNA interference and antisense drugs using an adeno-associated vector; and

   (b) A non-exclusive right for ReGenX's direct and indirect licensors (which right is sublicensable by such licensors) to use the Sublicensed Technology for non-commercial research purposes and to use the Sublicensed Technology for such licensors' discovery research efforts with non-profit organizations and collaborators.

2. Domain Antibodies. The rights and licenses granted in Section 5.1 shall not include any right (and Dimension's direct and indirect licensors retain the exclusive (even as to Dimension and Bayer), fully sublicensable right) under the Sublicensed Technology to make, have made, use, sell, offer to sell, and import Domain Antibodies (as defined in the ReGenX Agreement) that are expressed by an adeno-associated vector.

3. Hemophilia B.

   a. The rights and licenses granted in Section 5.1 shall not include any right (and ReGenX's direct and indirect licensors retain the exclusive (even as to Dimension and Bayer), fully sublicensable right) under the Sublicensed Technology that covers the rAAV serotype 8, to make, have made, use, sell, offer for sale, and import products for the treatment of all forms of hemophilia B (notwithstanding Bayer's rights under Section 5.10).

   b. ReGenX's direct and indirect licensors retain the following rights (even as to Dimension) with respect to the Sublicensed Technology: a non-exclusive, sublicensable right to make, have made, use, sell, offer for sale, and import all of the various serotypes of any adeno-associated vector that is the subject of at least one claim in the Sublicensed Patents solely for non-commercial research in the area of hemophilia B (notwithstanding Bayer's rights under Section 5.12).

4. Hemophilia A. ReGenX's direct and indirect licensors retain the following rights with respect to the Sublicensed Technology: to the extent Sublicensed Technology pertains to recombinant adeno-associated virus serotype 8, an exclusive, sublicensable right to make, have made, use, sell, offer for sale, and import products for the treatment of hemophilia A.

5. Service Businesses. The rights and licenses granted in Section 5.1 shall not include any right (and ReGenX's direct and indirect licensors retain the exclusive (even as to Dimension and Bayer), fully sublicensable right) under the Sublicensed Technology:

   (a) to conduct commercial reagent and services businesses, which includes the right to make, have made, use, sell, offer to sell, and import research reagents, including any viral vector construct; provided that, for clarity, such rights retained by ReGenX's direct and indirect licensors shall not include the right to conduct clinical trials in humans in the Field; or

   (b) to use the Sublicensed Technology to provide services to any Third Parties; provided that, for clarity, Bayer's license under Section 5.1 does include the right to administer Licensed GT Products to patients.

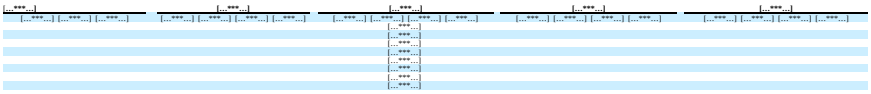
6. Research Rights. ReGenX's direct and indirect licensors retain the fully sublicensable right under the Sublicensed Technology to grant non-exclusive research and development licenses to their Affiliates and Third Parties; provided that such development rights granted by ReGenX's direct and indirect licensors shall not include the right to conduct clinical trials in humans in the Field or any rights to sell products in the Field.

7. Non-Commercial Entities. The University of Pennsylvania may use and permit other non-profit organizations or other non-commercial entities to use the Sublicensed Technology solely for educational, research, and other non-commercial purposes.

Exhibit D-1
Research Plan

[see attached]

Hem A tasts & timeline



[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]

[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]

Exhibit D-2
Operating Plan

[to be finalized and attached within […***…] after the Effective Date]

Exhibit D-3
Research Budget

[see attached]

Overall Hem A Project Budget

[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]

Budget Estimates with greatest uncertainty include:

- […***…]
- […***…]
    - […***…]

Not Included at this time:

- […***…]

2014 — 2015 Budget

[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]	[…***…]

2014 — 2015 Activities included are the following:

- […***…]
- […***…]
- […***…]
- […***…]
- […***…]

Exhibit E Demonstration of Clinical POC

The Clinical Proof of Concept will be considered having been achieved when all of the following criteria are met:

- Efficacy and Safety
    - […***…]
    - […***…]
    - […***…]
- Pre-existing antibodies against […***…]
    - […***…]
    - […***…]
- Feasibility of highest dose level tested
    - […***…]

Exhibit F

Press Releases

[see attached]

Bayer HealthCare

Press release
Not intended for US or UK media

Bayer HealthCare AG
Communications
51368 Leverkusen
Germany
Phone: +49 214 30-1
www.bayerhealthcare.com

Bayer HealthCare Press release Not intended for US or UK media Bayer HealthCare and Dimension Therapeutics to Develop Novel Gene Therapy for Hemophilia A

Leverkusen, June 23, 2014 - Bayer HealthCare (Bayer) and Dimension Therapeutics, a company focused on developing novel adeno-associated virus (AAV) gene therapy treatments for rare diseases, have entered into a collaboration for the development and commercialization of a novel gene therapy for the treatment of hemophilia A.

“Bayer is a worldwide leader in the treatment of hemophilia and we are highly committed to advancing innovative treatment options for patients with hemophilia A,” said Prof. Dr. Andreas Busch, Member of the Bayer HealthCare Executive Committee and Head of Global Drug Discovery. “We are excited to partner with Dimension to jointly harness the power of gene therapy to drive the development of new long-term options in treating this disease.”

“Currently available replacement therapies for hemophilia A are often administered intravenously multiple times a week and may be required for life, depending on the severity of a patient’s disease,” said Thomas R. Beck, M.D., chief executive officer of Dimension Therapeutics. “Gene therapy offers the potential to transform the treatment of hemophilia by inserting a correct version of the faulty gene responsible for the disease. We are proud to partner with Bayer, a leader in the treatment of hemophilia A, to develop a therapy with the potential to significantly change the treatment landscape and improve quality of life for patients.”

Under the terms of the agreement, Dimension will receive an upfront payment of $20 million and will be eligible for development and commercialization milestone payments of up to $232 million. Dimension will be responsible for all pre-clinical development activities and the Phase I/IIa clinical trial, with funding from Bayer. Depending on the results of the Phase I/IIa clinical trial, Bayer will conduct the confirmatory Phase III trial, make all regulatory submissions, and will have worldwide rights to commercialize the potential future product for the treatment of hemophilia A. Dimension is eligible to receive tiered royalties based on product sales.

Dimension’s AAV vector technology allows for systemic intravenous administration of the clotting factor gene in vivo, which has been shown in preclinical studies to target the liver

resulting in long lasting expression of FVIII protein at therapeutic levels. Dimension's vectors are enabled by REGENX Biosciences' proprietary NAV® technology.

About Hemophilia A

Hemophilia A, also known as factor VIII deficiency or classic hemophilia, is a largely inherited bleeding disorder in which one of the proteins needed to form blood clots in the body is missing or reduced. Hemophilia A, the most common type of hemophilia, is caused by a deficient or defective blood coagulation protein, known as factor VIII. Hemophilia A is characterized by prolonged or spontaneous bleeding, especially into the muscles, joints, or internal organs.

About Hematology at Bayer

Bayer is committed to delivering science for a better life by advancing a portfolio of innovative treatments. Bayer Hematology includes an approved treatment for hemophilia A and compounds in development for hemophilia A, sickle cell anemia, and other blood and bleeding disorders. Together, these compounds reflect the company's commitment to research and development in these disease states.

About Dimension Therapeutics

Dimension Therapeutics is a gene therapy company focused on developing novel therapies to treat rare diseases. Formed in 2013, the Dimension team comprises biotech industry veterans and renowned thought leaders in gene therapy and rare diseases. The company is focused on building its adeno-associated virus (AAV) therapeutic discovery platform and advancing multiple gene therapy programs in rare diseases, and is advancing a wholly-owned hemophilia B program towards clinical development. Dimension's partnerships with REGENX Biosciences and the University of Pennsylvania provide Dimension with exclusive gene therapy intellectual property and preferred access to multiple best-in-class AAV vector systems. Dimension has been funded by Fidelity Biosciences and OrbiMed Advisors. For more information, please visit www.dimensiontx.com.

About Bayer HealthCare

The Bayer Group is a global enterprise with core competencies in the fields of health care, agriculture and high-tech materials. Bayer HealthCare, a subgroup of Bayer AG with annual sales of EUR 18.9 billion (2013), is one of the world's leading, innovative companies in the healthcare and medical products industry and is based in Leverkusen, Germany. The company combines the global activities of the Animal Health, Consumer Care, Medical Care and Pharmaceuticals divisions. Bayer Healthcare's aim is to discover, develop, manufacture and market products that will improve human and animal health worldwide. Bayer HealthCare has a global workforce of 56,000 employees (Dec. 31, 2013) and is represented in more than 100 countries. More information is available at http://www.healthcare.bayer.com. Our online press service is just a click away: press.healthcare.bayer.com

Contact:

Diana Scholz, Tel. +49 30 468 193183
E-Mail: diana.scholz@bayer.com

Folgen Sie uns auf Facebook: http://www.facebook.com./healthcare.bayer

ds (2014-0267E)

Forward-Looking Statements

This release may contain forward-looking statements based on current assumptions and forecasts made by Bayer Group or subgroup management. Various known and unknown risks, uncertainties and other factors could lead to material differences between the actual future results, financial situation, development or performance of the company and the estimates given here. These factors include those discussed in Bayer's public reports which are available on the Bayer website at www.bayer.com. The company assumes no liability whatsoever to update these forward-looking statements or to conform them to future events or developments.

News Release Tweet

Text (max. 110 characters incl. spaces): Bayer HealthCare and Dimension Therapeutics to Develop Novel Gene Therapy for Hemophilia A
BHC NEWS: >> ***more information about XY***

Exhibit 10.16

CONFIDENTIAL
EXECUTION VERSION

***Text Omitted and Filed Separately with the Securities and Exchange Commission
Confidential Treatment Requested Under
17 C.F.R. Sections 200.80(b)(4) and 240.24b-2

RESEARCH, COLLABORATION & LICENSE AGREEMENT
DATED AS OF MAY 5, 2016
BY AND BETWEEN

THE TRUSTEES OF THE UNIVERSITY OF PENNSYLVANIA
AND
DIMENSION THERAPEUTICS, INC.

TABLE OF CONTENTS

UNIVERSITY OF PENNSYLVANIA
RESEARCH, COLLABORATION & LICENSE AGREEMENT

This Research, Collaboration & License Agreement (this "**Agreement**") is dated as of May 5, 2016 (the "**Effective Date"**) by and between The Trustees of the University of Pennsylvania, a Pennsylvania nonprofit corporation ("**Penn"**), and Dimension Therapeutics, Inc., a corporation organized under the laws of the state of Delaware ("**Licensee"**). Penn and Licensee may be referred to herein as a "**Party"** or, collectively, as "**Parties"**.

RECITALS:

WHEREAS, Licensee is a biopharmaceutical company with expertise in the development, manufacture and commercialization of human therapeutic products for treatment of genetic disorders associated with the liver.

WHEREAS, Penn, through Dr. James Wilson and the Wilson Laboratory, have technology and expertise in the research and development of Gene Therapy Products, including with respect to Gene Therapy Products for the treatment of genetic disorders associated with the liver.

WHEREAS, the Research Program contemplated by this Agreement is of mutual interest to Licensee and Penn and furthers the educational, scholarship and research objectives of Penn as a nonprofit, tax-exempt, educational institution, and may benefit Licensee and Penn through the creation or discovery of new inventions and the development and commercialization of Licensed Products (as defined below).

NOW, THEREFORE, in consideration of the various promises and undertakings set forth herein, the Parties agree as follows:

ARTICLE 1
DEFINITIONS

Unless otherwise specifically provided herein, the following terms shall have the following meanings:

1.1 "**Acceptance Criteria**" means the criteria set forth in the Research Plan to be used by the JSC to determine whether a Drug Candidate qualifies as a Development Candidate.

1.2 "**Affiliate**" means a Person that controls, is controlled by or is under common control with a Party, but only for so long as such control exists. For the purposes of this Section 1.2, the word "control" (including, with correlative meaning, the terms "controlled by" or "under the common control with") means the actual power, either directly or indirectly through one or more intermediaries, to direct the management and policies of such Person or entity, whether by the ownership of more than fifty percent (50%) of the voting securities of such entity, or by contract or otherwise.

1.3 "**Background Patent Rights"** means the Patent Rights that are listed on Exhibit A, and any Patent Rights issuing therefrom.

1.4 "**BLA**" means (a) a Biologics License Application as defined in the FD&C Act and the regulations promulgated thereunder, (b) a Marketing Authorization Application ("**MAA**") in the European Union, or (b) any equivalent or comparable application, registration or certification in any other country or region.

1.5 "**Calendar Quarter**" mean the respective periods of three (3) consecutive calendar months ending on March 31, June 30, September 30 and December 31 of each Calendar Year.

1.6 "**Calendar Year**" means each successive period of twelve (12) months commencing on January 1 and ending on December 31.

1.7 "**cGLP**" means the current good laboratory practice regulations promulgated by the FDA, published at 21 C.F.R. § 58, and all applicable FDA rules, regulations, orders and guidances and equivalent or comparable non-United States regulations, rules, orders, guidances and standards in the Territory, as applicable, as such current laboratory practices, rules, regulations, orders, guidances and standards may be amended from time to time.

1.8 "**cGMP**" means those current good manufacturing practices promulgated by the FDA, published at 21 C.F.R § § 210 and 211, and all applicable FDA rules, regulations, orders and guidances, and the requirements with respect to current good manufacturing practices prescribed by the European Community under provisions of "The Rules Governing Medicinal Products in the European Community, Volume 4, Good Manufacturing Practices, Annex 13, Manufacture of Investigational Medicinal Products, July 2003", as such practices, rules, orders, guidances, guidelines, regulations and standards may be amended from time to time.

1.9 "**Clinical Trial**" means a human clinical trial conducted on human subjects that is designed to (a) evaluate whether a pharmaceutical product is reasonably safe for continued testing, (b) investigate the safety and efficacy of the pharmaceutical product for its intended use, and to define warnings, precautions and adverse reactions that may be associated with the pharmaceutical product in the dosage range to be prescribed or (c) support Regulatory Approval of such pharmaceutical product or label expansion of such pharmaceutical product.

1.10 "**Combination Products**" means a Licensed Product that is delivered with one or more additional active ingredients and/or other items or services incident to the administration of any such Licensed Product (with or without one or more such other active ingredients), including companion diagnostics, in each such case when any of the foregoing are co-formulated, co-packaged or sold under one pricing scheme (whether payment of such price is paid to the same or to more than one seller).

1.11 "**Commercially Reasonable Efforts**" means the efforts and resources that a similarly situated biopharmaceutical company or research institution, as applicable, would use for its own internally discovered technology of similar commercial potential and similar stage of development, taking into consideration the likely timing of the technology's entry into the market, any patent and other proprietary position, issues of safety and efficacy, manufacturing and supply considerations, regulatory approval process, product labeling, product profile and pricing/reimbursement. Without limiting the foregoing, Commercially Reasonable Efforts requires, with respect to such obligations, that the Party (a) promptly assign responsibility for such obligation to specific employee(s) who are accountable for progress and monitor such progress on an on-going basis, (b) set annual objectives for carrying out such obligations, and (c) allocate resources designed to advance progress with respect to such objectives. For clarity, Commercially Reasonable Efforts will not mean that a Party guarantees that it will actually accomplish the applicable task or objective.

1.12 "**Compulsory License**" means a compulsory license under Penn Patent Rights obtained by a Third Party through the order, decree, or grant of a competent Governmental Body or court,

authorizing such Third Party to research, develop, make, have made, use, sell, offer for sale, commercialize or import a Licensed Product in any country.

1.13 "**Controlled**" means, with respect to intellectual property rights, that a Party or one of its Affiliates owns or has a license or sublicense to such intellectual property rights and has the ability to provide to, grant a license or sublicense to, or assign its right, title and interest in and to, such intellectual property rights as provided for in this Agreement without violating the terms of any agreement or other arrangement with any Third Party.

1.14 "**Development Candidate**" means (a) a Drug Candidate designated as a "Development Candidate" by the JSC following satisfaction of the Acceptance Criteria and (b) any Drug Candidate with respect to which the […***…] studies identified in the Research Plan are commenced with the intent to satisfy the requirements for filing an IND with respect to such Drug Candidate. For clarity, the JSC may designate back-up candidates as Development Candidates if such back-up candidates satisfy the Acceptance Criteria.

1.15 "**Drug Candidate**" means a Gene Therapy Product candidate discovered, conceived or developed by Penn or Licensee, or delivered to Licensee, in each case, under the Research Plan. For clarity, "Drug Candidate" includes only those Gene Therapy Product drug candidates that are worked on pursuant to the Research Plan.

1.16 "**EMA**" means the European Medicines Agency and any successor entity thereto.

1.17 "**Existing REGENXBIO Agreements**" means, collectively, the following agreements by and between REGENXBIO and Licensee: (a) License Agreement dated October 30, 2013, as previously amended, and (b) Option and License Agreement dated March 10, 2015, as each may be amended or restated.

1.18 "**FDA**" means the United States Food and Drug Administration and any successor entity thereto.

1.19 "**FD&C Act**" means the United States Federal Food, Drug and Cosmetic Act, as amended.

1.20 "**Field**" means collectively (a) treatment of Wilson Disease in human patients; (b) treatment of Phenylketonuria in human patients; and (c) treatment of Citrullinemia Type I in human patients, and for each of (a) through (c) relevant diagnostic or prognostic applications to support such therapeutic use (each of (a), (b) and (c), a "**Subfield**").

1.21 "**First Commercial Sale**" means, on a country-by-country basis, the first commercial transfer or disposition for value of Licensed Product in such country to a Third Party by Licensee, or any of its Affiliates or Sublicensees, in each case, after all Governmental Approvals have been obtained for such country.

1.22 "**GAAP**" means United States generally accepted accounting principles applied on a consistent basis.

1.23 "**Gene Therapy Product**" means, with respect to a pharmaceutical product, that such pharmaceutical product inserts one or more functional genes into a patient's cells using an adeno associated virus. For clarity, gene therapy products do not include genome editing, in which genetic engineering is used to insert, delete or replace DNA in the genome of an organism using engineered nucleases.

1.24 "**Governmental Approval**" means, with respect to a Licensed Product in a country or region, all approvals, licenses, registrations and authorizations of the relevant Governmental Body, if applicable, required for the commercialization of such Licensed Product in such country.

1.25 "**Governmental Body**" means any: (a) nation, principality, state, commonwealth, province, territory, county, municipality, district or other jurisdiction of any nature; (b) federal, provincial, state, local, municipal, foreign or other government; (c) governmental or quasi-governmental authority of any nature (including any governmental division, subdivision, department, agency, bureau, branch, office, commission, council, board, instrumentality, officer, official, representative, organization, unit, body or entity and any court or other tribunal); (d) multi-national or supranational organization or body; or (e) individual, entity, or body exercising, or entitled to exercise, any executive, legislative, judicial, administrative, regulatory, police, military or taxing authority or power of any nature.

1.26 "**IND**" means an Investigational New Drug Application as defined in the FD&C Act and the regulations promulgated thereunder, or (b) the equivalent application to the equivalent regulatory authority in any other regulatory jurisdiction, including a Clinical Trial Authorization ("**CTA**") to the European Medicines Agency, the filing of which is necessary to initiate or conduct clinical testing of a pharmaceutical product in humans in such jurisdiction.

1.27 "**Improvements**" means any modification, enhancement or other improvement arising from Licensee's use of Penn Know-How or Penn Materials in connection with the exploitation of the license granted to Licensee under Section 3.1.2 outside of the Research Program (provided that (a) for clarity, any such Penn Know-How continues to be confidential and proprietary to Penn at the time of such use and (b) "Improvements" does not include any modifications, enhancements or other improvements arising from any manufacturing and manufacturing-related activities (including assay development) conducted by or on behalf of Licensee).

1.28 "**Improvement Patent Rights**" means all Patent Rights claiming an Improvement.

1.29 "**Know-How**" means proprietary and confidential intellectual property, data, results, pre-clinical and clinical protocols and study data, chemical structures, chemical sequences, information, inventions, formulas, trade secrets, techniques, methods, processes, procedures and developments, and regulatory documentation, whether or not patentable; except that "Know-How" does not include Patent Rights claiming any of the foregoing. "Know-How" also does not include Penn Materials or Licensee Materials.

1.30 "**Law**" or "**Laws**" means all applicable laws, statutes, rules, regulations, ordinances and other pronouncements having the binding effect of law of any Governmental Body.

1.31 "**Licensee Materials**" means any biological or chemical materials Controlled by Licensee and provided to Penn under this Agreement.

1.32 "**Licensed Product**" means any Gene Therapy Product, including Combination Products, the researching, developing, making, using, importation, sale, offering for sale, or commercialization of which, (a) on a country-by-country basis, in the absence of the licenses granted to Licensee hereunder would infringe or reads on at least one pending or granted claim of the Penn Patent Rights in such country, or (b) incorporates or is based on the use of Penn Know-How, or (c) incorporates or is based on the use of Penn Materials (including any capsid). For clarity, any

drug or other product containing a Development Candidate (including each Development Candidate as a stand-alone Gene Therapy Product) will be treated as a Licensed Product.

1.33 "**Major Markets**" means […***…].

1.34 "**MHLW**" means the Ministry of Health, Labor and Welfare of Japan.

1.35 "**Net Sales**" means the gross consideration invoiced or received by Licensee or any of its Affiliates or Sublicensees for Sales of Licensed Product (including any cash amounts plus the fair market value of any other forms of consideration), less the following deductions (to the extent included in and not already deducted from the gross amounts invoiced or otherwise charged) determined in accordance with GAAP to the extent reasonable and customary:

1.35.1 […***…]
1.35.2 […***…]
1.35.3 […***…]
1.35.4 […***…]
1.35.5 […***…] and
1.35.6 […***…].

In the event that a Licensed Product is sold in any country in the form of a Combination Product, Net Sales of such Combination Product will be determined as follows:

[…***…].

[…***…]

1.36 "**Patent Rights**" means (a) patents and patent applications, together with any unlisted patents and patent applications claiming priority thereto, and any continuations, continuations-in-part (to the extent related directly to the subject matter of the parent application or containing new information developed pursuant to the Research Program), reissues, reexamination certificates, substitutions, divisionals, supplementary protection certificates, renewals, registrations, extensions including all confirmations, revalidations, patents of addition, PCTs, and pediatric exclusivity periods and all foreign counterparts thereof, and any patents issued or issuing with respect to any of the foregoing and (b) all official correspondence relating to the foregoing.

1.37 "**Penn Know-How**" means (a) all Know-How discovered or developed by the Wilson Laboratory and Controlled by Penn as of the Effective Date, (b) all Know-How used under the Research Program discovered or developed by the Wilson Laboratory and Controlled by Penn, and (c) all Research Program Know-How, and, for each of (a) through (c), that is reasonably necessary or desirable to research, develop, make, use, sell, offer for sale, commercialize or import any Licensed Product.

1.38 "**Penn Intellectual Property**" means the Penn Patent Rights, Penn Know-How and Penn Materials.

1.39 "**Penn Materials**" means any biological or chemical materials Controlled by Penn and provided to Licensee under this Agreement, in each case, that are reasonably necessary and available from Penn to exploit the licenses granted to Licensee hereunder, including cell lines, viral seed stocks, product-specific reference materials, platform or product specific assay controls and reagents that are not available as standard commercial items.

1.40 "**Penn Patent Rights**" means (a) Background Patent Rights (b) Research Program Patent Rights (including Joint Research Program Patent Rights) and (c) Penn's interest in Improvement Patent Rights.

1.41 "**Person**" means any natural person, corporation, firm, business trust, joint venture, association, organization, company, partnership or other business entity, or any government or agency or political subdivision thereof.

1.42 "**Phase 1 Study**" means a clinical study of a drug candidate in patients with the primary objective of characterizing its safety, tolerability, and pharmacokinetics and identifying a recommended dose and regimen for future studies as described in 21 C.F.R. § 312.21(a), or a comparable clinical study prescribed by the relevant regulatory authority in a country other than the United States. The drug candidate can be administered to patients as a single agent or in combination with other investigational or marketed agents.

1.43 "**Phase 1/2 Study**" means a clinical study of a drug candidate in diseased patients that satisfies the requirements of a Phase 1 Study and a Phase 2 Study.

1.44 "**Phase 2 Study**" means a clinical study of a drug candidate in patients with the primary objective of characterizing its activity in a specific disease state as well as generating more detailed safety, tolerability, and pharmacokinetics information as described in 21 C.F.R. § 312.21(b), or a comparable clinical study prescribed by the relevant regulatory authority in a country other than the United States including a human clinical trial that is also designed to satisfy the requirements of 21 C.F.R. § 312.21(a) or corresponding foreign regulations and is subsequently optimized or expanded to satisfy the requirements of 21 C.F.R. § 312.21(b) (or corresponding foreign regulations) or otherwise to enable a Phase 3 Clinical Study (e.g., a phase 1/2 trial). The relevant drug candidate may be administered to patients as a single agent or in combination with other investigational or marketed agents.

1.45 "**Phase 3 Study**" means a clinical study of a drug candidate in patients that incorporates accepted endpoints for confirmation of statistical significance of efficacy and safety with the aim to obtain regulatory approval in any country as described in 21 C.F.R. § 312.21(c), or a comparable clinical study prescribed by the relevant regulatory authority in a country other than the United States. The relevant drug candidate may be administered to patients as a single agent or in combination with other investigational or marketed agents.

1.46 "**Product Specific Program Data**" means Program Data that relates solely to a Development Candidate. For clarity, Product Specific Program Data includes data solely related to the performance or use of a Development Candidate.

1.47 "**Program Data**" means the data resulting from the performance of the Research Program by the Wilson Laboratory.

1.48 "**REGENXBIO**" means REGENXBIO, Inc. and any successor thereto.

1.49 "**Regulatory Approval**" means, with respect to a product in any regulatory jurisdiction, approval from the applicable Regulatory Authority sufficient for the manufacture, commercialization, use, marketing and sale of such pharmaceutical product in such jurisdiction in accordance with Laws. "Regulatory Approval" does not include authorization by a Regulatory Authority to conduct named patient, compassionate use or other similar activities.

1.50 "**Regulatory Authority**" means any Governmental Authority, including the FDA, EMA or MHLW, or any successor agency thereto, that has responsibility for granting any licenses or approvals or granting pricing or reimbursement approvals necessary for the marketing and sale of a pharmaceutical product in any country.

1.51 "**Research Plan**" means the research plan setting forth the Parties' roles and responsibilities for the Research Program as set forth in Exhibit B hereto, respectively, and as may be amended from time to time with written approval of the JSC.

1.52 "**Research Program**" means the research and pre-clinical development program of Licensed Products in the Field funded by Licensee and to be conducted by the Parties hereunder, but will not include any manufacturing or manufacturing-related activities (including assay development) conducted by or on behalf of Licensee.

1.53 "**Research Program Know-How**" means all Know-How, including Research Results, discovered or developed in the Wilson Laboratory under the Research Program.

1.54 "**Research Program Patent Rights**" means all Patent Rights conceived in the Wilson Laboratory or by Dimension under the Research Program and any Patent Rights issuing therefrom.

1.55 "**Research Results**" means all any and all information, inventions, developments, animate and inanimate materials, including live animals, discoveries, software, know-how, methods, techniques, formulae, data, software, processes, methodologies, techniques, biological materials, software and works of authorship, whether patentable or copyrightable, that are first conceived, discovered, developed or reduced to practice, or generated in the performance of the Research Program by the Wilson Laboratory, including any unpatentable inventions discovered, developed or conceived in the conduct of the Research Program. Research Results expressly excludes Penn Patent Rights.

1.56 "**Sale**" means any transaction for which consideration is received or expected by Licensee, its Affiliates or Sublicensees for sale, use, lease, transfer or other disposition of a Licensed Product to or for the benefit of a Third Party. For clarity, sale, use, lease, transfer or other disposition of a Licensed Product by Licensee or any of its Affiliates or Sublicensees to another of these entities for resale by such entity to a Third Party shall not be deemed a Sale.

1.57 "**Sublicensee**" means a Person (including any Affiliate) to which a Sublicense is granted pursuant to the terms of Section 3.4. For clarity, subcontractors engaged pursuant to Section 2.2.6 are not Sublicensees.

1.58 "**Sublicense Documents**" means any and all agreements, amendments or written understandings entered into with a Sublicensee (including any of its Affiliates) pertaining to a Sublicense, Penn Patent Rights or Licensed Product.

1.59 "**Sublicense Income**" means income received by Licensee or its Affiliates in consideration for a Sublicense or other agreement providing the right to negotiate for or obtain a Sublicense. Sublicense Income includes income received from a Sublicensee in the form of license issue fees, milestone payments and the like but specifically excludes […***…].

1.60 "**Tax**" means all taxes, duties, fees, premiums, assessments, imposts, levies, rates, withholdings, dues, government contributions and other charges of any kind whatsoever, whether direct or indirect, together with all interest, penalties, fines, additions to tax or other additional amounts, imposed by any Governmental Body.

1.61 "**Third Party**" means any Person other than Penn, Licensee or any of their respective Affiliates.

1.62 "**United States**" or "**US**" means the United States of America, its territories and possessions.

1.63 "**USD**" or "**$**" means the lawful currency of the United States of America.

1.64 "**Valid Claim**" means (a) any claim of any of the Penn Patent Rights that has issued, is unexpired and has not been rejected, revoked or held unenforceable or invalid by a final, non-appealable decision of a court or other governmental authority of competent jurisdiction or unappealed within the time allowable for appeal or (b) a claim of a patent application included in the Penn Patent Rights that has been pending less than […***…] from the filing date of the first patent application in the priority lineage for such patent application and which claim has not been cancelled, withdrawn or abandoned or finally rejected by an administrative agency action from which no appeal can be taken; provided that, if any such claim issues after such […***…] period, it will thereafter be considered a Valid Claim.

1.65 "**Wilson Laboratory**" means all individuals within the Wilson Laboratory at Penn that report directly to, or are under the direct supervision or control of, James M. Wilson, MD, PhD.

1.66 **Other Terms**. The definition of each of the following terms is set forth in the section of the Agreement indicated below:

Defined Term	**Section**
Agreement	Introductory Clause
Anti-Stacking Percentage	4.3.3(b)(ii)
Bankruptcy Action	10.3.4
Carve-Out Patent Rights	6.2.2
Commercial Milestone	4.2.2(a)
Commercial Milestone Payment	4.2.2(a)
Confidential Information	7.1
CTA	1.25
Development Milestone	4.2.1(a)
Development Milestone Payment	4.2.1(a)
Disclosing Party	7.1
Effective Date	Introductory Clause
Financial Report	4.6
Infringement Notice	6.4.1
Joint Research & Development Committee ("JRDC")	2.6.2(a)

Defined Term	Section
Joint Research Program Patent Rights	6.1.1
Joint Steering Committee ("JSC")	2.6.1(a)
Know-How License	3.2
License	3.1
Licensee	Introductory Clause
MAA	1.4
Maximum Anti-Stacking Reduction	4.3.3(b)(ii)
Observer Period	5.4.2
Ongoing Patent Costs	6.3.2
Party or Parties	Introductory Clause
Patent Costs	6.3.1
Patent Counsel	6.2.1
Penn	Introductory Clause
Penn Indemnitees	9.1.1
Penn Sublicense Income	4.4.1
Progress Report	5.6.1
Prosecution Request	6.2.2
Receiving Party	7.1
Representative	7.5
Royalty	4.3.1
Royalty Period	4.3.2
SDR Report	3.4.4
Subfield	1.20
Sublicense	3.4.1
Term	10.1

ARTICLE 2
COLLABORATION PROGRAMS; GOVERNANCE

2.1 **Overall Project**. The Parties desire to collaborate with respect to the pre-clinical development of a Development Candidate, as set forth in more detail in this Article 2, in each Subfield within the Field, with the goal of identifying one or more Development Candidates for clinical development and commercialization in each Subfield. Penn will be responsible for preclinical development activities, including all IND-enabling non-clinical studies, manufacture of research grade vectors to support pre-clinical studies, and all other activities assigned to Penn in the Research Plan. Licensee will be responsible for manufacture of vectors for IND-enabling studies, regulatory strategy and operations, clinical development, GMP manufacture in support of Licensee's activities, and commercialization of all Licensed Product.

2.2 **Research**.

2.2.1 Penn will use Commercially Reasonable Efforts to conduct the Research Program in accordance with the Research Plan and the other terms and conditions of this Agreement. Absent Licensee's prior written consent to the contrary, the Wilson Laboratory will solely perform the work under the Research Program on behalf of Penn. All personnel, contractors and others who participate in the conduct of the Research Program on behalf of Penn shall be bound by written agreements that contain

confidentiality obligations that are at least as restrictive as the confidentiality obligations set forth in this Agreement and are consistent with the intellectual property assignment provisions set forth in this Agreement. Without limiting the foregoing, within each Subfield, Penn will be responsible for the completion of the Research Plan for the research and development work up to completion of IND enabling studies, including animal model development, and IND supporting preclinical work (toxicology and pharmacokinetics) of at least one (1) Development Candidate in each of the three (3) Subfields within the Field. Penn shall be responsible through the Research Plan for the manufacture of research-grade vectors to support pre-clinical studies. Licensee shall be responsible for the manufacture of the vectors for IND-enabling studies and Licensed Products in accordance with cGMP.

2.2.2 The JSC shall review the Research Plan at least […***…] per […***…]. Subject to the limits set forth in Section 2.6.1(b)(v), the JSC may amend the Research Plan at any time, including amendments to include further activities, including corresponding revisions to the budget.

2.2.3 Penn shall maintain records of the results of the Research Program in sufficient detail and in good scientific manner appropriate for patent and regulatory purposes to properly reflect all work done and results achieved. Penn will provide task-based, scientific reports of the progress and results of the Research Program on the schedule specified in the Research Plan or on another schedule to be agreed in writing by the Parties. Penn shall maintain records of the use of the funds provided by Licensee and shall make such records available to Licensee in accordance with the terms of this Agreement including Section 4.10.2. Within […***…] after the […***…] of the Research Program, Penn will provide Licensee with a written report setting forth the research conducted and results obtained which report shall include the items set forth on Schedule 2.2.3. For a period of […***…] after delivery of such written report, and at […***…] sole cost and expense, Penn shall, through the Wilson Laboratory, provide reasonable technical assistance as Licensee may reasonably request to assist Licensee in connection with questions arising from such written report; provided, however, that such assistance shall not include performance of any additional activities that are not set forth in the Research Plan.

2.2.4 Through the JSC, during the performance of activities under the applicable Research Plan, the Parties will discuss potential Development Candidates and seek to identify and mutually agree upon a Development Candidate for each Subfield arising out of the applicable Research Program. […***…].

2.2.5 The Parties hereby acknowledge that there are inherent uncertainties involved in the research and development of products and such uncertainties form part of the business risk involved in undertaking the Research Program. Accordingly, in the event that upon completion of the applicable Research Plan in accordance with the terms of this Agreement and on a Subfield-by-Subfield basis, the Parties do not develop or identify a suitable candidate to propose as a Development Candidate, then the Research Program with respect to the relevant Subfield shall terminate, and Penn shall have no further obligations to Licensee under the Research Plan with respect to such Subfield.

2.2.6 Each Party will have the right to engage Third Party subcontractors to perform certain of its obligations under this Agreement; provided that Penn's right to engage Third Party

subcontractors is subject to Licensee's prior written consent, which may not be unreasonably withheld. Any subcontractor to be engaged by a Party to perform a Party's obligations set forth in the Agreement will meet the qualifications typically required by such Party for the performance of work similar in scope and complexity to the subcontracted activity and will enter into such Party's standard agreement for such activity consistent with such Party's standard practices, subject to modifications to ensure that such agreement shall be as least as protective as the nondisclosure obligations and consistent with the assignment of intellectual property rights set forth herein. Any Party engaging a subcontractor hereunder will remain responsible and obligated for such activities and will not grant rights to such subcontractor that interfere with the rights of the other Party under this Agreement.

2.2.7 In addition to the Research Plan, Penn shall provide to Licensee through the JSC the proposed constructs for a Drug Candidate such that the Parties may consider known freedom-to-operate issues related thereto. For clarity, this Section 2.2.7 will not change the governance of the Research Program and does not require that Penn engage in a freedom-to-operate analysis with respect to any technology or intellectual property relating to a Drug Candidate or Penn's performance of the Research Plan.

2.3 **Funding of the Research Program**.

2.3.1 The initial budget for the Research Program, broken down by […***…], is set forth in Exhibit C. On the Effective Date, Licensee shall pay to Penn an upfront one-time non-refundable research payment of $[…***…]. On or before […***…], the Parties, through the JSC, will agree on an updated budget for the remainder of the Research Program, also broken down by […***…]. Subject to the terms and conditions of this Agreement, Licensee shall pay Penn research and development funding including direct and in-direct costs to cover the cost of the performance of the Research Plan by Penn in accordance with the remainder of this Section 2.3.1 and the terms of Section 4.5 (including reasonable and documented direct external expenses incurred by Licensee in accordance with the Research Plan and as agreed to by the Parties through the JSC).

(a) Within […***…] of the Effective Date, Licensee shall pay to Penn an amount of $[…***…] for performance of the research and development under the Research Program for […***…]. On […***…], Licensee shall pay to Penn an amount of $[…***…] for performance of the research and development under the Research Program for […***…]. On […***…], Licensee shall pay to Penn an amount of $[…***…] for performance of the research and development under the Research Program for […***…]; provided, however, that prior to the payment of such amount for […***…], Penn and Licensee shall review the payments made by Licensee during […***…] in connection with work performed under the Research Program and adjust the budgeted amount of such […***…] payment to take into account any paid but unused research and development funds paid by Licensee in […***…].

(b) Penn shall track actual expenses. "Actual expenses" for purposes of this Section 2.3.1 are all expenses that are recorded in the Penn General Ledger System.

(c) Licensee shall pay Penn for the performance of the Research Plan according to the following schedule:

(i) Commencing on […***…] and on […***…] in which Penn is conducting research under the Research Program, Licensee will pay to Penn […***…] of the research budget for such […***…]; and

(ii) No later than the […***…] of each subsequent […***…] during the performance of the Research Program by Penn, Licensee will pay to Penn […***…] of the amount allocated in the research budget for such […***…]; provided, however, that on […***…] of the performance of the Research Program by Penn, such amount shall be […***…] with Licensee paying the remaining […***…] upon Licensee's receipt of the final report from Penn pursuant to Section 2.2.3 for such Research Program.

(iii) Within […***…] after the end of each […***…] during the performance of the Research Program by Penn, Penn will provide Licensee with a report setting forth (x) the Penn costs actually incurred during such […***…] and (y) Penn's actual expenses recorded during such […***…], in the performance of the Research Program, on a Subfield-by-Subfield basis.

(iv) Prior to the payment of the scheduled payment for research and development funding by Licensee to Penn for […***…], Penn and Licensee shall review the payments made by Licensee during such […***…] in connection with work performed under the Research Program and adjust the budgeted amount of such […***…] payment to take into account any paid but unused research and development funds paid by Licensee in such […***…].

(d) In no event will Licensee be obligated to pay for work that was not included in a JSC-approved budget.

2.3.2 If at any time Penn determines that it will require additional funds for the Research Program, it will notify Licensee through the JSC and provide a good faith estimate and itemized budget of the additional amount. Notwithstanding the foregoing, changes to the scope of or budget for the Research Plan in […***…] will require approval of the JSC if the budget impact is greater than […***…] of the agreed upon budget for such […***…].

2.3.3 Title to any equipment, laboratory animals, or any other tangible materials made or acquired (in whole or in part) with funds provided under this Agreement will vest in Penn, and such equipment, animals, or tangible materials will remain the property of Penn following termination or expiration of this Agreement (but subject to any license grants to Licensee hereunder). For clarity, absent a subsequent agreement to the contrary, Licensee will only be responsible for the costs of such tangible materials to the extent the same will be utilized for performance of the Research Program.

2.4 **Unavailability of Dr. James M. Wilson**. If James M. Wilson, MD, PhD becomes unavailable to oversee and support the performance of the research under the Research Plan for any reason, Penn may propose another member of its faculty who is acceptable to Licensee, in its sole discretion, to oversee the performance of the Research Program. If a substitute faculty member acceptable to Licensee has not been agreed upon within […***…] after James M. Wilson, MD, PhD is no longer available to oversee and support the performance of the Research Plan, Licensee may terminate this Agreement upon written notice thereof to Penn, subject to the provisions of Article 10.

2.5 **Technology Transfer**. Subject to the terms and conditions of this Agreement, and to the extent Controlled by Penn at the date of transfer, Penn will, at […***…] sole cost and expense, provide Licensee with Penn Materials and Penn Know-How, including but not limited to nonclinical data (*in vitro* and *in vivo*), and vector development data and results that are required for the execution of the Research Program by Licensee. For clarity, (a) Penn shall have no obligation under this Agreement to include any Penn Materials or Penn Know-How relating to manufacturing processes or methods and (b) the Parties agree that the Research Program will not include any manufacturing and manufacturing-related activities (including assay development) conducted by or on behalf of Licensee. All Penn Materials and Licensee Materials shall be transferred and documented by the Parties pursuant to the terms set forth in this Agreement and the terms of material transfer set forth on Exhibit F, and the use of such Penn Materials and Penn Know-How shall be limited to the rights granted to Licensee herein and in Exhibit F and the use of such Licensee Materials shall be limited to Penn's performance of the Research Program. Licensee shall ensure that Penn's authorized representatives, may, during regular business hours, examine and inspect Licensee's facilities, subject to any Third Party confidentiality restrictions and other obligations, and the facilities of any subcontractor or any investigator site used by Licensee in the performance of manufacturing and development of products in the Field for the sole purpose of confirming Licensee's capability to manufacture vectors in support of the Research Plan. Licensee and Penn shall enter into a confidentiality agreement, in a form mutually agreeable between the Parties, in connection with such examination and inspection. In the event the Parties are unable to agree upon Penn's authorized representative for such examination and inspection, then Licensee may request Penn to engage, at […***…] expense, an independent third party reasonably acceptable to each Party to perform such examination and inspection under a confidentiality agreement mutually agreed upon by the Parties and any report or other communication from such auditor to Penn shall be limited solely to an assessment of Licensee's capability to manufacture vectors in support of the Research Plan and such auditor shall provide Licensee with a copy of all such reports at the same time such reports are provided to Penn.

2.6 **Governance**.

2.6.1 **Joint Steering Committee**.

(a) Formation; Composition. Within […***…] of the Effective Date, the Parties will establish a joint steering committee (the "**Joint Steering Committee**" or "**JSC**") comprised of […***…] representatives from each Party with sufficient seniority within the applicable Party to make decisions arising within the scope of the JSC's responsibilities. The JSC may change its size from time to time by mutual consent of its members, provided that the JSC will consist at all times of […***…] representatives of each of Penn and Licensee. Each Party may replace its JSC representatives at any time upon written notice to the other Party.

(b) Specific Responsibilities. The JSC will:

(i) oversee the Research Program;

(ii) amend the Acceptance Criteria;

(iii) determine whether a Drug Candidate satisfies the Acceptance Criteria and is therefore a Development Candidate and designate any back-up Development Candidates, if any;

(iv) review freedom-to-operate issues related to proposed constructs of Drug Candidates;

(v) on or before […***…], approve an updated budget in accordance with Section 2.3.1;

(vi) approve any amendments to the Research Plan (including any changes to the budget that are greater than […***…] of the then-current budget for the then-current […***…]);

(vii) resolve any disagreement between the Parties relating to the Research Program or Research Plan;

(viii) designate patent representatives from each Party to consider, and resolve as necessary to the extent possible, any intellectual property matters, including the use of any Patent Rights in connection with the Research Program or any Licensed Product (including any Patent Rights owned in whole or in part by Penn) and resolve issues brought by such patent representatives to the JSC;

(ix) establish such additional subcommittees as it deems necessary to achieve the objectives and intent of the Research Program;

(x) resolve issues presented to it by, and disputes within, the JRDC; and

(xi) perform such other functions as appropriate, and direct the JRDC to perform such other functions as appropriate, to further the purposes of this Agreement, in each case as agreed in writing by the parties.

(c) Reporting. Each Party shall keep the JSC informed on the progress of the activities under the Research Program then currently ongoing under the Research Plan, including delivering […***…] written updates of its progress under the Research Plan to the JSC at least […***…] in advance of each JSC meeting.

(d) Meetings. During the performance of the Research Plan by Penn, the JSC will meet at least […***…]. Following the completion of Penn's performance of the Research Plan, the Parties may agree to meet to discuss items previously addressed by the JSC. The JSC may meet in person, by videoconference or by teleconference. Notwithstanding the foregoing, at least […***…] will be in person unless the parties mutually agree in writing to waive such requirement. In-person JSC meetings will be held at locations alternately selected by Penn and by Licensee; provided, however, that […***…] shall reimburse […***…] for its JSC representatives' reasonable, documented out-of-pocket costs in connection with attending such in-person JSC meeting at a location other than […***…]. Meetings of the JSC will be effective only if all representatives of each Party are present or participating in such meeting. The JSC shall keep accurate minutes of its deliberations which shall record all proposed decisions and all actions recommended or taken. The secretary of the JSC (as appointed by the members of the JSC) shall be responsible for the preparation of draft minutes. Draft minutes shall be sent to all members of the JSC within […***…] after each

meeting and shall be approved, if appropriate, at the next meeting. All records of the JSC shall at all times be available to both Penn and Licensee.

(e) Decision-Making. The representatives from each Party on the JSC will have, collectively, […***…], and all decision making will be by unanimous consent of both Parties. If the JSC is unable to reach agreement on any issue or matter for which it is responsible, such disputed matter will be escalated to […***…] or his designee, for discussion in good faith. In the event that after escalation the Parties are unable to reach agreement with respect to the disputed matter, then (i) Licensee may terminate this Agreement or (ii) Licensee may provide Penn notice that Licensee shall assume the performance of Penn's obligations under the Research Plan for such Subfield. If Licensee terminates this Agreement, Section 10.4 shall apply. If Licensee assumes performance of Penn's obligations under the Research Plan with respect to a particular Subfield, Licensee shall pay Penn […***…] per the budget of the Research Plan for such Subfield as well […***…] for such Subfield that are reflected in the budget (i.e., […***…] until the earlier of (a) […***…] of […***…] and (b) […***…]; and subject to Penn's written notification to Licensee and Licensee's acknowledgement of […***…]. In the event that the disputed matter is whether the Drug Candidate meets the Acceptance Criteria, and Licensee assumes the performance of Penn's obligations under the Research Plan with respect to such particular Subfield, then the Parties agree that solely with respect to […***…], […***…] upon the earlier of (a) […***…] and (b) […***…].

2.6.2 **Joint Research & Development Committee**.

(a) Formation; Composition. Within […***…] of the Effective Date, the Parties will establish a joint research & development committee (the "**Joint Research & Development Committee**" or "**JRDC**") comprised of […***…] representatives from each Party. The JRDC may change its size from time to time by mutual consent of its members, provided that the JRDC will consist at all times of […***…] representatives of each of Penn and Licensee. Each Party may replace its JRDC representatives at any time upon written notice to the other Party.

(b) Specific Responsibilities. The JRDC will:

(i) oversee, manage, coordinate and integrate the activities of the Parties under the Research Plan;

(ii) make key decisions during the progress of the Research Plan including selection of the Development Candidates; provided, however that any material amendment to the Research Plan shall be the specific responsibility of the JSC;

(iii) address any issues identified by Licensee with respect to Third Party intellectual property rights necessary for the performance of a Research Program, including Licensee's analysis of whether a license is required from such Third Party for the exploitation of a Licensed Product;

(iv) perform such other functions as appropriate to further the purposes of this Agreement, as directed by the JSC in accordance with Section 2.6.1(b)(ix).

(c) Meetings. The JRDC will meet at least […***…], unless the Parties mutually agree in writing to a different frequency. The JRDC may meet in person, by videoconference, or by teleconference. In-person JRDC meetings will be held at locations alternately selected by Penn and by […***…]; provided, however, that […***…] shall reimburse […***…] for its JRDC representatives' reasonable, documented out-of-pocket costs in connection with attending such in-person JRDC meeting at a location other than […***…]. Meetings of the JRDC will be effective only if all representatives of each Party are present or participating in such meeting.

(d) Decision-Making. The representatives from each Party on the JRDC will have, collectively, […***…], and all decision making will be by unanimous consent by the Parties. Disputes at the JRDC will be referred to the JSC for resolution.

ARTICLE 3
LICENSES AND OTHER RIGHTS

3.1 **Grant of License**. Subject to the terms and conditions of this Agreement, Penn hereby grants to Licensee and its Affiliates (the "**License**"):

3.1.1 an exclusive (even as to Penn but subject to Section 3.2), worldwide, royalty-bearing right and license (with the right to sublicense (through multiple tiers) as provided in, and subject to, the provisions of Section 3.4) under the Research Program Patent Rights and Penn's interest in the Improvement Patent Rights, to research, develop, make, have made, use, sell, offer for sale, commercialize and import Licensed Products in the Field during the Term; and

3.1.2 a non-exclusive, worldwide, royalty-bearing right and license (with the right to sublicense (through multiple tiers) as provided in, and subject to, the provisions of Section 3.4) under Background Patent Rights, Penn Know-How and Research Program Know-How, which includes Program Data) and Penn Materials, in each case to the extent necessary or useful to research, develop, make, have made, use, sell, offer for sale, commercialize and import Licensed Products in the Field during the Term.

3.2 **Retained Rights**. Notwithstanding the License set forth in Section 3.1.1, Penn retains the right under the Research Program Patent Rights and the Improvement Patent Rights to: (a) conduct educational, research and non-commercial clinical activities itself and (b) authorize non-commercial Third Parties to conduct educational, research and non-commercial clinical activities. For clarity, the foregoing retained rights of Penn are in all fields (including the Field).

3.3 **U.S. Government Rights**. The License is expressly subject to all applicable provisions of any license to the United States Government executed by Penn and is subject to any overriding obligations to the United States Federal Government under 35 U.S.C. §§200-212, applicable governmental implementing regulations, and the U.S. Government sponsored research agreement or other guidelines, including that products that result from intellectual property funded by the United States Federal Government that are sold in the United States be substantially manufactured in the United States. In the event that Licensee believes in good faith that substantial manufacture of such product is not commercially feasible in the United States and makes a request to Penn in writing to assist in obtaining a waiver of such requirement from the

United States Government, then Penn shall, […***…], use reasonable efforts to assist in obtaining such waiver.

3.4 **Grant of Sublicense by Licensee**.

3.4.1 Penn grants to Licensee the right to grant sublicenses (through multiple tiers), in whole or in part, under the License (each, a "**Sublicense**") subject to the terms and conditions of this Agreement and specifically this Section 3.4. The term Sublicense shall include any grant of rights under the License by a Sublicensee to any downstream Third Party, such applicable downstream Third Party shall be considered a Sublicensee for purposes of this Agreement.

3.4.2 All Sublicenses will be (a) issued in writing, (b) to the extent applicable, include all of the rights of Penn and require the performance of obligations due to Penn (and, if applicable, the U.S. Government under 35 U.S.C. §§200-212) contained in this Agreement and (c) shall include no less than the following terms and conditions, and in each such instance shall be consistent with (but not more burdensome) than the provisions applicable to Licensee under this Agreement:

(i) Reasonable record keeping, audit and reporting obligations sufficient to enable Licensee and Penn to reasonably verify the payments due to Licensee and Penn under such Sublicense and to reasonably monitor such Sublicensee's progress in developing and/or commercializing Licensed Product, provided that such obligations shall be no less stringent that those provided in this Agreement for Licensee.

(ii) Infringement and enforcement provisions that do not conflict with the restrictions and procedural requirements imposed on Licensee and do not provide greater rights to Sublicensee than as provided in Section 6.4.

(iii) Confidentiality provisions with respect to Confidential Information of Penn consistent with the restrictions on Licensee in Article 7 of this Agreement.

(iv) Covenants by Sublicensee that are equivalent to those made by Licensee in Section 8.3.

(v) A requirement of indemnification of Penn by Sublicensee that is equivalent to the indemnification of Penn by Licensee under Section 9.1 of this Agreement.

(vi) A requirement of obtaining and maintaining commercially reasonable insurance by Sublicensee.

(vii) Restriction on use of Penn's names etc. consistent with Section 11.4 of this Agreement.

(viii) A requirement of antidiscrimination by Sublicensee no less stringent than that provided in Section 11.5 of this Agreement.

Any Sublicense that does not include all of the terms and conditions set forth in this Section 3.4.2 or which is not issued in accordance with the terms and conditions set forth in this Section 3.4, shall be considered null and void with no further notice from Penn.

3.4.3 Within […***…] after of the execution of a Sublicense Document, Licensee shall provide a complete and accurate copy of such Sublicense Document to Penn (which copy may be redacted solely to remove confidential information of Licensee that is not applicable to determining compliance with this Agreement and confidential information of such Sublicensee), in the English Language, and such copies will be the Confidential Information of Licensee and may only be used to determine Licensee's compliance with this Agreement. Penn's receipt of a Sublicense Document, however, will constitute neither an approval nor disapproval of the Sublicense Document nor a waiver of any right of Penn or obligation of Licensee under this Agreement. In the event Penn cannot, in its reasonable discretion, interpret the Sublicense Document due to the redacted information, Penn may request, and Licensee shall be obligated to provide to Penn counsel a copy of the unredacted Sublicense Document (other than any research and development plans included as an exhibit to such Sublicense Document).

3.4.4 Licensee shall provide an annual Sublicense Development Report on or before […***…] during the Term ("**SDR Report**"), which shall contain the information set forth on Exhibit D attached hereto.

3.5 **No Implied License.** Each Party acknowledges that the rights and licenses granted in this Agreement are limited to the scope expressly granted. Accordingly, except for the rights expressly granted under this Agreement, no right, title, or interest of any nature whatsoever is granted whether by implication, estoppel, reliance, or otherwise, by either Party to the other Party. All rights with respect to any know-how, patent or other intellectual property right rights that are not specifically granted herein are reserved to the owner thereof.

3.6 **Exclusivity** […***…]. Except as otherwise prohibited by Section 3.7.1, on a Subfield-by-Subfield basis, […***…] during the period starting on the Effective Date and ending […***…] as it relates to such Subfield from which the […***…] arose.

3.7 **Exclusivity to** […***…] **and of Wilson Laboratory**.

3.7.1 On a Subfield-by-Subfield basis, […***…] in the applicable Subfield for a period of […***…] from the date […***…] as it relates to the relevant Subfield.

3.7.2 For a period of […***…] from the date of final receipt by Penn of […***…], the Wilson Laboratory shall not […***…], provided that for purposes of this Section 3.7, the Wilson Laboratory does not include […***…] that are part of the Wilson Laboratory. If Licensee […***…] prior to the expiration of such […***…] period, then the foregoing restriction on the Wilson Laboratory shall extend for […***…].

ARTICLE 4
FINANCIAL PROVISIONS

4.1 **Issue Fee.** On the Effective Date, Licensee will pay to Penn a one-time, non-refundable payment of […***…]. Such payment will be made by wire transfer of immediately available funds into the account specified in Section 4.5.

4.2 **Milestone Payments.**

4.2.1 **Development Milestones**.

(a) As additional consideration for the License, Licensee will pay Penn the following milestone payments (each, a "**Development Milestone Payment**") upon the achievement of […***…] (each, a "**Development Milestone**"), whether achieved by Licensee or an Affiliate or Sublicensee. Licensee shall promptly notify Penn in writing of the achievement of any such Development Milestone and Licensee shall pay Penn in full the corresponding Development Milestone Payment within […***…] of such achievement. For clarity, each Development Milestone Payment is non-refundable, is not an advance against royalties due to Penn or any other amounts due to Penn.

Development Milestone	**One-Time Milestone Payment (in U.S. dollars)**
[…***…]	$[…***…]
[…***…]	$[…***…]
[…***…]	$[…***…]
[…***…]	$[…***…]
[…***…]	$[…***…]
Total	**$5,000,000**

(b) Each time a Development Milestone is achieved, then any other Development Milestone Payments with respect to earlier Development Milestones that have not yet been paid will be due and payable together with the Development Milestone Payment for the Development Milestone that is actually achieved; provided, however, that if there is a dispute over whether the "[…***…]" Development Milestone has been achieved, such Development Milestone shall be paid by Licensee no later than […***…].

(c) For clarity, Development Milestone Payments are due and payable on Licensed Product and on products that, upon FDA approval, would become Licensed Product, and for further clarity, the maximum Development Milestone Payments payable by Licensee under this Agreement is $[…***…].

(d) Each Development Milestone in the Table above will be payable […***…], provided that, if a […***…] at any point […***…], then […***…] provided that […***…] would remain […***…].

4.2.2 **Commercial Milestone Payments**.

(a) As additional consideration for the License, Licensee will pay Penn the following commercial milestone payments (each, a "**Commercial Milestone Payment**") upon the achievement of the corresponding milestone (each, a "**Commercial Milestone**"), whether achieved by Licensee or an Affiliate or Sublicensee, or a combination of Licensee, Affiliate or Sublicensee, when aggregate worldwide Net Sales of a Licensed Product in […***…] first reaches the respective

thresholds indicated below. Licensee shall promptly notify Penn in writing of the achievement of any such Commercial Milestone and Licensee shall pay Penn in full the corresponding Commercial Milestone Payment within […***…] of such achievement. For clarity, each Commercial Milestone Payment is non-refundable, is not an advance against royalties due to Penn or any other amounts due to Penn.

Commercial Milestone Event […***…]	[…***…] **Milestone Payment (U.S. dollars)**
Worldwide annual Net Sales of royalty bearing Licensed Product first exceeding $[…***…]	$[…***…]
Worldwide annual Net Sales of royalty bearing Licensed Product first exceeding $[…***…]	$[…***…]
Worldwide annual Net Sales of royalty bearing Licensed Product first exceeding $[…***…]	$[…***…]

(b) For clarity, the foregoing Commercial Milestone Payments shall be due […***…].

4.3 **Royalties**.

4.3.1 **Royalty**. As further consideration for the License, on a Licensed Product-by-Licensed Product and country-by-country basis during the Royalty Period Licensee shall pay to Penn a non-refundable, non-creditable royalty on all Net Sales of such Licensed Product in such country ("**Royalty**") as set forth below:

Annual Worldwide Net Sales	**Royalty Rate**
Less than $[…***…]	[…***…]%
Greater than or equal to $[…***…]and less than or equal to $[…***…]	[…***…]%
Greater than $[…***…]	[…***…]%

4.3.2 **Royalty Period**. Licensee's obligations to pay Penn the Royalty will continue on a country-by country and Licensed Product-by-Licensed Product basis from the date of the First Commercial Sale of such Licensed Product in a country until the later of (a) expiration of the last Valid Claim within the Penn Patent Rights in the country in which such Licensed Product is made, used or sold and (b) the expiration of the data exclusivity term (i) for such Licensed Product granted upon receipt of the applicable Regulatory Approval in such country or (ii) resulting from orphan drug status, in each case of (i) and (ii), conferred by the applicable Regulatory Authority in such country with respect to such Licensed Product (such period, the "**Royalty Period**"). In the event that all Valid Claims within the Penn Patent Rights in the relevant country have expired such that the applicable Royalty Period is as defined in Section (b) of the definition of Royalty Period, the royalty rate payable under this Section 4.3 to Penn for Net Sales in such country will automatically be reduced by […***…].

4.3.3 **Royalty Reductions**.

(a) Notwithstanding anything in this Section 4.3, in the event that Penn or Licensee receives a request for a Compulsory License anywhere in the world, it shall promptly notify the other Party. If any Third Party obtains a Compulsory License in any country, then Penn or Licensee (whoever has first notice) shall promptly notify the other Party. Thereafter, as of the date the Third Party obtained such Compulsory License in such country, the royalty rate payable under this Section 4.3 to Penn for Net Sales in such country will be adjusted to equal any lower royalty rate granted to such Third Party for such country with respect to the Sales of such Licensed Product therein.

(b) Third Party Licenses.

(i) If after the Effective Date Licensee determines upon the advice of outside intellectual property counsel that a license to Patent Rights from a Third Party is reasonably necessary to research (solely with respect to manufacturing), develop, make, have made, use, sell, offer for sale, commercialize or import a Licensed Product, Licensee may obtain such a Third Party license to such Patent Rights. For clarity, the foregoing does not include the Patent Rights licensed under the Existing REGENXBIO Agreements.

(ii) Licensee may deduct from any royalty payments due to Penn under Section 4.3.1 of this Agreement an amount equal to: (1) […***…], and (2) […***…] (the "**Anti-Stacking Percentage**") of any Royalty paid by Licensee to a Third Party on sales of a particular Licensed Product in a particular country during a […***…] under (a) a Third Party license obtained by Licensee pursuant to Section 4.3.3(b)(i), or (b) […***…]; provided that in no event will the deductions under this Section 4.3.3(b) reduce the Royalty payable in respect of Net Sales of such Licensed Product in such country by more than […***…] (the "**Maximum Anti-Stacking Reduction**") of the Royalty as set forth in Section 4.3.1 above; provided, however, that such excess reductions may be carried forward into future payment periods if excluded by such Maximum Anti-Stacking Reduction percentage.

(iii) Within […***…] days after the end of […***…], Penn shall disclose to Licensee all amounts received by Penn […***…] (the "[…***…] **Adjustment**"). If Penn does not disclose the […***…] Adjustment to Licensee within such […***…] period, Licensee may estimate the […***…] Adjustment applicable to such […***…] and apply such estimated REGENXBIO Adjustment to the calculations of Royalties for the relevant […***…]. The Parties will adjust Royalty calculations for the next subsequent […***…] as necessary to reflect the difference between the actual […***…] Adjustment and the estimated […***…] Adjustment.

4.3.4 **Calculations**. Licensee must pay Royalties owed to Penn on a Calendar Quarter basis on or before the following dates:

(a) […***…] for any Sales that took place on or before […***…]; (b)[…***…] for any Sales that took place on or before […***…];

(c) […***…] for any Sales that took place on or before […***…]; and

(d) […***…] for any Sales that took place on or before […***…].

4.4 **Penn Sublicense Income**.

4.4.1 Licensee will pay to Penn the following percentage of Sublicense Income ("**Penn Sublicense Income**") received by Licensee, on a Subfield-by-Subfield basis:

Stage at which Sublicense is Granted by Licensee for a specified Subfield	**% of Sublicense Income Payable to Penn**
[…***…]	[…***…]%
[…***…]	[…***…]%
[…***…]	[…***…]%

4.4.2 Licensee will make such payment to Penn on or before the following dates:

(a) […***…] for any Sublicense Income received by Licensee on or before […***…];

(b) […***…] for any Sublicense Income received by Licensee on or before […***…];

(c) […***…] for any Sublicense Income received by Licensee on or before […***…]; and

(d) […***…] for any Sublicense Income received by Licensee on or before […***…].

4.5 **Mode of Payment and Currency**. All payments to Penn hereunder shall be made by deposit of USD in the requisite amount to the "The Trustees of the University of Pennsylvania" and will be made by delivery to any one of the following:

For funding of the performance of the Research Program by Penn:

By ACH/Wire:
[…***…]
[…***…]
[…***…]
[…***…]
[…***…]
[…***…]

For all other payments to Penn under this Agreement:

By ACH/Wire:	**By Check (direct mail):**	**By Check (lockbox):**
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…] […***…]	[…***…][…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	[…***…]
[…***…]	[…***…]	

Payments under this Agreement shall be made in USD. All Royalties payable shall be calculated first in the currency of the jurisdiction in which payment was made, and if not in the United States, then converted into USD. The exchange rate for such conversion shall be the average of the rate quoted in The Wall Street Journal for […***…] for such Royalty payment made.

4.6 **Royalty and Penn Sublicense Income Reports**. Within […***…] days after the end of each […***…], Licensee shall deliver to Penn a report ("**Financial Report**") setting out all details necessary to calculate the Royalty and Penn Sublicense Income due under this Article 4 for such […***…], including:

4.6.1 Number of each Licensed Product Sold by Licensee, its Affiliates and Sublicensees in each country, the corresponding name of each such Licensed Product;

4.6.2 Gross sales, Net Sales of each Licensed Product made by Licensee, its Affiliates and Sublicensees;

4.6.3 Royalties;

4.6.4 Sublicense Income and the calculation of Penn Sublicense Income;

4.6.5 The method and currency exchange rates (if any) used to calculate the Royalties and Penn Sublicense Income;

4.6.6 A specification of all deductions and their dollar value that were taken to calculate Net Sales;

4.6.7 A list of all countries in which Licensed Product is being manufactured (on a product by product basis); and

4.6.8 Date of First Commercial Sale in the United States (this need only be reported in the first royalty report following such First Commercial Sale in the United States).

Each Financial Report shall be substantially in the form of the sample report attached hereto as Exhibit E.

4.7 **Late Payments**. In addition to any other remedies available to Penn, including the right to terminate this Agreement, any failure by Licensee to make an undisputed (in good faith) payment within […***…] after the date when due shall obligate Licensee to pay computed interest, the interest period commencing on the due date and ending on the actual payment date, to Penn at a rate per annum equal to […***…], or the highest rate allowed by Law, whichever is lower.

4.8 **Accounting**. Each Party shall calculate all amounts, and perform other accounting procedures required, under this Agreement and applicable to it in accordance with GAAP.

4.9 **Books and Records**.

4.9.1 Licensee will keep accurate books and records of all Licensed Products developed, manufactured, used or sold and all Sublicenses, collaboration agreements and joint venture agreements entered into by Licensee that involve Penn Patent Rights. Licensee

will preserve these books and records for at least […***…] from the date of the Financial Report to which they pertain. Upon reasonable notice and at mutually agreeable times, key personnel, books and records will be made reasonably available and will be open to interview or examination (as applicable) by representatives or agents of Penn during regular office hours solely to determine their accuracy and assess Licensee's compliance with the terms of this Agreement, provided that Licensee shall not have an obligation to provide access more than […***…] in any given […***…] and not more frequently than […***…] with respect to specific records or with respect to interviewing personnel regarding any specific period of time.

4.9.2 Penn will keep accurate books and records of all work performed under the Research Program. Penn will preserve these books and records for at least […***…] from the date to which they pertain. Upon reasonable notice and at mutually agreeable times, key personnel, books and records will be made reasonably available and will be open to interview or examination (as applicable) by representatives or agents of Licensee during regular office hours solely to determine their accuracy and assess Penn's compliance with the terms of this Agreement, provided that Penn shall not have an obligation to provide access more than […***…] in any given […***…] and not more frequently than […***…] with respect to records covering any specific period of time or with respect to interviewing personnel regarding any specific period of time. […***…] will be responsible for any and all out-of-pocket costs incurred by […***…] associated with such interviews or examinations.

4.10 **Audits**.

4.10.1 In addition to the right of Penn to examine the books and records and interview key personnel as provided in Section 4.9 above, Penn, […***…] cost, through an independent auditor reasonably acceptable to Licensee (and who has executed an appropriate confidentiality agreement reasonably acceptable to Licensee that requires the auditor to keep any information learned by it confidential except as needed to report its audit conclusions to Penn), may inspect and audit only the relevant records of Licensee pertaining to the calculation of any Milestones, Royalties and Penn Sublicense Income due to Penn under this Agreement. Licensee shall provide such auditors with reasonable access to the records during reasonable business hours and at mutually agreed upon times. Such access need not be given to any such set of records more often than […***…], not more frequently than […***…] with respect to records covering any specific period of time and not more than […***…] after the date of any report to be audited. Penn shall provide Licensee with written notice of its election to inspect and audit the records related to the Milestones, Royalties and Penn Sublicense Income due hereunder not less than […***…] prior to the proposed date of review of Licensee's records by Penn's auditors. Should the auditor find any underpayment of Milestones, Royalties or Penn Sublicense Income by Licensee, Licensee shall (a) promptly pay Penn the amount of such underpayment; (b) shall reimburse Penn for the cost of the audit, if such underpayment equals or exceeds […***…] of the total Milestones, Royalties and Penn Sublicense Income paid during the time period audited; and (c) provide such auditors with an audit right exercisable within […***…] after Penn receives the audit report. If the auditor finds overpayment by Licensee, then Licensee shall have the right to deduct the overpayment from any future Milestones, Royalties or Penn Sublicense Income due to Penn by Licensee or, if no such future Milestones, Royalties or Penn Sublicense Income are payable, then Penn shall refund the overpayment to Licensee

within […***…] after Penn receives the audit report. Licensee may designate competitively sensitive information which such auditor may see and review but which it may not disclose to Penn; provided, however, that such designation shall not restrict the auditor's investigation or conclusions.

4.10.2 In addition to the right of Licensee to examine the books and records and interview key personnel as provided in Section 4.9 above, Licensee, […***…] cost, through an independent auditor reasonably acceptable to Penn (and who has executed an appropriate confidentiality agreement reasonably acceptable to Penn that requires the auditor to keep any information learned by it confidential except as needed to report its audit conclusions to Licensee), may inspect and audit only the relevant records of Penn pertaining to the expenses incurred by and reduction of Royalties due to Penn under this Agreement. Penn shall provide such auditors with reasonable access to the records during reasonable business hours at mutually agreed upon times. Such access need not be given to any such set of records more often than […***…], not more frequently than […***…] with respect to records covering any specific period of time and not more than […***…] after the date of any report to be audited. Licensee shall provide Penn with written notice of its election to inspect and audit such records not less than […***…] prior to the proposed date of review of Penn's records by Licensee's auditors. Should the auditor find any over reporting of expenses or underreporting of reduction of Royalties then, Penn will issue to Licensee a credit against future payments due or a refund, in each case, in the amount of such overpayment, as selected by Licensee; provided, however, if the Research Term has expired, then such overpaid amounts shall be reimbursed to Licensee. If the auditor finds underpayment by Licensee to Penn, then Licensee shall pay the difference between the underpayment and the actual payment made for the relevant time period to Penn within […***…] after Licensee receives the audit report. Penn may designate competitively sensitive information which such auditor may see and review but which it may not disclose to Licensee; provided, however, that such designation shall not restrict the auditor's investigation or conclusions.

4.11 **Withholdings**.

4.11.1 Licensee may withhold from payments due to Penn amounts for payment of any withholding tax that is required by Law to be paid to any taxing authority with respect to such payments. Licensee will provide Penn all relevant documents and correspondence, and will also provide to Penn any other cooperation or assistance on a reasonable basis as may be necessary to enable Penn to claim exemption from such withholding taxes and to receive a refund of such withholding tax or claim a foreign tax credit. Licensee will give proper evidence from time to time as to the payment of any such tax. The Parties will cooperate with each other in seeking deductions under any double taxation or other similar treaty or agreement from time to time in force. Such cooperation may include Licensee making payments from a single source in the U.S., where possible.

4.11.2 Apart from any such permitted withholding and those deductions expressly included in the definition of Net Sales, the amounts payable hereunder will not be reduced on account of any taxes, charges, duties or other levies.

ARTICLE 5
CLINICAL DEVELOPMENT, REGULATORY AFFAIRS; COMMERCIALIZATION

5.1 **Clinical Development**. Licensee will have sole responsibility for and sole decision making over the clinical development of the Licensed Products arising from the Research Program or otherwise developed by or on behalf of Licensee or any of its Sublicensees, in each case, in the Field.

5.2 **Commercialization**. Licensee will have sole responsibility for and sole decision making over all commercialization activities of the Licensed Products arising from the Research Program or otherwise developed by or on behalf of Licensee or any of its Sublicensees, in each case, in the Field, and will be solely responsible for the associated costs of such commercialization activities.

5.3 **Manufacturing**. Except as otherwise provided in this Agreement or in the Research Plan, Licensee will have sole responsibility for and sole decision making authority over all manufacturing activities and associated costs for the production of vectors to support IND-enabling studies, clinical development (including GMP manufacturing for clinical trials) and commercialization of the Licensed Products arising from the Research Program or otherwise developed by or on behalf of Licensee or any of its Sublicensees, in each case, in the Field. Penn will have sole responsibility and sole decision making authority over manufacturing activities for research-grade vectors to support preclinical studies.

5.4 **Regulatory**.

5.4.1 Licensee will have sole responsibility for and sole decision making over all regulatory activities for the Licensed Products arising from the Research Program or otherwise developed by or on behalf of Licensee or any of its Sublicensees, in each case, in the Field. Licensee will have the sole right to conduct all communications with Regulatory Authorities, including all meetings, conferences and discussions (including advisory committee meetings), with regard to Licensed Products arising from the Research Program or otherwise developed by or on behalf of Licensee or any of its Sublicensees, in each case, in the Field. Licensee will lead and have sole control over preparing and submitting all regulatory filings related to the Licensed Products arising from the Research Program or otherwise developed by or on behalf of Licensee or any of its Sublicensees, in each case, in the Field, including all applications for Regulatory Approval, provided, however, that Licensee shall provide Penn with copies of all such applications prior to submission. Licensee will own solely any and all applications for Regulatory Approvals (including INDs), Regulatory Approvals, and other regulatory filings related to the Licensed Product arising from the Research Program or otherwise developed by or on behalf of Licensee or any of its Sublicensees, in each case, in the Field which will be held in the name of Licensee or its designees.

5.4.2 Penn shall have the right to participate as an observer in all material meetings, conferences, and discussions by Licensee with Regulatory Authorities pertaining to Development of the corresponding Licensed Products and Regulatory Approvals, provided that such right shall expire with respect to each Licensed Product upon the submission of an IND for such Product (the period of time during which Penn may participate in such meetings, conferences and discussions, the "**Observer Period**"). During the Observer Period, Licensee shall provide Penn with reasonable advance notice of all such meetings and other contact and shall provide advance copies of all related

documents and other relevant information relating to such meetings or other contact, including any documents that Licensee proposes to submit to any Regulatory Authority. During any meetings with Regulatory Authorities, Penn shall not initiate any interactions with any Regulatory Authority and will only communicate with a Regulatory Authority if (a) such Regulatory Authority asks a question of Penn or (b) Licensee instructs Penn to communicate with such Regulatory Authority.

5.4.3 Penn will, through the Wilson Laboratory, cooperate with any reasonable request from Licensee with respect to obtaining any Regulatory Approval for a Licensed Product arising from the Research Program in the Field including, at […***…] cost: (a) making its faculty, employees, consultants and other staff of the Wilson Laboratory available to assist Licensee upon reasonable notice, (b) responding to questions raised by Licensee, and (c) making available to Licensee, in the form requested by Licensee, information related to the Licensed Products that is necessary to prepare, file, obtain and maintain any Regulatory Approval for such Licensed Product arising from the Research Program in the Field.

5.5 **General Diligence**. Licensee will use Commercially Reasonable Efforts to clinically develop, obtain Regulatory Approval and commercialize at least one Licensed Product in each of the three (3) Subfields within the Field in the Major Markets.

5.6 **Progress Reports**.

5.6.1 After performance of the Research Plan by Penn but prior to the First Commercial Sale of a Licensed Product in the respective Subfield, Licensee on […***…], but in no event later than […***…], shall submit to Penn a progress report (each, a "**Progress Report**") covering Licensee's (and any Affiliates' and Sublicensees') activities related to the development of all Licensed Products in each Subfield and the obtaining of Governmental Approvals necessary for commercialization of Licensed Products.

5.6.2 Each Progress Report must include all of the following […***…]:

(a) Summary of work completed;

(b) Summary of work in progress;

(c) Current schedule of anticipated events or milestones;

(d) An updated SDR report listing of any and all Sublicenses granted by Licensee; and

(e) The names and addresses of all Sublicensees, and a current and valid phone number and e-mail address for a principal point of contact at each such Sublicensee who is responsible for administering the Sublicensee.

ARTICLE 6
INTELLECTUAL PROPERTY

6.1 **Ownership**.

6.1.1 Penn will retain all right, title and interest in and to the Penn Intellectual Property and any patents, copyrights, software and tangible research materials and other intellectual property related thereto, subject to the rights and licenses of Licensee set forth herein. Licensee will retain all right, title and interest in and to all Know-How, patent rights and other intellectual property rights conceived, developed or created by employees or consultants of Licensee under this Agreement or otherwise; provided, however, that notwithstanding the foregoing, Licensee shall assign and hereby assigns, transfers and conveys all right, title and interest in any Research Program Patent Right containing any claim or claims that were invented (solely or jointly) by employees or consultants of Licensee under this Agreement to Penn, including all intellectual property rights thereto ("**Joint Research Program Patent Rights**").

6.1.2 Improvements. Notwithstanding Section 6.1.1, any Improvements conceived, developed or created solely by employees or consultants of Licensee shall be jointly owned by the Parties, and Licensee shall assign and hereby assigns, transfers and conveys a one-half, undivided, right, title and interest in such Improvements to Penn, including all intellectual property rights thereto. Subject to the rights and licenses of Licensee set forth herein, each Party is entitled to practice, use and otherwise exploit all Improvements and Improvement Patent Rights for all purposes on a worldwide basis without consent of and without a duty of accounting to the other Party, and each Party will grant and hereby does grant such consents and will execute documents as necessary to accomplish the foregoing.

6.1.3 Cooperation. Upon the reasonable request of Penn, Licensee shall execute and deliver any and all instruments and documents and take such other acts as may be necessary or desirable to document the assignment and transfer described in Sections 6.1.1 and 6.1.2 or to enable Penn to secure its rights in the Joint Research Program Patent Rights, Improvements and Improvement Patent Rights, and other intellectual property rights in Joint Research Program Patent Rights, Improvements in any and all jurisdictions. Without limiting the foregoing, each Party shall disclose to the other Party all pertinent information and data with respect thereto and shall execute all applications, specifications, oaths and all other instruments which Penn reasonably deems necessary in order to apply for and obtain such rights and in order to assign and convey to Penn (a) sole right, title and interest in and to such Joint Research Program Patent Rights and (b) joint right, title and interest in and to such Improvement and all intellectual property rights thereto.

6.1.4 Non-Exclusive License. Subject to the terms and conditions of this Agreement, including Section 3.1.1, Penn hereby grants Licensee a non-exclusive, perpetual, fully paid-up, royalty-free, irrevocable, fully sublicenseable (through multiple tiers) license under the Joint Research Program Patent Rights to practice, use and otherwise exploit such Joint Research Program Patent Right throughout the world in all fields (including the Field) without consent of and without a duty of accounting to Penn. Penn will execute documents as necessary to accomplish the foregoing. Notwithstanding the foregoing, the

license grant within the Field for such Joint Research Program Patent Rights shall at all times during the Royalty Period be royalty-bearing.

6.2 **Patent Filing Prosecution and Maintenance**.

6.2.1 Penn Patent Rights will be held in the name of Penn; provided that […***…]. Penn Patent Rights shall be obtained with counsel selected by Penn and reasonably acceptable to Licensee ("**Patent Counsel**"). Upon […***…] written request, […***…] shall file, prosecute and maintain in accordance with the terms of this Agreement one or more patent applications claiming solely one or more Licensed Products. […***…] shall control all actions and decisions with respect to the filing, prosecution and maintenance of Penn Patent Rights and will […***…] will instruct Patent Counsel to copy […***…] on all correspondence related to Penn Patent Rights (including copies of each patent application, office action, response to office action, request for terminal disclaimer, and request for reissue or reexamination of any patent or patent application) and to interact with Licensee with respect to the preparation, filing, prosecution and maintenance of Penn Patent Rights. […***…] has the right to take action to preserve rights and minimize cost whether or not […***…] has commented, and will use reasonable efforts to not allow any Penn Patent Right for which Licensee is licensed and is underwriting the costs to lapse or become abandoned without Licensee's written authorization under this Agreement, except for filing of continuations, divisionals, or the like that substitute for the lapsed application, provided that, and without limiting Section 6.2.3, […***…] shall have no requirement to file, prosecute, or maintain Penn Patent Rights if Licensee is not current with the Patent Cost obligations as set forth in this Agreement and Licensee does not cure any lapse with respect Patent Cost obligations within […***…] of receiving written notice thereof. For the purposes of this Agreement, "maintenance" of the Penn Patent Rights includes interference proceedings, re-examinations, inter parties patent review proceedings before the USPTO or a similar patent administration outside the US (including opposition proceedings at the EPO). For further clarity, validity challenges raised in infringement litigation will be handled per Section 6.4. In the event that […***…] is being enforced against an infringer in a suit […***…] and such […***…] is also subject to an interference proceeding, re-examination, inter parties patent review proceeding before the USPTO or a similar patent administration outside the US (including an opposition proceeding at the EPO) at the same time as the suit, then […***…]; provided however, that such action […***…].

6.2.2 […***…] has the right to request a country filing via a written request to […***…] prior to the deadline set by the patent office in the territory in which filing is to take place ("**Prosecution Request**"). […***…] will use Commercially Reasonable Efforts to keep […***…] reasonably informed of the foreign patent application filing deadlines for jurisdictions identified by […***…]. The absence of a given Prosecution Request by such deadline will be considered an election not to secure the Patent Rights associated with the specific phase of patent prosecution in such territory, and such patent application(s) and patent(s) ("**Carve-Out Patent Rights**") will not be part of Penn Patent Rights and therefore not subject to this Agreement, including the License, and […***…] will have no further rights or license to them.

6.2.3 Licensee may terminate its obligations with respect to any given Penn Patent Right in any or all designated countries upon […***…] written notice to Penn, at which time Licensee will have no obligation to pay patent costs in connection therewith. Penn will use its best

efforts to curtail patent costs if the Parties agree to cease prosecuting such Patent Rights. Penn may continue prosecution and/or maintenance of such applications or patents at its sole discretion and expense; provided, however, that such applications (s) and patent(s) will be Carve-Out Patent Rights and will not be part of Penn Patent Rights and therefore not subject to this Agreement, including the License, and Licensee will have no further rights or license to them; provided, for clarity, that Licensee shall continue to hold any joint ownership interest in the Improvement Patent Rights in which Licensee has such a joint ownership interest.

6.2.4 In the event that Penn elects not to file, prosecute or maintain (or continue to do so) any Research Program Patent Rights or Improvement Patent Rights, Penn will notify Licensee at least […***…] before any such Patent Right would become abandoned or forfeited, and Licensee shall have the right (but not the obligation), at Licensee's sole discretion, and sole responsibility for all applicable costs, to file, prosecute and maintain such Patent Right in the name of Penn (which right will include the right to file additional Patent Rights claiming priority to such Patent Right); provided, however, that Licensee shall have no step-in right with respect to such Research Program Patent Rights (other than Product Specific Patent Rights) in the event that Penn notifies Licensee that it did not wish to pursue such Research Program Patent Right (other than Product Specific Patent Rights) for strategic reasons.

6.2.5 Patent Term Extensions. Penn will have the exclusive right to decide whether to elect and file for patent term restoration or extension, supplemental protection certificate or any of their equivalents with respect to Background Patent Rights and Research Program Patents in the Territory, the Parties will mutually decide whether to elect and file for patent term restoration or extension, supplemental protection certificate or any of their equivalents with respect to Improvement Patent Rights in the Territory, and Licensee will have the exclusive right to decide whether to elect and file for patent term restoration or extension, supplemental protection certificate or any of their equivalents with respect to Product Specific Patent Rights in the Territory and shall direct Penn regarding such filings with respect to Product Specific Patent Rights. Penn will cooperate and follow all instructions received from Licensee with respect to electing and filing for such restoration or extension, supplemental protection certificate or the equivalent of any of the foregoing for Product Specific Patent Rights. For clarity, only Licensee through directing Penn (as provided herein) will have the right to seek or obtain any patent term restoration or extension, supplemental protection certificate or any of their equivalents based on a Licensed Product for such Product Specific Patent Rights.

6.3 **Patent Costs**.

6.3.1 Licensee will reimburse Penn for all documented out-of pocket costs incurred on or after the Effective Date by Penn for the filing, prosecution and maintenance of Penn Patent Rights, including attorney fees, expenses, official and filing fees ("**Patent Costs**") within […***…] of receipt of a reasonably detailed invoice for such costs; provided, however, that Licensee's obligation with respect to Patent Costs relating to Background Patent Rights shall commence only after such Background Patent Right is included in an amendment to this Agreement and shall be an obligation on Licensee from the amendment effective date onward and solely with respect to Patent Costs incurred on or after such date. In the event that Penn licenses any Penn Patent Right in a field separate from the Field to a Third Party, Penn will use Commercially Reasonable Efforts to obtain

from such Third Party a pro-rata portion of the relevant historical costs previously incurred (which amount will be offset from Licensee's Patent Costs obligation), and upon execution of such Third Party license agreement, Licensee's ongoing Patent Cost obligation will be a pro-rata portion of such Patent Costs.

6.3.2 At any time, at Penn's request, Licensee shall pay in advance the Patent Counsel's estimated costs for undertaking material patent actions before Penn authorizes the Patent Counsel to proceed ("**Advance Payment**").

6.4 **Infringement**.

6.4.1 If either Party believes that an infringement by a Third Party with respect to any Penn Patent Right is occurring or may potentially occur, the knowledgeable Party will provide the other Party with (a) written notice of such infringement or potential infringement and (b) evidence of such infringement or potential infringement (the "**Infringement Notice**").

6.4.2 As between the Parties, […***…] will have the first right, under its sole control and at […***…] expense, to institute suit against an infringer asserting patent infringement of any […***…]. If required by law, […***…] will permit any action under this Section 6.4.2 to be brought in its name, including being joined as a party-plaintiff, provided that […***…] will reimburse […***…] for its documented out-of-pocket costs incurred in connection with such action. […***…] will have the right to settle any such action with […***…] consent (such consent not to be unreasonably withheld or delayed). For clarity, […***…]. In the event that […***…] provides an Infringement Notice to Licensee regarding an infringement of […***…] in the Field and […***…] does not within […***…] of receipt of such notice abate the infringement or file suit to enforce such Product Specific Patent Right or Improvement Patent Right, then […***…] shall have the right to take any action reasonably appropriate to enforce such Product Specific Patent Right or Improvement Patent Right.

6.4.3 As between the Parties, […***…] will have the first right, under its sole control and at […***…] expense, to institute suit against an infringer asserting patent infringement of any […***…] other than […***…] (which are addressed by Section 6.4.2), in the Field. In the event that […***…] provides an Infringement Notice to […***…] regarding an infringement of such […***…] in the Field and […***…] does not within […***…] of receipt of such notice abate the infringement or file suit to enforce such […***…], then […***…] shall have the right to take any action reasonably appropriate to enforce such […***…]; provided, however, that […***…] shall have no enforcement step-in right with respect to such […***…] in the event that […***…] notifies […***…] that it did not wish to pursue such […***…] for strategic reasons.

6.4.4 As between the Parties, […***…] will have the sole and exclusive right, under its sole control and at […***…] expense, to institute suit against an infringer asserting patent infringement of any […***…] outside the Field. […***…] will have the right to settle any such action without […***…] consent other than pursuant to a settlement, consent judgment, or other voluntary final disposition which imposes obligations on […***…] beyond those set forth herein, or which invalidates or restricts […***…] which will require the prior written consent of […***…] (such consent not to be unreasonably withheld or delayed). Except as otherwise expressly set forth above, any enforcement of […***…] and […***…] will be subject to further agreement of the Parties.

6.4.5 Any recovery or settlement received in connection with any suit will first be […***…] to cover […***…] and next shall be paid to […***…] to cover […***…]. Any remaining recoveries shall be allocated as follows:

(a) for any suit that is initiated by […***…] with respect to infringement of any Research Program Patent Right in the Field, Penn shall receive […***…] of the recovery (other than […***…]) and the Licensee shall receive […***…];

(b) for any suit that is initiated by […***…] with respect to infringement of any Background Patent Right or Research Program Patent Right, Penn shall receive […***…] of the recovery; and

(c) for any portion of the recovery or settlement […***…], (a) for a suit that is initiated by […***…] and […***…] voluntarily joins such suit, then […***…], and (b) for any suit that is initiated by […***…] and […***…] is not a party to the litigation, Penn shall receive […***…] and Licensee shall receive […***…].

6.4.6 Each Party will reasonably cooperate and assist with the other in litigation proceedings instituted hereunder but the Party who initiated the suit shall reimburse the cooperating party for documented out-of-pocket expenses with respect to such cooperation. For clarity, such requirement does not require a Party to join a suit unless otherwise specifically required under this Agreement. If Penn is subjected to third party discovery related to the Research Program Patent Rights or Licensed Products, Licensee will pay Penn's reasonable, documented out-of-pocket expenses with respect to same.

6.5 **Patent Marking**. Licensee shall place in a conspicuous location on any Licensed Product (or its packaging where appropriate and practicable) made or sold under this Agreement a patent notice in accordance with the Laws concerning the marking of patented articles where such Licensed Product is made or sold, as applicable.

ARTICLE 7
CONFIDENTIALITY& PUBLICATION

7.1 **Confidential Information**. Each Party shall use reasonable efforts to limit the disclosure of Confidential Information hereunder to the information that is required to be disclosed pursuant to the terms of this Agreement and that is reasonably necessary for either Party to fulfill its obligations and exercise its rights under this Agreement. Except to the extent expressly authorized by this Agreement or otherwise agreed in writing, the Parties agree that, during the Term and for […***…] thereafter, the receiving Party (the "**Receiving Party**") and its Affiliates will keep confidential and will not publish or otherwise disclose or use for any purpose, other than as necessary to satisfy obligations or exercise rights under this Agreement, any confidential or proprietary information or materials, patentable or otherwise, in any form (written, oral, photographic, electronic, magnetic, or otherwise), including trade secrets, Know-How, inventions or discoveries, proprietary information, formulae, processes, techniques and information relating to the past, present and future marketing, financial, and research and development activities of any product or potential product or useful technology of the Disclosing Party or its Affiliates and the pricing thereof (collectively, "**Confidential Information**"), which is disclosed by or on behalf of such Party (the "**Disclosing Party**") to the Receiving Party or its Affiliates or otherwise received or accessed by a Receiving Party in the course of performing its obligations or exercising its rights under this Agreement.

7.2 **Exceptions to Confidentiality**. "Confidential Information" does not include information that (a) was in the lawful knowledge and possession of the Receiving Party or its Affiliates prior to the time it was disclosed to, or learned by, the Receiving Party or its Affiliates, or was otherwise developed independently by the Receiving Party or its Affiliates, as evidenced by written records kept in the ordinary course of business, or other documentary proof of actual use by the Receiving Party or its Affiliates; (b) was generally available to the public or otherwise part of the public domain at the time of its disclosure to the Receiving Party or its Affiliates, as evidenced by written records of the Receiving Party or its Affiliates; (c) became generally available to the public or otherwise part of the public domain after its disclosure and other than through any act or omission of the Receiving Party or its Affiliates in breach of this Agreement; or (d) was disclosed to the Receiving Party or its Affiliates, other than under an obligation of confidentiality, by a Third Party who had no obligation to the Disclosing Party or its Affiliates not to disclose such information to others. In the event a Party is required to make a disclosure under Law or regulation, the order of a court of competent jurisdiction, or the rules of the U.S. Securities and Exchange Commission (including by reason of any securities offering by Licensee), any stock exchange or listing entity, the Receiving Party shall provide prompt prior written notice to the Disclosing Party and take all reasonable steps (including cooperating with the Disclosing Party in seeking to secure confidential treatment of, or otherwise limit, such Confidential Information required to be disclosed) to limit the extent of the disclosure and obtain confidential treatment for any remaining required disclosure.

7.3 **Penn Intellectual Property**. In order to preserve the patentability of Penn intellectual property and to preserve Penn's publication rights, Licensee shall maintain Penn Patent Rights, Research Results and information provided pursuant to the Research Program (whether oral or written) as confidential and shall not disclose such information to any Third Party until the publication of such information by Penn or until Penn provides Licensee with written verification that all desirable patentable inventions have been protected, whichever occurs sooner.

7.4 **Publications**. Penn shall have the first right to publish, present or otherwise disclose Research Results or other information and material resulting from the Research Program for any purpose. Penn shall furnish the Licensee with a copy of any proposed publication or presentation at least […***…] in advance of the date of such presentation or the submission of said proposed publication in order for Licensee to review and comment on said proposed publication or presentation to (a) determine whether such contains any Licensee Confidential Information and (b) enable Licensee to identify any Penn intellectual property that it wishes Penn to file patent applications on or to seek other intellectual property protection for. If within the […***…] review period (i) Licensee notifies Penn that the Licensee requires deletion from the publication or presentation of Licensee Confidential Information, the Parties will cooperate to modify the disclosure to ensure Licensee Confidential Information is not disclosed or (ii) if Licensee requests that publication or presentation be delayed to allow for patent filings or other intellectual property protection on certain items in the proposed publication or presentation, Penn shall delay the publication or presentation for up to […***…], subject to reasonable extension as mutually agreed upon by the Parties, to allow for the filing of patent applications or other intellectual property protection.

7.5 **Other Permitted Disclosures.** Notwithstanding anything herein to the contrary, either Party may disclose Confidential Information of the other Party to (a) its Affiliates, and to its and their directors, employees, consultants, agents, licensees, sublicensees, collaborators, subcontractors, potential or actual investors, acquirers or merger partners (each a "**Representative**") in each case who have a need to know such Confidential Information, are bound by commercially reasonable

obligations of confidentiality and such Party remains liable for any breach by such Representative of the non-disclosure and restrictions on use set forth in this Agreement and (b) the extent such disclosure is required to file or prosecute patent applications, prosecute or defend litigation, or to submit filings to Regulatory Authorities, provided, however, that in each case in this subsection (b), Licensee shall provide Penn prior written notice of such disclosure.

ARTICLE 8
REPRESENTATIONS, WARRANTIES AND COVENANTS

8.1 **Mutual Representations and Warranties**. Each Party represents and warrants to the other Party that, as of the Effective Date:

8.1.1 such Party is duly organized and validly existing under the Laws of the jurisdiction of its incorporation or organization;

8.1.2 such Party has taken all action necessary to authorize the execution and delivery of this Agreement and the performance of its obligations under this Agreement;

8.1.3 this Agreement is a legal and valid obligation of such Party, binding upon such Party and enforceable against such Party in accordance with the terms of this Agreement, except as enforcement may be limited by applicable bankruptcy, fraudulent conveyance, insolvency, reorganization, moratorium and other laws relating to or affecting creditors' rights generally and by general equitable principles; and

8.1.4 such Party has all right, power and authority to enter into this Agreement, to perform its obligations under this Agreement.

Further, Penn represents to Licensee that, as of the Effective Date, to the knowledge of Dr. James Wilson and the current staff of the Penn Center for Innovation, there are no Patent Rights, Know-How or biological/chemical materials Controlled by Penn and developed in the Wilson Laboratory, other than the Background Patent Rights, Penn Know-How and Penn Materials, that will be used or practiced in the performance of the Research Program as set forth in the Research Plan in Exhibit B.

8.2 **Disclaimer of Representations and Warranties**.

8.2.1 Other than the representations and warranties provided in Section 8.1 above, **NEITHER PENN NOR LICENSEE MAKES ANY REPRESENTATIONS OR WARRANTIES, WHETHER EXPRESS OR IMPLIED, AND PENN AND LICENSEE EACH EXPLICITLY DISCLAIMS ANY REPRESENTATION AND WARRANTY, INCLUDING WITH RESPECT TO ANY ACCURACY, COMPLETENESS, MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, COMMERCIAL UTILITY, NON-INFRINGEMENT OR TITLE FOR THE INTELLECTUAL PROPERTY, PATENT RIGHTS, LICENSE AND ANY LICENSED PRODUCT**.

8.2.2 Furthermore, nothing in this Agreement will be construed as:

(a) A representation or warranty by Penn as to the validity or scope of any Penn Patent Right;

(b) A representation or warranty that anything made, used, sold or otherwise disposed of under the License is or will be free from infringement of patents, copyrights, trademarks or any other forms of intellectual property rights or tangible property rights of Third Parties;

(c) Obligating Penn to bring or prosecute actions or suits against Third Parties for patent, copyright or trademark infringement; and

(d) Conferring by implication, estoppel or otherwise any license or rights under any Patent Rights of Penn other than Penn Patent Rights as defined herein, regardless of whether such Patent Rights are dominant or subordinate to Penn Patent Rights.

8.3 **Covenants of Licensee**.

8.3.1 Licensee and its Affiliates will not, directly or indirectly (including where such is done by a Third Party on behalf of Licensee or its Affiliates, at the urging of Licensee or its Affiliates or with the assistance of the Licensee or its Affiliates) challenge the validity, scope, or enforceability of or otherwise oppose any Penn Patent Right, provided that if any Penn Patent Right is asserted against Licensee or its Affiliate for activities authorized under this Agreement, then such Licensee or its Affiliates is entitled to all and any defenses available to it including challenging the validity or enforceability of such Patent Right. Licensee will comply with all Laws that apply to its activities or obligations under this Agreement. For example, Licensee will comply with applicable United States export laws and regulations. The transfer of certain technical data and commodities may require a license from the applicable agency of the United States government and/or written assurances by Licensee that Licensee will not export data or commodities to certain foreign countries without prior approval of the agency.

8.3.2 Licensee will not grant a security interest in the License or this Agreement.

ARTICLE 9
INDEMNIFICATION; INSURANCE AND LIMITATION OF LIABILITY

9.1 **Indemnification by Licensee**.

9.1.1 Licensee shall defend, indemnify and hold Penn and its respective trustees, officers, faculty, students, employees, contractors and agents (the "**Penn Indemnitees**") harmless from and against any and all liability, damage, loss, cost or expense (including reasonable attorneys' fees), including, without limitation, bodily injury, risk of bodily injury, death and property damage to the extent arising out of Third Party claims or suits related to:

(a) the gross negligence, recklessness or wrongful intentional acts or omissions of Licensee, its Affiliates or Sublicensees and its or their respective directors, officers, employees and agents, in connection with Licensee's performance of its obligations or exercise of its rights under this Agreement;

(b) any breach of this Agreement by Licensee; or

(c) the development, manufacturing or commercialization (including commercial manufacturing, packaging and labeling of Products, and all product liability

losses) of a Licensed Product by or on behalf of Licensee or its Affiliates or Sublicensees; or

(d) any enforcement action or suit brought by Licensee against a Third Party for infringement of Research Program Patent Rights;

provided that Licensee's obligations pursuant to this Section 9.1 shall not apply to the extent such claims or suits result from the gross negligence or willful misconduct of any of Penn Indemnitees.

9.1.2 As a condition to a Penn Indemnitee's right to receive indemnification under this Section 9.1, Penn shall: (a) promptly notify Licensee as soon as it becomes aware of a claim or suit for which indemnification may be sought pursuant hereto; (b) reasonably cooperate, and cause the individual Penn Indemnitees to reasonably cooperate, with Licensee in the defense, settlement or compromise of such claim or suit; and (c) permit the Licensee to control the defense, settlement or compromise of such claim or suit, including the right to select defense counsel. In no event, however, may Licensee compromise or settle any claim or suit in a manner which (i) admits fault or negligence on the part of Penn or any other Penn Indemnitee; (ii) commits Penn or any other Penn Indemnitee to take, or forbear to take, any action, without the prior written consent of Penn, or (iii) grant any rights under the Penn Patent Rights except for Sublicenses permitted under Article 3. Penn shall reasonably cooperate with Licensee and its counsel in the course of the defense of any such suit, claim or demand, such cooperation to include without limitation using reasonable efforts to provide or make available documents, information and witnesses.

9.1.3 Notwithstanding Section 9.1.2 above, in the event that Penn believes in good faith that a bonafide conflict exists between Licensee and Penn or any other Penn Indemnitee with respect to a claim or suit subject to indemnification hereunder, then Penn or any other Penn Indemnitee shall have the right to defend against any such claim or suit itself, including by selecting its own counsel, with any […***…] being paid for by […***…]. […***…].

9.2 **Insurance**.

9.2.1 Licensee, […***…], must insure its activities in connection with the exercise of its rights under this Agreement and obtain, and keep in force and maintain Commercial Form General Liability Insurance (contractual liability included) with limits as follows:

(a) Each occurrence$[…***…]; (b)General aggregate$[…***…] Prior to the commencement of clinical trials, if applicable, involving Licensed Product:

(c) Clinical trials liability insurance$[…***…] Prior to the First Commercial Sale of a Licensed Product:

(d) Products liability insurance$[…***…]

Penn may review periodically the adequacy of the minimum amounts of insurance for each coverage required by this Section 9.2.1, and has the right to require Licensee to adjust the limits in Penn's reasonable discretion but in no event will Licensee be required to increase such limits beyond the limits of insurance carried by similarly-situated companies.

9.2.2 If the above insurance is written on a claims-made form, it shall continue for […***…] following termination or expiration of this Agreement. The insurance shall have a retroactive date of placement prior to or coinciding with the Effective Date of this Agreement.

9.2.3 Licensee expressly understands, however, that the coverages and limits in Section 9.2.1 do not in any way limit Licensee's liability or indemnification obligations. Licensee's insurance will:

(a) Be issued by an insurance carrier with an A.M. Best rating of "A" or better;

(b) Provide for […***…] advance written notice to Penn of any modification;

(c) State that Penn is endorsed as an additional insured with respect to the coverages in Section 9.2.1; and

(d) Include a provision that the coverages will be primary and will not participate with nor will be excess over any valid and collective insurance or program of self insurance carried or maintained by Penn.

9.2.4 Licensee must furnish to Penn with (a) valid certificate of insurance evidencing compliance with all requirements of this Agreement and (b) additional insured endorsements for Licensee's applicable policies naming "The Trustees of the University of Pennsylvania" as an additional insured. Licensee must furnish both documents within […***…] of the Effective Date, up to […***…] thereafter upon Penn's request and at any time there is a material modification in such insurance.

9.3 **LIMITATION OF LIABILITY**. IN NO EVENT SHALL EITHER PARTY OR ANY OF ITS AFFILIATES BE LIABLE TO THE OTHER PARTY OR ANY OF ITS AFFILIATES FOR SPECIAL, INDIRECT, INCIDENTAL, CONSEQUENTIAL OR PUNITIVE DAMAGES, INCLUDING LOSS OF PROFITS, WHETHER IN CONTRACT, WARRANTY, TORT, NEGLIGENCE, STRICT LIABILITY OR OTHERWISE ARISING OUT OF OR RELATING TOTHIS AGREEMENT, THE TRANSACTIONS CONTEMPLATED HEREIN OR ANY BREACH HEREOF. NOTWITHSTANDING THE FOREGOING, NOTHING IN THIS AGREEMENT SHALL LIMIT LICENSEE'S INDEMNIFICATION OBLIGATIONS UNDER SECTION 9.1 ABOVE.

ARTICLE 10
TERM AND TERMINATION

10.1 **Term**. The term of this Agreement (the "**Term**") shall commence on the Effective Date and, unless terminated sooner as provided below, shall continue in full force and effect throughout the term of the Research Program and thereafter on a country-by-country and Licensed Product-by-Licensed Product basis until the expiration of the Royalty Period in such country for such

Licensed Product, whereupon the licenses set forth in Section 3.1.1 and Section 3.1.2 (other than licenses under Research Program Know-How (including the Program Data) and Penn Materials), in each case, in such country for such Licensed Product will become perpetual, irrevocable and fully paid-up for such Subfield.

10.2 **Termination of the Agreement for Convenience**. At any time during the Term, Licensee may, at its convenience, terminate this Agreement, or any Subfields within the Field, upon providing at least […***…] prior written notice to Penn of such intention to terminate.

10.3 **Termination For Cause**.

10.3.1 If Licensee fails to fulfill its obligations under Section 5.5 (i.e. use Commercially Reasonable Efforts to develop and commercialize a Licensed Product in each Subfield), Penn may provide written notice to Licensee of such failure. If Licensee fails to address such failure to the reasonable satisfaction of Penn within […***…] of receiving such written notice, Penn may terminate this Agreement with respect to the relevant Subfield(s) upon written notice to Licensee.

10.3.2 If either Party materially breaches any of its material obligations under this Agreement, the non-breaching Party may give to the breaching Party a written notice specifying the nature of the default, requiring the breaching Party to cure such breach, and stating the non-breaching Party's intention to terminate this Agreement. If such breach is not cured within […***…] of such notice, such termination shall become effective with respect to the relevant Subfield(s) upon a notice of termination by the terminating Party thereafter.

10.3.3 In addition to all other remedies available to it, Penn may terminate this Agreement with respect to the relevant Subfield(s), upon written notice, subject to the cure provisions set forth in Section 10.3.2, upon a breach of Section 8.3, Covenants of Licensee.

10.3.4 Either Party may terminate this Agreement, upon written notice, with immediate effect if, at any time, the other Party is unable to pay its debts, including any debts related to exclusive sublicensees, when they come due, or files in any court or agency pursuant to any statute or regulation of any state, country or jurisdiction, a petition in bankruptcy or insolvency or for reorganization or for an arrangement or for the appointment of a receiver or trustee of such Party or of its assets, or if such Party proposes a written agreement of composition or extension of its debts, or if such Party is served with an involuntary petition against it, filed in any insolvency proceeding, and such petition is not dismissed within […***…] after the filing thereof, or if such Party proposes or is a party to any dissolution or liquidation, or if such Party makes an assignment for the benefit of its creditors of all or substantially all its assets (in each case, "**Bankruptcy Action**").

10.4 **Effects of Termination**.

10.4.1 Notwithstanding the termination of this Agreement, the following provisions shall survive: Sections 2.3.3, 6.1.2, 6.1.3, 6.1.4, 6.2 (solely with respect to Improvement Patent Rights), 6.3 (solely with respect to Improvement Patent Rights), 8.2, 10.1 and 10.4 and Articles 1, 4, 7, 9 and 11. Further, if this Agreement is terminated by Licensee due to a material breach by Penn under Section 10.3.2, the provisions of Sections 2.2.3, 3.6 and 3.7.1 shall survive, and Section 3.7.2 shall survive for a period of […***…] after such

termination notwithstanding the time period set forth therein. All other provisions set forth in this Agreement shall terminate upon termination of this Agreement.

10.4.2 Notwithstanding the expiration of this Agreement, the following provisions shall survive: Sections 2.2.3, 2.3.3, 3.2, 3.3, 3.6, 3.7.1, 3.7.2, 6.1, 6.2 (solely with respect to Improvement Patent Rights), 6.3 (solely with respect to Improvement Patent Rights), 8.2, 10.1 and 10.4 and Articles 1, 4, 7, 9 and 11. All other provisions set forth in this Agreement shall terminate upon expiration of this Agreement.

10.4.3 Termination or expiration of this Agreement shall not relieve the Parties of any obligation or liability that, at the time of termination or expiration, has already accrued hereunder, or which is attributable to a period prior to the effective date of such termination or expiration. Termination or expiration of this Agreement shall not preclude either Party from pursuing all rights and remedies it may have hereunder or at Law or in equity with respect to any breach of this Agreement nor prejudice either Party's right to obtain performance of any obligation.

10.4.4 If this Agreement is terminated by Penn pursuant to Section 10.3, at the option of each relevant Sublicensee, all outstanding Sublicenses (including all Sublicense Documents for each Sublicense) pertaining solely to the terminated Subfield(s) that are not in default will be assigned by Licensee to Penn (the scope of such assignment shall be limited to the provisions of the Sublicense Documents pertaining to a Sublicense, Penn Patent Rights or Licensed Product), and such assignment will be accepted by Penn; provided, however, that such sublicense agreement shall comply with the terms of Section 3.4. Each assigned Sublicense will remain in full force and effect with Penn as the licensor or sublicensor instead of Licensee, but the duties and obligations of Penn under the assigned Sublicenses will not be greater than the duties of Penn under this Agreement, and the rights of Penn under the assigned Sublicenses will not be less than the rights of Penn under this Agreement, including all financial consideration and other rights of Penn. Penn may, at its sole discretion, amend such outstanding Sublicenses to contain the terms and conditions found in this Agreement.

10.4.5 Within […***…] of termination of this Agreement with respect to any Subfield (other than termination by Licensee pursuant to Section 10.3.2 or 10.3.4), Licensee shall pay Penn all costs not previously paid and attributable solely to the terminated Subfield(s) through the effective termination date per the budget of the Research Plan for services performed by, or on behalf of, Penn, as well as all commitments related to the performance of the Research Plan for such Subfield(s) that are reflected in the budget (i.e., […***…] until the earlier of (a) […***…] of termination of this Agreement and (b) […***…]; and subject to Penn's written notification to Licensee and Licensee's acknowledgement of […***…], as applicable.

10.4.6 Upon termination, but not expiration, of this Agreement, the licenses granted herein shall immediately terminate and Licensee, its Affiliates and Sublicensees (subject to Section 10.4.4), will promptly cease selling the Licensed Product(s) subject to such termination. Each Party will return (or destroy, as directed by the other Party) all data, files, records and other materials containing or comprising the other Party's Confidential Information with respect to this Agreement, except to the extent such Confidential Information is necessary or useful to conduct activities in connection with surviving portions of this Agreement. Notwithstanding the foregoing, the Parties will be permitted to retain one

copy of such data, files, records, and other materials for archival and legal compliance purposes.

10.5 **Tolling**. The Parties agree that all applicable statutes of limitation and time-based defenses (such as estoppel and laches), will be tolled once the dispute resolution procedures set forth in Section 11.10 have been initiated and for so long as they are pending, and the Parties will cooperate in taking all actions reasonably necessary to achieve such a result.

ARTICLE 11
ADDITIONAL PROVISIONS

11.1 **Relationship of the Parties**. Nothing in this Agreement is intended or shall be deemed, for financial, tax, legal or other purposes, to constitute a partnership, agency, joint venture or employer-employee relationship between the Parties. The Parties are independent contractors and at no time will either Party make commitments or incur any charges or expenses for or on behalf of the other Party.

11.2 **Expenses**. Except as otherwise provided in this Agreement, each Party shall pay its own expenses and costs incidental to the preparation of this Agreement and to the consummation of the transactions contemplated hereby

11.3 **Third Party Beneficiary**. The Parties agree that each Sublicensee is a third party beneficiary of this Agreement with respect to Section 10.4.4.

11.4 **Use of Names**.

11.4.1 Licensee, its Affiliates and Sublicensees may not use the name, logo, seal, trademark, or service mark (including any adaptation of them) of Penn or any Penn school, organization, employee, student or representative, without the prior written consent of Penn. Notwithstanding the foregoing, Licensee may use the name of Penn in a non-misleading and factual manner solely in (a) executive summaries, business plans, offering memoranda and other similar documents used by Licensee for the purpose of raising financing for the operations of Licensee, or entering into commercial contracts with Third Parties, but in such case only to the extent necessary to inform a reader that the Penn Patent Rights have been licensed by Licensee from Penn, and to inform a reader of the identity and published credentials of inventors of intellectual property, and (b) any securities reports required to be filed with the Securities and Exchange Commission.

11.4.2 Penn will not use Licensee's name without Licensee's prior written consent except that Penn may (a) acknowledge Licensee's funding of the Research Program, (b) use Licensee's name in connection with any scientific contributions in scientific publications and in listings of sponsored research projects, (c) use Licensee's name as required by Law, and (d) use Licensee's name in connection with institutional compliance policies; provided that, Penn shall not use Licensee's name for publicity purposes without Licensee's prior written consent.

11.5 **No Discrimination**. Neither Penn nor Licensee will discriminate against any employee or applicant for employment because of race, color, sex, sexual or affectional preference, age, religion, national or ethnic origin, handicap, or veteran status.

11.6 **Successors and Assignment**.

11.6.1 The terms and provisions hereof shall inure to the benefit of, and be binding upon, the Parties and their respective successors and permitted assigns.

11.6.2 Licensee may not assign or transfer this Agreement or any of Licensee's rights or obligations created hereunder, by operation of law or otherwise, without the prior written consent of Penn, provided that Penn shall not unreasonably withhold, condition or delay its consent; provided, however, that Licensee may assign this Agreement to any Affiliate of Licensee or to any entity with which Licensee merges or consolidates, or to which it sells or transfers all of its stock or all or substantially all of its assets to which this Agreement relates without Penn's consent ("**Permitted Assignment**"). For any Permitted Assignment, Licensee will provide Penn with notice of such assignment containing at minimum the contact information of the assignee within […***…] after closing of such Permitted Assignment, and such Permitted Assignment shall be in accordance with this Section 11.6. Upon Licensee's request and expense, the Parties may negotiate in good faith to separate this Agreement into multiple agreements, one (1) agreement for each Subfield.

11.6.3 Any assignment not in accordance with this Section 11.6 shall be void.

11.7 **Further Actions**. Each Party agrees to execute, acknowledge and deliver such further instruments and to do all such other acts as may be necessary in order to carry out the purposes and intent of this Agreement.

11.8 **Entire Agreement of the Parties; Amendments**. This Agreement and the Exhibits and Appendices or Schedules hereto constitute and contain the entire understanding and agreement of the Parties respecting the subject matter hereof and cancel and supersede any and all prior negotiations, correspondence, understandings and agreements between the Parties, whether oral or written, regarding such subject matter. No waiver, modification or amendment of any provision of this Agreement shall be valid or effective unless made in a writing referencing this Agreement and signed by a duly authorized officer of each Party.

11.9 **Governing Law**. This Agreement shall be governed by and interpreted in accordance with the laws of the Commonwealth of Pennsylvania, excluding application of any conflict of laws principles that would require application of the law of a jurisdiction outside of the Commonwealth of Pennsylvania.

11.10 **Dispute Resolution**. If a dispute arises between the Parties concerning this Agreement, then the Parties will confer, as soon as practicable, in an attempt to resolve the dispute. If the Parties are unable to resolve such dispute amicably, then the Parties will submit to the exclusive jurisdiction of, and venue in, the state and Federal courts located in the Eastern District of Pennsylvania.

11.11 **Injunctive Relief**. Notwithstanding anything herein to the contrary, in the event of an actual or threatened breach of this Agreement, the aggrieved Party may seek provisional equitable relief (including restraining orders, specific performance or other injunctive relief).

11.12 **Notices and Deliveries**. Any notice, request, approval or consent required or permitted to be given under this Agreement shall be in writing and directed to a Party at its address shown below or such other address as such Party shall have last given by notice to the other Party. A notice

will be deemed received: if delivered personally, on the date of delivery; if mailed, […***…] after deposit in the United States mail or if sent via courier, […***…] after deposit with the courier service.

For Penn	***with a copy to:***
Penn Center for Innovation University of Pennsylvania 3160 Chestnut Street, Suite 200 Philadelphia, PA 19104-6283 Attention: Executive Director	University of Pennsylvania Office of General Counsel 133 South 36th Street, Suite 300 Philadelphia, PA 19104-3246 Attention: General Counsel

For Licensee:	***with a copy to (which will not constitute notice):***
Dimension Therapeutics, Inc. 840 Memorial Drive Cambridge, MA 02139 Attention: Chief Executive Officer	On or prior to June 24, 2016: Goodwin Procter LLP 53 State Street Boston, MA 02109 Attention: Kingsley L. Taft, Ph.D. Effective after June 24, 2016: Goodwin Procter LLP 100 Northern Avenue Boston, MA 02210 Attention: Kingsley L. Taft, Ph.D.

11.13 **Waiver**. A waiver by either Party of any of the terms and conditions of this Agreement in any instance shall not be deemed or construed to be a waiver of such term or condition for the future, or of any other term or condition hereof. All rights, remedies, undertakings, obligations and agreements contained in this Agreement shall be cumulative and none of them shall be in limitation of any other remedy, right, undertaking, obligation or agreement of either Party.

11.14 **Severability**. When possible, each provision of this Agreement will be interpreted in such manner as to be effective and valid under law, but if any provision of this Agreement is held to be prohibited by or invalid under law, such provision will be ineffective only to the extent of such prohibition or invalidity, without invalidating the remainder of this Agreement. The Parties shall make a good faith effort to replace the invalid or unenforceable provision with a valid one which in its economic effect is most consistent with the invalid or unenforceable provision.

11.15 **Interpretation**. The words “include,” “includes” and “including” shall be deemed to be followed by the phrase “without limitation.” All references herein to Articles, Sections, Schedules and Exhibits shall be deemed references to Articles and Sections of, Schedules and Exhibits to, this Agreement unless the context shall otherwise require. “Herein,” “hereby,” “hereunder,” “hereof” and other equivalent words refer to this Agreement as an entirety and not solely to the particular portion of this Agreement in which any such word is used. The term “or” means “and/or” hereunder. All definitions set forth herein will be deemed applicable whether the words defined are used herein in the singular or the plural. Except as otherwise expressly provided herein, all terms of an accounting or financial nature shall be construed in accordance with GAAP, as in effect from time to time. Unless the context otherwise requires, countries shall include territories.

References to any specific Law or article, section or other division thereof, shall be deemed to include the then-current amendments or any replacement Law thereto.

11.16 **Counterparts**. This Agreement may be executed in counterparts, each of which will be deemed an original, and all of which together will be deemed to be one and the same instrument. A facsimile or a portable document format (PDF) copy of this Agreement, including the signature pages, will be deemed an original.

11.17 **Force Majeure**. Neither Party will be liable for any failure to perform as required by this Agreement to the extent such failure to perform is due to circumstances reasonably beyond such Party's control, including, without limitation, labor disturbances or labor disputes of any kind, accidents, failure of any governmental approval required for full performance, civil disorders or commotions, terrorism, acts of aggression, acts of God, energy or other conservation measures imposed by law or regulation, explosions, failure of utilities, mechanical breakdowns, material shortages, disease, or other such occurrences.

[SIGNATURE PAGE FOLLOWS]

IN WITNESS WHEREOF, duly authorized representatives of the Parties have executed this Agreement as of the Effective Date.

THE TRUSTEES OF THE UNIVERSITY OF PENNSYLVANIA	**DIMENSION THERAPEUTICS, INC.**
By: /s/ John S. Swartley	By: /s/ Annalisa Jenkins
Name: John S. Swartley, PhD	Name: Annalisa Jenkins
Title: Associate Vice Provost for Research and Executive Director, Penn Center for Innovation	Title: CEO

Read and Acknowledged by
Dr. James Wilson:

/s/ James Wilson

[Signature Page to Research, Collaboration & License Agreement]

Exhibit A

Background Patent Rights

[…***…]

Exhibit B

Research Plan

See attached.

UPenn / Dimension Therapeutics Work Plan for 2016

CITRULLINEMIA

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

WILSON’S DISEASE

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

PHENYLKETONURIA

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

Exhibit C

Research Program Budget

See attached.

Exhibit C
Research Program Budget

	[…***…]
Citrullinemia	[…***…]
Wilson's Disease	[…***…]
Phenylketonuria	[…***…]
[…***…]	[…***…]
Total	[…***…]

Exhibit D

Information to be provided in SDR Report

[…***…];

[…***…]; and

[…***…]

Exhibit E
Form of Financial Report

Licensee: _____ Agreement # _____
Inventor(s): _____ Patent #(s): _____
Period Covered: Prepared By _____
From _____ Date _____
To _____ Approved By _____
Date _____

If license covers several major product lines, please prepare a separate report for each line. Then combine all product lines into a summary report.

Report Type: ☐ Single Product Line Report
☐ Multiple product Summary Report Page ____ of ____ pages
☐ Product Line Detail: Line: _____
Trade Name _____
Page _____

Report Currency: ☐ US Dollars ☐ Other (specify) _____

					Period Royalty Amount			
Country	Gross Sales	Allowances	Net Sales	Royalty Rate	[…***…]	[…***…]	[…***…]	[…***…]
					0			
					0			
					0			
					0			
					0			
					0			
					0			
					0			
					0			
					0			
					0			
Total	0	0	0		0	0	0	0

Conversion rate if other than US Dollars _____
Royalties in US Dollars _____

EXHIBIT F

MATERIAL TRANSFER TERMS

Penn agrees to provide certain Penn Materials to Licensee, and Licensee agrees to provide certain Licensee Materials to Penn, under the following conditions:

1. The Penn Materials and the Licensee Materials are considered proprietary to the providing Party. The providing Party shall be free, in its sole discretion, to distribute its proprietary Materials to others and to use such Materials for its own purposes, unless otherwise stated in the Agreement.

2. Materials provided by a Party may only be utilized for research by the receiving Party at the receiving Party's facility and the facility of any permitted third party. The receiving Party shall not distribute or release the other Party's Materials to any person other than laboratory personnel under the receiving Party's direct supervision, or other personnel and third parties permitted by the Agreement. The receiving Party shall ensure that no one will be allowed to take or send Materials received from the providing Party to any location in violation of the Agreement.

3. The transfer of Materials are for the receiving Party's use of the Materials solely for the performance of the Research Program, subject to the terms of the Agreement. Each Party agrees that nothing herein shall be deemed to grant any additional rights under any Patent Rights except to those contained in the Agreement and to the extent provided therein. Materials received from the providing Party will not be used by or on behalf of the receiving Party in research that is subject to consulting or licensing obligations to any Third Party, other than obligations to the U.S. government resulting from research that is funded by the U.S. government.

4. Each Party agrees to use Materials received from the providing Party in compliance with all laws and regulations, including but not limited to current EPA, FDA, USDA, and NIH guidelines. All Materials are supplied solely for research purposes.

5. Neither Party shall have rights in the Materials received from the providing Party other than as provided in this Agreement, and at the request of the providing Party, the receiving Party will return all unused Materials received from the providing Party. It is understood that any and all proprietary rights, including but not limited to Patent Rights, trademarks, and proprietary rights, in and to the Materials and replications or derivatives of the Materials shall be and remain in the providing Party, subject to the rights granted herein.

6. Materials will be considered Confidential Information of the providing Party, and subject to the terms of Article 7 of the Agreement.

7. Each Party acknowledges that Materials received from the providing Party are experimental in nature and they are provided WITHOUT WARRANTY OF MERCHANTABILITY OR FITNESS

FOR A PARTICULAR PURPOSE OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED. THE PROVIDING PARTY MAKES NO REPRESENTATION OR WARRANTY THAT THE USE OF THE MATERIALS WILL NOT INFRINGE ANY PATENT OR OTHER PROPRIETARY RIGHTS.

8. For clarity, the terms of this Exhibit F shall not be interpreted to limit any rights granted, or to grant any rights other than those granted, elsewhere in the body Agreement. The terms set forth in the body of the Agreement shall prevail in the event of a conflict between this Exhibit F and any term set forth in the body of the Agreement.

Schedule 2.2.3

Written Reports

[…***…]

[…***…]

[…***…]

1st AMENDMENT TO SPONSORED RESEARCH AGREEMENT

THIS AMENDMENT ("Amendment 1") is entered into as of October 18, 2016 (the "*Amendment 1Effective Date*") by and between Dimension Therapeutics Inc., having its principal offices at 840 Memorial Drive, Cambridge, MA 02139 ("Sponsor"), and **The Trustees of the University of Pennsylvania**, a Pennsylvania nonprofit corporation, with offices located at Penn Center for Innovation, 3160 Chestnut Street, Suite 200, Philadelphia, PA 19104-6228 ("Institution"). Sponsor and Institution are sometimes hereinafter referred to collectively as the "*Parties*" and individually as a "*Party.*" Defined terms used, but not defined, herein shall have the meanings ascribed to them in the Agreement.

WHEREAS, the Parties entered into a Research, Collaboration & License Agreement having an effective date of May 5, 2016 (the "Agreement"); and

WHEREAS, the Parties wish to amend the Research Plan to include additional research;

NOW, THEREFORE, in consideration of the promises and mutual covenants contained in the Agreement and herein, and intending to be legally bound hereby, the Parties agree as follows:

1. The Research Plan set forth in Exhibit B of the Agreement is hereby amended to incorporate the additional tasks and activities listed under Exhibit A to this Amendment 1.

2. There is no added budget for the addition of the additional tasks and activities listed under Exhibit A to this Amendment 1.

3. This Amendment 1 and the Agreement, including all Exhibits, Appendices and Schedules hereto or thereto, contain the entire understanding among the Parties respecting the subject matter hereof and thereof and supersede any and all prior agreements, understandings and arrangements whether written or oral among the Parties with respect to the matters contained in the Agreement and this Amendment 1. No amendments, changes, modifications or alterations of the terms and conditions of this Amendment 1 shall be binding upon any Party, unless in writing and signed by an authorized Representative of each Party.

4. Except as expressly modified by this Amendment 1, the terms and conditions of the Agreement shall remain in full force and effect.

5. This Amendment 1 may be executed in counterparts, each of which will be deemed an original, and all of which together will be deemed to be one and the same instrument. A facsimile or a portable document format (PDF) copy of this Amendment 1, including the signature pages, will be deemed an original. Executed signature pages may be transmitted by e-mail transmission.

IN WITNESS WHEREOF, duly authorized representatives of the Parties have executed this Amendment 1 as of the Amendment 1 Effective Date.

Agreed on behalf of:	**Agreed on behalf of:**
Dimension Therapeutics, Inc.	The Trustees of the University of Pennsylvania
By: /s/ Annalisa Jenkins (Signature)	By: /s/ Coy Purcell (Signature)
Name: Annalisa Jenkins	Name: Coy Purcell
Title: CEO	Title: Sr. Assoc. Director, Corp. Contracts

Acknowledged as Read and Understood
by Institution Principal Investigator

/s/ James Wilson
(Signature)

Name:Dr. James Wilson

Exhibit A

UPENN / Dimension Therapeutics Programs 5-7 Work Plan Amendment 1

Wilson Disease

[…*…]**

[…*…]**

[…*…]**

[…*…]**

[…*…]**

[…*…]**

[…*…]**

[…*…]**

[…*…]**

[…*…]**

[…*…]**

[…*…]**

[…*…]**

[…*…]**

[…*…]**

[…*…]**

[…*…]**

Revision to work plans for PKU and Citrullinemia

[…*…]**

[…*…]**

[…*…]**

[…*…]**

[…*…]**

[…*…]**

[…*…]**

[…*…]**

[…*…]**

[…*…]**

[…*…]**

[…*…]**

[…*…]**

[…*…]**

[…*…]**

[…*…]**

2nd AMENDMENT TO RESEARCH, COLLABORATION AND LICENSE AGREEMENT

THIS SECOND AMENDMENT ("Second Amendment") is entered into as of December 23, 2016 (the "*Second Amendment Effective Date*") by and between Dimension Therapeutics Inc., having its principal offices at 840 Memorial Drive, Cambridge, MA 02139 ("Licensee"), and **The Trustees of the University of Pennsylvania**, a Pennsylvania nonprofit corporation, with offices located at Penn Center for Innovation, 3160 Chestnut Street, Suite 200, Philadelphia, PA 19104-6228 ("Penn"). Licensee and Penn are sometimes hereinafter referred to collectively as the "*Parties*" and individually as a "*Party.*"

WHEREAS, the Parties entered into a Research, Collaboration & License Agreement having an effective date of May 5, 2016 as amended by the First Amendment dated October 18, 2016 (collectively the "Agreement"); and

WHEREAS, the Parties wish to amend the Agreement to include additional research and funding;

NOW, THEREFORE, in consideration of the promises and mutual covenants contained in the Agreement and herein, and intending to be legally bound hereby, the Parties agree as follows:

1. The Research Plan set forth in Exhibit B of the Agreement is hereby amended to incorporate the additional tasks and activities listed for 2016 and 2017 under Schedule A to this Second Amendment.

2. The Research Program Budget in Exhibit C of the Agreement is hereby deleted in its entirety and replaced with the Research Program Budget and payment schedule set forth in Schedule B to this Second Amendment.

3. Section 2.3.1(a) of the Agreement is hereby deleted it in its entirety and replaced with the following language:

"Within […***…] of the Effective Date, Licensee shall pay to Penn an amount of $[…***…] for performance of the research and development under the Research Program for […***…].

On […***…], Licensee shall pay to Penn an amount of $[…***…] for performance of the research and development under the Research Program for […***…].

On […***…], Licensee shall pay to Penn an amount of $[…***…] for performance of the research and development under the Research Program for […***…].

On […***…], Licensee shall pay to Penn an amount of $[…***…] as detailed in Schedule B, provided however, that prior to the […***…] payment date, Licensee and Penn shall review the payments made by Licensee during […***…] in connection with work performed under the Research Program through […***…].

On […***…], Licensee shall pay Penn an amount of $[…***…] for performance of the research and development under the Research Program for […***…].

On […***…], Licensee shall pay Penn an amount of $[…***…] for performance of the research and development under the Research Program for […***…].

On […***…], Licensee shall pay Penn an amount of $[…***…]for performance of the research and development under the Research Program for […***…].

On […***…], Licensee shall pay Penn an amount of $[…***…] for performance of the research and development under the Research Program for […***…].

[…***…] after Licensee's receipt of the Final Report, Licensee shall pay Penn a final amount of $[…***…] for performance of the research and development under the Research Program for […***…]; provided however, […***…]."

4. The first sentence of Section 2.3.1(c) of the Agreement is hereby deleted in its entirety and replaced with the following:

"Licensee shall pay Penn for the performance of the Research Plan for […***…]: (x) as agreed in writing by the Parties at least […***…] prior to the start of such […***…] during the term of the Research Program or (y) if no agreement is reached by the Parties in accordance with 2.3.1(c)(x), then according to the following schedule:"

For clarity, Sections 2.3.1(c) (i-iv) remain unchanged.

5. This Second Amendment and the Agreement, including all Exhibits, Appendices and Schedules thereto, contain the entire understanding among the Parties respecting the subject matter hereof and thereof and supersede any and all prior agreements, understandings and arrangements whether written or oral among the Parties with respect to the matters contained in the Agreement and this Second Amendment. No amendments, changes, modifications or alterations of the terms and conditions of this Second Amendment shall be binding upon any Party, unless in writing and signed by an authorized Representative of each Party.

6. Except as expressly modified by this Amendment, the other terms and conditions of the Agreement shall remain in full force and effect.

7. This Second Amendment may be executed in counterparts, each of which will be deemed an original, and all of which together will be deemed to be on and the same instrument. A facsimile or a portable document format (PDF) copy of this Second Amendment, including the signature pages, will be deemed an original. Executed signature pages may be transmitted by e-mail transmission.

(*Signatures on following page*)

IN WITNESS WHEREOF the Parties hereto have caused this Second Amendment to be executed and delivered by their duly authorized representatives as set forth below.

AGREED ON BEHALF OF:	**AGREED ON BEHALF OF:**
DIMENSION THERAPEUTICS INC.	THE TRUSTEES OF THE UNIVERSITY OF PENNSYLVANIA
By: /s/ Annalisa Jenkins (Signature)	By: /s/ John Swartley (Signature)
Name:Annalisa Jenkins	Name: John Swartley
Title: President & CEO	Title:Associate Vice Provost for Research, Executive Director, PCI

ACKNOWLEDGED AS READ AND UNDERSTOOD
BY PENN PRINCIPAL INVESTIGATOR

/s/ James Wilson
(Signature)

Name:Dr. James Wilson

Schedule A

Penn / Dimension Therapeutics
Wilson's Disease Work Plan for 2017

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

Penn / Dimension Therapeutics
Phenylketonuria Work Plan for 2017

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

Penn / Dimension Therapeutics
Citrullinemia Work Plan for 2017

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

[…***…]

Schedule B

Original Research Program Budget for […***…]**:**

Citrullinemia	[…***…]
Wilson's Disease	[…***…]
Phenylketonuria	[…***…]
[…***…]	[…***…]
Original Total	[…***…]

Budget for additional Research Program work conducted in Calendar Year 2016 as set forth in this Second Amendment:

BUDGET	
Sponsor: DIMENSION THERAPEUTICS	
Project Title: Dimension B 2016 (Amend 2)	
Citrullinemia	[…***…]
Wilson's Disease	[…***…]
Phenylketonuria	[…***…]
[…***…]	[…***…]
Additional 2016 Total	[…***…]

Budget for additional Research Program work to be conducted in Calendar Year 2017 as set forth in this Second Amendment:

BUDGET	
Sponsor: DIMENSION THERAPEUTICS	
Summary Dimension B - 2017	
2017	
Citrullinemia	[…***…]
Wilson's Disease	[…***…]
Phenylketonuria	[…***…]
[…***…]	[…***…]
TOTAL	[…***…]

Complete Payment Schedule for Research Program

Payments Made by Licensee to Penn for Calendar Year 2016 Research Program Work as set forth in the Agreement

Payment Due Date	Amount of Payment to Penn
[…***…]	$[…***…] (payment received by Penn)
[…***…]	$[…***…] (payment received by Penn)
[…***…]	$[…***…] (payment received by Penn)

Payments Owed to Penn for additional Calendar Year 2016 Research Program work as set forth in this Second Amendment

Payment Due Date	Amount of Payment to Penn
[…***…]	$[…***…]

Payments Owed to Penn for Calendar Year 2017 Research Program work as set forth in this Second Amendment

Payment Due Date	Amount of Payment to Penn
[…***…]	$[…***…]
[…***…]	$[…***…]
[…***…]	$[…***…]
[…***…]	$[…***…]
[…***…] after Final Report	$[…***…]

Exhibit 10.17
[***] Text Omitted and Filed Separately with the Securities and Exchange Commission
Confidential Treatment Requested Under
17 C.F.R. Sections 200.80(b)(4) and 240.24b-2

3rd AMENDMENT TO RESEARCH, COLLABORATION AND LICENSE AGREEMENT

THIS THIRD AMENDMENT ("Third Amendment") is entered into as of October 30, 2017 (the "*Third Amendment Effective Date*") by and between Dimension Therapeutics Inc., having its principal offices at 840 Memorial Drive, Cambridge, MA 02139 ("Licensee"), and **The Trustees of the University of Pennsylvania**, a Pennsylvania nonprofit corporation, with offices located at Penn Center for Innovation, 3160 Chestnut Street, Suite 200, Philadelphia, PA 19104-6228 ("Penn"). Licensee and Penn are sometimes hereinafter referred to collectively as the "*Parties*" and individually as a "*Party*."

WHEREAS, the Parties entered into a Research, Collaboration & License Agreement having an effective date of May 5, 2016 as amended by the First Amendment dated October 18, 2016 and the Second Amendment Dated December 23, 2016 (collectively the "Agreement"); and

WHEREAS, the Parties wish to amend the Agreement to include additional research and funding;

NOW, THEREFORE, in consideration of the promises and mutual covenants contained in the Agreement and herein, and intending to be legally bound hereby, the Parties agree as follows:

1. The Research Plan set forth in Exhibit B of the Agreement is hereby amended to incorporate the updated tasks and activities listed for 2017 under Schedule A to this Third Amendment.

2. The Research Program Budget in Exhibit C of the Agreement is hereby amended to include the research budget and corresponding payment schedule for 2017 as set forth in Schedule B to this Third Amendment.

3. Section 2.3.1(a) of the Agreement is hereby deleted it in its entirety and replaced with the following language:

   "Within [***] days of the Effective Date, Licensee shall pay to Penn an amount of $[***] for performance of the research and development under the Research Program for [***].

   On [***], Licensee shall pay to Penn an amount of $[***] for performance of the research and development under the Research Program for [***].

   On [***], Licensee shall pay to Penn an amount of $[***] for performance of the research and development under the Research Program for [***].

   On [***], Licensee shall pay to Penn an amount of $[***] as detailed in Schedule B, provided however, that prior to the [***] payment date, Licensee and Penn shall review the payments made by Licensee during [***] in connection with work performed under the Research Program through [***].

   On [***], Licensee shall pay Penn an amount of [***] for performance of the research and development under the Research Program for [***].

[***] after Effective Date of this Third Amendment, Licensee shall pay Penn an amount of [***], as detailed in Schedule B, for performance of the research and development under the Research Program for [***].

4. This Third Amendment and the Agreement, including all Exhibits, Appendices and Schedules thereto, contain the entire understanding among the Parties respecting the subject matter hereof and thereof and supersede any and all prior agreements, understandings and arrangements whether written or oral among the Parties with respect to the matters contained in the Agreement and this Third Amendment. No amendments, changes, modifications or alterations of the terms and conditions of this Third Amendment shall be binding upon any Party, unless in writing and signed by an authorized Representative of each Party.

5. Except as expressly modified by this Amendment, the other terms and conditions of the Agreement shall remain in full force and effect.

6. This Third Amendment may be executed in counterparts, each of which will be deemed an original, and all of which together will be deemed to be on and the same instrument. A facsimile or a portable document format (PDF) copy of this Third Amendment, including the signature pages, will be deemed an original. Executed signature pages may be transmitted by e-mail transmission.

(*Signatures on following page*)

IN WITNESS WHEREOF the Parties hereto have caused this Second Amendment to be executed and delivered by their duly authorized representatives as set forth below.

AGREED ON BEHALF OF:

DIMENSION THERAPEUTICS INC.

By: /s/ Mary Thistle
(Signature)

Name:Mary Thistle

Title: Chief Operating Officer

AGREED ON BEHALF OF:

THE TRUSTEES OF THE UNIVERSITY OF PENNSYLVANIA

By: /s/ John Swartley
(Signature)

Name: John S. Swartley, Ph.D

Title: Associate Vice Provost for Research Managing Director, PCI

ACKNOWLEDGED AS READ AND UNDERSTOOD
BY PENN PRINCIPAL INVESTIGATOR

/s/ James Wilson
(Signature)

Name:Dr. James Wilson

Schedule A

UPenn / Dimension Therapeutics
Dimension Sponsored Research Agreement 2017 Amendment 3

[***]

Wilson's Disease Work Plan

[***]

Phenylketonuria Work Plan for 2017

[***]

Citrullinemia Work Plan for 2017

[***]

Schedule B

BUDGET SPONSOR: DIMENSION THERAPEUTICS	
Summary Dimension B - 2017	
	2017
Citrullinemia	[***]
Wilson's Disease	[***]
Phenylketonuria	[***]
[***]	[***]
TOTAL	[***]

Payment Schedule

Calendar Year 2017 Payment Schedule

Payment Due Date	**Amount of Payment to Penn**	**Payment Status**
[***]	[***]	[***]
[***] After Third Amendment Effective Date	[***]	[***]
[***] of the Final Report	[***]	[***]

Rentschler
THE BIOPHARMA MANUFACTURER

COMMERCIAL SUPPLY AND SERVICES AGREEMENT
- DRUG SUBSTANCE -

[***]

Effective Date: 7th December 2017

by and between

Ultragenyx Europe GmbH
Innere Margarethenstrasse 5
4051 Basel,
Switzerland

(„Customer“)

and

Rentschler Biopharma SE,
Erwin-Rentschler-Str. 21, 88471 Laupheim,
Germany

(„Rentschler“)

hereinafter called each or together "Party" or "Parties".

Preamble

WHEREAS, Rentschler is a company engaged in the field of pharmaceutical contract development, services and manufacturing and has the know-how, expertise, capability, experience and the infrastructure necessary to undertake certain commercial Services (as defined hereinafter); and

WHEREAS, Customer is a company engaged in the pharmaceutical field focussing on development of rare disease therapies and is eager to engage Rentschler as a contract manufacturing organization for the Product (as defined hereinafter); and

WHEREAS, Customer is planning to reach commercial stage in the near term for the Product; and

WHEREAS, Rentschler has agreed to manufacture and supply certain amounts of the Product to the Customer for commercial demands in the Territory (as defined hereinafter) subject to the terms and conditions set forth herein; and

WHEREAS, Both Parties agree to work in a partnership model and are committed to establish the appropriate level of trust and transparency. Each Party hereto has a duty of good faith and fair dealing in connection with its performance under this Agreement. Each Party shall perform its obligations under this Agreement in a diligent, legal, ethical and professional manner so as to advance the purposes and intent of this Agreement.

NOW, THEREFORE, in consideration of the mutual covenants contained herein, and for other good and valuable consideration, the Parties agree as follows:

1. Scope of the Agreement & Schedules

1.1. Rentschler will perform on a non-exclusive basis the Services upon the terms and conditions of this Agreement as well as its Schedules.

1.2. Attached to this Commercial Supply Agreement ("**Agreement**") are the following Schedules which form an integral part of this Agreement:

Schedule A:	Definitions used in this Agreement;
Schedule B:	Commercial Terms for the Services;
Schedule C:	Legal Terms, including liabilities and limitation of liabilities;
Schedule D:	Latest agreed version of the Quality Agreement defining the delineation of the pharmaceutical responsibilities. This Schedule will be executed directly between Ultragenyx Pharmaceutical Inc., part of Ultragenyx group of companies (that is providing pursuant to separate intra group agreements quality oversight and support services on behalf of the Customer) and Rentschler.
Schedule E:	Compliance

1.3. In the case of any inconsistencies between this Agreement, the Schedules and / or an Offer referring to it, this Agreement shall prevail, except for quality aspects and the definition of Territory after the Effective Date for which Schedule D shall prevail.

1.4. Neither Party shall alter or adjust this Agreement or any Schedule to it without the prior written permission of the other Party.

2. Customer's Responsibilities

2.1. Customer shall be responsible to

(i) provide complete and accurate requirements to define the Specifications;

(ii) provide Rentschler with complete and accurate information (Material Data Safety Sheet) and sufficient FOC Material necessary to perform the Services.

2.2. Customer shall supply FOC Material to Rentschler according to Schedule B in line with [***] (Incoterm 2010). Customer is responsible that such material is (i) suitable for the Manufacturing of the Product, (ii) fits for the Services and (iii) pharmaceutically compliant.

2.3. Customer shall inform Rentschler's incoming goods department (wareneingang@rentschler.de) and the project manager of any delivery at least [***] Business Days before any such delivery to Rentschler is initiated.

2.4. In case that Customer provides cell substrates, cell lines or cell banks, Customer provides only aliquots to Rentschler and safeguards that the primary seed lot, master cell bank or working cell bank as applicable is stored safely in another place. Customer confirms that it will provide all safety data and information available that are relevant for Rentschler's safety requirements.

2.5. Both Parties shall comply with Schedule E.

3. Rentschler Responsibilities

3.1. Rentschler shall comply with cGMP and with recognized industry standards, including, but not limited to applicable ICH guidelines and the pertaining laws and regulations.

3.2. Rentschler will make available and maintain an adequate manufacturing site, validated processing equipment, the manufacturing processes for the products of the Customer in a validated state, trained and competent personnel with relevant knowledge and experience, and will ensure sufficient capacity to store the FOC material and the excipients needed and render the Services, and Manufacture of Product.

3.3. All the responsibilities and obligation listed under section 3.1. and 3.2. will be covered by Rentschler at their own expenses.

3.4. Rentschler will notify the Customer immediately but not later than within [***] Business Days in the event of any potential failure to deliver Product within the agreed time lines.

3.5. Rentschler will render the Services in a professional and workman-like manner in accordance with this Agreement, including the Quality Agreement.

3.6. Rentschler will Manufacture the Product in accordance with the terms of this Agreement and the responsibilities as set out in the Quality Agreement.

3.7. Rentschler has to provide the Customer with a [***] Material inventory report by the [***] reflecting the inventory of FOC Material on the last day of the previous calendar month.

4. Governance Model

4.1. The partnership model includes a Steering Committee (as described in clause 4.2) and a Joint Working Team (as described in clause 4.13) focussing on operational execution. The Joint Working Team will be led by a project / relationship manager of each Party (**"Joint Working Team Leads"**).

4.2. The Parties shall establish a Steering Committee consisting of 4 (four) permanent senior management individuals ("**Committee Members**"). Each Party will nominate [***] Committee Members.

4.3. Either Party may replace its Committee Members by notice to the other Party.

4.4. The Committee Members shall be appropriately qualified and experienced in order to make a meaningful contribution to the Steering Committee meetings.

4.5. The purpose of the Steering Committee is to

(i) establish and maintain an effective and efficient collaboration between the Parties;

(ii) confirming the Joint Working Team Leads appointed by each Party;

(iii) oversee the Joint Working Team's performance in business review meetings;

(iv) evaluate in good faith and ratify any technical, business process and / or quality Improvements proposed by the Joint Working Team;

(v) act as escalation body for issue resolution;

(vi) define the framework for continuous Improvement, mutual long-term objectives and priorities.

(vii) any other topics assigned to it in compliance with this Agreement of following the mutual decision of the Parties.

4.6. The Steering Committee shall conduct its discussions in good faith with a view to operating to the mutual benefit of the Parties.

4.7. The Steering Committee shall meet as often as the Committee Members may determine (to this purpose the request of the Committee Members of each Party would be sufficient), but in any event no less than [***] per Calendar Year. Meetings can be held face-to-face or by teleconference, with minimum [***] per year. Either Party may request a meeting within [***] Business Days in urgent cases.

4.8. The agenda (including, any pre-read material) shall be distributed to the participants latest [***] Business Days prior to the meeting. In addition to any other topics to be discussed in the agenda of the relevant meeting, the following matters shall be invariably discussed during the meetings of the Steering Committee:

(i) company updates and strategic outlooks;

(ii) decisions requested from the Joint Steering Committee;

(iii) performance review (services, quality, relationship, financials);

(iv) performance review of the Joint Working Team;

(v) risk evaluation and associated risk mitigation projects;

(vi) review status of past meeting action items;

(vii) approval of target setting for Key Performance Indicators defined by Joint Working Team.

4.9. Each Party may invite individuals with special skills to attend such meetings where it is considered to be relevant and appropriate.

4.10. All decisions of the Steering Committee shall be made in good faith in the best interests of this Agreement and require a unanimous vote. In the event that the Steering Committee is unable to reach a decision on any matter after good faith attempts to resolve such disagreement in a commercially reasonable fashion and in any event if the Steering Committee is unable to decide within [***] Business Days, then such matter should be referred to the Executive Leadership of both Parties, who together shall use reasonable and good faith efforts to reach a

decision by consensus within [***] Business Days after such matter is referred to them.

4.11. If the Executive Leadership does not reach consensus in accordance with clause 4.10., either Party may commence dispute resolution proceedings in accordance with the relevant provisions set out in this Agreement.

4.12. The Steering Committee shall take minutes of its meetings and resolutions, which shall be promptly circulated to the Parties after each meeting for agreement. In case of any disagreement clauses 4.10. and 4.11. shall apply.

4.13. The Parties shall establish a Joint Working Team, consisting of subject matter experts at minimum in the field of manufacturing operations, quality ("**Joint Working Team Members**").

4.14. Either Party may replace its Joint Working Team Members by notice to the other Party.

4.15. The Joint Working Team Members shall be appropriately qualified and experienced in order to make a meaningful contribution to the Joint Working Team meetings.

4.16. The purpose of the Joint Working Team is to:

(i) drive and improve performance of Services and the Joint Working Team;

(ii) deliver on Service goals;

(iii) target setting for Key Performance Indicators (to be established; every Calendar Year by the 4th quarter of the preceding Calendar Year) that shall include performance and Yield values agreed by the Joint Working Team Members and approved by the Steering Committee;

(iv) manage and reduce aggregate risk, including lead times and safety stock management of Third Party Material;

(v) manage issues related to Services;

(vi) manage post-approval changes;

(vii) maintain a collaborative and constructive relationship (at operational level);

(viii) potentially propose any Improvement to the Steering Committee.

4.17. The Joint Working Team shall conduct its discussion in good faith with a view to operating to the mutual benefit of the Parties.

4.18. The Joint Working Team shall meet as often as the Joint Working Team Members may determine, but in any event [***]. Meetings can be held face-to-face or by teleconference, with minimum [***] per year.

4.19. In addition to any other topics to be discussed in the agenda of the relevant meeting, the following matters shall be invariably discussed during the Joint Working Team meetings:

(i) team member updates;

(ii) performance review (services, quality, relationship, financials) by means of defined Key Performance Indicators;

(iii) risk evaluation and associated risk mitigation projects;

(iv) review status of past meeting action items.

4.20. The Joint Working Team Members may invite individuals with special skills to attend such meetings where it is considered to be relevant and appropriate. Individuals belonging to a third party have to be mutually agreed. These invited individuals do not have voting powers.

4.21. The quorum for the validity of the Joint Working Team meetings shall be [***] for each Party.

4.22. All decisions of the Joint Working Team shall be made in good faith in the best interests of this Agreement and require a unanimous vote. In the event that the Joint Working Team is unable to reach a decision on any matter after good faith attempts to resolve such disagreement in a commercially reasonable fashion. Then such matter should be referred to and decided by the Steering Committee in a timely manner.

4.23. The Joint Working Team shall take minutes of its meetings and resolutions, which shall be promptly circulated to the Parties after each meeting for agreement.

5. Financial Audits

In case of Customer's doubts of Rentschler's compliance with respect to FOC Material and Third Party Material inventory management, Rentschler shall make available to Customer or to a certified public accountant (CPA) reasonably acceptable to Rentschler, upon Customer's reasonable request and with an appropriate period of notice during the regular office hours during the Term (or after the Term for activities started during the Term but with effects after the Term),

books, records and other documentation relevant to the Services. For the avoidance of doubt Customer shall bear the cost of the CPA.

6. Term and Termination

6.1. This Agreement is effective as of the last date of signature ("**Effective Date**") and will expire (if not terminated earlier in accordance with the Agreement's provisions) 5 (five) years thereafter ("**Initial Term**"). The Agreement will be automatically extended for another 5 (five) years following the Initial Term. Customer may withdraw from this Agreement at will (without cause) with a pre-notice of 18 (eighteen) months at any time following the Initial Term. Rentschler may withdraw from this Agreement at will (without cause) with a pre-notice of 36 (thirty-six) months at any time following the Initial Term.

6.2. This Agreement may be terminated by the non-breaching Party giving written notice of such termination to the other party if the other Party breaches a material provision of this Agreement (including any delay for reasons attributable to Rentschler in fulfilling Customer's orders, which would lead to a market stock-out as long as Customer has fulfilled its obligation and is able to prove such fulfilment to have an appropriate safety stock of the product at all times during the Term of the Agreement to eliminate the risk of a market stock out and such breach remains uncured for [***] days following the breaching party's receipt of written notice of such breach from the non-breaching party.

6.3. Each Party shall be entitled to terminate this Agreement with immediate effect if:

(i) any requirement / obligation mentioned in Schedule E is violated / breached by the respective other Party and / or its Affiliates;
(ii) a Material Change in Control and Business Model of the respective other Party;
(iii) the respective other Party infringes Party's Intellectual Property Rights.

6.4. Customer shall be entitled to terminate this Agreement with immediate effect if Rentschler loses the right to operate under this Agreement following any decision from the competent authorities and / or revocation of the necessary approvals / regulatory permits (including FDA taking control of Rentschler following a consent decree).

6.5. Unless otherwise agreed in writing termination or expiration of this Agreement for any reason shall not relieve either Party or its Affiliates from their obligations under this Agreement until the date of such termination or expiration or to perform such obligations as described in Schedule E) that will survive for [***] years after the expiration or termination of this Agreement.

6.6. Either Party may terminate this agreement at any time if Rentschler is unable to deliver the Services agreed in this Agreement. In the event of Force Majeure for a period greater than [***] consecutive calender months.

6.7. In any event of termination (including termination at will as per clause 6.1) of this Agreement triggered by any of the Parties or resulting from a Force Majeure event and upon written notice by Customer ("**Transfer Request**"), Rentschler will start immediately to make available, in accordance with sections 2 and 3, Schedule C of this Agreement, the manufacturing technology from Rentschler to Customer or a third party designated by the Customer and provide reasonable technical assistance to the Customer or such third party to operate the manufacturing process developed under the Master Service Agreement (dated August 31, 2012) and this Agreement in order to enable the Customer or such third party to continue the manufacturing and supply of Products ("**Technology Transfer**"). Rentschler shall make reasonable efforts to complete the Technology Transfer within [***] months. The successful completion of the Technology Transfer shall be confirmed by the Joint Steering.

6.8. Rentschler shall initiate Technology Transfer within [***] days after written notice from Customer requesting such initiation ("**Initiation Notice**"), which Initiation Notice may be made by Customer within [***] months after the date of the Transfer Request.

6.9. Such a Technology Transfer cost will be borne by the Customer unless terminated by the Customer in line with the section 6.4. or terminated by Rentschler according to section 6.1. In case of Force Majeure such a Technology Transfer cost will be equally borne by both Parties.

(Rest of page intentionally left blank; signatures follow on the next page)

Rentschler Biopharma SE Date: December 6, 2017 Signature: /s/ Klaus Schoepe Name: Dr. Klaus Schoepe Position: SVP Project Management		If second signature is required: Date: December 6, 2017 Signature: /s/ Thomas Lottner Name: Thomas Lottner Position: VP Commercial Management
Ultragenyx Europe GmbH Date: January 2, 2018 Signature: /s/ Shalini Sharp Name: Shalini Sharp Position: CFO		If second signature is required: Date: December 15, 2017 Signature: /s/ Stefano Portolano Name: Stefano Portolano Position: SVP, Regional Head, Europe

SCHEDULE A

DEFINITIONS

- **Additional Services** means any service specifically qualified as an additional service in any approved Rentschler Offer, except all activities involved in converting FOC Material into Product and according to the quality standards set forth in the Quality Agreement including costs of in-process control, quality assurance, quality control and release, deviation and complaint handling, storage of FOC Material until delivery notice, storage of purchased material procured by Rentschler and of Product until delivery notice, disposal of waste.

- **Affiliate** shall mean with respect to a Party, any person, corporation, company, partnership or other entity that controls, is controlled by, or is under common control with that Party. For the purpose of this definition, “control” shall mean direct ownership of [***] of the shares of stock entitled to vote for the election of directors, in the case of a corporation, or [***] of the equity interest in the case of any other type of legal entity, status as a general partner in any partnership, or any other arrangement whereby the entity or person controls or has the right to control the board of directors or equivalent governing body of a corporation or other entity, or

the ability to cause the direction of the management or policies of a corporation or other entity.

- **BSE** shall mean Bovine Spongiform Encephalopathy
- **Business Day** shall mean each day of the week save for Saturday, Sunday and public holidays in Germany or Switzerland or the United States of America.
- **Calendar Year** shall mean a period of 12 (twelve) consecutive months corresponding to the calendar year commencing on the first day of January.
- **Confidential Information** means contents of this Agreement and any information regarding the other Party's business and / or its Affiliates' business as well as information relating to the Product disclosed by one Party and / or its Affiliates to the other Party pursuant to this Agreement.
- **Delivery Date** means the date of delivery requested by Customer in a Purchase Order.
- **Drug Substance** means Customer's active pharmaceutical ingredient manufactured under GMP condition for human use.
- **DSP** stands for downstream processing and describes the process of Drug Substance Manufacturing starting with the filtration of the unprocessed fluid until the formulation of bulk Drug Substance.
- **Equipment means** any equipment system to support manufacturing and / or packaging of Customer's Product.
- **Executive Leadership** shall mean for the purpose of this Agreement the Chief Technical Operations Officer of the Customer and the Chief Executive Officer of Rentschler respectively (or whoever is on these roles ad interim).
- **Exit Fee** shall mean the fee to be paid by the Customer in accordance with the provision of section 2 of Schedule B.
- **Facility** shall mean Rentschler's manufacturing facilities located in Laupheim, Germany.
- **Final Release** shall mean Product is quality released by Customer or Customer's delegate as per the Quality Agreement in Schedule D.
- **FOC (Free of Charge) Material** means cell lines and other materials be supplied by Ultragenyx to Rentschler free of charge.

- **Force Majeure** shall have the meaning as provided in Schedule C, section 8.

- **Good Manufacturing Practices** or **cGMP** means the current good manufacturing practices including EU GMP Guide, 21 CFR, ICH Q7A, 21 CFR, EU guide and their current official interpretations applicable to the manufacturing of drug substances.

- **Hidden Defects** means a defect of FOC Material or Product already present at the time of delivery but not detectable at the time of the inspection.

- **Improvement** means technical and business process optimization that is beneficial for the manufacturing process, product quality, financial aspect or supply of Customer's Product.

- "**Intellectual Property Rights**" means rights in patents, patent applications (including all utility and design patents and patent applications), inventions, trademarks, service marks, trade names, internet domain names, rights in designs, rights in get-up and trade dress, goodwill and the right to sue for passing off or unfair competition, copyrights, (including all computer applications, programs and other software, including without limitation operating software, network software, firmware, middleware, and design software rights in computer software and databases), database rights, industrial property rights, moral rights of authors, rights to use, and protect the confidentiality of, confidential information (including know-how and trade secrets), utility models, any common law rights arising from use of the foregoing, all rights of renewal, continuations, divisions, extensions and the like relating to the foregoing, and other intellectual property rights, in each case whether registered or unregistered and including any applications and rights to apply for the grant of any such rights and all rights and forms of protection having an equivalent or similar effect anywhere in the world.

- **Joint Working Team Members** shall mean the team selected by the Steering Committee in accordance with the criteria set out under section 4.15 of this Agreement.

- **Key Performance Indicators**, shall mean a quantifiable measure used to evaluate the performance of Rentschler in meeting the objectives of this Agreement as defined by the Joint Working Team and approved by the Steering Committee.

- **Manufacture or Manufacturing** means compounding, harvesting, filling or processing, producing, testing and packaging of FOC Material and purchased material to obtain Customer's Product by Rentschler in accordance to the Product specification.

- **Material Change in Control or Business Model** shall mean any of the following: (i) the sale or disposition of all or substantially all of the assets of a Party to a Third

Party, (ii) the acquisition by a Third Party, of [***] of a Party's outstanding shares of voting capital stock (e.g. capital stock entitled to vote generally for the election of directors), or (iii) the merger or consolidation of a Party with or into another corporation. References in this definition to a Third Party shall also include Affiliates in case Affiliate has no comparable financial resources and financial reputation as Customer or Rentschler has.

- **Offer** shall mean Rentschler's quotation containing the details of the proposed Services subject to Customer's binding order.
- **Product** shall mean the Drug Substance manufactured by Rentschler and to be delivered to Customer.
- **Purchase Order** shall mean a firm order placed by Customer issued by Customer with a corresponding purchase order number to Rentschler reflecting forecasted Services within the Binding Forecast.
- **TSE** shall mean Transmissible Spongiform Encephalopathy.
- **Quality Agreement** shall be drafted substantially in the same form as **Schedule D.**
- **Quarantined Production** means a Manufacturing of Product with any material not released by the quality department of Rentschler before such Manufacturing. Such Manufacturing requires explicit request by Customer.
- **Quarantined Shipment** means a shipment of Product before the quality release by Rentschler in accordance with the Quality Agreement.
- **Rentschler Know-How** means all know-how or intellectual property relating to Rentschler's background know-how in the field of the manufacturing and Rentschler's operations of drug delivery, medical devices, drug process development services as well as regulatory, packaging and quality issues.
- **Rentschler Offer** means any quote proposed for Additional Services approved by the Customer.
- **Services** means all activities related to Manufacturing of Customer's Product as described in this Agreement and Schedule D which do not include Additional Services.
- **Service Fee** means the fee paid by the Customer for each Services as itemized in **Schedule B.1** in this Agreement and includes all activities involved in converting FOC Material into Product and according to the quality standards set forth in the Technical Quality Agreement including costs of in-process control, quality

assurance, quality control and release, packaging, storage of FOC Material.Fees for Third Party Materials and Third Party Services are not included and are covered separately.

- **Specifications** means the written Product specifications as mutually agreed.
- **Steering Committee** shall mean the committee selected by the Parties in accordance with the criteria set out under section 4 of this Agreement.
- **Third Party** means any Person other than Customer, Rentschler and their respective Affiliates
- **Third Party Material** means all materials procured by Rentschler for the Manufacturing of the Product.
- **Third Party Services** means all services procured by Rentschler for the Manufacturing of the Product (e.g. laboratory services, hazardous waste disposal etc.).
- **Technical Release** means the release of the Product by Rentschler in accordance with Schedule D.
- **Territory** shall mean the following countries: EU, USA, Brazil, Mexico, Colombia, Chile, Japan, Turkey or any different country as agreed by the Parties in the Quality Agreement during the term of this Agreement after the Effective Date.
- **USP** stands for upstream processing and describes the process of Drug Substance Manufacturing starting from thawing of the cell line until the harvest of the unprocessed fluid.
- **Yield** shall mean the amount of Drug Substance manufactured in a production batch, as agreed in writing by the Joint Working Team in compliance with section 4.16 (iii) of the Agreement.
-

SCHEDULE B

COMMERCIAL TERMS

1. Order Processing

Rentschler will quote the Additional Services to Customer by written Rentschler Offer referring to this Agreement.

Upon agreement between the Parties about such Rentschler Offer, Rentschler will provide the Additional Services as described in the respective Rentschler Offer.

2. Forecast and Purchase Orders

The Parties hereby establish a forecast procedure, comprising a binding rolling forecast period and a non-binding long-term range as follows:

Within [***] weeks after the Effective Date Customer will provide a good faith rolling forecast covering the next [***] months which Customer will update within the first [***] weeks of each calendar quarter, specifying the Product, the ordered quantity (number of batches) and the expected Technical Release month ("**Long Range Forecast**"). The first [***] months of each Long Range Forecast shall become binding for the Customer as to the quantity of Product, for which purchase orders must be placed during such [***] month period (the "**Binding Forecast**"), and sent together with the Binding Forecast, and the remaining [***] months of each Long Range Forecast shall be non-binding. Any Long Range Forecast and the respective updates will only become effective upon confirmation by Rentschler, which has to be provided within [***] Business Days. If Rentschler does not confirm the Long Range Forecast within [***] Business Days Customer may immediately escalate this topic to the Steering Committee for resolution.

Any cancellation or reduction in the quantity of Product ordered during the period of the Binding Forecast by Customer will be subject to the Exit Fee mentioned below. For the avoidance of doubt, if Customer increases the Long Range Forecast over the previously submitted Long Range Forecast Rentschler is not obliged to reserve resources as long as the Long Range Forecast is not confirmed by Rentschler.

Customer shall issue written purchase orders corresponding to the firm and binding quantities defined in the Binding Forecast to Rentschler. Each Purchase Order shall state the expected day of delivery ("**Delivery Date**"). Rentschler shall confirm the received Purchase Orders within [***] Business Days.

If Customer does not issue a Purchase Order as foreseen in the respective part of the Binding Forecast or if Customer cancels any purchase order already issued, Customer shall be pay an Exit Fee as follows:

Time period between cancellation and the start date of the USP / DSP reservation	**Exit Fee (percentage of the Service Fee applicable to the Product in the cancelled Purchase Order)**
[***]	[***]
[***]	[***]

The start date of the USP / DSP reservation shall be [***] days prior to the requested Delivery Date of the corresponding batch.

For the avoidance of any doubts the pre-notice provided for by this section 2 (i) and (ii) will be calculated with reference to the expected Delivery Date indicated in the Long Range Forecast.

Rentschler will use reasonable commercial efforts to allocate the reserved production capacity of the above mentioned orders to other Customer's orders. If such allocation will be successful, the Exit Fee will equal to [***] in case of 2 (i) and [***] in case of 2 (ii).

For the months [***] until [***] Customer can request the postponement of maximum [***] months of the Delivery Date of a binding purchase order by written communication without the payment of any Exit Fee. Rentschler will evaluate such postponement request and confirm Customer such postponement if practicable. Such postponement shall only become effective after confirmation by Rentschler. For the avoidance of doubt, if the postponed Delivery Date is later than month [***] of the Binding Forecast a cancellation of the batch by Customer is not possible.

3. Delivery

3.1 Delivery of FOC Material by Customer.

Customer shall deliver all FOC Materials with a notice time of at least [***] prior to the intended Delivery Date.

On written request by Customer, the Parties can agree on a Quarantined Production. In this case, Rentschler conducts a preliminary analysis (identity,

sterility and BSE / TSE) of the FOC Materials and uses the FOC Materials in the manufacture before their complete release.

3.2 Delivery of Product by Rentschler

Any delivery of Product by Rentschler to Customer or to a third Party named by Customer will be based on [***] (Incoterms 2010).

In urgent cases, Customer may request in writing to Rentschler for:

(i) a Quarantined Shipment; or

(ii) a Quarantined Production

Customer assumes all risks, responsibilities and costs associated with a Quarantined Shipment or Quarantined Production, unless the reason for the non-compliance of the Product is caused by Rentschler.

3.3 Rentschler will use their best endeavour to improve constantly the processes and the technology pertaining to the execution of this Agreement. Rentschler shall communicate the Improvements to the Steering Committee, who will evaluate in good faith if any mutual benefit may derive from the communicated Improvement.

4. Key Performance Indicators

The performance or non-performance in whatever shape or form of the agreed Key Performance Indicators (section 4.8 (vii) and 4.16 (iii) shall in no respect constitute a material breach (section 6.1 of this Agreement) of this Agreement and shall have no impact with respect to the fees (section 5 of this Schedule B). For the time being the purpose of the Key Performance Indicators shall only be to evaluate performance against mutually defined goals.

5. Fees

Customer will pay to Rentschler a Service Fee as defined in Schedule B.1 and / or fee for Additional Services following the acceptance of a Rentschler's Offer.

The Service Fee and fee for Additional Services do not contain value-added tax (VAT). If Rentschler's Services or Additional Services are subject to VAT, Customer will be charged for the VAT incurred in addition.

The Service Fee will always be invoiced in two instalments. [***] of the fees will be upon start date of vial thaw; the remaining [***] will be invoiced upon release of the respective batch of Product.

The fees for the Additional Services will be paid according to the payment schedule contained in any approved Rentschler's Offer.

All payments must be made in Euro and are payable within [***] days from date of invoice or a designated date where the payment will fall due.

Rentschler may adjust the Service Fees [***]. Any increase will be calculated with an average value based on [***] of the [***] and [***] of the [***]. If Rentschler chooses not to adjust the price for [***] or more years ("Period"), Rentschler may adjust the price on the respective next [***] as if Rentschler had made use of its right to adjust the price [***] during the Period. The decision for any potential adjustment proposal in excess of [***] will be deferred to the Steering Committee. Rentschler shall provide Customer with all the official referenced sources justifying any adjustment in accordance with this clause with a [***] Business Day notice.

6. Third Party Services

Rentschler shall agree with Customer on Third Parties **Services,** and shall contract and pay for the supply of all Third Party Services necessary to render Services in accordance with this Agreement. For all Third Party Services, Rentschler shall invoice Customer for the costs paid to the Third Party for the Third Party Services and Customer will reimburse Rentschler following the presentation of an itemized invoice, for all Third Party Services costs actually incurred by Rentschler for procurement of such Third Party Services. For the avoidance of doubt, there will be no mark-up on Third Party Services necessary to render Services in accordance with this Agreement.

7. Third Party Material

Except for FOC, Rentschler shall contract with Third Parties and pay for the supply of all Third Party Materials necessary to manufacture the Product in accordance with this Agreement. Customer will reimburse Rentschler following the presentation of an itemized invoice, for all Third Party Material costs actually incurred by Rentschler for procurement of such Third Party Materials. For the avoidance of doubt, there will be no mark-up on Third Party Materials necessary to render Services in accordance with this Agreement. For the avoidance of doubt, costs for preparation of process media and process buffers (direct labour without overhead and profit contribution) are invoiced as Third Party Material costs.

Rentschler will promptly inform Customer if it encounters supply problems, including delays and / or delivery of non-conforming Third Party Material with respect to any supply of purchased material for Manufacturing of Product and Rentschler must take reasonable measures to correct such problems and the Customer may in their discretion provide assistance in agreement with

Rentschler.Rentschler should ensure sufficient safety stocks available of any such Third Party Material based on best market practice and on Rentschler's experience with its suppliers and their respective contractual agreements. The definition of such safety stock levels should be reviewed periodically and mutually agreed by the Joint Working Team.

8. Special Costs

All costs concerning the further use or importation by Customer into a country of Territory any Product resulting from the Services are to be borne by Customer, especially administration fees connected with the marketing of the Product, even if the respective administrative authority should charge Rentschler directly. In such case, Customer ensures that the respective amounts are received by Rentschler on Rentschler's bank account within [***] calender days. Customer will inform Rentschler about any administrative requirement applicable to Rentschler of any country Customer is marketing its Product as soon as possible.

9. Additional Services

Upon request by Customer, Rentschler will perform the following Additional Services but are not limited to which are further defined as follows:

(i) stability Studies of Product;

(ii) cGMP audits as outlined in Schedule D;

(iii) inspections of Health Authorities other than EU and FDA;

(iv) accommodation of "Persons in Plant" Rentschler will accommodate and grant reasonable access during working hours for "Person in Plant" at no cost for the Customer. If such an access will exceed [***] Business Days, Rentschler will have the right to charge Customer an amount of [***] EUR for any Business Days of access in excess of [***] Business Days.

SCHEDULE B.1
Service Fees

The Service Fees are (i) for [***] batch of Product [***] EUR, (ii) for a campaign of [***] consecutive batches of Product [***] EUR, (iii) for a campaign of [***] consecutive batches of Product [***] EUR.

SCHEDULE C
LEGAL TERMS

1.

1. Scope

These terms are applicable for any engagement or order relating to the Services and Additional Services as requested by Customer and shall prevail and supersede any conflicting terms as provided by the Customer.

2. Results

2.1 Neither Party shall, as a result of this Agreement, acquire any right, title, or interest in any intellectual property that the other Party owns or controls as of the Effective Date of this Agreement, or that the other Party obtains ownership or control of separately and apart from the performance of the Services under this Agreement ("**Background Intellectual Property**").

2.2 Customer shall own exclusively all rights, titles, and interests in any and all intellectual property that Rentschler conceives, invents, reduces to practice, develops or makes, solely or jointly with Customer, in the course of performance of the Services or as a result of using Customer's Background Intellectual Property.

2.3 Notwithstanding the foregoing, Rentschler shall own all rights, titles and interests in any intellectual property regarding Know How that Rentschler develops, conceives, invents, reduces to practice or makes in the course of performance of the Services that (i) relates to the Rentschler Background Intellectual Property; (ii) Rentschler's Know How, (iii) which is severable from the Product, and (iii) does not reveal or disclose any Confidential Information of Customer.

3. Intellectual Property

3.1 For any Inventions both parties shall cooperate in good faith to allocate the rights and the costs which are associated with the possible protection of the Inventions.

3.2 If the performance of the Services and / or Additional Services requires the use of Intellectual Property Rights of Rentschler, Rentschler hereby grants to Customer the necessary rights of use to these Intellectual Property Rights solely for the marketing, distribution and sale of the Products. In addition, Rentschler grants to Customer the necessary rights of use to these Intellectual Property Rights for the manufacture of the Products by Customer itself of the Products. Such licenses are granted on a worldwide basis, non-exclusively and royalty-free, unless expressly otherwise agreed.

3.3 If the performance of this Agreement requires the use of Intellectual Property Rights of Customer or of third parties, Customer hereby grants to or procures for Rentschler the necessary rights of use to these Intellectual Property Rights solely for the performance of the Services and / or Additional Services on a worldwide basis, non-exclusively and free of fees.

All documents which Rentschler receives from Customer for the fulfilment of the Services remain the property of Customer.

Rentschler may in each case archive a copy of all documents and data produced at or in connection with the Services in copy, and will not use this archive copy for any purposes other than to abide by the relevant commercial and tax law provisions or to the extent to which these documents and this data are suitable as proof of a circumstance on the basis of which an otherwise mandatory existing liability of Rentschler, in particular pursuant to the Product Liability Act, the Medical Products Act or the Pharmaceuticals Act, could be excluded.

Notwithstanding anything to the contrary in this Agreement, Rentschler shall not be required to destroy any computer files stored securely by Rentschler that are created during automatic system back-up.

3.4 Each Party shall be obliged to acquire the inventions and rights on the inventions made under this Agreement of its employees, consultants, agents and representatives to the extent necessary to secure the other Party's rights set out in this section 3. Employee invention compensation claims arising under the German Law on Employee Inventions (Gesetz über Arbeitnehmererfindungen / ArbnErfG) and / or comparable legislation as may be applicable in other countries shall be reimbursed by the Party up to [***] EUR, that is exclusively entitled to own such invention, following the allocation of Intellectual Property Right ownership as set out in this Agreement. In case of proposed reimbursements above [***] EUR the Steering Committee shall decide on the respective reimbursement amount.

4. Defective Product

4.1 IF AND TO THE EXTENT PERMITTED BY LAW, THE PRODUCT IS DELIVERED TO CUSTOMER "AS IS" FOLLOWING COMPLETION OF THE CHECKS DESCRIBED UNDER SECTION 4.2 AND RENTSCHLER MAKES NO WARRANTIES, REPRESENTATIONS OR GUARANTEES NOR ANY TERMS AND/OR CONDITIONS OF ANY KIND WHATSOEVER, EITHER EXPRESS OR IMPLIED WHETHER BY STATUTE, COMMON LAW, CUSTOM, COURSE OF DEALING OR OTHERWISE, INCLUDING ANY EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY, NON-INFRINGEMENT, FITNESS FOR

A PARTICULAR PURPOSE. FOR THE AVOIDANCE OF ANY DOUBTS THIS PROVISION WILL NOT APPLY TO ANY HIDDEN DEFECTS OF THE PRODUCT.

4.2 Customer shall examine the Product Manufactured and delivered by or on behalf of Rentschler for compliance with the Specifications, intactness, shortage, identity or any defect without undue delay. Should any of the Products fail to meet the Specifications, or in the event of any other claim, Customer shall inform Rentschler in writing without undue delay, latest within [***] Business Days after receipt of the Product. Hidden Defects can be claimed in writing within [***] Business Days after being detected by Customer. If Customer fails to notify the defect within such period, Customer shall be deemed to have accepted the consignment.

4.3 In the event Customer notifies Rentschler within the period mentioned in section. 4.2 above that any of the Products does not conform with the Specifications or is otherwise defective and Rentschler agrees with it, Rentschler shall conduct its own evaluation within the time frame define in the Quality Technical Agreement and Schedule D. Rentschler will then repeat the Service free of charge, if Customer agrees to that. This is Customer's sole and exclusive remedy. If Rentschler fails to remedy, Rentschler will reimburse Customer for the damages caused by the default up to the limits of liabilities as described in section 5 below. If Rentschler pays the compensation, Rentschler is no longer obliged to perform the respective concerned Service.

4.4 In the event Rentschler disagrees with the results obtained by Customer the issue shall be submitted to an independent testing laboratory, jointly defined by the Steering Committee, whose decision shall be binding on both Parties. The costs of such test shall be borne by the Party found to be at fault.

5. Indemnification and Limitation of Liability

5.1 The Parties shall indemnify, defend and hold each other and their respective Affiliates, officers, employees and agents harmless from and against any and all losses, costs, damages, fees or expenses, including but not limited to claims on patent infringement and / or infringement of any third party intellectual property rights, as well as product liability claims, complaints or procedures, relating to the Product or otherwise caused by the Services or the Additional Services. ("**Losses**") incurred in connection with or arising out of any:

(i) Third Party claims, demands, suits, proceedings or causes of actions ("**Claims**") to the extent arising out of the breach of any Party to provisions of this Agreement;

(ii) Third Party Claims to the extent arising out of any neglicence or willful misconduct of the Parties in the performance of any obligations under this Agreement.

5.2 All indemnification claims in respect of any person seeking indemnification (collectively the "**Indemnitees**" and each an "**Indemnitee**") under section 5.1 shall be made by the corresponding Party (the "**Indemnified Party**"). The Indemnified Party shall give to the other Party (the "**Indemnifying Party**") prompt written notice ("**Indemnification Claim Notice**") of any Losses or the discovery of any fact upon which such Indemnified Party intends to base an indemnification request pursuant to clause 5.1. Each Indemnification Claim Notice must contain a description of the Claim and the nature and the amount of such Loss (to the extent that the nature and the amount are known at such time). Together with the Indemnification Claim Notice, the Indemnified Party shall furnish promptly to the Indemnifying Party copies of all the notices and documents (including court papers) received by any Indemnitee in connection with the Third Party Claim. The Indemnifying Party shall not be obligated to indemnify the Indemnified Party to the extent any admission or statement made by the Indemnified Party materially prejudices the defence of such Third Party Claim. Where required the Indemnifying Party shall promptly send a copy of the Indemnification Claim Notice to its relevant insurers and shall permit them to exercise rights of subrogation.

5.3 At its option the Indemnifying Party may assume control of the defence of any Third Party Claim by giving written notice to the Indemnified Party within [***] Business Days after the Indemnifying Party's receipt of an Indemnification Claim Notice.

5.4 If the Indemnifying Party chooses not to take control of the defence or prosecute any Third Party Claim, the Indemnified Party shall retain control of the defence thereof, but no Indemnified Party or Indemnitee shall admit any liability with respect to, or settle, compromise or discharge, any such Third Party Claim without the prior written consent of the Indemnifying Party, which consent shall not be unreasonably withheld or delayed.

5.5 Rentschler excludes any liability for punitive or exemplary damages, recall costs or loss of profit or indirect or consequential damages or damages on Customer Material provided that they do not depend on any wilful misconduct, gross negligence or breach of any provision of this Agreement.

5.6 The Parties overall liability, including the obligation to indemnify, arising out of or in connection with this Agreement, whether in contract or tort, statutory or otherwise is limited to the amount of [***] of the [***]. This limitation does not apply in case of liability arising out of willful misconduct or gross negligence of any of the party including death or personal injury resulting from its negligence, or any liability for fraud, fraudulent misrepresentation or any other liability that cannot be restricted by law.

5.7 If Rentschler's cooperation is required in administrative procedures, especially in procedures of admission, customs or of importation, Customer indemnifies Rentschler from any liability which may arise out of this cooperation. That applies,

in particular, in cases, where Rentschler, on Customer's request, makes statements or applications at or towards governmental authorities or where Rentschler participates in making those statements or applications.

6. Insurance

Either Party shall, at its sole cost and expense, obtain and maintain in force for the Term an adequate and suitable insurance in the minimum amounts set forth below with a reputable insurance company to cover its liability under this Agreement.

Comprehensive products liability insurance, with combined single limits of [***] EUR for each claim with respect to personal injury and / or damage to property and [***] EUR aggregate.

Upon execution of this Agreement, each Party shall furnish to the other party a written statement by the insurer evidencing such coverages referred herein that must remain in place for the entire duration of this Agreement and for [***] years after termination triggered in compliance with section 6 of the Agreement. For the avoidance of doubt, each Party is allowed to change the insurer during the validity term of this clause provided that all the conditions described in this sections are properly met.

7. Confidentiality

Each of the Parties will keep the Confidential Information of the respective other Party secret. Parties will use the Confidential Information only for the Services / Additional Services.

Each Party shall limit the disclosure of the other Party's Confidential Information to Affiliates, officers or employees, and in case of Rentschler to the employees of Rentschler, Inc., who reasonably require the same in performance of activities related to this Agreement in order to perform the Services / Additional Services and who are obligated to treat the same as confidential in the same manner and to the same extent as provided herein. The receiving Party will use its reasonable efforts to ensure that any Affiliate, employee or officer to which it discloses Confidential Information will retain such information in strict confidence. Rentschler is allowed to share the Confidential Information with those third party suppliers which are listed in the respective Offer.

The receiving Party may disclose Confidential Information to a governmental, administrative or other regulatory body or during judicial process to the extent required by mandatory law. In case of such disclosure, the receiving Party shall provide the disclosing Party – as far as legally possible - with written notice of such

request or requirement so that the disclosing Party may seek a protective order or other appropriate remedy. If the receiving Party is unable to inform the disclosing Party before the information is disclosed pursuant to this paragraph, it shall to the extent permitted by law inform the disclosing Party of the full circumstances of disclosure and the Confidential Information which has been disclosed immediately after the disclosure. The receiving Party agrees further to provide immediately notice to the disclosing Party in the case of any unauthorized use of Confidential Information.

The provisions of this section do not apply to information which receiving Party proves that:

(i) the receiving Party already knew, the prior knowledge of which it can document by prior written records;

(ii) is or becomes public knowledge other than through the receiving Party's breach of this promise of confidentiality;

(iii) the receiving Party receives in good faith from a third party not in violation of an obligation of confidentiality or

(iv) the receiving Party independently develops, discovers or arrives at without use of or reference to the Confidential Information.

For the avoidance of doubt, no provision in this Agreement shall restrict each Party's right to disclose the existence of a business relationship between the Parties to potential customers**.**

8. Force Majeure

Neither Party is liable to the other Party for failure or delay to the extent and for so long as such failure or delay results from causes beyond the reasonable control of such Party, including fires, earthquakes, floods, embargoes, wars, acts of war (whether war is declared or not), terrorist acts, insurrections, riots, civil commotion, strikes, lockouts or other labour disturbances, acts of God or other acts, omissions or delays in acting by any administrative authority or other party.

In the event of occurrence of *force majeure*, each Party will use their commercially reasonable efforts to mitigate the adverse consequences.

9. Miscellaneous

No change of this Agreement is valid unless it is in writing and signed by the Parties. This applies also to the foregoing sentence.

In case one of the clauses is invalid or unenforceable, the other clauses remain unaffected by this. The Parties shall negotiate in good faith if they wish to replace such invalid or unenforceable clause.

Any notice or request required or permitted to be given under or in connection with this Agreement or the subject matter hereof shall be given by prepaid registered or certified first class airmail, e-mail or telefax to the recipient at its address set forth on the first page of this Agreement or to such other address as may have therefore been furnished in writing by the recipient to the sending Party. Any such aforementioned notice or request concerning this Agreement shall be effective upon receipt by the Party to which it is addressed.

Neither Party may assign or transfer this Agreement or any rights or obligations hereunder, by operation or law or otherwise, without the prior written consent of the other Party, except that a Party may make such an assignment or transfer, by operation of law or otherwise, without the other Party's consent to its Affiliate(s) or to an entity that acquires all or substantially all the business of such Party, whether in a merger, consolidation, reorganization, acquisition, sale or otherwise. Notwithstanding anything to the contrary contained herein, in the event of an assignment to an Affiliate pursuant to this section 9, the assigning Party consents, acknowledges, covenants and guarantees that it shall remain jointly and severally liable, along with the assignee, to the non – assigning Party for all the obligations contained herein. This Agreement shall be binding on the successors and permitted assigns of the assigning Party, and the name of a Party appearing herein shall be deemed to include the name(s) of such Party's successors and permitted assigns to the extent necessary to carry out the intent of this Agreement. Any assignment or attempted assignment by either Party in violation of this section 9, shall be null and void and of no legal effect.

This Agreement and any potential subsequent amendment to it, may be executed in two or more counterparts, each of which shall be deemed an original and all of which shall constitute together the same instrument. In the event that any signature is delivered by facsimile transmission or by e-mail delivery of a .pdf format data file, such signature shall create a valid and binding obligation of the party executing (or on whose behalf such signature is executed) with the same force and effect as if such facsimile or ".pdf" signature page where an original thereof.

This Agreement is governed by the laws of Switzerland. All disputes out of or in connection with this Agreement and / or any Offer shall be exclusively settled by the competent court in Basel, Switzerland.

SCHEDULE D

QUALITY AGREEMENT

Current version of the Quality Agreement executed separately by the Parties
(Rentschler contract no. B15B-4301)

SCHEDULE E

COMPLIANCE

1. Compliance

For Rentschler, it is a matter of course that group members of Rentschler comply with the law and any and all other relevant provisions applicable in the countries where they operate. Rentschler expects the same from its business partners.

2. Anti-Corruption

Neither Party shall perform any actions that are prohibited by local and other anti-corruption laws that may be applicable to one or both Parties to the Agreement. Without limiting the foregoing, neither Party shall make any payments, or offer or transfer anything of value, to any government official or government employee, to any political party official or candidate for political office or to any other Third Party related to this Agreement in a manner that would violate Anti-Corruption Laws.

3. Export

Each Party hereby acknowledges that this Agreement is or might be subject to one or more export control laws, regulations or the like, and agrees that it will not transfer, export or re-export any such item, including any documentation, information or product that incorporates, is derived from or otherwise reveals such, without complying with all applicable export control laws, regulations and like, including obtaining and / or cooperating with the other Party in securing all appropriate licenses and authorizations.

Customer specifically certifies that it will not transfer, export, or re-export any item under this Agreement to any country or entity subject to export control restrictions and / or embargoes under any applicable laws, regulations and the like.

4. Dealing with Internal Knowledge, Confidentiality

In principle, company and operational secrets must be treated with confidentiality. This shall also apply to any other information (such as customer information) whose confidentiality is in the interest of Rentschler's customers.

5. Data Privacy

Both Parties must comply with the applicable statutory and operational principles regarding the protection of data regarding employees, customers, and investors. In order to protect personal data either Party must observe the necessary diligence in the context of the assigned task.

6. Documentation of Business Transactions

The documentation of any and all business transactions must be complete, transparent, and in compliance with the statutory provisions as well as with any provisions and processes.

7. Social Responsibility

Rentschler respects the dignity of every human being and is committed to the compliance with and the protection of human rights.

Rentschler does not tolerate any kind of child labor as well as any exploitation of children and adolescents. Minimum age for the admission to employment must not be under the age for the fulfilment of compulsory education and in no case under 15 (fifteen) years.

Rentschler disapproves of any form of forced labor.

8. No Discrimination

Rentschler creates a working atmosphere characterized by respectful cooperation and to strictly oppose to any kind of discrimination on grounds of race or ethnic origin, gender, religion or philosophy of life, disability, age, or sexual identity.

9. EHS (Environmental, Health and Safety)

It is Rentschler's policy to operate in a safe and responsible manner with respect to the environment and health of our employees, our customers and the communities where we operate.

Rentschler will not compromise environmental, health or safety values for other interests; value human life above all else and manage risks accordingly.

Rentschler pursues and continually improves an EHS system and processes to achieve an EHS incident-free environment.

Rentschler complies with applicable laws and set standards and for suppliers.

Rentschler uses its EHS knowledge to enhance the safety and well-being of the communities.

Rentschler
THE BIOPHARMA MANUFACTURER

COMMERCIAL SUPPLY AND SERVICES AGREEMENT
- Drug Product-

[***]

by and between

Ultragenyx Europe GmbH
Innere Margarethenstrasse 5
4051 Basel,
Switzerland

(„Customer“)

and

Rentschler Biopharma SE,
Erwin-Rentschler-Str. 21, 88471 Laupheim,
Germany

(„Rentschler“)

hereinafter called each or together "Party" or "Parties".

Preamble

WHEREAS, Rentschler has the know-how, expertise, capability, experience and the infrastructure necessary to manufacture the Drug Substance to a final Product ready for labelling subject to and in accordance with the terms hereof; and

WHEREAS, Customer is a company engaged in the pharmaceutical field focussing on development of rare disease therapies and is eager to engage Rentschler as a contract manufacturing organization for the Product (as defined hereinafter); and

WHEREAS, Customer is planning to reach commercial stage in the near term for the Product; and

WHEREAS, Rentschler has agreed to manufacture and supply certain amounts of the Product to the Customer for commercial demands in the Territory (as defined hereinafter) subject to the terms and conditions set forth herein; and

WHEREAS, Rentschler announced to discontinue the Product production.

WHEREAS, Both parties have agreed to transfer the Manufacturing of the Customer`s Product to the manufacturing site Rentschler Fill Solutions GmbH, Roemergrund 6, A-6830, Rankweil, Austria ("Rentschler Fill Solutions") and therefore limit the term of this agreement.

WHEREAS, Both Parties agree to work in a partnership model and are committed to establish the appropriate level of trust and transparency. Each Party hereto has a duty of good faith and fair dealing in connection with its performance under this Agreement. Each Party shall perform its obligations under this Agreement in a diligent, legal, ethical and professional manner so as to advance the purposes and intent of this Agreement.

NOW, THEREFORE, in consideration of the mutual covenants contained herein, and for other good and valuable consideration, the Parties agree as follows:

1. Scope of the Agreement & Schedules

1.1. Rentschler will perform on a non-exclusive basis the Services upon the terms and conditions of this Agreement as well as its Schedules.

1.2. Attached to this Commercial Supply Agreement ("**Agreement**") are the following Schedules which form an integral part of this Agreement:

Schedule A:	Definitions used in this Agreement;
Schedule B:	Commercial Terms for the Services;
Schedule B.1:	Service Fee
Schedule C:	Legal Terms, including liabilities and limitation of liabilities;
Schedule D:	Latest agreed version of the Quality Agreement defining the delineation of the pharmaceutical responsibilities. This Schedule will be executed directly between Ultragenyx Pharmaceutical Inc., part of Ultragenyx group of companies (that is providing pursuant to separate intra group agreements quality oversight and support services on behalf of the Customer) and Rentschler.
Schedule E:	Compliance
Schedule F:	**Storage Terms**

1.3. In the case of any inconsistencies between this Agreement, the Schedules and / or an Offer referring to it, this Agreement shall prevail, except for quality aspects and the definition of Territory after the Effective Date for which Schedule D shall prevail.

1.4. Neither Party shall alter or adjust this Agreement or any Schedule to it without the prior written permission of the other Party.

2. Customer's Responsibilities

2.1. Customer shall be responsible to

(i) provide complete and accurate requirements to define the Specifications;

(ii) provide Rentschler with complete and accurate information (Material Data Safety Sheet) and sufficient FOC Material necessary to perform the Services.

2.2. Customer shall supply FOC Material to Rentschler according to Schedule B in line with [***] (Incoterm 2010). Customer is responsible that such material is (i) suitable for the Manufacturing of the Product, (ii) fits for the Services and (iii) pharmaceutically compliant. Rentschler is the manufacturer of FOC Material. Rentschler will ensure on-time movement of FOC Material within their premises to allow for timely fulfilment of Services.

2.3. Both Parties shall comply with Schedule E.

3. Rentschler Responsibilities

3.1. Rentschler shall comply with cGMP and with recognized industry standards, including, but not limited to applicable ICH guidelines and the pertaining laws and regulations.

3.2. Rentschler will make available and maintain an adequate manufacturing site, validated processing equipment, the manufacturing processes for the products of the Customer in a validated state, trained and competent personnel with relevant knowledge and experience, and will ensure sufficient capacity to store the FOC material and the excipients needed and render the Services, and Manufacture of Product.

3.3. All the responsibilities and obligation listed under section 3.1. and 3.2. will be covered by Rentschler at their own expenses.

3.4. Rentschler will notify the Customer immediately but not later than within [***] Business Days in the event of any potential failure to deliver Product within the agreed time lines.

3.5. Rentschler will render the Services in a professional and workman-like manner in accordance with this Agreement, including the Quality Agreement.

3.6. Rentschler will Manufacture the Product in accordance with the terms of this Agreement and the responsibilities as set out in the Quality Agreement.

3.7. Rentschler has to provide the Customer with a [***] Material inventory report by the [***] of the year reflecting the inventory of FOC Material on the last day of the previous calendar month.

4. Transfer Activities of Customer`s Product from Rentschler to Rentschler Fill Solutions, Rankweil, Austria

4.1. Rentschler will execute the transfer of the Customer`s Product to Rentschler Fill Solutions in a compliant and timely manner. A completion of the transfer will be confirmed by the Steering Committee in accordance to section 5.

4.2. Subject to Sections 4.4 and 7.1 Rentschler will fulfil the Services of this Agreement until the transfer of the Customer`s Product to Rentschler Fill Solutions, Rankweil, Austria is successfully completed.

4.3. Rentschler shall under no circumstances charge the Customer any costs associated with the transfer of the Customer`s Product to Rentschler Fill Solutions, Rankweil, Austria.

4.4. Customer shall maintain appropriate safety stock of the Product at all times during the Term of the Agreement to mitigate the risk of a market stock out.

4.5. In case Rentschler Fill Solutions, Rankweil, Austria, fails to:

(i) Obtain a Manufacturing License from AGES,

(ii) or successfully validate the process for Customer`s Product,

(iii) or obtain FDA and EMA approval as Manufacturing Site of the Product,

(iv) or execute the transfer within the agreed timelines therefore leading to risk of patient supply,

(v) or in case of a Force Majeure event on part of Rentschler Fill Solutions,

Rentschler will provide reasonable support to transfer the Product to another site selected by the Customer until the transfer is successfully done and confirmed by the Steering Committee. The expenses for such support shall be agreed by the Steering Committee and shall be borne equally by the Parties.

5. Governance Model

5.1. The partnership model includes a Steering Committee (as described in clause 5.2) and a Joint Working Team (as described in clause 5.13) focussing on operational execution. The Joint Working Team will be led by a project / relationship manager of each Party ("**Joint Working Team Leads**").

5.2. The Parties shall establish a Steering Committee consisting of 4 (four) permanent senior management individuals ("Committee Members"). Each Party will nominate [***] Committee Members.

5.3. Either Party may replace its Committee Members by notice to the other Party.

5.4. The Committee Members shall be appropriately qualified and experienced in order to make a meaningful contribution to the Steering Committee meetings.

5.5. The purpose of the Steering Committee is to

(i) establish and maintain an effective and efficient collaboration between the Parties;

(ii) confirming the Joint Working Team Leads appointed by each Party;

(iii) oversee the transfer of the Product according to section 4.;

(iv) oversee the Joint Working Team's performance in business review meetings;

(v) evaluate in good faith and ratify any technical, business process and / or quality Improvements proposed by the Joint Working Team;

(vi) act as escalation body for issue resolution;

(vii) define the framework for continuous Improvement, mutual long-term objectives and priorities.

(viii) any other topics assigned to it in compliance with this Agreement of following the mutual decision of the Parties.

5.6. The Steering Committee shall conduct its discussions in good faith with a view to operating to the mutual benefit of the Parties.

5.7. The Steering Committee shall meet as often as the Committee Members may determine (to this purpose the request of the Committee Members of each Party would be sufficient), but in any event no less than [***] per Calendar Year. Meetings can be held face-to-face or by teleconference, with minimum [***] per year. Either Party may request a meeting within [***] Business Days in urgent cases.

5.8. The agenda (including, any pre-read material) shall be distributed to the participants at the latest [***] Business Days prior to the meeting. In addition to any other topics to be discussed in the agenda of the relevant meeting, the following matters shall be invariably discussed during the meetings of the Steering Committee:

(i) company updates and strategic outlooks;

(ii) decisions requested from the Joint Steering Committee;

(iii) performance review (services, quality, relationship, financials);

(iv) performance review of the Joint Working Team;

(v) risk evaluation and associated risk mitigation projects;

(vi) all transfer activities according to Section 4;

(vii) review status of past meeting action items;

5.9. Each Party may invite individuals with special skills to attend such meetings where it is considered to be relevant and appropriate.

5.10. All decisions of the Steering Committee shall be made in good faith in the best interests of this Agreement and require a unanimous vote. In the event that the Steering Committee is unable to reach a decision on any matter after good faith attempts to resolve such disagreement in a commercially reasonable fashion and in any event if the Steering Committee is unable to decide within [***] Business Days, then such matter should be referred to the Executive Leadership of both Parties, who together shall use reasonable and good faith efforts to reach a decision by consensus within [***] Business Days after such matter is referred to them.

5.11. If the Executive Leadership does not reach consensus in accordance with clause 4.10., either Party may commence dispute resolution proceedings in accordance with the relevant provisions set out in this Agreement.

5.12. The Steering Committee shall take minutes of its meetings and resolutions, which shall be promptly circulated to the Parties after each meeting for agreement. In case of any disagreement clauses 5.10. and 5.11. shall apply.

5.13. The Parties shall establish a Joint Working Team, consisting of subject matter experts at minimum in the field of manufacturing operations, quality ("**Joint Working Team Members**").

5.14. Either Party may replace its Joint Working Team Members by notice to the other Party.

5.15. The Joint Working Team Members shall be appropriately qualified and experienced in order to make a meaningful contribution to the Joint Working Team meetings.

5.16. The purpose of the Joint Working Team is to:

(i) drive and improve performance of Services including the Yield, and the Joint Working Team;

(ii) deliver on Service goals;

(iii) track yield of the delivered batches

(iv) manage and reduce aggregate risk, including lead times and safety stock management of Third Party Material;

(v) manage issues related to Services;

(vi) maintain a collaborative and constructive relationship (at operational level);

(vii) potentially propose any Improvement to the Steering Committee;

(viii) closely monitor all transfer activities according to Section 4.

5.17. The Joint Working Team shall conduct its discussion in good faith with a view to operating to the mutual benefit of the Parties.

5.18. The Joint Working Team shall meet as often as the Joint Working Team Members may determine, but in any event no less than [***]. Meetings can be held face-to-face or by teleconference, with minimum [***] per year.

5.19. In addition to any other topics to be discussed in the agenda of the relevant meeting, the following matters shall be invariably discussed during the Joint Working Team meetings:

(i) team member updates;

(ii) performance review (services, quality, relationship, financials);

(iii) risk evaluation and associated risk mitigation projects;

(iv) review status of past meeting action items.

5.20. The Joint Working Team Members may invite individuals with special skills to attend such meetings where it is considered to be relevant and appropriate. Individuals belonging to a third party have to be mutually agreed. These invited individuals do not have voting powers.

5.21. The quorum for the validity of the Joint Working Team meetings shall be [***] for each Party.

5.22. All decisions of the Joint Working Team shall be made in good faith in the best interests of this Agreement and require a unanimous vote. In the event that the Joint Working Team is unable to reach a decision on any matter after good faith attempts to resolve such disagreement in a commercially reasonable fashion. Then such matter should be referred to and decided by the Steering Committee in a timely manner.

5.23. The Joint Working Team shall take minutes of its meetings and resolutions, which shall be promptly circulated to the Parties after each meeting for agreement.

6. Financial Audits

In case of Customer's doubts of Rentschler's compliance with respect to FOC Material and Third Party Material inventory management, Rentschler shall make available to Customer or to a certified public accountant ("**CPA**") reasonably acceptable to Rentschler, upon Customer's reasonable request and with an appropriate period of notice during the regular office hours during the Term (or after the Term for activities started during the Term but with effects after the Term), books, records and other documentation relevant to the Services. For the avoidance of doubt Customer shall bear the cost of the CPA.

7. Term and Termination

This Agreement is effective as of the last date of signature by the Parties ("**Effective Date**") and will expire on December 31, 2025 without further written termination notice.

The Parties agree that the last Product will be produced by Rentschler no later than the 30th of June 2019 ("**Production End Date**")

If any of the following events will materialize:

(i) risk of supply to patients ascertained by the Steering Committee despite Customers fulfilment of its obligation in Section 4.4;

(ii) any of the events listed under clause 4.5 from (i) to (v);

(iii) delay in successfully completing the transfer of the Product as per clause 4.6.

the Parties shall use commercially reasonable efforts to extend the Production End Date. For the avoidance of doubt, commercially reasonable efforts does not include technical renewal or major repair efforts with respect to the production facility. Customer acknowledges that Rentschler depends on official measures of the supervisory competent authority, which Rentschler can only partially influence and which could preclude an extension of the Production End Date. In such case Rentschler will have to show to the Customer official documentation from the competent authorities which prohibits an extension of the Production End Date.

7.1. Each Party shall be entitled to terminate this Agreement with immediate effect if:

(i) any requirement / obligation mentioned in Schedule E is violated / breached by the respective other Party and / or its Affiliates;
(ii) a Material Change in Control and Business Model of the respective other Party;
(iii) the respective other Party infringes Party's Intellectual Property Rights.

7.2. Customer shall be entitled to terminate this Agreement with immediate effect if Rentschler loses the right to operate under this Agreement following any decision from the competent authorities and / or revocation of the necessary approvals / regulatory permits (including FDA taking control of Rentschler following a consent decree).

7.3. Unless otherwise agreed in writing termination or expiration of this Agreement for any reason shall not relieve either Party or its Affiliates from their obligations under this Agreement until the date of such termination or expiration or to perform such obligations as described in Schedule E) that will survive for [***] years after the expiration or termination of this Agreement.

7.4. Either Party may terminate this agreement at any time if Rentschler is unable to deliver the Services agreed in this Agreement. In the event of Force Majeure for a period greater than [***] consecutive calendar months.

Rentschler Biopharma SE Date: January 31, 2018 Signature: /s/ Klaus Schoepe Name: Dr. Klaus Schoepe Position: SVP Project Management		If second signature is required: Date: January 31, 2018 Signature: /s/ Thomas Lottner Name: Thomas Lottner Position: VP Commercial Management
Ultragenyx Europe GmbH Date: January 23, 2018 Signature: /s/ Stefano Portolano Name: Stefano Portolano Position: Regional Head, Europe		If second signature is required: Date: January 16, 2018 Signature: /s/ Shalini Sharp Name: Shalini Sharp Position: CFO

SCHEDULE A

DEFINITIONS

- **Additional Services** means any service specifically qualified as an additional service in any approved Rentschler Offer, except all activities involved in converting FOC Material into Product and according to the quality standards set forth in the Quality Agreement including costs of in-process control, quality assurance, quality control and release, deviation and complaint handling, storage of FOC Material until delivery notice, storage of purchased material procured by Rentschler and of Product until delivery notice, disposal of waste.
- **Affiliate** shall mean with respect to a Party, any person, corporation, company, partnership or other entity that controls, is controlled by, or is under common control with that Party. For the purpose of this definition, "control" shall mean direct ownership of [***] of the shares of stock entitled to vote for the election of directors, in the case of a corporation, or [***] of the equity interest in the case of any other type of legal entity, status as a general partner in any partnership, or any other arrangement whereby the entity or person controls or has the right to control the board of directors or equivalent governing body of a corporation or other entity, or the ability to cause the direction of the management or policies of a corporation or other entity.
- **Business Day** shall mean each day of the week save for Saturday, Sunday and public holidays in Germany or Switzerland or the United States of America.
- **Calendar Year** shall mean a period of 12 (twelve) consecutive months corresponding to the calendar year commencing on the first day of January.
- **Confidential Information** means contents of this Agreement and any information regarding the other Party's business and / or its Affiliates' business as well as information relating to the Product disclosed by one Party and / or its Affiliates to the other Party pursuant to this Agreement.
- **Delivery Date** means the date of delivery requested by Customer in a Purchase Order.
- **Drug Product** means Customer's FOC Material with excipients filled into glass vials under cGMP conditions for human use.
- **Drug Substance** means Customer's active pharmaceutical ingredient manufactured under GMP condition for human use.
- **Equipment means** any equipment system to support manufacturing and / or packaging of Customer's Product.
- **Executive Leadership** shall mean for the purpose of this Agreement the Chief Technical Operations Officer of the Customer and the Chief Executive Officer of Rentschler respectively (or whoever is on these roles ad interim).

- **Exit Fee** shall mean the fee to be paid by the Customer in accordance with the provision of section 2 of Schedule B.
- **Facility** shall mean Rentschler's manufacturing facilities located in Laupheim, Germany.
- **Final Release** shall mean Product is quality released by Customer or Customer's delegate as per the Quality Agreement in Schedule D.
- **FOC (Free of Charge) Material** means Drug Substance manufactured by Rentschler and other materials supplied by Customer to Rentschler free of charge.
- **Force Majeure** shall have the meaning as provided in Schedule C, Section 8.
- **Good Manufacturing Practices** or **cGMP** means the current good manufacturing practices including EU GMP Guide, 21 CFR, ICH Q7A, 21 CFR, EU guide and their current official interpretations applicable to the manufacturing of Product.
- **Hidden Defects** means a defect of FOC Material or Product already present at the time of delivery but not detectable at the time of the inspection.
- **Improvement** means technical and business process optimization that is beneficial for the manufacturing process, product quality, financial aspect or supply of Customer's Product.
- "**Intellectual Property Rights**" means rights in patents, patent applications (including all utility and design patents and patent applications), inventions, trademarks, service marks, trade names, internet domain names, rights in designs, rights in get-up and trade dress, goodwill and the right to sue for passing off or unfair competition, copyrights, (including all computer applications, programs and other software, including without limitation operating software, network software, firmware, middleware, and design software rights in computer software and databases), database rights, industrial property rights, moral rights of authors, rights to use, and protect the confidentiality of, confidential information (including know-how and trade secrets), utility models, any common law rights arising from use of the foregoing, all rights of renewal, continuations, divisions, extensions and the like relating to the foregoing, and other intellectual property rights, in each case whether registered or unregistered and including any applications and rights to apply for the grant of any such rights and all rights and forms of protection having an equivalent or similar effect anywhere in the world.
- **Joint Working Team Members** shall mean the team selected by the Steering Committee in accordance with the criteria set out under section 5.13 of this Agreement.
- **Manufacture or Manufacturing** means compounding, filling or processing, producing, testing and packaging of FOC Material and purchased material to obtain Customer's Product by Rentschler in accordance to the Product specification.

- **Material Change in Control or Business Model** shall mean any of the following: (i) the sale or disposition of all or substantially all of the assets of a Party to a Third Party, (ii) the acquisition by a Third Party, of more than [***] of a Party's outstanding shares of voting capital stock (e.g. capital stock entitled to vote generally for the election of directors), or (iii) the merger or consolidation of a Party with or into another corporation. References in this definition to a Third Party shall also include Affiliates in case Affiliate has no comparable financial resources and financial reputation as Customer or Rentschler has.

- **Offer** shall mean Rentschler's quotation containing the details of the proposed Services subject to Customer's binding order.

- **On-Time Delivery** shall mean Product released by Rentschler as per Schedule D (Quality Agreement).

- **Product** shall mean the Drug Product manufactured by Rentschler.

- **Purchase Order** shall mean a firm order placed by Customer issued by Customer with a corresponding purchase order number to Rentschler reflecting forecasted Services within the Binding Forecast.

- **Quality Agreement** shall be drafted substantially in the same form as **Schedule D.**

- **Quarantined Production** means a Manufacturing of Product with any material not released by the quality department of Rentschler before such Manufacturing. Such Manufacturing requires explicit request by Customer.

- **Quarantined Shipment** means a shipment of Product before the quality release by Rentschler in accordance with the Quality Agreement.

- **Rentschler Know-How** means all know-how or intellectual property relating to Rentschler's background know-how in the field of the Manufacturing and Rentschler's operations of drug delivery, medical devices, drug process development services as well as regulatory, fill and finish, packaging and quality issues.

- **Rentschler Offer** means any quote proposed for Additional Services approved by the Customer.

- **Services** means all activities related to Manufacturing of Customer's Product as described in this Agreement and Schedule D which do not include Additional Services.

- **Service Fee** means the fee paid by the Customer for each Services as itemized in **Schedule B.1** in this Agreement and includes all activities involved in converting FOC Material into Product and according to the quality standards set forth in the Technical Quality Agreement including costs of in-process control, quality

assurance, quality control and release, storage of FOC Material and Third Party Material procured by Rentschler, disposal of waste.

- **Specifications** means the written Product specifications as mutually agreed.
- **Steering Committee** shall mean the committee selected by the Parties in accordance with the criteria set out under section 5 of this Agreement.
- **Storage Fee** shall have the meaning provided in Schedule F.
- **Third Party** means any Person other than Customer, Rentschler and their respective Affiliates.
- **Third Party Material** means all materials procured by Rentschler for the Manufacturing of the Product.
- **Technical Release** means the release of the Product by Rentschler and the Customer in accordance with Schedule D.
- **Territory** shall mean the following countries: EU, USA, Brazil, Mexico, Colombia, Chile, Japan, Turkey or any different country as agreed by the Parties in the Quality Agreement during the term of this Agreement after the Effective Date.
- **Yield** shall mean the number of vials manufactured in a production batch.
-

SCHEDULE B

COMMERCIAL TERMS

1. Order Processing

Rentschler will quote the Additional Services to Customer by written Rentschler Offer referring to this Agreement.

Upon agreement between the Parties about such Rentschler Offer, Rentschler will provide the Additional Services as described in the respective Rentschler Offer.

2. Forecast and Purchase Orders

The Parties hereby establish a forecast procedure, comprising a binding rolling forecast period and a non-binding long-term range as follows:

Customer will provide a good faith rolling forecast covering the current plus next [***] no later than the [***] calendar day of [***], specifying the Product, the ordered quantity, number of batches and the expected Delivery Date ("**Forecast**") together with the related Purchase Order. Rentschler will confirm the Forecast and the Purchase Order to Customer within [***] Business Days after the receipt of such a Forecast and Purchase Order. The [***] months of the Forecast shall be binding to both Parties as to the quantity of the Product, number of batches and the Delivery Date ("**Binding Forecast**").

If Customer cancels any Purchase Order already issued within the Binding Forecast period, Customer shall pay an Exit Fee as follows:

Time period of cancellation, rescheduling prior starting Manufacturing	**Exit Fee (percentage of the Service Fee applicable to the Product in the cancelled Purchase Order)**
[***]	[***]
[***]	[***]

In case an order is cancelled by Customer and needs to be rescheduled within the Binding Forecast period both Parties agree to find in good faith an alternative Manufacturing schedule for the respective Purchase Order in good faith.

Rentschler will use reasonable commercial efforts to allocate the reserved production capacity of the above mentioned orders to other customers' orders. If such allocation will be successful, the Exit Fee will equal to [***].

3. Delivery

3.1 Delivery of FOC Material by Customer.

Customer shall deliver all FOC Materials with a notice time of at least [***] prior to the intended Delivery Date with the exception of Drug Substance manufactured by Rentschler.

On written request by Customer, the Parties can agree on a Quarantined Production.

3.2 Delivery of Product by Rentschler

Any delivery of Product by Rentschler to Customer or to a third Party named by Customer will be based on [***] (Incoterms 2010). Rentschler will package the Product in the manner appropriate for transport in line with FCA requirements and the Quality Agreement or mutually agreed shipping procedures. In case Customer has special requirements for transport packaging, Customer shall inform Rentschler about such requirements in a timely manner. If agreed between the Parties such special packing requirements shall be documented in writing in a separate document between the Parties.

In urgent cases, Customer may request in writing to Rentschler for:

(i) a Quarantined Shipment; or

(ii) a Quarantined Production

Customer assumes all risks, responsibilities and costs associated with a Quarantined Shipment or Quarantined Production, unless the reason for the non-compliance of the Product is caused by Rentschler.

3.3 Within [***] Business Days following notification of Technical Release, Rentschler and Customer shall agree if Rentschler shall either (a) place Product with a common carrier for delivery to Customer or a third party as directed by Customer, or (b) store the applicable Product at the Facility or other mutually agreed location according to Schedule F.

4. Fees

Customer will pay to Rentschler a Service Fee according to Schedule B.1 and / or fee for Additional Services following the acceptance of a Rentschler's Offer.

The Service Fee and fee for Additional Services do not contain value-added tax (VAT). If Rentschler's Services or Additional Services are subject to VAT, Customer will be charged for the VAT incurred in addition.

The Service Fee will paid upon Technical Release of the respective batch of Product.

The fees for the Additional Services will be paid according to the payment schedule contained in any approved Rentschler's Offer.

All Payments must be made in Euro and are payable within [***] days from date of invoice or a designated date where the payment will fall due.

Rentschler may adjust the Service Fees [***]. Any increase will be calculated with an average value based on [***] of the [***] and [***] of the [***]. If Rentschler chooses not to adjust the price for [***] or more years ("**Period**"), Rentschler may adjust the price on the respective next [***] as if Rentschler had made use of its right to adjust the price [***] during the Period. The decision for any potential adjustment proposal in excess of [***] will be deferred to the Steering Committee. Rentschler shall provide Customer with all the official referenced sources justifying any adjustment in accordance with this clause with a [***] Business Day notice.

5. Third Party Material

All Services requiring materials which are purchased, procured, stored and tested by Rentschler shall be at Rentschler's own expense and are subject to correct and punctual supply of Rentschler's respective suppliers.

Rentschler will promptly inform Customer if it encounters supply problems, including delays and / or delivery of non-conforming Third Party Material with respect to any supply of purchased material for Manufacturing of Product and Rentschler must take reasonable measures to correct such problems and the Customer may in their discretion provide assistance in agreement with Rentschler. Rentschler should ensure sufficient safety stocks available of any such Third Party Material based on best market practice and on Rentschler's experience with its suppliers and their respective contractual agreements. The definition of such safety stock levels should be reviewed periodically and mutually agreed by the Joint Working Team.

6. Special Costs

All costs concerning the further use or importation by Customer into a country of Territory any Product resulting from the Services are to be borne by Customer, especially administration fees connected with the marketing of the Product, even if

the respective administrative authority should charge Rentschler directly. In such case, Customer ensures that the respective amounts are received by Rentschler on Rentschler's bank account within [***] calender days. Customer will inform Rentschler about any administrative requirement applicable to Rentschler of any country Customer is marketing its Product as soon as possible.

7. Additional Services

Upon request by Customer, Rentschler will perform the following Additional Services but not limited, which are further defined as follows:

(i) stability Studies of Product;

(ii) cGMP audits as outlined in Schedule D;

(iii) inspections of Health Authorities [***] and FDA;

(iv) accommodation of "Persons in Plant" Rentschler will accommodate and grant reasonable access during working hours for "Person in Plant" at no cost for the Customer. If such an access will exceed [***] Business Days, Rentschler will have the right to charge Customer an amount of [***] EUR for any Business Days of access in excess of [***] Business Days.

SCHEDULE B.1
Service Fee

	Service Fee in EUR
Production of [***] max. [***] vials GMP-batch Preparation / formulation / pooling / filtration / aseptic filling / capping / visual inspection / in-process control / quality control and release testing (incl. methods performed externally) / quality assurance / storage of Third Party Material procured by Rentschler / disposal of waste.	

SCHEDULE C
LEGAL TERMS

1.

1. Scope

These terms are applicable for any engagement or order relating to the Services and Additional Services as requested by Customer and shall prevail and supersede any conflicting terms as provided by the Customer.

2. Results

2.1 Neither Party shall, as a result of this Agreement, acquire any right, title, or interest in any intellectual property that the other Party owns or controls as of the Effective Date of this Agreement, or that the other Party obtains ownership or control of separately and apart from the performance of the Services under this Agreement ("**Background Intellectual Property**").

2.2 Customer shall own exclusively all rights, titles, and interests in any and all intellectual property that Rentschler conceives, invents, reduces to practice, develops or makes, solely or jointly with Customer, in the course of performance of the Services or as a result of using Customer's Background Intellectual Property.

2.3 Notwithstanding the foregoing, Rentschler shall own all rights, titles and interests in any intellectual property regarding Know How that Rentschler develops, conceives, invents, reduces to practice or makes in the course of performance of the Services that (i) relates to the Rentschler Background Intellectual Property; (ii) Rentschler's Know How, (iii) which is severable from the Product, and (iii) does not reveal or disclose any Confidential Information of Customer.

3. Intellectual Property

3.1 For any Inventions both parties shall cooperate in good faith to allocate the rights and the costs which are associated with the possible protection of the Inventions.

3.2 If the performance of the Services and / or Additional Services requires the use of Intellectual Property Rights of Rentschler, Rentschler hereby grants to Customer the necessary rights of use to these Intellectual Property Rights solely for the marketing, distribution and sale of the Products. In addition, Rentschler grants to Customer the necessary rights of use to these Intellectual Property Rights for the manufacture of the Products by Customer itself of the Products. Such licenses are granted on a worldwide basis, non-exclusively and royalty-free, unless expressly otherwise agreed.

3.3 If the performance of this Agreement requires the use of Intellectual Property Rights of Customer or of third parties, Customer hereby grants to or procures for Rentschler the necessary rights of use to these Intellectual Property Rights solely

for the performance of the Services and / or Additional Services on a worldwide basis, non-exclusively and free of fees.

All documents which Rentschler receives from Customer for the fulfilment of the Services remain the property of Customer.

Rentschler may in each case archive a copy of all documents and data produced at or in connection with the Services in copy, and will not use this archive copy for any purposes other than to abide by the relevant commercial and tax law provisions or to the extent to which these documents and this data are suitable as proof of a circumstance on the basis of which an otherwise mandatory existing liability of Rentschler, in particular pursuant to the Product Liability Act, the Medical Products Act or the Pharmaceuticals Act, could be excluded.

Notwithstanding anything to the contrary in this Agreement, Rentschler shall not be required to destroy any computer files stored securely by Rentschler that are created during automatic system back-up.

3.4 Each Party shall be obliged to acquire the inventions and rights on the inventions made under this Agreement of its employees, consultants, agents and representatives to the extent necessary to secure the other Party's rights set out in this Section 3. Employee invention compensation claims arising under the German Law on Employee Inventions (Gesetz über Arbeitnehmererfindungen / ArbnErfG) and / or comparable legislation as may be applicable in other countries shall be reimbursed by the Party up to [***] EUR, that is exclusively entitled to own such invention, following the allocation of Intellectual Property Right ownership as set out in this Agreement. In case of proposed reimbursements above [***] EUR the Steering Committee shall decide on the respective reimbursement amount.

4. Defective Product

4.1 IF AND TO THE EXTENT PERMITTED BY LAW, THE PRODUCT IS DELIVERED TO CUSTOMER “AS IS” FOLLOWING COMPLETION OF THE CHECKS DESCRIBED UNDER SECTION 4.2 AND RENTSCHLER MAKES NO WARRANTIES, REPRESENTATIONS OR GUARANTEES NOR ANY TERMS AND/OR CONDITIONS OF ANY KIND WHATSOEVER, EITHER EXPRESS OR IMPLIED WHETHER BY STATUTE, COMMON LAW, CUSTOM, COURSE OF DEALING OR OTHERWISE, INCLUDING ANY EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY, NON-INFRINGEMENT, FITNESS FOR A PARTICULAR PURPOSE. FOR THE AVOIDANCE OF ANY DOUBTS THIS PROVISION WILL NOT APPLY TO ANY HIDDEN DEFECTS OF THE PRODUCT.

4.2 Customer shall examine the Product Manufactured and delivered by or on behalf of Rentschler for compliance with the Specifications, intactness, shortage, identity or any defect without undue delay. Should any of the Products fail to meet the Specifications, or in the event of any other claim, Customer shall inform Rentschler in writing without undue delay, latest within [***] Business Days after receipt of the Product. Hidden Defects can be claimed in writing within [***] Business Days after

being detected by Customer. If Customer fails to notify the defect within such period, Customer shall be deemed to have accepted the consignment.

4.3 In the event Customer notifies Rentschler within the period mentioned in section. 4.2 above that any of the Products does not conform with the Specifications or is otherwise defective and Rentschler agrees with it, Rentschler shall conduct its own evaluation within the time frame define in the Quality Technical Agreement and Schedule D. Rentschler will then repeat the Service free of charge, if Customer agrees to that. This is Customer's sole and exclusive remedy. If Rentschler fails to remedy, Rentschler will reimburse Customer for the damages caused by the default up to the limits of liabilities as described in section 5 below. If Rentschler pays the compensation, Rentschler is no longer obliged to perform the respective concerned Service.

4.4 In the event Rentschler disagrees with the results obtained by Customer the issue shall be submitted to an independent testing laboratory, jointly defined by the Steering Committee, whose decision shall be binding on both Parties. The costs of such test shall be borne by the Party found to be at fault.

5. Indemnification and Limitation of Liability

5.1 The Parties shall indemnify, defend and hold each other and their respective Affiliates, officers, employees and agents harmless from and against any and all losses, costs, damages, fees or expenses, including but not limited to claims on patent infringement and / or infringement of any third party intellectual property rights, as well as product liability claims, complaints or procedures, relating to the Product or otherwise caused by the Services or the Additional Services. ("**Losses**") incurred in connection with or arising out of any:

(i) Third Party claims, demands, suits, proceedings or causes of actions ("**Claims**") to the extent arising out of the breach of any Party to provisions of this Agreement;

(ii) Third Party Claims to the extent arising out of any neglicence or willful misconduct of the Parties in the performance of any obligations under this Agreement.

5.2 All indemnification claims in respect of any person seeking indemnification (collectively the "**Indemnitees**" and each an "**Indemnitee**") under section 5.1) shall be made by the corresponding Party (the "**Indemnified Party**"). The Indemnified Party shall give to the other Party (the "**Indemnifying Party**") prompt written notice ("**Indemnification Claim Notice**") of any Losses or the discovery of any fact upon which such Indemnified Party intends to base an indemnification request pursuant to clause 5.1. Each Indemnification Claim Notice must contain a description of the Claim and the nature and the amount of such Loss (to the extent that the nature and the amount are known at such time). Together with the Indemnification Claim Notice, the Indemnified Party shall furnish promptly to the Indemnifying Party

copies of all the notices and documents (including court papers) received by any Indemnitee in connection with the Third Party Claim. The Indemnifying Party shall not be obligated to indemnify the Indemnified Party to the extent any admission or statement made by the Indemnified Party materially prejudices the defence of such Third Party Claim. Where required the Indemnifying Party shall promptly send a copy of the Indemnification Claim Notice to its relevant insurers and shall permit them to exercise rights of subrogation.

5.3 At its option the Indemnifying Party may assume control of the defence of any Third Party Claim by giving written notice to the Indemnified Party within [***] Business Days after the Indemnifying Party's receipt of an Indemnification Claim Notice.

5.4 If the Indemnifying Party chooses not to take control of the defence or prosecute any Third Party Claim, the Indemnified Party shall retain control of the defence thereof, but no Indemnified Party or Indemnitee shall admit any liability with respect to, or settle, compromise or discharge, any such Third Party Claim without the prior written consent of the Indemnifying Party, which consent shall not be unreasonably withheld or delayed.

5.5 Rentschler excludes any liability for punitive or exemplary damages, recall costs or loss of profit or indirect or consequential damages or damages on Customer Material provided that they do not depend on any wilful misconduct, gross negligence or breach of any provision of this Agreement.

5.6 The Parties overall liability, including the obligation to indemnify, arising out of or in connection with this Agreement, whether in contract or tort, statutory or otherwise is limited to the amount of [***] of the [***]. This limitation does not apply in case of liability arising out of willful misconduct or gross negligence of any of the party including death or personal injury resulting from its negligence, or any liability for fraud, fraudulent misrepresentation or any other liability that cannot be restricted by law.

5.7 If Rentschler's cooperation is required in administrative procedures, especially in procedures of admission, customs or of importation, Customer indemnifies Rentschler from any liability which may arise out of this cooperation. That applies, in particular, in cases, where Rentschler, on Customer's request, makes statements or applications at or towards governmental authorities or where Rentschler participates in making those statements or applications.

6. Insurance

Either Party shall, at its sole cost and expense, obtain and maintain in force for the Term an adequate and suitable insurance in the minimum amounts set forth below with a reputable insurance company to cover its liability under this Agreement.

Comprehensive products liability insurance, with combined single limits of [***] EUR for each claim with respect to personal injury and / or damage to property and [***] EUR aggregate.

Upon execution of this Agreement, each Party shall furnish to the other party a written statement by the insurer evidencing such coverages referred herein that must remain in place for the entire duration of this Agreement and for [***] years after termination triggered in compliance with section 7 of the Agreement. For the avoidance of doubt, each Party is allowed to change the insurer during the validity term of this clause provided that all the conditions described in this sections are properly met.

7. Confidentiality

Each of the Parties will keep the Confidential Information of the respective other Party secret. Parties will use the Confidential Information only for the Services / Additional Services.

Each Party shall limit the disclosure of the other Party's Confidential Information to Affiliates, officers or employees, and in case of Rentschler to the employees of Rentschler, Inc., who reasonably require the same in performance of activities related to this Agreement in order to perform the Services / Additional Services and who are obligated to treat the same as confidential in the same manner and to the same extent as provided herein. The receiving Party will use its reasonable efforts to ensure that any Affiliate, employee or officer to which it discloses Confidential Information will retain such information in strict confidence. Rentschler is allowed to share the Confidential Information with those third party suppliers which are listed in the respective Offer.

The receiving Party may disclose Confidential Information to a governmental, administrative or other regulatory body or during judicial process to the extent required by mandatory law. In case of such disclosure, the receiving Party shall provide the disclosing Party – as far as legally possible - with written notice of such request or requirement so that the disclosing Party may seek a protective order or other appropriate remedy. If the receiving Party is unable to inform the disclosing Party before the information is disclosed pursuant to this paragraph, it shall to the extent permitted by law inform the disclosing Party of the full circumstances of disclosure and the Confidential Information which has been disclosed immediately after the disclosure. The receiving Party agrees further to provide immediately notice to the disclosing Party in the case of any unauthorized use of Confidential Information.

The provisions of this Section do not apply to information which receiving Party proves that:

(i) the receiving Party already knew, the prior knowledge of which it can document by prior written records;

(ii) is or becomes public knowledge other than through the receiving Party's breach of this promise of confidentiality;

(iii) the receiving Party receives in good faith from a third party not in violation of an obligation of confidentiality or

(iv) the receiving Party independently develops, discovers or arrives at without use of or reference to the Confidential Information.

For the avoidance of doubt, no provision in this Agreement shall restrict each Party's right to disclose the existence of a business relationship between the Parties to potential customers**.**

8. Force Majeure

Neither Party is liable to the other Party for failure or delay to the extent and for so long as such failure or delay results from causes beyond the reasonable control of such Party, including fires, earthquakes, floods, embargoes, wars, acts of war (whether war is declared or not), terrorist acts, insurrections, riots, civil commotion, strikes, lockouts or other labour disturbances, acts of God or other acts, omissions or delays in acting by any administrative authority or other party.

In the event of occurrence of Force Majeure, each Party will use their commercially reasonable efforts to mitigate the adverse consequences.

9. Miscellaneous

No change of this Agreement is valid unless it is in writing and signed by the Parties. This applies also to the foregoing sentence.

In case one of the clauses is invalid or unenforceable, the other clauses remain unaffected by this. The Parties shall negotiate in good faith if they wish to replace such invalid or unenforceable clause.

Any notice or request required or permitted to be given under or in connection with this Agreement or the subject matter hereof shall be given by prepaid registered or certified first class airmail, e-mail or telefax to the recipient at its address set forth on the first page of this Agreement or to such other address as may have therefore been furnished in writing by the recipient to the sending Party. Any such aforementioned notice or request concerning this Agreement shall be effective upon receipt by the Party to which it is addressed.

Neither Party may assign or transfer this Agreement or any rights or obligations hereunder, by operation or law or otherwise, without the prior written consent of the other Party, except that a Party may make such an assignment or transfer, by operation of law or otherwise, without the other Party's consent to its Affiliate(s) or to an entity that acquires all or substantially all the business of such Party, whether in a merger, consolidation, reorganization, acquisition, sale or otherwise. Notwithstanding anything to the contrary contained herein, in the event of an assignment to an Affiliate pursuant to this section 9, the assigning Party consents, acknowledges, covenants and guarantees that it shall remain jointly and severally

liable, along with the assignee, to the non – assigning Party for all the obligations contained herein. This Agreement shall be binding on the successors and permitted assigns of the assigning Party, and the name of a Party appearing herein shall be deemed to include the name(s) of such Party's successors and permitted assigns to the extent necessary to carry out the intent of this Agreement. Any assignment or attempted assignment by either Party in violation of this section 9, shall be null and void and of no legal effect.

This Agreement and any potential subsequent amendment to it, may be executed in two or more counterparts, each of which shall be deemed an original and all of which shall constitute together the same instrument. In the event that any signature is delivered by facsimile transmission or by e-mail delivery of a .pdf format data file, such signature shall create a valid and binding obligation of the party executing (or on whose behalf such signature is executed) with the same force and effect as if such facsimile or ".pdf" signature page where an original thereof.

This Agreement is governed by the laws of Switzerland. All disputes out of or in connection with this Agreement and / or any Offer shall be exclusively settled by the competent court in Basel, Switzerland.

SCHEDULE D

QUALITY AGREEMENT

Current version of the Quality Agreement executed separately by the Parties
(Rentschler contract no. B15B-4301)

SCHEDULE E

COMPLIANCE

1. Compliance

For Rentschler, it is a matter of course that group members of Rentschler comply with the law and any and all other relevant provisions applicable in the countries where they operate. Rentschler expects the same from its business partners.

2. Anti-Corruption

Neither Party shall perform any actions that are prohibited by local and other anti-corruption laws that may be applicable to one or both Parties to the Agreement. Without limiting the foregoing, neither Party shall make any payments, or offer or transfer anything of value, to any government official or government employee, to any political party official or candidate for political office or to any other Third Party related to this Agreement in a manner that would violate Anti-Corruption Laws.

3. Export

Each Party hereby acknowledges that this Agreement is or might be subject to one or more export control laws, regulations or the like, and agrees that it will not transfer, export or re-export any such item, including any documentation, information or product that incorporates, is derived from or otherwise reveals such, without complying with all applicable export control laws, regulations and like, including obtaining and / or cooperating with the other Party in securing all appropriate licenses and authorizations.

Customer specifically certifies that it will not transfer, export, or re-export any item under this Agreement to any country or entity subject to export control restrictions and / or embargoes under any applicable laws, regulations and the like.

4. Dealing with Internal Knowledge, Confidentiality

In principle, company and operational secrets must be treated with confidentiality. This shall also apply to any other information (such as customer information) whose confidentiality is in the interest of Rentschler's customers.

5. Data Privacy

Both Parties must comply with the applicable statutory and operational principles regarding the protection of data regarding employees, customers, and investors.

In order to protect personal data either Party must observe the necessary diligence in the context of the assigned task.

6. Documentation of Business Transactions

The documentation of any and all business transactions must be complete, transparent, and in compliance with the statutory provisions as well as with any provisions and processes.

7. Social Responsibility

Rentschler respects the dignity of every human being and is committed to the compliance with and the protection of human rights.

Rentschler does not tolerate any kind of child labour as well as any exploitation of children and adolescents. Minimum age for the admission to employment must not be under the age for the fulfilment of compulsory education and in no case under 15 (fifteen) years.

Rentschler disapproves of any form of forced labour.

8. No Discrimination

Rentschler creates a working atmosphere characterized by respectful cooperation and to strictly oppose to any kind of discrimination on grounds of race or ethnic origin, gender, religion or philosophy of life, disability, age, or sexual identity.

9. EHS (Environmental, Health and Safety)

It is Rentschler's policy to operate in a safe and responsible manner with respect to the environment and health of our employees, our customers and the communities where we operate.

Rentschler will not compromise environmental, health or safety values for other interests; value human life above all else and manage risks accordingly.

Rentschler pursues and continually improves an EHS system and processes to achieve an EHS incident-free environment.

Rentschler complies with applicable laws and set standards and for suppliers.

Rentschler uses its EHS knowledge to enhance the safety and well-being of the communities.

Schedule F

Storage Terms

1. Storage Terms

RENTSCHLER will store Drug Product for CUSTOMER due at the Facility in Laupheim under the temperature conditions as listed in Section 2. The Drug Product will remain sole and exclusive property of CUSTOMER and will stored by RENTSCHLER following the applicable GMP regulations and in accordance with the common standards for the storage of pharmaceutical goods.

The Drug Product will be stored in as many storage bins as reasonably required.

RENTSCHLER will notify CUSTOMER in the case that any change will occur which may affect the Drug Product quality.

RENTSCHLER is not responsible for any risk of loss or damage, as far as not provided by mandatory laws.

In deviation of the provisions in Schedule C, Section 6, RENTSCHLER will maintain an insurance for the storage site in order to cover the elemental risk for the storage of the Product. Therefore, Customer shall inform Rentschler in writing timely ahead of the first Product storage about the insurance value of the Product. If Customer fails to inform Rentschler about the insurance value of the Product Rentschler has no obligation to insure the Product against elemental risk. Upon request by CUSTOMER, RENTSCHLER will provide evidence upon such insurance.

Upon request by CUSTOMER, RENTSCHLER will dispatch the Drug Product ready to be pick-up to a carrier designated by CUSTOMER.

2. Storage Fees

CUSTOMER shall pay to RENTSCHLER the following Storage Fees:

Storage Area per storage unit and calendar quarter	Storage conditions	Price
High rack warehouse	[***]	[***]
Cooling warehouse	[***]	[***]
Freezing warehouse	[***]	[***]
Deep freezer	[***]	[***]
Cell bank storage	[***]	[***]

Rentschler will store the Product free of charge for up to [***] months after the Technical Release. Thereafter storage according to the above mentioned Storage Fees shall be invoiced.

CUSTOMER will also reimburse reasonable out-of-pocket expenses actually incurred by RENTSCHLER in the course of providing the storage services and as evidenced to CUSTOMER's reasonable satisfaction. The prior written consent of CUSTOMER shall be required for out-of-pocket expenses in excess of EUR [***].

The fees are exclusive of storage of materials provided by CUSTOMER. Rentschler will invoice CUSTOMER per used storage unit at the end of each quarter. One storage unit is defined as one palette, one shelf, one storing position and/or one freezing compartment.

RENTSCHLER may adjust the Storage Fee according to Schedule B, Section 4.

3. Limitation of Liability

In deviation of Schedule C, Section 5 RENTSCHLER´s liabilities for the storage services as detailed in this Schedule F shall be limited to gross-negligence or wilful misconduct. With the exception of cases of wilful misconduct, Rentschler shall not be liable to Customer for any indirect, punitive or consequential damages or loss of profit, whether based on contract, tort or rising under other applicable laws. With the exception of cases of wilful misconduct, the Parties' respective total liability under this Agreement shall in no event exceed an amount equal to EURO [***]

RENTSCHLER DOES NOT MAKE OR HAS MADE ANY OTHER REPRESENTATION, WARRANTY, COVENANT OR AGREEMENT (WHETHER EXPRESS OR IMPLIED).

Name: [●]
Number of Performance Stock Units subject to Award: [●]
Date of Grant: [●]

ULTRAGENYX PHARMACEUTICAL INC.
2014 INCENTIVE PLAN

PERFORMANCE STOCK UNIT AGREEMENT (CURRENT EMPLOYEES)

This agreement (this "Agreement") evidences an award (the "Award") of performance stock units (the "Performance Stock Units") granted by Ultragenyx Pharmaceutical Inc. (the "Company") to the undersigned (the "Grantee") pursuant to and subject to the terms of the Ultragenyx Pharmaceutical Inc. 2014 Incentive Plan (as amended from time to time, the "Plan"), which is incorporated herein by reference.

1. Grant of Performance Stock Units. The Company grants to the Grantee on the date set forth above (the "Date of Grant") an award consisting of the right to receive on the terms provided herein and in the Plan, one share of Stock with respect to each Performance Stock Unit forming part of the Award, in each case, subject to adjustment pursuant to Section 7(b) of the Plan in respect of transactions occurring after the date hereof.

2. Meaning of Certain Terms. Except as otherwise defined herein, all capitalized terms used herein have the same meaning as in the Plan.

3. Vesting.

(a) Unless earlier terminated, forfeited, relinquished or expired, and subject to the Grantee's continued employment through the applicable vesting dates, the Performance Stock Units shall vest as follows:

(i) If the Administrator certifies that performance metric A as set forth in Appendix A attached hereto (the "First Vesting Metric") has been achieved during the applicable performance period set forth in Appendix A, 16.6% of the Performance Stock Units shall vest on the first anniversary of the date on which the Administrator certified such achievement (the "First Time-Based Vesting Date");

(ii) if the Administrator certifies that the First Vesting Metric has been achieved, an additional 16.7% of the Performance Stock Units shall vest on the second anniversary of the date on which the Administrator certified such achievement (the "Second Time-Based Vesting Date");

(iii) if the Administrator certifies that performance metric B as set forth in Appendix A attached hereto (the "Second Vesting Metric") has been achieved during the applicable performance period set forth in Appendix A, an additional 16.6% of the Performance Stock Units shall vest on the first anniversary of the date on which the Administrator certified such achievement (the "Third Time-Based Vesting Date");

(iv) if the Administrator certifies that the Second Vesting Metric has been achieved, an additional 16.7% of the Performance Stock Units shall vest on the second anniversary of the date on which the Administrator certified such achievement (the "Fourth Time-Based Vesting Date");

(v) if the Administrator certifies that performance metric C as set forth in Appendix A attached hereto (the "Third Vesting Metric") has been achieved during the applicable performance period set forth in Appendix A, an additional 16.6% of the Performance Stock Units shall vest on the first anniversary of the date on which the Administrator certified such achievement (the "Fifth Time-Based Vesting Date"); and

(vi) if the Administrator certifies that the Third Vesting Metric has been achieved, an additional 16.7% of the Performance Stock Units shall vest on the second anniversary of the date on which the Administrator certified such achievement (the "Sixth Time-Based Vesting Date" and together with the First, Second, Third, Fourth, and Fifth Time-Based Vesting Dates, the "Time-Based Vesting Dates").

(b) Notwithstanding anything to the contrary in Section 3(a) above, in the event that the Company fails to achieve any of the Vesting Metrics during the applicable performance period set forth in Appendix A, the vesting of any Performance Stock Units tied to such Vesting Metric shall immediately cease and such Performance Stock Units shall be immediately forfeited as of the last day of the applicable performance period.

(c) Notwithstanding anything to the contrary in Section 3(a) above and subject to the conditions set forth below, if the Company consummates a Covered Transaction prior to the end of the applicable performance period set forth in Appendix A for any of the Vesting Metrics, the Performance Stock Units granted hereby tied to such Vesting Metrics that have not otherwise vested or been terminated, forfeited, relinquished or expired prior to the Covered Transaction shall automatically become time-vested restricted stock units ("Restricted Stock Units"), which Restricted Stock Units shall vest on the first anniversary of the Covered Transaction, subject to Grantee's continued employment through that date. For any Vesting Metric that an Administrator certifies has been achieved during the applicable performance period set forth in Appendix A, the applicable Time-Based Vesting Dates shall not be affected by any Covered Transaction, and the Performance Stock Units granted hereby tied to such Vesting Metrics shall continue to vest based on their applicable Time-Based Vesting Dates.

4. Delivery of Stock. The Company shall deliver to the Grantee as soon as practicable upon the vesting of the Performance Stock Units (or, if applicable, Restricted Stock Units) or any portion thereof, but in all events no later than March 15th of the year following the year in which such units vest, one share of Stock with respect to each such vested unit, subject to the terms of the Plan and this Agreement.

5. Dividends; Other Rights. The Award shall not be interpreted to bestow upon the Grantee any equity interest or ownership in the Company or any Affiliate prior to the date on which the Company delivers shares of Stock to the Grantee (if any). The Grantee is not entitled to vote any shares of Stock by reason of the granting of this Award or to receive or be credited with any dividends declared and payable on any share of Stock prior to the date on which any such share is delivered to the Grantee hereunder. The Grantee shall have the rights of a shareholder only as to those shares of Stock, if any, that are actually delivered under this Award.

6. Forfeiture; Recovery of Compensation.

(a) The Administrator may cancel, rescind, withhold or otherwise limit or restrict the Award at any time if the Grantee is not in compliance with all applicable provisions of this Agreement and the Plan.

(b) By accepting the Award the Grantee expressly acknowledges and agrees that his or her rights, and those of any permitted transferee of the Award, under the Award to any Stock acquired under the Award or proceeds from the disposition thereof, are subject to Section 6(a)(5) of the Plan (including any successor provision). Nothing in the preceding sentence shall be construed as limiting the general application of Section 10 of this Agreement.

7. Nontransferability. Neither the Award nor the Performance Stock Units (or, if applicable, Restricted Stock Units) may be transferred except as expressly permitted under Section 6(a)(3) of the Plan.

8. Certain Tax Matters.

(a) The Grantee expressly acknowledges and agrees that the Grantee's rights hereunder, including the right to be issued shares of Stock upon the vesting of the Performance Stock Units (or, if applicable, Restricted Stock Units) (or any portion thereof), are subject to the Grantee's promptly paying, or in respect of any later requirement of withholding being liable promptly to pay at such time as such withholdings are due, to the Company in cash (or by such other means as may be acceptable to the Administrator in its discretion) all taxes required to be withheld, if any (the "Tax Withholding Obligation"). No shares of Stock will be transferred pursuant to the vesting of the Performance Stock Units (or, if applicable, Restricted Stock Units) (or any portion thereof) unless and until the Grantee or the person then holding the Award has remitted to the Company an amount in cash sufficient to satisfy any federal, state, or local withholding tax requirements then due and has committed (and by accepting this Award the Grantee shall be deemed to have committed) to pay in cash all tax withholdings required at any later time in respect of the transfer of such shares, or has made other arrangements satisfactory to the Company with respect to such taxes. The Grantee also authorizes the Company and its subsidiaries to withhold such amount from any amounts otherwise owed to the Grantee, but nothing in this sentence shall be construed as relieving the Grantee of any liability for satisfying his or her obligations under the preceding provisions of this Section.

(b) The Grantee expressly acknowledges that the Grantee's acceptance of this Agreement constitutes the Grantee's instruction and authorization to the Company and any brokerage firm determined acceptable to the Company for such purpose to sell on the Grantee's behalf a whole number of shares from those shares of Stock issuable to the Grantee as the Company determines to be appropriate to generate cash proceeds sufficient to satisfy the applicable Tax Withholding Obligation, and to transfer the proceeds from the sale of such Stock from the Grantee's securities account established with the brokerage service provider for the settlement of the Grantee's vested Performance Stock Units (or, if applicable, Restricted Stock Units) to any account held in the name of the Company. Such shares will be sold on the date of vesting or as soon thereafter as practicable. Grantee will be responsible for all brokers' fees and other costs of sale, which fees and costs may be deducted from the proceeds of the foregoing sale of Stock, and Grantee agrees to indemnify and hold the Company and any brokerage firm selling such Stock harmless from any losses, costs, damages, or expenses relating to any such sale. To the extent the proceeds of such sale exceed Grantee's Tax Withholding Obligation, such excess cash will be deposited into the securities account established with the brokerage service provider for the settlement of Grantee's vested Performance Stock Units (or, if applicable, Restricted Stock Units). Grantee acknowledges that the Company or its designee is under no obligation to arrange for such sale at any particular price, and that the proceeds of any such sale may not be sufficient to satisfy Grantee's Tax Withholding Obligation. Accordingly, Grantee agrees to pay to the Company as soon as practicable, including through additional payroll withholding, any amount of the Tax Withholding Obligation that is not satisfied by the sale of shares described above. Unless otherwise authorized by the Administrator in its sole discretion, the sale of Stock will be the primary method used by the Company to satisfy the applicable Tax Withholding Obligation.

(c) The Grantee expressly acknowledges that because this Award consists of an unfunded and unsecured promise by the Company to deliver Stock in the future, subject to the terms hereof, it is not possible to make a so-called "83(b) election" with respect to the Award.

9. Effect on Employment. Neither the grant of the Award, nor the issuance of Shares upon vesting of the Award, will give the Grantee any right to be retained in the employ or service of the Company or any of its Affiliates, affect the right of the Company or any of its Affiliates to discharge or discipline such Grantee at any time, or affect any right of such Grantee to terminate his or her Employment at any time.

10. Provisions of the Plan. This Agreement is subject in its entirety to the provisions of the Plan, which are incorporated herein by reference. A copy of the Plan as in effect on the Date of Grant has been furnished to the Grantee. By accepting the Award, the Grantee agrees to be bound by the terms of the Plan and this Agreement. In the event of any conflict between the terms of this Agreement and the Plan, the terms of the Plan shall control.

11. Acknowledgments. The Grantee acknowledges and agrees that (a) this Agreement may be executed in two or more counterparts, each of which shall be an original and all of which together shall constitute one and the same instrument, (b) this agreement may be executed and exchanged using facsimile, portable document

format (PDF) or electronic signature, which, in each case, shall constitute an original signature for all purposes hereunder and (c) such signature by the Company will be binding against the Company and will create a legally binding agreement when this Agreement is countersigned by the Grantee.

[The remainder of this page is intentionally left blank.]

IN WITNESS WHEREOF, the Company has caused this Agreement to be executed by its duly authorized officer.

ULTRAGENYX PHARMACEUTICAL INC.

By:
Name:
Title:

Dated:

Acknowledged and Agreed:

By:
[Grantee's Name]

APPENDIX A

The following performance metrics shall be applicable to the Award:

A. Approval and launch in the US of a broad label (for 1 year old and up and no disease restrictions) for Crysvita in 2018

B. New NDA or MAA submission or a new commercial product in a major market, in either case, by the end of 2019

C. First 12 months of US commercial net sales of Crysvita following approval and launch exceeding forecast by 35% (to be achieved by no later than the end of 2019)

Name: [●]
Number of Performance Stock Units subject to Award: [●]
Date of Grant: [●]

ULTRAGENYX PHARMACEUTICAL INC.
2014 INCENTIVE PLAN

PERFORMANCE STOCK UNIT AGREEMENT (NEW EMPLOYEES)

This agreement (this "Agreement") evidences an award (the "Award") of performance stock units (the "Performance Stock Units") granted by Ultragenyx Pharmaceutical Inc. (the "Company") to the undersigned (the "Grantee") pursuant to and subject to the terms of the Ultragenyx Pharmaceutical Inc. 2014 Incentive Plan (as amended from time to time, the "Plan"), which is incorporated herein by reference.

1. Grant of Performance Stock Units. The Company grants to the Grantee on the date set forth above (the "Date of Grant") an award consisting of the right to receive on the terms provided herein and in the Plan, one share of Stock with respect to each Performance Stock Unit forming part of the Award, in each case, subject to adjustment pursuant to Section 7(b) of the Plan in respect of transactions occurring after the date hereof.

2. Meaning of Certain Terms. Except as otherwise defined herein, all capitalized terms used herein have the same meaning as in the Plan.

3. Vesting.

(a) Unless earlier terminated, forfeited, relinquished or expired, and subject to the Grantee's continued employment through the applicable vesting dates, the Performance Stock Units shall vest as follows:

(i) If the Administrator certifies that performance metric A as set forth in Appendix A attached hereto (the "First Vesting Metric") has been achieved during the applicable performance period set forth in Appendix A, 25% of the Performance Stock Units shall vest on the first anniversary of the date on which the Administrator certified such achievement (the "First Time-Based Vesting Date");

(ii) if the Administrator certifies that the First Vesting Metric has been achieved, an additional 25% of the Performance Stock Units shall vest on the second anniversary of the date on which the Administrator certified such achievement (the "Second Time-Based Vesting Date");

(iii) if the Administrator certifies that performance metric B as set forth in Appendix A attached hereto (the "Second Vesting Metric") has been achieved during the applicable performance period set forth in Appendix A, an additional 25% of the Performance Stock Units shall vest on the first anniversary of the date on which the Administrator certified such achievement (the "Third Time-Based Vesting Date");

(iv) if the Administrator certifies that the Second Vesting Metric has been achieved, an additional 25% of the Performance Stock Units shall vest on the second anniversary of the date on which the Administrator certified such achievement (the "Fourth Time-Based Vesting Date" and together with the First Time-Based Vesting Date, the Second Time-Based Vesting Date, and the Third Time-Based Vesting Date, the "Time-Based Vesting Dates").

(b) Notwithstanding anything to the contrary in Section 3(a) above, in the event that the Company fails to achieve any of the Vesting Metrics during the applicable performance period set forth in Appendix A, the vesting of any Performance Stock Units tied to such Vesting Metric shall immediately cease and such Performance Stock Units shall be immediately forfeited as of the last day of the applicable performance period.

(c) Notwithstanding anything to the contrary in Section 3(a) above and subject to the conditions set forth below, if the Company consummates a Covered Transaction prior to the end of the applicable performance period set forth in Appendix A for any of the Vesting Metrics, the Performance Stock Units granted hereby tied to such Vesting Metrics that have not otherwise vested or been terminated, forfeited, relinquished or expired prior to the Covered Transaction shall automatically become time-vested restricted stock units ("Restricted Stock Units"), which Restricted Stock Units shall vest on the first anniversary of the Covered Transaction, subject to Grantee's continued employment through that date. For any Vesting Metric that an Administrator certifies has been achieved during the applicable performance period set forth in Appendix A, the applicable Time-Based Vesting Dates shall not be affected by any Covered Transaction, and the Performance Stock Units granted hereby tied to such Vesting Metrics shall continue to vest based on their applicable Time-Based Vesting Dates.

4. Delivery of Stock. The Company shall deliver to the Grantee as soon as practicable upon the vesting of the Performance Stock Units (or, if applicable, Restricted Stock Units) or any portion thereof, but in all events no later than March 15th of the year following the year in which such units vest, one share of Stock with respect to each such vested unit, subject to the terms of the Plan and this Agreement.

5. Dividends; Other Rights. The Award shall not be interpreted to bestow upon the Grantee any equity interest or ownership in the Company or any Affiliate prior to the date on which the Company delivers shares of Stock to the Grantee (if any). The Grantee is not entitled to vote any shares of Stock by reason of the granting of this Award or to receive or be credited with any dividends declared and payable on any share of Stock prior to the date on which any such share is delivered to the Grantee hereunder. The Grantee shall have the rights of a shareholder only as to those shares of Stock, if any, that are actually delivered under this Award.

6. Forfeiture; Recovery of Compensation.

(a) The Administrator may cancel, rescind, withhold or otherwise limit or restrict the Award at any time if the Grantee is not in compliance with all applicable provisions of this Agreement and the Plan.

(b) By accepting the Award the Grantee expressly acknowledges and agrees that his or her rights, and those of any permitted transferee of the Award, under the Award to any Stock acquired under the Award or proceeds from the disposition thereof, are subject to Section 6(a)(5) of the Plan (including any successor provision). Nothing in the preceding sentence shall be construed as limiting the general application of Section 10 of this Agreement.

7. Nontransferability. Neither the Award nor the Performance Stock Units (or, if applicable, Restricted Stock Units) may be transferred except as expressly permitted under Section 6(a)(3) of the Plan.

8. Certain Tax Matters.

(a) The Grantee expressly acknowledges and agrees that the Grantee's rights hereunder, including the right to be issued shares of Stock upon the vesting of the Performance Stock Units (or, if applicable, Restricted Stock Units) (or any portion thereof), are subject to the Grantee's promptly paying, or in respect of any later requirement of withholding being liable promptly to pay at such time as such withholdings are due, to the Company in cash (or by such other means as may be acceptable to the Administrator in its discretion) all taxes required to be withheld, if any (the "Tax Withholding Obligation"). No shares of Stock will be transferred pursuant to the vesting of the Performance Stock Units (or, if applicable, Restricted Stock Units) (or any portion thereof) unless and until the Grantee or the person then holding the Award has remitted to the Company an amount in cash sufficient to satisfy any federal, state, or local withholding tax requirements then due and has committed (and by accepting this Award the Grantee shall be deemed to have committed) to pay in cash all tax withholdings required at any later time in respect of the transfer of such shares, or has made other arrangements satisfactory to the Company

with respect to such taxes. The Grantee also authorizes the Company and its subsidiaries to withhold such amount from any amounts otherwise owed to the Grantee, but nothing in this sentence shall be construed as relieving the Grantee of any liability for satisfying his or her obligations under the preceding provisions of this Section.

(b) The Grantee expressly acknowledges that the Grantee's acceptance of this Agreement constitutes the Grantee's instruction and authorization to the Company and any brokerage firm determined acceptable to the Company for such purpose to sell on the Grantee's behalf a whole number of shares from those shares of Stock issuable to the Grantee as the Company determines to be appropriate to generate cash proceeds sufficient to satisfy the applicable Tax Withholding Obligation, and to transfer the proceeds from the sale of such Stock from the Grantee's securities account established with the brokerage service provider for the settlement of the Grantee's vested Performance Stock Units (or, if applicable, Restricted Stock Units) to any account held in the name of the Company. Such shares will be sold on the date of vesting or as soon thereafter as practicable. Grantee will be responsible for all brokers' fees and other costs of sale, which fees and costs may be deducted from the proceeds of the foregoing sale of Stock, and Grantee agrees to indemnify and hold the Company and any brokerage firm selling such Stock harmless from any losses, costs, damages, or expenses relating to any such sale. To the extent the proceeds of such sale exceed Grantee's Tax Withholding Obligation, such excess cash will be deposited into the securities account established with the brokerage service provider for the settlement of Grantee's vested Performance Stock Units (or, if applicable, Restricted Stock Units). Grantee acknowledges that the Company or its designee is under no obligation to arrange for such sale at any particular price, and that the proceeds of any such sale may not be sufficient to satisfy Grantee's Tax Withholding Obligation. Accordingly, Grantee agrees to pay to the Company as soon as practicable, including through additional payroll withholding, any amount of the Tax Withholding Obligation that is not satisfied by the sale of shares described above. Unless otherwise authorized by the Administrator in its sole discretion, the sale of Stock will be the primary method used by the Company to satisfy the applicable Tax Withholding Obligation.

(c) The Grantee expressly acknowledges that because this Award consists of an unfunded and unsecured promise by the Company to deliver Stock in the future, subject to the terms hereof, it is not possible to make a so-called "83(b) election" with respect to the Award.

9. Effect on Employment. Neither the grant of the Award, nor the issuance of Shares upon vesting of the Award, will give the Grantee any right to be retained in the employ or service of the Company or any of its Affiliates, affect the right of the Company or any of its Affiliates to discharge or discipline such Grantee at any time, or affect any right of such Grantee to terminate his or her Employment at any time.

10. Provisions of the Plan. This Agreement is subject in its entirety to the provisions of the Plan, which are incorporated herein by reference. A copy of the Plan as in effect on the Date of Grant has been furnished to the Grantee. By accepting the Award, the Grantee agrees to be bound by the terms of the Plan and this Agreement. In the event of any conflict between the terms of this Agreement and the Plan, the terms of the Plan shall control.

11. Acknowledgments. The Grantee acknowledges and agrees that (a) this Agreement may be executed in two or more counterparts, each of which shall be an original and all of which together shall constitute one and the same instrument, (b) this agreement may be executed and exchanged using facsimile, portable document format (PDF) or electronic signature, which, in each case, shall constitute an original signature for all purposes hereunder and (c) such signature by the Company will be binding against the Company and will create a legally binding agreement when this Agreement is countersigned by the Grantee.

[The remainder of this page is intentionally left blank.]

IN WITNESS WHEREOF, the Company has caused this Agreement to be executed by its duly authorized officer.

ULTRAGENYX PHARMACEUTICAL INC.

By:
Name:
Title:

Dated:

Acknowledged and Agreed:

By:
[Grantee's Name]

APPENDIX A

The following performance metrics shall be applicable to the Award:

A. New NDA or MAA submission or a new commercial product in a major market, in either case, by the end of 2019

B. First 12 months of US commercial net sales of Crysvita following approval and launch exceeding forecast by 35% (to be achieved by no later than the end of 2019)

Exhibit 10.46

January 15, 2018

Camille Bedrosian, M.D.

Re: Offer of Employment

Dear Camille,

On behalf of Ultragenyx Pharmaceutical Inc. (the "Company"), I am pleased to offer you the position of Chief Medical Officer and Executive Vice President, on the following terms, commencing on a date mutually agreed to by you and I "Hire Date". You and I will also mutually agree on the content and timing of any public announcement of your hiring. The Company's Board of Directors (the "Board") and I are excited about the important contributions you can make by joining the Ultragenyx management team and are confident that you will play a key role in our company's growth and success.

You will be a regular, full-time, exempt employee of the Company. You will report directly to me and will work at our facility located at Novato, CA.

In your role as Chief Medical Officer, you will report directly to me and be a member of the Executive Leadership Team (XLT). In this role, you will have primary responsibility for the successful conduct of clinical development in all of our programs from inception through post-marketing. Your responsibilities include providing medical and operational leadership company-wide and directing all clinical activities for the company's clinical programs. This will include designing clinical development plans for our products including writing or reviewing clinical protocols, statistical analysis plans and a study reports. You will provide management and medical oversight of investigational drug safety data and safety monitoring, and related activities (e.g. adverse event reporting and product safety reviews for preparation of technical and regulatory documents). You will provide leadership and direction to Global Clinical Development, Global Medical Affairs, Clinical Operations, Regulatory Affairs, and Drug Safety/Pharmacovigiliance. As for all functions at Ultragenyx, the development group is expected to work in an integrated fashion with Biometrics, Portfolio and Program Management, Technical Operations, Business Development and Commercial operations to drive the growth and success of the company. This includes establishing, maintaining and evolving the critical and unique strategies for development at Ultragenyx which depend on unique collaborations between departments, and novel approaches to traditional clinical development challenges.

Compensation

The Company will pay you an initial base salary at a gross annual rate of $500,000, less payroll deductions and withholdings, on a bi-weekly basis. If your Hire Date is on or after January 1 and before October 1 of the calendar year, you will be eligible to be considered for a salary merit increase during the next calendar year's Annual Performance Review process. If your Hire Date is after September 30 of the calendar year, you will not be eligible to be considered for a salary merit increase until the second Annual Performance Review process that follows your Hire Date. The Annual Performance Review process generally takes place in the first quarter of the calendar year. Salary merit increases, if any, will be awarded at the Company's discretion on the basis of your performance, and will be prorated based on the number of months that you actually worked during the previous calendar year if your Hire Date is on or before September 30. The Board or the Compensation Committee of the Board shall review your Base Salary at least annually.

Sign-On Bonus

In addition, the company will provide you with a one-time sign-on bonus in the amount of $210,000, less any applicable withholdings, to be paid within 30 days following your start date. In the event that your employment is ended due to a termination by the Company or its successor for Cause, or you resign your employment under circumstances that do not constitute a Constructive Termination, within 12 months of your Hire Date, you agree to repay the Company a pro-rated amount of the sign-on bonus (based on the number of completed months you have been employed as of the Termination Date) within thirty (30) of your termination.

Annual Bonus Program

You will also be eligible to participate in Ultragenyx's discretionary annual bonus program. The current target bonus opportunity for your position is 40% of your annual base salary. However, the actual amount of such bonus, if any, will be determined by the Company in its sole discretion based on the Company's achievement of the financial and other goals established for the year and the Company's assessment of your job performance for the year. You must commence your employment by September 30 in order to be eligible for a bonus for the calendar year during which you were hired. If you join the Company between January 1 and September 30, you will be eligible for a pro-rated bonus for that calendar year. When bonuses are awarded, they typically are paid on or around March 15 of the following year. To encourage continued tenure with the Company and satisfactory or better performance after the end of the bonus performance year and through the bonus payment date, to be eligible for a bonus payment, you must remain an active employee of the Company through bonus payment date, and maintain satisfactory or better job performance through the bonus payment date.

Further details pertaining to the Annual Bonus Plan are attached.

New Hire Equity Awards

Pursuant to the Company's 2014 Incentive Plan (the "Plan"), the Company shall grant you an option to purchase up to 88,000 shares (the "Option") of the Company's Common Stock at fair market value as determined by the Compensation Committee as of the date of grant. The Option will be subject to the terms and conditions of the Plan and your grant agreement. Your grant agreement will include a four-year vesting schedule, under which 25 percent of your shares will vest on the first (1st) anniversary of the date of grant, and thereafter 1/48th of the Option shall vest and become exercisable each month until your Option is fully vested, in each case subject to your continued employment by the Company (or its subsidiaries).

Subject to the approval of the Compensation Committee, you will also receive a grant of 18,000 restricted stock units (the "RSUs") pursuant to the Plan. The RSUs will vest annually over a four-year period from the date of grant (i.e., 25% of the RSUs shall vest and become exercisable on each anniversary of the date of grant during the four-year period), in each case subject to your continued employment by the Company (or its consolidated subsidiaries). The RSUs shall be governed by the Company's standard form of restricted stock unit agreement and the Plan.

Annual Equity Grant Program

You may also be considered for the Company's discretionary annual equity grant program based on the Company's assessment of your job performance. If your Hire date is on or after January 1 and before October 1, you will be eligible for a grant in the calendar year that follows, with the amount of such equity grant, if any, being determined by the Company in its sole discretion and prorated if your Hire Date is after January 1.

Change of Control

Notwithstanding the foregoing, in the event that (i) the Company consummates a Covered Transaction (as defined in the Plan), (ii) on the date such Covered Transaction is consummated you are employed by the Company (or its subsidiaries) and (iii) within 24 months after the date such Covered Transaction is consummated your employment by the Company (or its successor or subsidiaries) is terminated without Cause (as defined below) or you resign such employment due to a Constructive Termination (as defined below), then provided such termination constitutes a "separation from service" (as defined under Treasury Regulation Section 1.409A-1(h), without regard to any alternative definition thereunder, a "Separation from Service"), in addition to the severance benefits set forth below, the vesting of any equity-based compensation awards granted to you in connection with your employment shall accelerate with respect to 100% of the then-unvested shares then subject to such awards.

Relocation

Provided that you move and relocate within 12 months of your Relocation Date (and if no Relocation Date is specified in the attached Domestic Relocation Summary, your Hire Date is your Relocation Date), you will be eligible for relocation assistance. All portions of your core relocation benefits must be used within 12 months of your Relocation Date. You will work directly with The

MI Group, the Company's third-party relocation vendor. Please refer to the Domestic Relocation Summary for more details. You will be responsible for any taxable expenses related to relocation benefits, including temporary housing. As required by applicable tax laws and government regulations, any taxable amounts for expenses related to relocation benefits will be included in your wage statement for the first pay period after your Relocation Date. In the event that your employment is ended due to a termination by the Company or its successor for Cause, or you resign your employment under circumstances that do not constitute a Constructive Termination within twelve (12) months after your Relocation Date, you agree to reimburse the Company for the pro-rated amount of your relocation assistance benefits (based on the number of completed months you have been employed as of the Employment Date) within thirty (30) days of the Termination Date

Benefits

You will be eligible to participate in all of the employee benefits and benefit plans that the Company generally makes available to its full-time regular employees, subject to the terms and conditions of such benefits and benefit plans. At this time, these include medical, dental and vision insurance coverage. Coverage for these benefits begin on your Hire Date and upon completion of your enrollment in the plans. Detailed information about the benefits presently available will be provided to you on your first day of employment.

The health plan options will include 4 medical plans (2-HMO, a PPO, and a HDHP), a dental and vision plan, life/AD&D insurance, disability and voluntary insurance as well as a 401k retirement plan, with a company match of 3%. The Company will cover 90% of the benefit costs for employees and 75% of the benefits costs for eligible dependents. Based on conditions and situations over time, the Company may change specific benefits and plans from time to time, but our intent is to provide an excellent health benefit program to our employees.

Your will accrue vacation time at the rate of four weeks (160 hours) per year, up to an accrual cap of 240 hours, under the terms of the Company's PTO policy. You will also be eligible for 5 paid sick days.

"At Will" Employment

Employment at Ultragenyx is on an "at-will" basis, meaning that you are free to end your employment at any time, with or without advance notice and for any reason or no reason at all, and that Ultragenyx likewise may end your employment, at any time, with or without advance notice and for any reason or no reason at all. In addition, subject to your rights relating to a Constructive Termination, your job duties, title, responsibilities, reporting structure, compensation and benefits, as well as the Company's personnel policies and procedures, may be changed at any time, with or without notice, in the sole discretion of the Company. No manager or employee of the Company (other than the CEO) has any authority to enter into any agreement for employment for any specified period of time or to make any agreement for employment

other than an at-will employment relationship, and then only if the Company's CEO does so in a written agreement that is signed by both you and the CEO.

Severance

If, at any time, your employment with the Company or its successor is terminated without Cause, or you resign your employment due to a Constructive Termination, then provided such termination constitutes a Separation from Service, the Company shall: (i) accelerate the vesting of any equity-based compensation awards granted to you in connection with your employment as of you remained employed for an additional twelve (12) months following the date of your Separation from Service (ii) extend the exercise period applicable to the Option (and to any other options to purchase the Company's Common Stock you then hold) such that you will have until the date that is twelve (12) months after the date of your Separation from Service to exercise any of the vested shares (determined as of the date of your Separation from Service) subject to the Option (but in no event will the exercise period be extended until later than the date of expiration of the term of the Option as set forth in the agreement evidencing such Option); and (iii) the Company shall pay you, as severance, the equivalent of one (1) year of your Base Salary and a pro-rated annual bonus at Target in effect as of the date of your Separation from Service, subject to standard payroll deductions and withholdings (the "Severance Amount"). The Severance Amount will be paid in installments in the form of continuation of your Base Salary and pro-rated annual bonus payments, paid on the Company's regular payroll dates, commencing on the Company's first regular payroll date that follows the 60th day after such Separation from Service. The first regular payroll date that follows the 60th day after such Separation from Service shall be for all accrued Base Salary for the 60-day period plus the period from the 60th day until the regular payroll date; the remainder of the Base Salary continuation payments shall thereafter be made on the Company's regular payroll dates.

Notwithstanding anything herein to the contrary, the receipt of any of the severance or acceleration benefits described in this letter will be subject to and conditioned upon: (i) your signing a separation agreement and release of claims in a form reasonably satisfactory to you and the Company (the "Separation Agreement") and such Separation Agreement becoming effective and irrevocable as specified therein no later than sixty (60) days following your Separation from Service; and (ii) your continued compliance with the terms of this letter, the Separation Agreement, the enclosed Confidential Information and Invention Assignment Agreement (including without limitation, your not using or disclosing any confidential or proprietary information of the Company), and any other agreement entered into between you and the Company. No severance benefits of any kind will be paid or provided, and no acceleration of vesting shall be effective, until the Separation Agreement becomes effective. You shall also resign from all positions and terminate any relationships as an employee, advisor, officer or director with the Company and any of its affiliates, each effective on the date of termination.

Additionally, and for the avoidance of doubt, in the event that the Company terminates your employment for Cause, or you resign your employment for any reason other than due to a

Constructive Termination, or your employment terminates upon your death or disability, you will no longer vest in the Option or the RSUs (or any other equity) and you will not be entitled to any severance benefits described herein.

For purposes of this offer letter, “Cause” means any of the following: (i) commission of a felony or any crime involving dishonesty, breach of trust, or physical harm to any person; (ii) willful engagement in conduct that is in bad faith and materially injurious to the Company, including but not limited to misappropriation of trade secrets, fraud, or embezzlement; (iii) material breach of any agreement with the Company that is not cured within 10 days of written notice by the Company to you; or willful refusal to implement or follow a lawful policy or directive of the Company’s, which breach is not cured within 10 days after written notice by the Company to you.

For the purposes of this letter, “Constructive Termination” means the occurrence of any of the following events without your written consent: (i) a material reduction or change in your job duties, responsibilities, authority or requirements from your job duties, responsibilities authority or requirements immediately prior to such reduction or change,; (ii) a material reduction of your Base Salary (other than an equal, across-the-board reduction in the compensation of all similarly-situated employees of the Company or the surviving entity that is approved by the Board); (iii) a requirement that you relocate to a principal office that increases your one-way commute by more than 50 miles relative to your immediately preceding principal office.; or (iv) a material breach of this offer letter agreement (including the failure to grant the new hire equity set forth above within 30 days of your Hire Date) or any other agreement between you and the Company). Notwithstanding the foregoing, none of the foregoing events or conditions will constitute Constructive Termination unless: (x) you provide the Company with written objection (or notice) to the event or condition within 90 days following the occurrence thereof, (y) the Company does not reverse or otherwise cure the event or condition within 30 days of receiving that written objection, and (z) you resign your employment within 30 days following the expiration of that cure period.

Notwithstanding any other provision herein or any other plan, arrangement or agreement to the contrary, if any of the payments or benefits provided or to be provided by the Company or its affiliates to you or for your benefit pursuant to the terms of this Offer Letter or otherwise (“Covered Payments”) constitute parachute payments (“Parachute Payments”) within the meaning of Section 280G of the Internal Revenue Code of 1986, as amended (the “Code”) and would, but for this paragraph be subject to the excise tax imposed under Section 4999 of the Code (or any successor provision thereto) or any similar tax imposed by state or local law or any interest or penalties with respect to such taxes (collectively, the “Excise Tax”), then the Covered Payments shall be either (i) reduced to the minimum extent necessary to ensure that no portion of the Covered Payments is subject to the Excise Tax (that amount, the “Reduced Amount”) or (ii) payable in full if your receipt on an after-tax basis of the full amount of payments and benefits (after taking into account the applicable federal, state, local and foreign income, employment and excise taxes (including the Excise Tax)) would result in you receiving an amount greater than the Reduced Amount.

Any reduction pursuant to the preceding paragraph shall be made in a manner consistent with the requirements of Section 409A of the Code and the following: (i) the Covered Payments which do not constitute nonqualified deferred compensation subject to Section 409A of the Code shall be reduced first; and (ii) all other Covered Payments shall then be reduced as follows: (A) cash payments shall be reduced before non-cash payments; and (B) payments to be made on a later payment date shall be reduced before payments to be made on an earlier payment date.

Any such required determination shall be made in writing in good faith by an independent accounting firm selected by the Company (the "Accountants"), which shall provide detailed supporting calculations to the Company and you as reasonably requested by the Company or you. The Company and you shall provide the Accountants with such information and documents as the Accountants may reasonably request in order to make a determination. For purposes of making the calculations and determinations required herein, the Accountants may rely on reasonable, good faith assumptions and approximations concerning the application of Section 280G and Section 4999 of the Code. The Accountants' determinations shall be final and binding on the Company and you. The Company shall be responsible for all fees and expenses incurred by the Accountants in connection with the calculations required herein.

Compliance with Section 409A

It is intended that all of the severance benefits and other payments payable under this letter satisfy, to the greatest extent possible, the exemptions from the application of Code Section 409A provided under Treasury Regulations 1.409A-1(b)(4), 1.409A-1(b)(5) and 1.409A-1(b)(9), and this letter agreement will be construed to the greatest extent possible as consistent with those provisions, and to the extent not so exempt, this letter (and any definitions hereunder) will be construed in a manner that complies with Section 409A. Any payment by the Company under this letter agreement that is subject to Section 409A and that is contingent on a termination of employment is contingent on a "separation from service" within the meaning of Section 409A. Each such payment shall be considered to be a separate payment for purposes of Section 409A. Notwithstanding any provision to the contrary in this letter, if you are deemed by the Company at the time of your Separation from Service to be a "specified employee" for purposes of Code Section 409A(a)(2)(B)(i), and if any of the payments upon Separation from Service set forth herein and/or under any other agreement with the Company are deemed to be "deferred compensation", then to the extent delayed commencement of any portion of such payments is required in order to avoid a prohibited distribution under Code Section 409A(a)(2)(B)(i) and the related adverse taxation under Section 409A, such payments shall not be provided to you prior to the earliest of (i) the expiration of the six-month period measured from the date of your Separation from Service with the Company, (ii) the date of your death, or (iii) such earlier date as permitted under Section 409A without the imposition of adverse taxation. Upon the first business day following the expiration of such applicable Code Section 409A(a)(2)(B)(i) period, all payments deferred pursuant to this paragraph shall be paid in a lump sum to you, and any remaining payments due shall be paid as otherwise provided herein or in the applicable agreement. No interest shall be due on any amounts so deferred.

Compliance with Company Policies

As an employee of the Company, you will be expected to comply with the Company's written personnel and other policies, and acknowledge in writing that you have read the Company's Employee Handbook, a copy of which you will receive during your new employee orientation.

Full-time Services to the Company

The Company requires that, as a full-time employee, you devote your full business time, attention, skills and efforts to the tasks and duties of your position as assigned by the Company. However, the Company will not preclude you from providing services to others, so long as such services would not be to the benefit of a competitor of the Company and will not otherwise interfere with your ability to satisfactorily fulfill your job responsibilities to the Company. The Company acknowledges and agrees that you may serve on the Board of
[INSERT NAME] If you wish to perform other services (for any or no form of compensation) to any other person or business entity while employed by the Company, please contact me and discuss your plans in advance of providing such services for review and evaluation of its impact on your work at the Company and so that no problem later arises that could have been avoided from the outset.

Conditions

This offer, and any employment pursuant to this offer, is conditioned upon the following:

- You accepting and returning a signed original of this offer letter and the accompanying *Mutual Agreement to Arbitrate Claims* and *Confidential Information and Inventions Assignment Agreement* without modifications;
- The completion of an I-9 form within the legally required time period, which requires that you provide a specified document(s) proving your identity and legal authorization to work in the United States of America;
- Your consent to, and results satisfactory to the Company of, reference and background checks.

You are encouraged to discuss any of the attached documents with your own advisor to the extent you desire.

No Conflicting Obligations

In your work for the Company, you will be expected not to use or disclose any confidential information, including trade secrets, of any former employer or other person to whom you have

an obligation of confidentiality. Rather, you will be expected to use only that information which is generally known and used by persons with training and experience comparable to your own, which is common knowledge in the industry or otherwise legally in the public domain, or which is otherwise provided or developed by the Company. You agree that you will not bring onto Company premises any unpublished documents or property belonging to any former employer or other person to whom you have an obligation of confidentiality. By signing this letter or electronically accepting its terms and conditions, you are representing that you have disclosed to the Company any contract you have signed that may restrict your activities on behalf of the Company, and that you are under no obligations or commitments, whether contractual or otherwise, that are inconsistent with your obligations under this offer letter and resulting agreement, and that you have returned all property and confidential information belonging to any prior employer. The Company acknowledges receipt of certain provisions of your Employment Agreement dated February 26, 2016 with your former employer. To the best of the Company's knowledge, the Company agrees that the provisions of such Agreement that the Company has received and reviewed should not conflict with and are not inconsistent with your obligations under this offer letter.

Entire Agreement

This offer letter, together with the accompanying Agreement for Protection of Company Information and Mutual Agreement to Arbitrate Claims, forms the complete and exclusive statement of your employment agreement with the Company. It supersedes any other agreements or promises made to you by anyone, whether oral or written. Changes in your employment terms, other than those changes expressly reserved to the Company's discretion in this letter, require a written modification signed by an officer of the Company.

Please sign and date this letter, and return them to me by January 19, 2018, if you wish to accept employment at the Company under the terms described above. This offer will expire if we have not received your signed offer letter by that time. If you accept our offer, but would like a different start date from the one in the first paragraph above, please contact me as soon as possible.

We look forward to working with you on developing treatment for many rare genetic diseases and hope you find your employment at Ultragenyx Pharmaceutical Inc. a rewarding experience. If you have any questions regarding this offer letter, please feel free to contact me at (415) 483-8800.

Warm Regards,

/s/ Emil D. Kakkis

Emil D. Kakkis, M.D., Ph.D.

Chief Executive Officer

I accept and agree to employment with Ultragenyx on the terms and conditions above:

Signature: _/s/ Camille L. Bedrosian, MD_____ Dated: __17 January_____, 2018

Exhibit 10.60

LAKEPOINT BUSINESS PARK
STANDARD LEASE
BASIC LEASE INFORMATION

1.) Date: Dec 17, 2015

2.) Landlord: CONDIOTTI ENTERPRISES, INC.
P. 0. Box 5260
Santa Rosa, CA 95402
(707) 544-7125

3.) Tenant: Ultragenyx Pharmaceutical, Inc., a Delaware corporation
Address for Tenant Notices: 60 Leveroni Court, Suite 200, Novato, CA 94949
Phone: (415) 483-8800 **FAX:** (415) 483-8810

4.) Tenant Contact Party: Thomas Kassberg, Chief Business Officer
60 Leveroni Court, Suite 200
Novato, CA 94949

5.) Premises: Entire Building "J" located at 81 Digital Drive, Novato, CA 94949
Office: Approx 9,l00sf **Warehouse:** Approx 16,000 **Other:** -0- **Total:** Approx 25,l00sf

6.) Term: Five years.

7.) **Estimated Commencement Date:** 1/1/16

8.) Base Term Expiration Date: 12/31/20

9.) Options to Extend: Two consecutive Options at five years each.

10.) Initial Base Monthly Rent: $43,674.00NNN

11.) Security Deposit: Letter of Credit as detailed in Addendum 1, Section 49.

12.) Use: General office use.

13.) Exhibits:

"A"	The Building
"B"	The Premises
"C"	Declaration of Covenants and Protective Standards
"D"	Insurance Endorsement Format
"E"	Estoppel Format
"F"	SNDA
"G"	Space Plans

14.) Addenda: Addendum 1, Sections 44 through 50.

In the event of conflict between any Basic Lease Information and the Lease, the former shall control.

/s/ Jan Warz
Lessor

/s/ Email Kakkis, CEO
Lessee: Email Kakkis, CEO

/s/ Shalini Sharp, CFO
Lessee: Shalini Sharp, CFO

LAKEPOINT BUSINESS PARK
STANDARD LEASE

For and in consideration of the rents, covenants, conditions and agreements hereinafter reserved and contained, by Lessee, to be paid, kept, observed and performed, Condiotti Enterprises, Inc. ("Lessor") leases unto Ultragenyx Pharmaceutical, Inc., a Delaware corporation ("Lessee") and Lessee hires from Lessor the premises described in the Basic Lease Information (the Premises) together with appurtenances, situated in Building "J" at 81 Digital Drive, located in Lakepoint Business Park (the Project), in the city of Novato, county of Marin, state of California.

Said hiring and Jetting is upon each and every of the following terms and conditions:

1. BACKGROUND:
The Lessor holds a fee simple interest in the Project and represents and warrants that Lessor has right, title and authority to enter into this agreement.

2. LESSEE AUTHORITY:
If Lessee is a corporation, trust or general or limited partnership, or sole proprietor, each individual executing this Lease on behalf of such entity represents and warrants that he and/or she is duly authorized to execute and deliver this Lease on behalf of said entity. Lessee shall, prior to the execution of this Lease, deliver satisfactory evidence to Lessor of such authority. Failure to comply with this requirement within the time stated shall constitute a breach of the Lease.

3. TERM:
The term of this Lease shall be for a period of 5 (five) years, beginning January 1, 2016.

If Lessor shall not have tendered possession of the Premises to Lessee such that the occupancy date thereof would be more than one hundred, eighty (180) days after the commencement date set forth in paragraph "a" above, Lessee may at Lessee's option by notice in writing to Lessor, cancel this Lease, in which event Lessor and Lessee shall be discharged from all obligations hereunder. In the event this Lease is cancelled by Lessee due to Lessor's failure to diligently pursue work on the Premises to be performed by it, Lessor shall be discharged from all obligations under this Lease and shall not be liable for any other costs or damages which Lessee may suffer, except for return of advance rent payments and security deposits made by Lessee.

4. SECURITY DEPOSIT:
Lessee shall deposit with Lessor upon execution hereof the sum indicated on the Basic Lease Information and as further detailed in Addendum l, Section 49 as security for Lessee's full and faithful performance of Lessee's obligations hereunder. **Such deposit does not constitute an advance payment of last months' rent.** If Lessee fails to pay rent or other charges due hereunder or otherwise defaults with respect to any provision of this Lease, Lessor may use, apply or retain all or any portion of such deposit for payment of any rent or other charge in default, or for the payment of any other sum to which Lessor may become obligated by reason of Lessee's default, or to compensate Lessor for any loss or damage which Lessor may suffer thereby. Should Lessor so use, apply or retain all or any portion of such deposit, Lessee shall, within five (5) days after written demand therefore, deposit certified funds with Lessor in an amount sufficient to restore such deposit to the full amount herein stated, and Lessee's failure to do so shall be a material breach of this Lease.

Lessor shall not be required or in any way obligated to keep such deposit separate from its general accounts. No trust relationship is created herein between Lessor and Lessee with respect to such deposit. If Lessee performs all of Lessee's obligations hereunder, such deposit, or so much thereof as has not therefore been used, applied or retained by Lessor, shall be returned, without payment of interest or other increment for its use, to Lessee within twenty-one (21) days of the later of Lease expiration or Lessee's vacating the Premises and return of keys to Lessor.

5. USE:
The Premises are hereby leased to Lessee upon the express condition that Lessee shall use said Premises ONLY for the use indicated in the Basic Lease Information.
Lessee agrees that utility and/or fire sprinkler riser closets are considered "Common Area" and are not for use by Lessee as storage, or for any other use (except as may be appropriate for telecommunications equipment, when approved in advance in writing by Lessor). Lessee shall at all times maintain clear access to the utility and/or fire sprinkler riser closets.
Lessee agrees that Lessee's business shall be established and conducted through the term hereof in a first class manner, which shall include acquisition and maintenance of any and all licenses, permits, etc. which are required by any governmental agency having jurisdiction over Lessee and/or Lessee's business. Lessee will not use the demised Premises for, or carry on or permit upon said Premises any offensive, noisy, dangerous or unlawful trade, business, manufacture or occupation or any nuisance or violation of public policy, nor permit any auction sale to be held or conducted on or about said Premises. Lessee shall not commit, or suffer to be committed, any waste upon the Premises. Lessee shall not do or suffer anything to be done upon said Premises which will cause structural injury to said Premises or the Building of which same form a part; that said Premises will not be overloaded and that no machinery, apparatus or other appliance shall be used or operated in or upon the Premises which will in any manner injure, vibrate or shake said Premises or the Building of which it is a part. No use will be made of the Premises which will in any way impair the efficient operation of the sprinkler system within the Building containing the Premises. Lessee will not vacate or abandon said Premises during the term hereof unless pursuant to an assignment of this Lease or subletting of the Premises approved by Lessor in the manner described elsewhere in this Lease; and that without the advance written permission of Lessor no musical instrument of any sort, or any noise-making device will be operated or allowed upon said Premises for the purpose of attracting trade or otherwise.

Lessee further agrees not to use or permit the use of the Premises or any part thereof for any purpose prohibited by law or which will increase the existing rate of insurance upon the Building in which the Premises may be located, or cause a cancellation of any insurance policy covering said Building or any part thereof. If any act or use of Premises on the part of Lessee shall cause, directly or indirectly, any increase of Lessor's insurance premiums said additional premiums shall be paid by Lessee to Lessor upon demand. No such payment by Lessee shall limit Lessor in the exercise of any other rights or remedies, or constitute a waiver of Lessor's right to require Lessee to discontinue such act or use.

No use shall be made or permitted to be made of the Premises or any part thereof, and no act done therein, which may unreasonably disturb the quiet enjoyment of any other tenant in the Project or the Building of which the Premises are a part. Lessee, at Lessee's sole cost and expense, agrees to do all things necessary to:

1. maintain the Premises in a clean, neat, sanitary and safe manner;
2. to repair and maintain the interior of the Premises forming all or part of the Building in compliance and conformity with all municipal, state, federal laws and ordinances, and with the requirements of any other governmental board or authority, present or future, in any way relating to the condition, use or occupancy of the Premises throughout the entire term of this Lease and to the perfect exoneration from liability of Lessor,
3. or if due to Lessee's specific use of the Premises any governmental authority requires alterations, Lessee shall make such alterations at its sole cost and expense.

The judgment of any court or the admission of Lessee in any action or proceeding against Lessee, whether Lessor be a party thereto or not, that Lessee has violated any such law, ordinance, requirement or order in the use of the Premises, shall be conclusive of that fact between Lessor and Lessee.

Lessee shall keep at the Premises, and maintain in good working condition, a sufficient number of fire extinguishers as determined by the Novato Fire Department or other agency of authority in this regard.

Lessee shall not, without prior written consent from Lessor, use any common area of the Project or Building(s) for any purpose not specifically granted in this Lease and Attachments (if any).

6. ACCEPTANCE OF PREMISES BY LESSEE:

Lessee has examined the Premises as of the date of this Lease and acknowledges and covenants to Lessor that the same is in the condition represented by Lessor and fit and suitable for the use and purpose demised. Lessee hereby accepts the Premises “AS IS”, subject to the provisions of Addendum 1, Section 44, and shall indemnify and defend Lessor from and against any claim or action that may arise from any defective or allegedly defective condition existing in or with respect to the Premises.

7. RENT:

Starting with the commencement date of this Lease, Lessee shall pay to Lessor the Base Monthly Rent as indicated in the Basic Lease Information. The Base Monthly Rent shall be paid on the first (1st) day of each month during the term thereof without notice, demand or any offset, and shall be paid in lawful money of the United States. Lessee shall pay to Lessor one month's Base Monthly Rent upon execution of this Lease, which shall be applied to the first (1st) month rent due hereunder.

b. If the commencement date does not fall on the first (1st) of the month, or if Lessee with Lessor's consent occupies the Premises prior to the commencement date, Lessee shall pay to Lessor rent for the first month of the term, prorated at 1/30th of the Basic Monthly Rent thereof per day. In this case, Lessee's anniversary date shall be considered to be the first (1st) day of the month immediately following occupancy.

c. The Basic Monthly Rent hereunder shall be increased during the term of the Lease as hereinafter provided, but in no event shall any adjustment to rent result in a reduction below the initial Basic Monthly Rent or any subsequently determined rent, whichever is higher.

d. Rent shall be payable to Lessor at the address listed on the Basic Lease Information or to such other person(s) or at such other place(s) as Lessor may designate in writing.

8. COST OF LIVING ADJUSTMENT:

On each and every anniversary following the commencement of this Lease, the Basic Monthly Rent shall be adjusted for the ensuing twelve (12) months by the proportion that the Consumer Price Index All Items, All Urban Consumers in the San Francisco Bay Area, of the U.S. Department of Labor, Bureau of Labor Statistics, then most recently published, bears to the Consumer Price Index All Items, All Urban Consumers in the San Francisco Bay Area most recently published prior to the previous anniversary.

Should the U.S. Department of Labor discontinue *its* computation and publication of said Consumer Price Index or the publication thereof should be delayed so as to prevent its use hereunder at the times required, there shall be substituted therefore by Lessor such other index or method of ascertaining changes in the price levels as, in the opinion of the Lessor, most closely resembles the Consumer Price Index and method of arriving at the index figure by said Bureau.

The annual increase shall not be less than three percent (3%) nor more than six percent (6%).

9. OPERATING EXPENSES:

Lessee shall pay to Lessor in addition to the Basic Monthly Rent during the term hereof, Lessee's share of all Operating Expenses, as hereinafter defined, during each month of the term of this Lease. “Lessee’s share” is defined, for the purposes of this Lease, as the percentage determined by division of Lessee's Premises square footage divided by the rentable square footage of the Project. As improvements, additions and deletions may affect the Project square footage, and/or Lessee may add space, this percentage may change from time to time. “Operating Expenses” is defined, for the purposes of this Lease, as all costs incurred by Lessor, including, but not limited to:

a. the operation, repair and maintenance in neat, clean, good order and condition, of the common areas, including, but not limited to parking areas, loading and unloading areas, trash enclosures, roadways, sidewalks, parkways, driveways, landscaped areas, striping, irrigation systems, common area lighting,

fences and gates;

b. Fire detection and/or suppression systems, including sprinkler maintenance, monitoring and repair;
c. Project management fees;
d. The cost of premiums for liability, property and business income insurance policies elsewhere described in this Lease to be responsibility of Lessor and any deductible portion of an insured loss covered by said policies;
e. Utility services to the Common Areas;
f. Capital expenditures such as roofing, HVAC replacement, and parking lot resurfacing, etc. pro-rated over their useful life as reasonably determined by Lessor;
g. The pro-rata portion of a maintenance contract for the HVAC,
h. All costs relating to Lessor's employees for the Project;
i. Other costs connected with the operation and maintenance of the Project.

The inclusion of the improvements, facilities and services set forth above shall not be deemed to impose an obligation upon Lessor to either have or provide said improvements, facilities or services unless the Project already has the same, Lessor already provides the services, or Lessor has agreed elsewhere in this Lease to provide the same or some of them.

Lessee's share of Operating Expenses shall be payable by Lessee within five (5) days after a statement of expenses is presented to Lessee by Lessor, which shall include copies of billing documents applicable to Operating Expenses except when such expenses have been amortized over more than one month and copies have been previously provided. At Lessor's option, however, an amount may be estimated by Lessor from time to time of Lessee's share of Operating Expenses, which estimate shall be due within five (5) days after such estimate is presented to Lessee by Lessor. Lessor shall prepare and present to Lessee an actual statement of expenses as soon as is practical after such estimate has been presented, and shall credit Lessee any over-charge or bill any short-charge as may be actually due.

10. UTILITIES:
Lessee shall pay for all water, gas, heat, light, power, telephone and other utilities and services supplied to the Premises, together with any taxes thereon. If any such services are not separately metered to Lessee, Lessee shall pay a reasonable proportion, to be determined by Lessor, of all charges jointly metered with other premises. Lessor's reasonable determination thereof, in good faith, shall be conclusive. Lessor shall have exclusive right of selection of power provider.

11. INSURANCE:
a.) Liability Insurance: Lessee shall, at Lessee's expense, obtain and keep in force throughout the term of this Lease, beginning upon Lessee taking possession of the Premises or the Commencement Date, whichever occurs first, and for a period of not less than two years following the expiration of this Lease, a policy or policies of General Liability Insurance insuring Lessor and Lessee against any liability arising out of the ownership, use, occupancy or maintenance of the Premises and all areas appurtenant thereto. Such insurance shall provide bodily injury, property damage, personal injury, advertising injury, contractual liability and products-completed operations coverage and shall have combined single limits in an amount not less than $2,000,000 per occurrence or offense. The policy or policies shall provide fire legal liability coverage with limits of at least $1,000,000.00. The policy or policies shall also insure the risks assumed by Lessee of the indemnity provisions of Section 15 of this Lease. The limits of said insurance shall not, however, limit or decrease the liability of Lessee hereunder.
b.) Additional Insured/Primary Insurance: Lessee will insure that the policy or policies required by subparagraph 11a. name Lessor as an additional insured and further provide that such insurance shall be primary to, and non-contributory with, any and all insurance maintained by Lessor. Lessee shalt provide Lessor with an endorsement to the policy or policies required by subparagraph 11a. substantially identical to Exhibit "D" to this Lease.
c.) Property Insurance: Lessee shall obtain and keep in force during the term of this Lease a policy or policies of insurance covering loss or damage to *its* fixtures, equipment, tenant improvements, inventory and other contents stored in the Premises, whether the property of Lessee or anyone else, in the amount of the full replacement value thereof, as the same may exist from time to time. Such policy or policies shall contain a waiver of subrogation provision specifying that the insurer(s) waives any right of recovery against Lessor to recover any payments made under the policy or policies.
d.) **Insurance Policies:** Insurance required hereunder shall be in companies holding a "General Policyholders Rating" of at least "A", or such other rating as may be required by a lender having a lien on the Premises, as set forth in the most current issue of "Best's Insurance Guide". The insuring party shall deliver to the other party copies of policies of such insurance or certificates evidencing the existence and amounts of such insurance with Joss payable clauses as required by this Paragraph. No such policy shall be cancelable or subject to reduction of coverage or other modification except after thirty (30) days prior written notice to Lessor. If Lessee is the insuring party, Lessee shall, at least thirty (30) days prior to the expiration of such policies, furnish Lessor with renewals or binders thereof, or Lessor may, at Lessor's sole option and discretion, order such insurance and charge the cost thereof to Lessee, which amount shall be payable by Lessee immediately upon demand.
e.) Waiver of Claims and Right of Subrogation: Lessor shall not be liable to Lessee, nor shall Lessor be liable to any person claiming under Lessee by lease, license, assignment or subrogation by operation of Jaw or contract, or upon the Premises with the express, implied or constructive consent of Lessee, or for any loss of, or damage to or the destruction of the Premises, or some part or parts thereof, or any goods, furniture, fixtures or equipment thereon, for the interruption of any business, or for any injury to the person (including wrongful death) or property of the Lessee or to any such persons claiming under Lessee, resulting from any cause

whatsoever, including without limitation the sole negligence of Lessor, any broken pipe, water seepage, blocked drain, defective wiring, interruption in power, malfunction of any air conditioning, plumbing system, sewer, storm drain or the like.

f.) Fire and Extended Coverage Insurance: At all times from and after the date of commencement of this Lease, Lessor shall keep the Building of which the Premises are a part, but not the contents of the Premises or any property of Lessee or others, insured for the mutual benefit of Lessor and Lessee against (i) loss or damage by fire and such other risks as may be included in a standard form of Extended Coverage Insurance from time to time available, in amounts sufficient to prevent Lessor or Lessee from becoming a co-insurer within the terms of the applicable policies and, in any event, in an amount not less than one hundred percent (1 00%) of the then full replacement value of the Building, together with an addendum thereto providing for six (6) months rental income coverage payable to Lessor, (ii) loss or damage from leakage of sprinkler systems now or hereafter installed in the Building by Lessor in such amount as Lessor shall reasonably establish, and (iii) loss or damage resulting from explosion of steam boiler, air conditioning equipment, pressure vessels or similar apparatus, now or hereinafter installed in or on the Building by Lessor, in such amount as Lessor shall reasonably establish.

g.) Notice by Lessee: Lessee agrees to give prompt written notice to Lessor with respect to all events occurring upon the Premises which may be the subject of claims on insurance policies, whether policies are being maintained by Lessor or Lessee.

12. TAXES:

a.) **Definition of "Real Property Tax":** As used herein the term "real property tax" shall include any form of real estate tax or assessment, general, special, ordinary or extraordinary, and any license, fee, commercial rental tax, improvement bond or bonds, levy or tax (other than inheritance, personal income or estate taxes) imposed on the Premises by any authority having the direct or indirect power to tax including any city, state or federal government or any school, agricultural, sanitary, fire, street, drainage, lighting or other improvement district thereof, as against any legal or equitable interest of Lessor in the Premises or in the real property of which the Premises are a part, as against Lessor's right to rent or other income therefrom, and as against Lessor's business of leasing the Premises. The term "real property tax" shall also include any tax, fee, levy, assessment or charge (i) in substitution of, partially or totally, any tax, fee, levy, assessment or charge hereinabove included within the definition of "real property tax", or (ii) the nature of which was hereinabove included within the definition of "real property tax", or (iii) which is imposed for a service or right not charged prior to June 1, 1978, or, if previously charged, has been increased since June 1, 1978, or (iv) which is imposed as a result of transfer, either partial or total, of Lessor's interest in the Premises or which is added to a tax or charge hereinabove included within the definition of "real property tax" by reason of such transfer, or (v) which is imposed by reason of this transaction, any modification or changes hereto, or any transfers thereof.

There shall be excluded from real property taxes all income taxes, environmental assessments, charges or liens arising in connection with the remediation of Hazardous Materials (as defined in Section 39 below) from the Project or any portion thereof, the causation of which arose prior to the delivery of the Premises to Lessee, or to the extent caused by Lessor: costs or fees (other than real property taxes) attributable to Lessor's transfer of ownership of the Project or any interest of Lessor therein, capital stock, inheritance, estate, gift, or any other taxes imposed upon or measured by Lessor's gross income or profits unless the same is specifically included within the definition of real property taxes above or otherwise shall be imposed in lieu of real estate taxes or other ad valorem taxes. For example, assessment district fees would be included in real property taxes.

b.) **Joint Assessment:** If the Premises are not separately assessed, Lessee's liability shall be an equitable proportion of the real property taxes for all of the land and improvements included within the tax parcel assessed plus any property taxes assessed as a result of tenant improvements, such proportion to be determined by Lessor from such information as may be reasonably available. Lessor's determination thereof, in good faith, shall be conclusive. Lessor is not obligated to pro-rate the recovery of such taxes. Lessee shall pay such proportion to Lessor within five (5) days of receipt of Lessor's written notice thereof.

c.) **Personal Property Taxes:** Lessee shall pay prior to delinquency all taxes assessed against and levied upon trade fixtures, furnishings, equipment and all other personal property of Lessee contained in the Premises or elsewhere as it may affect the Project. When possible, Lessee shall cause said trade fixtures, furnishings, equipment and all other personal property to be assessed and billed separately from the real property of the Lessor. If any of Lessee's personal property shall be assessed with Lessor's real property, Lessee shall pay the taxes attributable to Lessee within five (5) days of receipt of written notice thereof from Lessor or taxing entity.

13. REPAIRS:

a.) **Repairs by Lessee:** Lessee agrees at its sole cost and expense to maintain, repair and keep the interior of the Premises and all building systems within and serving the Premises though not necessarily located within the Premises forming a part of the Building, and all appurtenances (including without limitation wiring, plumbing, sewage system, heating and air cooling installation, all glazing and doors in or bordering the Premises and any store front) in good condition and repair during the term of this Lease, excepting only the foundations and structural portions of the Premises, damage thereto by fire, earthquake, civil insurrection and act of God or the elements. Upon request from Lessor, Lessee shall provide Lessor with evidence satisfactory to Lessor of Lessee's maintenance contracts and invoices of repair. In the event Lessee fails to make the repairs required of Lessee within thirty (30) days from delivery of Lessor's notice to Lessee to make such repairs, Lessor, in addition to all other remedies available hereunder or by law, and without waiving any said alternative remedies, may make same and Lessee agrees to repay Lessor the cost thereof, plus ten percent (10%) of costs for Lessor's administration expenses, within five (5) days of delivery of Lessor's demand thereof. Failure by Lessee

to pay same shall carry with it the same consequences as failure to pay any installment of rent. To the extent Lessee is responsible for such maintenance, repair and replacement, Lessee agrees during the full term of this Lease, at its sole cost and expense, to make all repairs and replacements of whatever kind or nature, to either the interior or exterior of the Premises, rendered necessary by reason of any act or omission of Lessee or its agents, servants or employees. Lessee waives all rights to make repairs at the expense of Lessor as provided for in any statute or law in effect at the time of the execution of this Lease or any amendment thereof or any other statute or law which may be hereafter enacted during the term of this Lease, or sooner termination hereof, and to surrender unto Lessor the Premises in the same condition as received, ordinary wear and tear and damage by fire, earthquake, civil insurrection, act of God or the elements alone excepted.

b.) **Repairs by Lessor**: Lessor agrees, after receipt of written notice of the necessity therefore, and should same not be caused by Lessee or by reason of Lessee's occupancy, or its misuse, negligence, or alterations to the Premises to initiate necessary repairs to the fire sprinkler system, foundations and other structural portions of the Premises which could be a part of the Building, the common areas, the roof, exterior walls, parking areas, landscaping, wiring to the Building, plumbing and sewage system exterior to the Premises, within thirty (30) days or as soon as is reasonably practical.

14. ALTERATIONS; LIENS; PERMITS:

Lessee agrees not to make any structural alterations of, changes in or additions to the Premises. Lessee agrees not to make any non-structural alterations of, changes in or additions to the Premises without the prior written consent of Lessor. Lessee shall be required to submit plans, specifications and a budget, as well as the name, address and license number of the general contractor performing the work, along with the application for Lessor's consent. Lessee agrees that all non-structural alterations, changes, additions and improvements, including fixtures, made in, to or on the Premises, except unattached movable business fixtures, shall be the property of Lessor at termination of Lease and shall remain upon and be surrendered with the Premises. Should Lessor so desire, Lessee shall restore the Premises or such part or parts thereof by the end of the term of this Lease at Lessee's sole cost and expense. Lessee agrees that if any such alterations, changes, additions or improvements are approved by Lessor, Lessee shall take all steps necessary to assure the completion of same in a good and workmanlike manner and in compliance with applicable code, and shall, at Lessee's sole cost and expense, secure any permits or licenses which may be required by government agency.

Lessee agrees that no such alterations, changes, additions or improvements will commence until seven (7) days after Lessee's receipt of written consent of Lessor as required by this Paragraph in order that Lessor may post appropriate notices to avoid liability on account thereof. Lessee agrees to indemnify and save harmless Lessor from all liens, claims or demands arising out of any work performed, materials furnished or obligations incurred by or for Lessee upon the Premises during the entire term of this Lease, and agrees not to suffer any such lien or other lien to be created.

15. HOLD HARMLESS:

This Lease is made upon the express condition that Lessee agrees to indemnify, keep, save and hold Lessor free and harmless from all liability, penalties, losses, damages, costs, expenses, causes of action, claims and/or judgments arising by reason of any injury or damage to any person or persons, including without limitation, Lessee, its invitees, servants, agents and employees, or property of any kind whatsoever and to whomsoever belonging, including, without limitation, Lessee, its invitees, servants', agents' and employees', from any cause or causes whatsoever, excepting the sole negligence of Lessor, while in, upon, or in any way connected with said demised Premises or the Building or Project of which the Premises are a part, or its appurtenances, or the sidewalks or other areas adjacent thereto, during the term of this Lease or any occupancy hereunder. Lessee hereby covenants and agrees to defend, indemnify, protect and save Lessor harmless from all liability, loss, costs and obligations on account of or arising out of any such claims, injuries or losses, however occurring, excepting those that are a result of Lessor's sole negligence.

In the event of any breach by Lessee of any of the requirements of Paragraph 11 Insurance, then Lessee's indemnity obligations shall be extended to include any benefits to which Lessor would have been entitled under the policy or policies described in Paragraph 11 Insurance, and Lessee shall be obligated to provide Lessor with all of the benefits that would have been furnished under such policy or policies, and Lessee shall assume all of the obligations of an insurer under such policy or policies in addition to any other remedy available to Lessor, either provided in this Lease or by law.

Lessee, as a material part of the consideration to be rendered to Lessor, hereby waives all claims against Lessor for damages to goods, wares and merchandise in, upon or about the Premises and for injuries to Lessee, his agents or third persons in or about the Premises from any cause arising at any time including, without limiting the generality of the foregoing, damages arising from the sole negligence of Lessor, from acts or omissions of other tenants of the Building or Project of which the Premises are a part and from failure of Lessor to make repairs.

16. ENTRY AND INSPECTION:

Lessee agrees that Lessor and his agents may enter upon the Premises to inspect same, to submit them to a prospective purchaser, lender or lessee or to make any changes, alterations or repairs which Lessor shall consider necessary for the protection, improvement or preservation thereof, or of the Building in which the Premises are situated, or to make changes in the plumbing, wiring, meters or other equipment, fixtures or appurtenances of the Building, or to post any notice provided for by law, or otherwise to protect any and all rights of Lessor. Lessor shall provide Lessee reasonable notice of intent to enter, except in case of emergency. Lessor shall have the right to erect and maintain all necessary or proper scaffolding or other structures for the making of such changes, alterations or repairs (provided the entrance to the Premises shall not be blocked thereby and that such work shall be completed with diligence and dispatch) and there shall be no liability against Lessor for damages thereby sustained by Lessee, nor shall Lessee be entitled to any abatement of rent by reason of the exercise by Lessor of any such rights herein reserved. Nothing herein contained shall be

construed to obligate Lessor to make any changes, alterations or repairs. Lessee further agrees that at any time after six (6) months prior to the termination of this Lease, Lessor may place thereon "To Let" or "To Lease" signs.

17. EASEMENTS:
Lessor reserves to itself the right, from time to time, to grant such easements, rights and dedications that Lessor deems necessary or desirable and to cause the recordation of parcel maps and restrictions, so long as such easements, rights, dedications, maps and restrictions do not unreasonably interfere with the use of the Premises by Lessee. Lessee shall sign any of the aforementioned documents upon request of Lessor and failure to do so in a timely manner shall constitute a material breach of this Lease.

18. ESTOPPELS:
Lessee agrees, at any time and from time to time within seven (7) days of written request from Lessor to execute, acknowledge and deliver to Lessor a statement in writing certifying that this Lease is unmodified and in full force and effect (or, if there have been modifications, that the same is in full force and effect as modified, and stating the modifications) and the dates to which rent and other charges have been paid in advance, if any, and any other matters reasonably requested by Lessor, it being intended that any such statement delivered pursuant to this Paragraph may be relied upon by any present or perspective purchasers, mortgagee(s) or assignee(s) of any mortgagee of the Premises. Failure of Lessee to comply with any and all provisions of this Paragraph shall constitute a breach of the Lease.

19. MULTIPLE TENANT BUILDING:
In the event that the Premises are a part of a larger building or group of buildings, Lessee agrees that it will abide by, keep and observe all reasonable rules and regulations which Lessor may make from time to time, including but not limited to the management, safety, operation, care and cleanliness of the Building and grounds, the parking of the vehicles and the preservation of good order therein as well as for the convenience of other occupants and tenants of the Project. Violation of any such rules and regulations shall be deemed a breach of this Lease by Lessee.

20. SIGNS:
Lessee agrees not to inscribe, paint or affix any signs, advertisements, placards or awnings on the exterior or roof of the Premises or upon the entrance doors, windows, monuments, or the sidewalk on or adjacent to the Premises without the written consent of Lessor first obtained. Any signs so placed on the Premises shall be so placed upon the understanding and agreement that Lessee will remove same at the termination of tenancy herein created and repair any damage or injury to the Premises caused thereby, and if not so removed by Lessee, then Lessor may have same so removed at Lessee's expense. Lessee shall not be allowed to use the name of the Project, or words to such effect in connection with any business carried on in the Premises (except as the address of the Lessee) without the written consent of Lessor. Lessor reserves the right to change the name and title of the Project and Building at any time during the term of said Lease. Lessee hereby expressly agrees to such change at the option of Lessor and waives any and all damage occasioned thereby.

21. ABANDONMENT:
If Lessee should abandon or surrender Premises or be dispossessed by process of law, in addition to all other remedies of Lessor, Lessor, at its option, may deem that any personal property belonging to Lessee left on the Premises is abandoned and/or Lessor may at once enter upon the Premises and remove therefrom any and all equipment, fixtures and merchandise therein and may sell same at public or private sale at such price and upon such terms as Lessor may determine, without notice to or demand upon Lessee. Out of the proceeds of such sale Lessor may reimburse itself for the expense of such taking, removal and sale and for any indebtedness of Lessee to Lessor and the surplus, if any, shall be accounted for to Lessee at Lessee's last known address. Abandonment of the Premises shall be deemed a breach of the Lease.

22. DESTRUCTION; RENEWAL:
A. In the event of damage or destruction to the Premises during the term hereof which Lessor is obligated to repair by the terms of this Lease, Lessor shall forthwith repair the same, provided such repairs can be made within ninety (90) days under the laws and regulations of State, Federal, County or Municipal authorities, but such destruction shall in nowise annul or void this Lease, except that Lessee shall be entitled to a proportionate reduction of rent to be based upon the extent to which the making of such repairs shall interfere with the business carried on by Lessee in the Premises. If such repairs cannot be made within ninety (90) days, Lessor may, at its option, make same within a reasonable time, in which event this Lease shall continue in full force and effect and the monthly rent shall be proportionately reduced as aforesaid in this Paragraph provided. In the event that Lessor does not so elect to make such repairs which cannot be made within one hundred eighty (180) days, this Lease may be terminated at the option of either party. In the event that the Building of which the Premises are a part is damaged or destroyed to the extent of one-third (33.33%) or more of the replacement cost thereof, Lessor may elect to terminate this Lease, whether the Premises be injured or not.
B. Notwithstanding anything herein to the contrary, if, at any time during the term hereof, any governmental agency having jurisdiction over the Premises of Building(s) of which the Premises are a part, shall require the making of any repairs, improvements or alterations to said Building(s) or Premises, and Lessor determines to demolish said Building(s) or Premises rather than to make said repairs, improvements or alterations, or allow same to be made, Lessor, upon written notice to Lessee as soon as is practical, shall have the right to terminate this Lease. Upon the date specified in such notice, this Lease shall terminate and Lessor shall have no further liability to Lessee except that Lessor shall refund to Lessee any unearned rents and shall return the balance of security deposit after such offsets as may be provided in this Lease. In the event Lessor had heretofore given written consent to any leasehold improvements upon the Premises made and paid for by Lessee, and had

agreed, in writing, as to the cost thereof, Lessor shall pay to Lessee upon such termination the unamortized portion of such cost as the number of full calendar months remaining in the original term of this Lease bears to the total number of calendar months is said original term.

23. CONDEMNATION:

If any part of the Premises or of the Building of which same are a part (even info part of the Premises be taken) be condemned for a public or quasi-public use by right of eminent domain, with or without litigation, or transferred by agreement in connection with such public or quasi-public use, this Lease,
as to the part so taken, shall terminate as of the date title shall vest in the condemnor, and the rent payable hereunder shall be adjusted so that the Lessee shall be required to pay for the remainder of the term only such portion of rent as the value of the part remaining after condemnation bears to the value of the entire Premises at the date of condemnation. In such event Lessor shall have the option to terminate this Lease as of the date when title to the part so condemned vests in the condemnor. If more than one-third (33.33%) of the Premises is taken, Lessee at Lessee's option to be exercised in writing within ten (IO) days after Lessor shall have given written notice to Lessee of such taking (or in absence of such notice, within ten (10) days after the condemning authority shall have taken possession or title), terminate this Lease as of the date the condemning authority takes such possession or title.
All compensation awarded upon such condemnation or taking shall belong and be paid to Lessor and Lessee shall have no claim thereto, and Lessee hereby irrevocably assigns and transfers to Lessor any right to compensation or damages to which Lessee may become entitled during the term hereof by reason of the condemnation of all or part of the Premises.

24. SALE OF PREMISES:

In the event of sale or conveyance by Lessor of the Premises, the same shall operate to release Lessor from any future liability upon any of the covenants or conditions, express or implied, herein contained in favor of Lessee, and in such event Lessee agrees to look solely to the responsibility of the successor in interest of Lessor. If any security be given by Lessee to secure faithful performance of Lessee's covenants in this Lease or any rent shall have been prepaid, Lessor may transfer same as such to the purchaser of the reversion thereon and thereupon Lessor shall be discharged from any further liability in reference thereto.

25. COSTS OF SUIT:

Lessee agrees that if Lessor is involuntarily made a party defendant to any litigation concerning this Lease or the Premises by reason of any act or omission of Lessee and not because of any act or omission of Lessor, then Lessee shall hold Lessor harmless from all liability by reason thereof, including reasonable attorney's fees incurred by Lessor in such litigation and all court costs. If legal action be brought by either party hereto for the unlawful detainer of the Premises, for the recovery of any rent due under the provisions of this Lease, or due to any breach of any term, covenant, condition or provision thereof, the party prevailing in said action (Lessor or Lessee as the case may be) shall be entitled to recover from the party not prevailing court costs and a reasonable attorney's fee which shall be fixed by the Judge of the Court. The entry of dismissal without prejudice shall not create a prevailing party.

If any action be instituted by Lessor to enforce any provision of this Lease and/or collect any sum due hereunder, Lessor shall recover from Lessee all costs connected with such enforcement and/or collection.

26. SECURITY MEASURES:

Lessee hereby acknowledges that the rent payable to Lessor hereunder does not include the cost of guard service or other security measures, and that Lessor has no obligation whatsoever to provide it. Lessee assumes all responsibility for the protection of Lessee, its agents and invitees, the Premises and any property on the Premises from acts of third parties.

27. PERFORMANCE UNDER PROTEST:

If at any time a dispute shall arise as to any amount or sum of money to be paid by one party to the other under the provisions hereof, the party against whom the obligation to pay the money is asserted shall have the right to make payment "under protest" and such payment shall not be regarded as a voluntary payment, and there shall survive the right on the part of said party to institute suit for recovery of such sum. If it shall be adjudged that there was no legal obligation on the part of said party to pay such sum or any part thereof, said party shall be entitled to recover such sum or so much thereof as it was not legally required to pay under the provisions of this Lease.

28. ASSIGNMENT AND SUBLETTING:

a. **Lessor's Consent Required:** Lessee shall not voluntarily or by operation of law assign, transfer, mortgage, sublet or otherwise transfer or encumber all or any part of Lessee's interest in this Lease or in the Premises without Lessor's prior written consent, which consent shall not be unreasonably withheld or conditioned. Lessee shall provide Lessor with documentation including, but not limited to the sublease or assignment document, the legal name of the proposed subtenant/assignee, financial statements for the proposed subtenant/assignee, proposed use of the premises, the type of business to be conducted by proposed subtenant/assignee, and any other documentation required by Lessor to make a reasonable determination. (For the purposes of this section 28, it shall be deemed unreasonable for a tenant or approved subtenant or assignee to sublet or assign all or any part of the Premises at less than the adjusted Base Rent payable under this Lease.) Lessor shall respond to Lessee's request for consent hereunder in a timely manner. Any attempted assignment, transfer, mortgage, encumbrance or subletting without Lessor's written consent shall be void and shall constitute a breach of this Lease. In no event shall Lessee have the right to sublease beyond Lessee’s lease term.

b. **No Release of Lessee:** Regardless of Lessor's consent, no subletting or assignment shall release Lessee

of Lessee's obligation or alter the primary liability of Lessee to pay the rent and to perform all other obligations to be performed by Lessee hereunder. The acceptance of rent by Lessor from any other person or entity shall not be deemed a waiver by Lessor of any provision hereunder. Consent to one assignment or subletting shall not be deemed consent to any subsequent assignment or subletting. In the event of default by any assignee of Lessee or any successor of Lessee in the performance of any of the terms hereof, Lessor may proceed directly against Lessee without the necessity of exhausting remedies against said assignee or sub-tenant. Lessor may or may not consent to subsequent assignments or subletting of this Lease, or amendments or modifications to this Lease with assignees of Lessee, with or without notifying Lessee, or any successors of Lessee, and without obtaining its or their consent thereto and such action shall not relieve Lessee of liability under this Lease.

c. **Attorney's Fees:** In the event Lessee shall assign or sublet the Premises or request consent of Lessor to any assignment or subletting, or if Lessee shall request the consent of Lessor for any act Lessee proposes to do, then Lessee shall pay Lessor's attorney's fees and any other costs incurred in connection therewith.

29. CONFLICT:

Any conflict between the printed provisions of this Lease and the typewritten or handwritten provisions shall be controlled by the typewritten or handwritten provisions, where both parties have initialed such provisions.

30. SUBORDINATION:

a. This Lease, at Lessor's option, shall be subordinate to any ground lease, mortgage, deed of trust, or any other hypothecation or security now or hereafter placed upon the real property of which the Premises are a part and to any and all advances made on the security thereof and to all renewals, modifications, consolidations, replacements and extensions thereof. If any mortgagee, trustee or ground Lessor shall elect to have this Lease prior to the lien of its mortgage, deed of trust or ground lease, and shall give written notice thereof to Lessee, this Lease shall be deemed prior to such mortgage, deed of trust or ground lease on the date of recording thereof;

b. Lessee agrees to execute any documents required to effectuate an attornment, a subordination, or to make this Lease prior to the lien of any mortgage, deed of trust or ground lease, as the case may be. Lessee's failure to execute such documents within seven (7) days after written demand shall constitute a default by Lessee hereunder.

31. SURRENDER OF LEASE:

No act or conduct of Lessor, whether consisting of the acceptance of the keys to the Premises, or otherwise, shall be deemed to be or constitute an acceptance of the surrender of the Premises by Lessee prior to the expiration of the term hereof, and such acceptance by Lessor of surrender by Lessee shall only flow from and must be evidenced by a written acknowledgement of acceptance of surrender by Lessor. The voluntary or other surrender of this Lease by Lessee, or a mutual cancellation thereof, shall not work a merger and shall, at the option of the Lessor, terminate all or any existing subleases, or subtenancies or may, at the option of the Lessor, operate as an assignment to it of any or all such subleases, or subtenancies.

32. HOLDING OVER:

Should Lessee hold over the term hereby created with written consent of Lessor, Lessee shall become a tenant from month to month at one hundred twenty-five percent (125%) of the rent payable hereunder for the prior six (6) months, and otherwise upon the covenants and conditions in this Lease contained, and shall continue to be such tenant until thirty (30) days after either party hereto serves upon the other written notice of intent to terminate such monthly tenancy. Should such termination occur on any day other than the last day of the month, any unearned prepaid rent shall be prorated based on a 30 day month and shall be credited to Lessee's account as additional security deposit, to be disbursed according to the provisions of Paragraph 4.

33. NOTICES:

It is agreed between the parties hereto that any notice required hereunder or by law to be served upon either of the parties shall be in writing and shall be delivered personally upon the other or sent by first class mail, postage prepaid, addressed to the addresses listed in the Basic Lease Information or such other address as may be from time to time furnished in writing by Lessor to Lessee or by Lessee to Lessor, each of the parties waiving personal or any other service than as in this Paragraph provided for. Notice by first class mail shall be deemed to be communicated the second business day from the time of mailing. Notice by any other means shall be effective upon delivery, or refusal of delivery.

34. DEFAULTS; REMEDIES:

a. **Defaults:** The occurrence of any one or more of the following events shall constitute a default and breach of this Lease by Lessee:

i. The vacating or abandonment of the Premises by Lessee or assignee or sublessee as applicable.

ii. The failure of Lessee to make any payment of rent or any other payment required to be made by Lessee hereunder, as and when due.

iii. The failure by Lessee to observe or perform any conditions, covenants or provisions of this Lease to be observed or performed by Lessee, other than described in Section 34a(ii) above, and where such failure shall continue for a period of seven (7) days after written notice thereof from Lessor to Lessee provided, however, that if the nature of Lessee's default is such that more than seven (7) days are reasonably required for its cure, then Lessee shall not be deemed to be in default if Lessee commenced such cure within said seven (7) day period and thereafter diligently prosecutes such cure to completion.

iv. The making by Lessee of any general arrangement or assignment for the benefit of creditors;

v. The appointment of a trustee or receiver to take possession of substantially all of Lessee's assets located at the Premises or of Lessee's interest in this Lease, where possession is not restored to Lessee within thirty (30) days; or

vi. The attachment, execution or other judicial seizure of substantially all of Lessee's assets located at the Premises or of Lessee's interest in this Lease where such seizure is not discharged within thirty (30) days. Provided, however, in the event that any provision in this Paragraph is contrary to any applicable law, such provision shall be of no force or effect.

vii. The discovery by Lessor that any financial information given to Lessor by Lessee, any assignee of Lessee, any subtenant of Lessee, any successor in interest of Lessee or any guarantor of Lessee's obligation hereunder, and any of them, was materially false.

b. **Remedies:** In the event of any such default or breach by Lessee, Lessor may at any time thereafter, by written notice or demand and without limiting Lessor in the exercise of any right or remedy which Lessor may have by reason of such default or breach:

i. Terminate Lessee's right to possession of the Premises by any lawful means, in which case this Lease shall terminate and Lessee shall immediately surrender possession of the Premises to Lessor. In such event Lessor shall be entitled to recover from Lessee all damages incurred by Lessor by reason of Lessee's default including, but not limited to, the cost of recovering possession of the Premises, attorney's fees, any real estate commission actually paid, the balance remaining of unamortized tenant improvements, if any, the worth at the time of award by the court having jurisdiction thereof of the unpaid rent which had been earned at the time of termination; the worth at the time of award of the amount by which the unpaid rent would have been earned after termination until the time of award exceeds the amount of such rental loss that the Lessee proves could have been reasonably avoided; the worth at the time of award of the amount by which the unpaid rent for the balance of the term after the time of award exceeds the amount of such rental loss that the Lessee proves could be reasonably avoided; and any other amount necessary to compensate Lessor for all the detriment proximately caused by Lessee's failure to perform his obligations under the Lease or which in the ordinary course of things would be likely to result therefrom.

ii. Maintain Lessee's right to possession in which case this Lease shall continue in effect whether or not Lessee shall have abandoned the Premises. In such event Lessor shall be entitled to enforce all of Lessor's rights and remedies under this Lease, including the right to recover rent as it becomes due hereunder.

iii. Pursue any other remedy now or hereafter available to Lessor under the laws or judicial decisions of the state wherein the Premises are located. Unpaid installments of rent and other monetary obligations of Lessee under the terms of this Lease shall bear interest from the date due at the maximum rate then allowable by law.

c. **Default by Lessor:** Lessor shall not be in default unless Lessor fails to perform obligations required of Lessor within a reasonable time, after written notice by Lessee to Lessor specifying wherein Lessor has failed to perform such obligations provided, however, that if the nature of Lessor's obligations is such that more than sixty (60) days are required for performance then Lessor shall not be in default if Lessor commences performance within such sixty (60) day period and thereafter diligently pursues the same to completion.

d. **Late Charges:** Lessee hereby acknowledges that late payment by Lessee to Lessor of rent and/or other sums due hereunder will cause Lessor to incur costs not contemplated by this Lease, the exact amount of which will be extremely difficult to ascertain. Such costs include, but are not limited to, processing and accounting charges, and late charges which may be imposed on Lessor by terms of any mortgage or trust deed covering the premises. Accordingly, if any installment of rent or any other sum due from Lessee shall not be received by Lessor (or Lessor's designee, if applicable) within five (5) days after such amount shall be due, then, without any requirement for notice to Lessee, Lessee shall pay to Lessor a late charge equal to six percent (6%) of such overdue amount, plus accrued interest at the maximum amount allowable by law. The parties agree that such late charge represents a fair and reasonable estimate of the costs Lessor will incur by reason of late payment by Lessee. Acceptance of such late charge by Lessor shall in no event constitute a waiver of Lessee's default with respect to such overdue amount, nor prevent Lessor from exercising any of the other rights and remedies hereunder. In the event that a late charge is payable hereunder, whether or not collected, for three (3) installments of rent or other sum, then rent shall automatically become due and payable quarterly in advance, rather than monthly, notwithstanding Paragraph 8 or any other provision of this Lease to the contrary.

e. **Impounds:** In the event that a late charge is payable hereunder, whether or not collected, for three (3) installments of rent or any other sum due hereunder, Lessee shall pay to Lessor, if Lessor shall so request, in addition to any other payments required under this Lease, a monthly advance installment, due on the first (1st) day of each month, as estimated by Lessor for the real property tax, insurance and operating expenses on the Premises which are payable by Lessee under the terms of this Lease. Such fund shall be established to insure payment when due, before delinquency, of any or all such taxes, premiums and expenses. If the amounts paid to Lessor by Lessee under the provisions of this Paragraph are insufficient to discharge the obligations of Lessee to pay such taxes, premiums and expenses as the same shall become due, Lessee shall pay to Lessor, upon Lessor's demand, such additional sums as necessary to pay such obligations. All monies paid to Lessor under this Paragraph may be intermingled with other monies of Lessor and shall not bear interest. In the event of a default in the obligations of Lessee to perform under this Lease, then any balance remaining from the funds paid to Lessor under the provisions of this Paragraph may, at the option of Lessor, be applied to the payment of any monetary default of Lessee in lieu of being applied to the payment of taxes, premiums and/or expenses.

35. CUMULATIVE REMEDIES; NON-WAIVER:

The receipt by Lessor of any rent or payment with or without knowledge of the breach of any covenant hereof shall not be deemed a waiver of any such breach and no waiver by Lessor of any sum due hereunder or any provision hereof shall be deemed to have been made unless expressed in writing and signed by Lessor. No delay or omission in the exercise of any right or remedy accruing to Lessor upon any breach by Lessee under this Lease shall impair

such right or remedy or be construed as a waiver of any such breach theretofore or hereafter occurring. The waiver by Lessor of any breach of any term, covenant or condition herein contained shall not be deemed to be a waiver of any subsequent breach of the same or any other term, covenant or condition herein contained. All rights, powers, options or remedies afforded to Lessor either hereunder or by law shall be cumulative and not alternative and the exercise of one right, power, option or remedy shall not bar other rights, powers, options or remedies allowed herein or by law.

36. ADDITIONAL RENT:
Any monetary obligations of Lessee to Lessor under the terms of this Lease shall be deemed to be rent. All amounts due Lessor are payable in lawful money of the United States of America. Any amount due to Lessor, if not paid when due, shall bear interest from the date due until paid at the maximum amount allowable by law. Payment of interest shall not excuse or cure any default hereunder by Lessee.

37. INCORPORATION OF PRIOR AGREEMENTS; AMENDMENTS:
This Lease contains all agreements of the parties hereto with respect to any matter mentioned herein. No prior agreement or understanding pertaining to any such matter shall be effective. This Lease may be modified in writing only, signed by the parties in interest at the time of the modification. Except as otherwise stated in this Lease, Lessee hereby acknowledges that neither the Lessor nor any employees or agents of any said persons has made any oral or written warranties or representations relative to the condition or use by Lessee of the Premises and Lessee acknowledges that Lessee assumes all responsibility regarding the Occupational Safety Health Act, the legal use and adaptability of the Premises and the compliance thereof with all applicable laws and regulations in effect during the term of this Lease except as otherwise specifically state in this Lease.

38. COMPLIANCE WITH APPLICABLE LAWS:
Lessee shall use the Premises in accordance with all applicable laws and government regulations. If any law or government regulation (such as, but not limited to, the Americans With Disabilities Act of 1990) should require renovation or alteration of the Premises, Lessee shall be responsible for such alteration or renovation and shall pay all costs and expenses required to alter or renovate the Premises to conform to any such law or governmental regulation. If any law or governmental regulation (such as, but not limited to, the Americans With Disabilities Act of 1990) should require the renovation or alteration of the Common Area(s), Lessor shall be responsible for such renovation or alteration and shall pay all costs and expenses required to alter or renovate the Common Area(s) to conform to any such law or governmental regulation. All such costs and expenses required to alter or renovate the Common Area(s) to conform to any such law or governmental regulation shall be included in the Operating Expenses as provided in Paragraph 9 of this Lease. Lessee shall indemnify and defend Lessor against any loss suffered or liability incurred by Lessor, and all actions, suits, damages or claims brought against Lessor as a result of Lessee's failure to use the Premises in accordance with any such law or governmental regulation.

39. ENVIRONMENTAL MATTERS:

A. (i) The term "Hazardous Materials" as used herein shall mean any petroleum products, asbestos, polychlorinated biphenyls, P.C.B.'s, chemicals, compounds, materials, mixtures or substances that are now or hereinafter defined, listed in or otherwise classified as a "hazardous substance", "hazardous material", "hazardous waste", "extremely hazardous waste", "infectious waste", "toxic substance", "toxic pollutant", or any other formulation intended to define, list or classify substances by reason of deleterious properties such as ignitability, corrosivity, reactivity, carcinogenicity or toxicity pursuant to any federal, state or local environmental law, regulation, ordinance, resolution, order or decree relating to industrial hygiene, environmental protection or the use, analysis, generation, manufacture, storage, release, disposal or transportation of the same ("Hazardous Materials Laws").

(ii) Lessee shall not use, manufacture, store, release, dispose or transport any Hazardous Materials in, on, under or about the Premises, the Building or the Project without giving prior written notice to Lessor and obtaining Lessor's prior written consent, which consent Lessor may withhold in its sole discretion. Lessee shall, at its own expense, procure, maintain in effect and comply with all conditions of any and all permits, licenses and other governmental and regulatory approvals required in connection with Lessee's generation, use, storage, disposal and transportation of Hazardous Materials. Except as discharged into the sanitary sewer in strict accordance and conformity with all applicable Hazardous Materials laws, Lessee shall cause any and all Hazardous Materials to be removed from the Premises and transported solely by duly licensed haulers to duly licensed facilities for final disposal of such materials and wastes. Regardless whether permitted under the Hazardous Materials laws, Lessee shall not maintain in, on, under or about the Premises, the Building or the Project any above or below ground storage tanks, clarifiers or sumps nor shall any wells for the monitoring of ground water, soils or subsoils be allowed.

(iii) Lessee shall immediately notify Lessor in writing of any enforcement, cleanup, removal or other governmental or regulatory action instituted, completed or threatened pursuant to any Hazardous Materials law; any claim made or threatened by any person or entity against Lessee or the Premises, Building and/or Project relating to damage, contribution, cost, recovery, compensation, loss or injury resulting from or claimed to result from any Hazardous Materials; any reports, information, inquiries or demands made, ordered or received by or on behalf of Lessee which arise out of or in connection with the existence or potential existence of any Hazardous Materials in, on, under or about the Premises, the Building or the Project, including, without limitation, any complaints, notices, warnings, asserted violations, or mandatory or voluntary informational filings with any governmental agency in connection therewith, and immediately supply Lessor with copies thereof.

B. Lessee shall indemnify, defend (by counsel reasonably acceptable to Lessor), protect, and hold Lessor, and each of Lessor's partners, officers, directors, partners, employees, affiliates, joint venturers, members, trustees, owners, shareholders, principals, agents, representatives, attorneys, successors and assigns free and harmless from and against any and all claims, liabilities, damages, fines, penalties, forfeitures, losses,

cleanup and remediation costs or expenses (including attorney fees) or death of or injury to any person or damage to any property whatsoever, arising from or caused in whole or in part, directly or indirectly by Lessee's use, analysis, generation, manufacture, storage, release, disposal or transportation of Hazardous Materials by Lessee, Lessee's agents, employees, contractors, licensees or invitees to, in, on, under, about or from the Premises, the Building or the Project or Lessee's failure to comply with any Hazardous Materials law. Lessee's obligations hereunder shall include, without limitation, and whether foreseeable or unforeseeable, all costs of any required or necessary repair, cleanup, detoxification or decontamination of the Premises, the Building or the Project, and the preparation and implementation of any closure, remedial action or other required plans in connection therewith, and shall survive the expiration or earlier termination of this Lease.

C. Lessor shall have the right to enter the Premises during regular business hours upon reasonable prior notice at all times for the purposes of ascertaining compliance by Lessee with all applicable Hazardous Materials laws, provided, however, that in the instance of an emergency Lessor's entry onto the Premises shall not be restricted to regular business hours nor shall notice be required.

D. Lessor shall have the option to declare a default of this Lease for the release or discharge of Hazardous Materials by Lessee, Lessee's employees, agents, contractors or invitees on the Premises, Building or Project or in violation of law or in deviation from prescribed procedures in Lessee's use or storage of Hazardous Materials. If Lessee fails to comply with any of the provisions under this entire Paragraph 39, Lessor shall have the right, but not the obligation, to remove or otherwise cleanup any Hazardous Materials from the Premises, the Building or the Project. In such case, the costs of any Hazardous Materials investigation, removal or other cleanup (including, without limitation, transportation, storage, disposal, attorney fees and costs) will be deemed additional rent due under this Lease, whether or not a court has ordered the cleanup, and will become due and payable on demand by Lessor.

E. Lessor shall indemnify, protect, and hold Lessee free and harmless from and against any and all claims, liabilities, damages, fines, penalties, forfeitures, losses, cleanup and remediation costs or expenses (including reasonable attorney fees) or death or injury to any person or damage to any property whatsoever arising from or caused by any Hazardous Materials existing on, under, in or about the Project or any portion thereof (including, without limitation, the Building and the Premises) on or prior to the Commencement Date. Lessor's obligations hereunder shall include, without limitation, all costs of any required or necessary repair, cleanup, detoxification or decontamination of the Premises, the Building or the Project, and the preparation and implementation of any closure, remedial action or other required plans in connection therewith.

40. MISCELLANEOUS:

a. Lessee and Lessee's Guarantor, if any, agree to deliver to Lessor, within thirty (30) days from written request therefore (but not more frequently than once each calendar year) complete financial statements prepared and certified by a Public Accountant or Certified Public Accountant showing the true and accurate net worth of Lessee and said Guarantor, if any, as of the close of Lessee's and said Guarantor's most recent accounting period.

b. In case there is more than one Lessee, the obligations of Lessee executing this Lease shall be joint and several. The words "Lessor" and "Lessee" as used herein shall include the plural as well as the singular. The covenants and agreements contained herein shall be binding upon and enforceable by the parties hereto and their respective heirs, executors, administrators, successors and assigns, subject to the restrictions herein imposed on assignment by Lessee.

c. Time is of the essence of this Lease and each and every covenant, condition and provision herein contained.

d. The paragraph headings are inserted only as a matter of convenience and for reference, and in no way define, limit or describe the scope or intent of this agreement or any provision thereof or in any way affect this agreement.

e. In the event there is a Guarantor of this Lease, said Guarantor shall have the same obligations as Lessee under this Lease.

41. PARKING:
Lessee shall be entitled to up to three (3) unassigned and undesignated onsite parking spaces per one thousand (1,000) square feet of office space, and one (1) unassigned and undesignated space per fifteen hundred (1,500) square feet of warehouse space covered by this Lease.

42. ADDENDA:
Attached hereto is an addendum or addenda as indicated on the Basic Lease Information which constitute(s) a part of this Lease: Sections 44 through 50.

43. ENTIRE AGREEMENT:
Except as noted in Section 42 above, this Lease includes the entire agreement between the parties and may neither be added to nor amended without the signature of all parties.

IN WITNESS WHEREOF, the parties hereto have subscribed their names, and if corporations executed this Lease by officers thereunto duly authorized by resolution of said corporations, in duplicate, the day and year stated below.

Lessee

/s/ Emil Kakkis

By: Emil Kakkis
Ultragenyx Pharmaceutical, Inc.
CEO 12/17/15
Title Date

/s/ Shalini Sharp

By: Shalini Sharp
Ultragenyx Pharmaceutical, Inc.
CFO 12/17/15
Title Date

Lessor

/s/ Jan Warz 12/17/15

By: Date
Condiotti Enterprises, Inc.

EXHIBIT "E"

ESTOPPEL STATEMENT

The undersigned hereby acknowledges the notification and receipt of the validly filed and posted NOTICE OF NONRESPONSIBILITY by the property owner and Lessor, Condiotti Enterprises, Inc., with respect to 81 Digital Drive, Novato, California:

(description of work)

The undersigned is aware that the filing and posting of such NOTICE OF NONRESPONSIBILITY, as set forth in Section 3094 of the California Civil Code, has the effect of exempting Lessor's interest in the property from any mechanics' liens filed in connection with any alterations, changes, additions or improvements performed at the request of the Lessee.

The undersigned acknowledges and understands that the NOTICE OF NONRESPONSIBILITY is the method by which a property owner exempts the property from mechanics' liens and notifies all those who are expending labor and/or materials on a project that the property owner will not be responsible for such labor and/or materials.

The undersigned acknowledges that Lessor is NOT a PARTICIPATING OWNER (i.e., Lessee is not an agent of Lessor in performing any alterations, changes, additions, or improvements. Such work is not a condition of the Lease, and does not materially enhance the value of Lessor's property) and that no relationship exists between Lessor and Lessee other than that of landlord and tenant. The undersigned acknowledges and understands that Lessor claims no ownership interest in such tenant improvements, and any retention of such improvements as part of the Premises when they are returned to Lessor at the termination of the Lease is not a requirement under the Lease, and may occur only if Lessee desires to avoid the expense of restoring the property to its condition prior to the Lease. Accordingly, the undersigned hereby waives and relinquishes any and all rights to assert a claim and/or file a mechanics' lien against the Lessor's interest in the property relating to or arising from the work described herein; provided, however, that nothing in this estoppel shall prohibit any claims from being made against the Lessee's interest in the property and/or Lessee's alterations, changes, additions or improvements thereto.

By: (print name)
For: (contractor name) Date:
Contractor's License Number:

TENANT'S ESTOPPEL CERTIFICATE

REFERENCE is made to that certain Lease Agreement dated the_____, entered into by and between **Bayview Ignacio, LLC, a California limited liability company,** (or its predecessor) as Landlord or Lessor (hereinafter “Landlord”), and _____, (or its predecessor), as Tenant or Lessee (hereinafter "Tenant"); said Lease or Lease Agreement being hereinafter referred to merely as the “Lease”), covering certain premises commonly described as_____Digital Drive, Novato, California (the “premises”), located in the Lakepoint Business Park, situated at 15 and 25 Leveroni Court and 90 and 105 Digital Drive, Novato, California. This Certificate is executed by the undersigned and delivered to **CUNA MUTUAL LIFE INSURANCE COMPANY, a corporation** (hereinafter “Lender”), in connection with Lender's making to **CONDIOTTI ENTERPRISES, INC., a California corporation,** of a certain first mortgage loan secured by the premises covered by the Lease and with the recognition that Lender is relying upon the contents hereof in making said loan and/or in disbursing some or all of the proceeds thereof. The undersigned hereby certifies and declares as follows:

1. The building(s) and all of the other improvements contemplated by and/or intended to be covered by the Lease have been constructed and completed to the satisfaction of the undersigned and in accordance with the plans and specifications pursuant to which said building(s) and other improvements were required to be constructed. Said building(s) and other improvements have been unconditionally accepted by the undersigned.

2. The undersigned currently is in possession of the premises covered by the Lease and is conducting its business therein.

3. The Lease is in full force and effect and has not been modified, supplemented or amended except as is indicated at the outset of this Certificate in connection with the reference to and identification of the Lease. Except for the Lease, there are no agreements between the undersigned and the Landlord under the Lease in any way concerning the subject matter of the Lease or the premises covered by the Lease. The interests of the Tenant under the Lease have not been assigned.

4. To the best of the undersigned's knowledge, as of the date hereof all conditions or obligations under the Lease to be satisfied or performed by the Landlord have been satisfied or performed. As of the date hereof, the undersigned does not assert, and to the best of the undersigned's knowledge is not entitled to assert, any defense to or offset against the enforcement of the Lease or any of the provisions thereof by the Landlord thereunder.

5. The term of the Lease was is scheduled to run for a period of _____years, commencing on _____and terminating on_____

6. The obligation of the undersigned to pay rent under the Lease began on the above- mentioned commencement date of the term and full rental is currently accruing thereunder. The monthly fixed minimum or fixed basic rent currently payable by the undersigned under the Lease is _____Dollars ($ _____). No rent under the Lease beyond the current month has been paid in advance by the undersigned.

7. The amount of the security deposit given by the undersigned and held by the Landlord under the Lease is the sum of_____ Dollars ($_____). The undersigned, as Tenant under the Lease, hereby agrees not to look to the holder (including Lender) of a first mortgage or Deed of Trust on the premises covered by the Lease, as mortgagee, mortgagee in possession, or successor in title to said premises, for accountability for any security deposit required or held by the Landlord under the Lease, unless said deposit has actually been received by said holder.

8. The undersigned acknowledges that Lender is or is about to become the holder of a mortgage or Deed of Trust encumbering the premises covered by the Lease. The undersigned agrees that in the event the Landlord under the Lease defaults in payment, performance or observance of any of the covenants, obligations or conditions on the part of the Landlord to be paid, performed or observed under the Lease and fails to timely cure such default, then the undersigned shall, before exercising any right it might otherwise have to withhold payment of rent or to terminate the Lease, give Lender written notice of the claimed default and allow Lender at least thirty (30) days (or such longer period of time as may be reasonably required to cure a default which, due to its nature, cannot reasonably be rectified within thirty days) within which to effect a cure thereof. The undersigned also acknowledges and agrees that until it is otherwise advised in writing by Lender, any notice or communication shall be given to Lender at its following address:

CUNA MUTUAL LIFE INSURANCE COMPANY
5910 Mineral Point Road Madison, Wisconsin 53705-4456

Attention: CIMCO, INC. Mortgage Loan Closing and Servicing

9. The undersigned hereby acknowledges notice that, in connection with the above- referenced mortgage loan being made by Lender, the Lease and the interests of the Landlord thereunder have been or are being assigned to Lender through an Assignment of Rents and Leases (or other document) which provides, among other things, that the Landlord shall not, without Lender’s prior written consent, modify, terminate or accept surrender of the Lease or reduce, abate or accept pre-payment of any rent under the Lease. The undersigned agrees to be bound by the terms thereof.

10. The undersigned hereby certifies that the attached copy of the Lease is a true and correct copy of the original Lease, including any amendments thereto.

11. The undersigned does not engage in the generation, storage or disposal of hazardous wastes or hazardous substances and the building(s) are not and shall not be used for such purposes, or if hazardous substances are stored or used in the building(s), they are handled in accordance with all government regulations. The undersigned has no notice of any local, state or federal environmental regulatory action regarding the building(s) or the real property on which it is located. The undersigned agrees to send to Lender a copy of any notice received of any pending of threatened environmental regulatory action and notify Lender of any release or discharge of any hazardous substances on the property or in the building(s).

Executed this _____day of _____, 20____,

Tenant:

By: _____

Print Name: _____

Title: _____

State of California)
) ss.
County of)

On the _____day of_____, 2004, before me, _____, Notary Public, State of California, personally appeared_____, personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that she/he/they executed the same in her/his/their authorized capacity(ies), and that by her/his/their signature(s) on the instrument the person or the entity(ies) upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

(SEAL)

EXHIBIT "D"

POLICY NUMBER_____

THIS ENDORSEMENT CHANGES THE POLICY
ADDITIONAL INSURED-LESSOR OF PREMISES

This endorsement modifies insurance provided under the following:
GENERAL LIABILITY COVERAGE

1. Designation of Premises:
Lakepoint Business Park
81 Digital Drive
Novato, California
The entire second floor of 60 Leveroni Court

2. Name of Organization-Additional Insured:
Condiotti Enterprises, Inc.
Dba Lakepoint Business Park
P. 0. Box 5260
Santa Rosa, California 95402
(707) 544-7125
(707) 523-7031 Fax

WHO IS AN INSURED is amended to include as insures the organization named above but only with respect to liability arising out of the ownership, maintenance or use of that part or parts of the Premises leased to you and designated above.

The insurance provided to the additional insured by this policy shall be primary to, and noncontributory with, any other insurance available to the additional insured as the Named Insured, and such other insurance shall only apply in excess of this insurance.

ADDENDUM 1 TO LEASE DATED 12/17/2015 BY AND BETWEEN

CONDIOTTI ENTERPRISES, INC AS LESSOR AND

ULTRAGENYX PHARMACEUTICAL INC. AS LESSEE

The following terms and conditions are hereby included and incorporated into the above Lease:

44. Lessor inspections prior to occupancy.

In addition to the provisions of Section 6 of this Lease, prior to occupancy Lessor shall inspect building systems including roof, HVAC, and interior lighting are in proper working condition and repair, and shall repair or replace as Lessor deems appropriate.

45. Options to Extend Lease Term.

So long as Lessee has performed all obligations of the current term and no delinquency remains outstanding, Lessee shall have two consecutive Options to Extend the Lease Term, subject to the following:

a.) Lessee shall retain all of the space in Building 81;
b.) The space shall be taken on an "As Is" basis without further allowance for Tenant Improvements;
c.) Each party shall bear the cost of any commission incurred by that party in relation to these Options to Extend;
d.) Options are exclusive to Lessee and may not be transferred or assigned;
e.) Option periods are consecutive to the then expiring Term;
f.) Lessee shall provide Lessor with not less than six months advance written notification of intent to exercise each Option period. Should Lessor not receive notice as herein described, both Options shall expire.
g.) The first Option shall commence on January 1, 2021, and shall extend to be co-terminous with the then current Term for other Buildings within the Park occupied by Lessee. Currently, these Buildings are 52, 60, and 68 Leveroni Court. If the first Option for the Buildings on Leveroni Court is extended through the Initial Term of this Lease, the then current expiration of those Leases is projected to be April 30, 2024.
h.) Base Monthly Rent for the period January 1, 2021 to April 30, 2021 shall be at the same rate as the expiring Term. Thereafter, Base Monthly Rent shall be subject to the annual escalation per Section 8 of this Lease.
i.) The Term of the second Option to Extend the Term would be May 1, 2024 to April 30, 2029 (five years). Notification to exercise this Option would be due to Lessor not later than October 31, 2023. Should Lessor not receive such notice as herein described, the Option shall expire.
j.) The Base Monthly Rent for the first year of the second Option (5/1/24-4/30/25) would be at the same rate as the then expiring Term. Thereafter, the Base Monthly Rent shall be subject to the annual escalation per Section 8 of this Lease.

46. Parking.

The Premises is currently demised into approximately 9,100sf Office and 16,000sf warehouse, which qualifies for up to 38 onsite parking spaces. Lessor acknowledges Lessee's intent to improve the entire space for office use. Should Lessee do so, they will qualify for up to 90 unmarked and unassigned onsite parking spaces.

47. Tenant Improvements.

Lessee intends to install substantial improvements to the Premises at Lessee's sole cost and expense and subject to the following:

a. Lessee's build-out of the Premises shall be subject to the Terms of the Lease including, but not limited to, Lessor's right to review and approve, deny or modify all aspects of the construction plans and/or change orders

b. Lessee shall provide Lessor with the name, contact information and certificate of insurance as required in this Lease for the General Contractor prior to the start of any construction. Lessor shall have the right to accept or reject the General Contractor within 5 days of receipt of such information.
c. Lessee shall provide Lessor with a copy of the construction budget and plans for Lessor's review and approval or denial. Once the budget has been approved by Lessor ("Approved Budget"), any change orders must be approved by Lessor in advance of start of work on such changes.
d. No work shall commence without Lessor's advance written approval.
e. Lessee acknowledges that Lessor intends to file a Notice of Non-Responsibility for the Improvements and will provide Lessor with the actual date of start of work, as well as provide copies of the Notice of Non-Responsibility to all suppliers, materialmen, contractors and sub-contractors.
f. Lessee shall keep the Premises free from any and all liens related to the Improvements.
g. Lessee shall construct all aspects of the Improvements in a good and workmanlike manner, shall diligently pursue completion of the Improvements, and shall use reasonable means to minimize noise and inconvenience to other tenants within the Project throughout construction.
h. Lessee shall be responsible for the acquisition and completion of any and all permits, fees, inspections, etc. required by government agency in regards to the construction of the Improvements, and shall provide Lessor with copies of all such signed-off permits, fees, inspections, etc. prior to release of Tenant Improvement funds by Lessor.

48. Tenant Improvement Contribution.

Lessor shall contribute up to $401,600.00 toward Lessee's Improvements. Such payment will be made directly to Lessee promptly after receipt of the following:

a. A Certificate of Occupancy issued by the City of Novato;
b. 2 copies of the "As Built" plans (one hard copy and one on disc);
c. Copies of unconditional lien releases from all suppliers, materialmen, contractors, sub-contractors and other parties asserting Mechanics' Lien rights.
d. No part of Lessor's Improvement contribution shall be used for the acquisition or installation of Lessee's personal property.

49. Deposit.

Lessee shall provide Lessor with an irrevocable Letter of Credit in the amount of the Approved Budget prior to start of work. Once Lessor has received and reviewed the documentation described in Section 48 above, and so long as a delinquency does not exist on Lessee's account, Lessor shall execute the documents necessary to reduce the Letter of Credit to the amount of Lessor's contribution to Tenant Improvements. Thereafter, so long as Lessee remains current in the performance of its obligations stated in the Lease, the remaining amount of the Letter of Credit will be reduced on each anniversary of the Lease Commencement date by $80,320.00. However, at no time during the term of this Lease shall the amount of the irrevocable Letter of Credit be reduced to less than $80,320.00. Lessee shall provide all forms and requirements necessary for drawing on the Letter of Credit with the actual document.

It is hereby acknowledged by Lessee that the Letter of Credit is a material consideration of this Lease. Lessor may draw upon the Letter of Credit at any time within the Term of this Lease to recover any damages suffered by Lessor in relation to Lessee's tenancy and/or construction of approved improvements. Should Lessor draw upon the Letter of Credit, Lessee shall, within 3 days, restore the Letter of Credit to the full amount.

50. Early Occupancy and Rent Concession.

In consideration of the agreements herein and subject to Lessor's receipt of first month Base Rent, Lessee's Certificate of Insurance naming Lessor as Additional Insured and the fully executed Lease, Lessor shall forgive the first 3 months (January through March, 2016) of Base Monthly Rent. Lessee shall remain responsible for the CAM charges and any utility or other charges incurred by them during this period.

Lessee shall be provided with keys to the Premises upon receipt of the above documentation.

Agreed to this 17th day of December, 2015

Lessor	Lessee
/s/ Jan Warz	/s/ Emil Kakkis
Jan Warz, Vice-President	Emil Kakkis, Chief Executive Officer
Condiotti Enterprises, Inc.	Ultragenyx Pharmaceutical, Inc.

/s/ Shalini Sharp

Shalini Sharp, Chief Financial Officer

Ultragenyx Pharmaceutical, Inc.

Exhibit 10.62

Addendum 2 To The Lease Dated 12/17/15

By and Between

Ultragenyx Pharmaceutical Inc. As Lessee and

Condiotti Enterprises, Inc. As Lessor

On or about December 17, 2015 the above Parties entered into a Lease and Addendum 1 (the "Lease") for the entire Premises of 81 Digital Drive, Novato, California which included approximately 25,100sf. The Parties now wish to incorporate the following provisions into that Lease:

51. There shall be added to the Lease approximately 4,388sf of Building at 77 Digital Drive. This added space consists of approximately 2,388sf of first floor office and 2,000sf of second floor office.

52. The Term for this additional space shall be from April 1st, 2016 to July 31, 2017.

53. The anniversary date for this additional space shall be January 1.

54. Base Monthly Rent for this additional space shall be $5,485.00NNN for the period March 1, 2016 to December 31, 2016. Thereafter, the Base Monthly Rent shall be adjusted per the Terms of the Lease. Lessee may have immediate occupancy of this additional space upon receipt by Lessor of this executed agreement and Lessee's certificate of insurance adding the space per the terms of the Lease.

55. Lessee shall have an Option to Extend the initial Term of this Lease from August 1, 2017 through December 31, 2020 upon the following terms and conditions:

A. Lessee shall provide advance written notice of intent to extend to be received by Lessor by or before January 31, 2017.

B. Lessee shall retain the entire additional space (4,388sf).

C. Lessee shall be in compliance with all terms and conditions of the Lease and have no outstanding amount due as of the date of the advance notice to Lessor.

D. Lessee shall retain the space in "As-Is" condition.

E. This Option to Extend is personal to Lessee and is not assignable or transferrable to any other party, except as noted in the Lease.

F. Lessee and Lessor acknowledge and agree that any commission, referral, or other fee incurred in relation to the Option to Extend shall be solely borne by the party incurring such commission or fee.

G. Should Lessee exercise this Option to Extend, Base Monthly Rent for the period August 1, 2017 through December 31, 2017 shall remain at the same rate as the Term expiring July 31, 2017. Thereafter, the Base Monthly Rent shall be adjusted annually on January 1 throughout the remaining Term, as provided in the Lease.

56. In all other terms, conditions and obligations the Lease shall remain in full force and effect.

[*Signature page follows*]

Agreed to and effective as of the 14 day of March, 2016.

/s/ Tom Kassberg	/s/ Jan Warz
Tom Kassberg, CBO	Jan Warz, VP of Leasing and COO
Ultragenyx Pharmaceutical Inc.	Condiotti Enterprises, Inc.
Date: MARCH 14, 2016	Date: 3/15/16

Addendum 3 To The Lease Dated 12/17/15

By and Between

Ultragenyx Pharmaceutical Inc. As Lessee and

Condiotti Enterprises, Inc. As Lessor

On or about December 17, 2015 the above Parties entered into a Lease and Addendum 1 (the "Lease") for the entire Premises of 81 Digital Drive, Novato, California, which included approximately 25,100sf. On or about March 14, 2016 the Parties executed Addendum 2, which added approximately 4,388sf of first and second floor office at 77 Digital, the Term for which has been extended to December 31, 2020.

The Parties now wish to incorporate the following provisions into that Lease:

57. There shall be added to the Lease approximately 13,000sf of Building at 77 Digital Drive, currently identified as suites 100 and 150, and consisting of approximately 3,783sf of office space and 9,217sf of warehouse space.

58. The Term for this additional space shall be from September 22, 2017 to December 31, 2020.

59. The anniversary date for this additional space shall be January 1.

60. Base Monthly Rent for this additional space shall be $13,945.75 NNN for the period October 1, 2017 to December 31, 2018. Thereafter, the Base Monthly Rent shall be adjusted per the Terms of the Lease. Lessee may have immediate occupancy of this additional space upon receipt by Lessor of this executed agreement and Lessee's certificate of insurance adding the space per the terms of the Lease.

61. In all other terms, conditions and obligations the Lease shall remain in full force and effect.

Agreed to and effective as of the 22nd day of September 2017.

/s/ Emil Kakkis	/s/ Jann Warz
Emil Kakkis, CEO	Jan Warz, VP of Leasing and COO
Ultragenyx Pharmaceutical Inc.	Condiotti Enterprises, Inc.
Date: 12/19/2017	Date: 12/19/2017

Record # 27135_UGNX Reviewer AU

Exhibit 10.64

INDENTURE OF LEASE

by and between
RIVERTECH ASSOCIATES II, LLC
(“LESSOR”)
and

DIMENSION THERAPEUTICS, INC.
(“LESSEE”)
RIVERSIDE TECHNOLOGY CENTER

840 Memorial Drive
Cambridge, Massachusetts

RIVERSIDE TECHNOLOGY CENTER
COMMERCIAL LEASE
BETWEEN
RIVERTECH ASSOCIATES II, LLC
AND
DIMENSION THERAPEUTICS, INC.

Agreement entered into this 11$_{th}$day of March, 2014 in consideration of the covenants and other benefits herein contained the receipt and sufficiency of said consideration being hereby acknowledged.

Rivertech Associates II, LLC, a Massachusetts limited liability corporation, c/o The Abbey Group, 575 Boylston Street, Boston, MA 02116 (herein "**LESSOR**"), does hereby lease to LESSEE, and **Dimension Therapeutics, Inc.** a Delaware corporation duly qualified to conduct business in Massachusetts, having a principal place of business at 850 Winter Street, Gunderson Dettner Waltham, MA 02451 (herein "**LESSEE**"), does hereby lease from said LESSOR, certain space located at 840 Memorial Drive, Cambridge, Massachusetts (herein "**Building**") being that portion of the fourth (4$_{th}$) floor of the Building consisting of approximately 8,060 rentable square feet of space as shown on Exhibit A-1 (the "**Lease Plan**") attached hereto, and an additional ***approximately*** 50 rentable square feet of space serving as an "acid neutralization room on the third (3$_{rd}$) floor of the Building as shown on the Lease Plan, totaling approximately 8,110 rentable square feet of space (herein, collectively the "**Leased Premises**" or "**Premises**"); with the right in common with others in the Building to use such common areas of the Building and the property on which the Building is located as are designated by the LESSOR, from time to time including but not limited to the fourth floor common lavatories; shared loading dock; shared passenger and freight elevators; and common stairways, corridors, walkways, driveways and lobbies.

1. Bluebird Bio, Inc. Sublease Term, and Direct Lease Term.

(a) Bluebird Bio, Inc. Lease. Bluebird Bio, Inc., is the current tenant under a certain lease for space in the Building as follows: Rivertech Associates, LLC and Genetix Pharmaceuticals, Inc. entered into a certain lease agreement dated February 18, 2000 (the "**Original Lease**"); which was amended by a certain Amended and Restated Lease Agreement dated May 18, 2007 (the "**First Amended Lease Agreement**"); which was further amended by a certain Lease Extension and Modification Agreement dated November 24, 2009 (the "**First Lease Extension Agreement**"); which was further amended by a certain Second Amended and Restated Lease Agreement dated October 19, 2010 (the "**Second Amended Lease Agreement**"); and which was most recently further amended by a Second Lease Extension Agreement dated September,2012 (the "**Second Lease Extension Agreement**"); all now collectively referred to herein as the "**Bluebird Lease**."

Under the Bluebird Lease, Bluebird Bio., Inc. currently leases and currently occupies approximately 8,060 rentable square feet of space located on the fourth (4th) floor of the Building, in addition to approximately fifty (50) rentable square feet of space on the third (3rd) floor of the Building, for a total of approximately 8,110 rentable square feet of space in the Building, being the same space as is identified herein alternatively as the "**Bluebird / Dimensions Subleased Space,** and also as the "**Leased Premises**" under this Lease, as the context so permits. Additionally, under the Bluebird Lease, Bluebird Bio, Inc. also currently leases and currently occupies approximately 9,488 rentable square feet of space located on the fourth (4th) floor of the Building, in addition to approximately fifty (50) rentable square feet of space on the third (3rd) floor of the Building, for a total of approximately 9,538 rentable square feet in the Building, which Bluebird has subleased as of the date hereof to another tenant (KEW Group, Inc.) which additional space is herein identified as the "**Bluebird / KEW Space**". LESSOR hereunder has also entered into a separate lease agreement with KEW Group, Inc. dated February 20, 2014 (the "**KEW Group Lease**"), governing KEW Group Inc.'s occupancy and certain other rights upon expiration of a certain sublease between Bluebird and KEW Group, Inc., dated as of February 6, 2014 (the "**KEW Group Sublease**") as of the Bluebird Lease Termination Date (as defined below).

The Bluebird Lease terminates, and all space leased to Bluebird Bio, Inc. thereunder (i.e. the Bluebird / Dimensions Subleased Space and the Bluebird / KEW Space) is to be surrendered and vacated by March 31, 2015 (the "**Bluebird Lease Termination Date**").

(b) Sublease from Bluebird Bio, Inc. - Initial Occupancy - LESSOR Approval. The LESSEE, contemporaneously with the execution of this Lease, has entered into a certain sublease agreement with Bluebird Bio, Inc., a copy of which is attached hereto as Exhibit A - 2, to sublease the Bluebird / Dimensions Subleased Space (i.e. the Leased Premises as defined herein) from Bluebird Bio, Inc., commencing on March 11, 2014, and ending on March 31, 2015 (the "**Bluebird / Dimensions Sublease**"). Consequently, LESSEE will commence its use and occupancy of the Leased Premises under the Bluebird Dimensions Sublease, and will continue its use and occupancy of the Leased Premises on that basis up to the Bluebird Lease Termination Date.

The LESSOR hereby approves LESSEE's use and occupancy of the Leased Premises under the terms and conditions of the Bluebird Dimensions Sublease. LESSOR's approval is expressly conditioned upon the following: (i) LESSEE's acknowledgment, hereby given by its execution of this Lease, that it accepts the Leased Premises in an AS/IS condition as of the date hereof, subject only to the provisions of Section 32 hereof, and without LESSOR's representation or warranty of any kind or nature; (ii) the LESSEE's actual use and occupancy of the Leased Premises and the conduct of its operations therein, is to be consistent in all respects with the terms and conditions of this separate Lease, during the term of the Bluebird / Dimensions Sublease, notwithstanding any contrary provisions of the Bluebird / Dimensions Sublease; (iii) the LESSEE shall adhere to the terms and conditions of the Bluebird / Dimensions Sublease (to the extent not inconsistent with this Lease, *provided however* that all of Lessee's rental obligations shall be governed by the Bluebird / Dimensions Sublease until the Bluebird Lease Termination Date); and, (iv) the LESSEE hereby agrees, effective upon execution of this Lease, that upon the occurrence of any material default by Bluebird Bio, Inc., under the Bluebird Lease, LESSEE shall directly attorn to LESSOR hereunder and continue its use and occupancy

of the Leased Premises under the terms and conditions of the Bluebird/Dimensions Sublease, paying all rent and other payments dues under said Bluebird/ Dimensions Sublease to the LESSOR hereunder upon the receipt of a written notice from LESSOR (the "**Bluebird Default Notice**") advising of the Bluebird default and directing such payments to itself (notwithstanding any proceedings against Bluebird Bio, Inc. as may be brought by LESSOR against it under the terms and conditions of the Bluebird Lease and/or any termination of said Bluebird Lease on account of said default and/or proceedings). Upon delivery of the Bluebird Default Notice to LESSEE, the Bluebird/ Dimensions Sublease shall convert to a direct lease arrangement as between LESSOR and LESSEE up to and through March 31, 2015; and from after the delivery of the Bluebird Default Notice, but only if required under the Bluebird / Dimensions Sublease, LESSEE shall additionally be required to pay to LESSOR its Allocable Percentage for (x) Additional Operating Expense Rent per Section 3 hereof (y) Additional Real Estate Tax Rent per Section 4 hereof, and (z) Utilities per Section 7 hereof, and for Lessee's use of any shared equipment then under the Bluebird Lease from and after such conversion date; Bluebird Bio, Inc. relinquishing and waiving any and all claims for rent or other sums under the Bluebird/ Dimensions Sublease as of the date of its default under the Bluebird Lease. Notwithstanding the foregoing, LESSOR shall not be liable to LESSEE on account of any claims LESSEE may have against Bluebird Bio, Inc. arising from any breach by Bluebird Bio, Inc. under the Bluebird/ Dimensions Sublease, LESSEE hereby waiving any and all such claims, directly as against LESSOR, or as grounds for LESSEE's non-performance thereunder or any defense or offset to LESSEE's performance hereunder; however, LESSOR shall be entitled to enforce the Bluebird/ Dimensions Sublease directly as against LESSEE for any claims against LESSEE arising from any breach by LESSEE under the Bluebird/ Dimensions Sublease, from and after any conversion of said Bluebird Dimensions Sublease to a direct lease relationship as contemplated above. LESSOR reserves for itself any and all rights and remedies it may have as against Bluebird Bio, Inc., on account of any default under the Bluebird Lease, including claims for any incremental sums owed by Bluebird Bio, Inc., under the Bluebird Lease representing the differential in the rent paid by LESSEE to LESSOR as contemplated above under the terms of the Bluebird Dimensions Sublease, and the sums owed to LESSOR as Annual Base Rent and Additional Rent under the Bluebird Lease. LESSEE shall have no liability to LESSOR for any default or amounts owed by Bluebird under the Bluebird Lease.

(c) Direct Lease Term. As of the Commencement Date as defined below, LESSEE will already be in possession of the Leased Premises under its prior occupancy under the Bluebird Dimensions Sublease. Consequently, there is no actual delivery date for the Leased Premises, and the "**Commencement Date**" of the LESSEE's tenancy under this direct Lease shall be April 1, 2015, the date immediately following expiration of the Bluebird Lease. LESSEE leases the Leased Premises for an original Term commencing as of the Commencement Date, and thereafter running twenty four (24) consecutive calendar months (herein, "**Lease Term**" or "**Term**"). Therefore, the Term of this direct Lease shall end on March 31, 2017 (the "**Termination Date**").

2. Annual Base Rent and Additional Rent.

Subject to the provisions hereof, commencing on the Commencement Date, LESSEE shall pay to LESSOR an Annual Base Rent pursuant to the schedule below during each Lease Year (or portion thereof as the case may be) of the Term hereof, (herein, "**Annual Base Rent**").

Annual Base Rent shall be payable in advance, in equal monthly installments, due on the first day of each calendar month, pursuant to the schedule below.

LESSEE's first payment of Annual Base Rent for the first month of the first Lease Year shall be due on the Commencement Date.

All payments of Annual Base Rent (and any Additional Rent or other sums due LESSOR) shall be made to LESSOR at 575 Boylston Street, Boston, Massachusetts 02116 or to such other agent or at such other place as LESSOR may designate in writing. The covenants to pay all Annual Base Rent and all Additional Rent hereunder (collectively, "**Rent**") shall be independent from any and all other covenants of LESSOR to LESSEE hereunder; and all Rent shall be promptly paid when due stated hereunder.

LESSEE shall pay interest from the date due, at annual rate of fourteen (14%) percent of any installments of Annual Base Rent, or Additional Rent or other payments which are not received by LESSOR within ten days after written notice from LESSOR that any such Rent was not received.

SCHEDULE OF ANNUAL BASE RENT

Lease Year	Annual Base Rent	Monthly Installment
First Lease Year	$369,005.00	$30,750.42
Second Lease Year	$381,170.00	$31,764.17

This Lease is intended to be a triple net lease, and as such LESSEE shall also be responsible for payment of its pro rata share of Operating Expenses (see Section 3 herein), real estate taxes (see Section 4 herein) and utilities (see Section 7 herein), all in accordance with the terms and conditions herein. All payments due to LESSOR hereunder in addition to those under Section 2 shall be deemed to be "**Additional Rent**". All LESSEE's obligations to pay any Annual Base Rent or Additional Rent hereunder shall be independent covenants from any other obligations under this Lease.

LESSEE's allocable pro rata share is 6.26 % (the LESSEE's "**Allocable Percentage**") as that concept is applicable and used herein.

3. Additional Rent (Operating Expenses).

LESSEE, in addition to the sums payable to LESSOR as Annual Base Rent as determined in Section 2 hereof shall pay to LESSOR for each year (or portion thereof, as applicable) of the Lease Term, as Additional Rent, LESSEE's Allocable Percentage of any and all Operating Expenses attributable to the Building for said year of the Lease Term (herein, "**Additional Operating Expense Rent**"). Operating Expenses as set forth in Exhibit B hereto (provided for illustration) are the unaudited expenses for calendar year 2012. Actual Operating Expenses will be subject to change based on actual costs and expenses incurred for each of the categorized Exhibit B costs and expenses actually incurred in 2015 and for each subsequent calendar year during the Lease Term, and through the Extended Term (if any).

"**Operating Expenses**" means the costs incurred by the LESSOR in connection with the operation, management and maintenance of the Building. "Operating Expenses" shall not include the following: the costs of LESSEE's or any other tenant's improvements and services for which LESSEE or any tenant directly reimburses LESSOR, or pays third persons at LESSOR's directions; Taxes and any income, excise, transfer or franchise taxes of the LESSOR; the costs incurred in any rehabilitation, reconstruction or other work occasioned by any insured casualty (i.e. as to which LESSOR is required to carry insurance hereunder), or by the exercise of the right of eminent domain (except to the extent of any so-called "deductible" amount under policies of insurance or any costs actually incurred for which any insurance company does not reimburse or compensate LESSOR or Owner); depreciation or interest payments on the Building; general corporate overhead of the LESSOR entity (including salaries of executives and owners not directly employed in the management/operation of the Building, and any penalties or damages that LESSOR may pay to LESSEE or any other tenant of the Building under their respective leases); expenses incurred in any direct dispute with any particular tenant (other than those incurred which are of benefit to or protect the rights of other tenants in the Building, generally); costs of renovations to vacant or other tenants' spaces; costs of capital improvements to the Building its systems and appurtenances (but not including maintenance, repairs or replacements), and any rental payments for equipment which, if purchased, would be excluded as a capital improvement under generally accepted accounting standards in LESSOR's reasonable judgment; brokerage and advertising costs in seeking or leasing to new tenants; and penalties incurred due to LESSOR's violation or any violation of any government order; any ground or underlying lease rental; bad debt expenses and interest, principal, points and fees on debts or amortization on any mortgage or other debt instrument encumbering the Building or the property; costs arising from LESSOR's charitable or political contributions; costs of selling, syndicating, financing, mortgaging or hypothecating any of LESSOR's interest in the Building; management fees paid or charged by LESSOR in connection with the management of the Building other than a management fee based on five (5%) percent of income which is the management fee uniformly and customarily charged to other tenants in the Building by LESSOR; costs and expenses (including taxes) to operate the parking garage, valet and other parking services for the Building, costs for sculptures, paintings, fountains or other objects of art or the display of such item, and any replacement garages or parking facilities and any shuttle services as may be placed in service, including any capital improvements to the parking areas; and remediation of hazardous materials in the Building or on the land parcels on which it is located.

LESSEE shall pay its Allocable Percentage of Additional Operating Expense Rent to LESSOR based on a prospective annual schedule prepared by the LESSOR, in monthly increments based on said schedule, with each monthly payment of Annual Base Rent due hereunder. LESSOR, at its discretion, may assess LESSEE for any extraordinary item of cost or expense which may actually occur as a direct result of LESSEE's own distinct uses or activities which shall be itemized, invoiced separately, and paid by LESSEE within thirty (30) days of its receipt of the invoice. Within one hundred twenty (120) days of the close of each calendar year, LESSOR shall adjust the prior year's schedule of Additional Operating Expense Rent to account for actual and properly accrued costs, expenses, and liabilities, and shall issue LESSEE a refund or deficiency statement for that year, as appropriate (the "**Operating Statement**"). LESSEE shall pay any deficiency shown thereon within thirty (30) days of its receipt of said Operating Statement. Any rebates due LESSEE (not contested by LESSOR) shall, in LESSOR's

reasonable discretion, be credited toward current monthly Additional Operating Expense Rent or paid to LESSEE within thirty (30) days.

LESSEE shall have the right to audit the applicable records of LESSOR to confirm that the charges billed to LESSEE under Sections 3 and 4 herein are proper and conform to the provisions of such Sections. Such right shall be exercisable by LESSEE within six (6) months after LESSEE's receipt of LESSOR's Operating Statement for the subject Lease Year. LESSOR shall cooperate with LESSEE in providing LESSEE reasonable access to LESSOR's books and records during normal business hours to enable LESSEE to audit LESSOR's books and records as they relate to any costs or expenses passed through to LESSEE pursuant to any provisions of this Lease. If the audit discloses any overpayment on the part of LESSEE, then LESSEE shall be entitled to a credit on the next succeeding installment of Rent for an amount equal to the overcharge plus interest on the amount of such overcharge from the date on which same was paid by LESSEE until the date refunded by LESSOR at the prime rate then published in The Wall Street Journal, and such credit shall be extended to succeeding installments of Rent in the event such overcharge exceeds the amount of the next succeeding such installment and, in the event the term of this Lease has expired or been earlier terminated, then LESSEE shall be entitled to a refund of such excess from LESSOR within thirty (30) days after such date or expiration or earlier termination. If the audit discloses any undercharge or underpayment on the part of LESSEE, then LESSOR shall be entitled payment of that difference, to be paid with the next succeeding installment of Rent, in the amount equal to the undercharge or underpayment. If the audit discloses any overpayment on the part of the Lessee, then subject to the LESSOR's rights to arbitration of the disputed issues as set forth below (in which case payment shall be tolled to the end of such proceedings), the LESSOR shall reimburse LESSEE for the actual third party costs of such audit, but in no event shall such cost reimbursement exceed a sum equal to the overpayment amount due to LESSEE.

If there are disputes regarding the results of the audit, the parties will attempt to resolve such disputes in good faith. Any unresolved dispute may be referred for final and binding arbitration before JAMS Inc., (the alternative dispute resolution company located in Boston, Mass.) on terms and conditions to be established by the arbitrator, the hearings thereon not to proceed longer than one (1) day. The arbitrator will be an individual selected by agreement of the parties consistent with the procedures and practices of JAMS, Inc., with knowledge of commercial real estate in the greater Boston area, and who is a "disinterested person" with respect to the LESSOR and LESSEE. All costs of arbitration shall be shared equally by LESSOR and LESSEE.

4. Additional Rent (Real Estate Taxes).

LESSEE, in addition to the sums payable to LESSOR as Annual Base Rent as determined in Section 2 hereof, shall pay to LESSOR for each year (or portion thereof, as applicable) of the Lease Term, as Additional Rent, LESSEE's Allocable Percentage of all sums attributable to the municipal real estate taxes on the Building and land on which it is situated ("**Taxes**") allocable to said year) (herein the "**Additional Real Estate Tax Rent**").

Notwithstanding the foregoing, LESSOR shall be under no obligation to file for any abatement of taxes for FY 2014 or any other fiscal year, and LESSEE shall pay all amounts as

invoiced by LESSOR, receiving a rebate based on its Allocable Percentage only if an abatement is sought and received by LESSOR.

LESSEE shall pay its Allocable Percentage of Additional Real Estate Tax Rent to LESSOR based on a prospective annual schedule prepared by the LESSOR, in monthly increments based on said schedule, with each monthly payment of Annual Base Rent due hereunder. Within one hundred twenty (120) days of the close of each tax year, LESSOR shall adjust the prior year's schedule of Additional Real Estate Tax Rent to account for actual and properly accrued costs, expenses, and liabilities, and shall issue LESSEE a refund or deficiency statement for that year, as appropriate. LESSEE shall pay any deficiency shown thereon within thirty (30) days of its receipt of said Operating Statement. Any rebates due LESSEE (not contested by LESSOR) shall, in LESSOR's reasonable discretion, be credited toward current monthly Additional Real Estate Tax Rent or paid to LESSEE within thirty (30) days.

LESSOR shall keep complete books and records regarding Operating Expenses and Taxes at LESSOR's principal offices, as to which LESSEE shall be given access as contemplated below during LESSOR's normal business hours for the purpose of reviewing and copying (at LESSEE's expense except as otherwise set forth herein). LESSOR shall retain all records of Operating Expenses and Taxes for at least three (3) years.

5. Security Deposit.

No later than Commencement Date, LESSEE shall post with LESSOR (and maintain at all times during the Original and Extended Term, if any), a Security Deposit in the amount of Ninety Two Thousand Two Hundred Fifty One and 26/100 ($92,251.26) Dollars (the "**Security Deposit Amount**") as described below; which shall be held as security for LESSEE's performance as herein provided, to be returned to LESSEE at the end of this Lease Term (as may be earlier terminated or extended), unless applied by LESSOR prior thereto in the event of any uncured default by LESSEE hereunder beyond applicable notice and cure periods. The Security Deposit shall be delivered to Landlord in two installments: (i) the sum of Sixty One Thousand Five Hundred 67/100 ($ 61,500.67) Dollars to be tendered by LESSEE upon execution of this Lease; and (ii) an additional sum of Thirty Thousand Seven Hundred Fifty 33/100 ($ 30,750.33) Dollars to be tendered by LESSEE on the Commencement Date (i.e. on or before April 1, 2015) hereunder. Failure to deliver the Security Deposit within five (5) days after written notice by LESSOR shall result in breach of this Lease and at Landlord's election, termination of this Lease, time being of the essence.

The Security Deposit Amount shall be delivered to LESSOR, as set forth above, either by:

(a) bank check (which sum, plus any interest thereon, LESSOR shall be entitled to commingle and use with LESSOR's own funds); or

(b) irrevocable stand-by Letter of Credit, substantially in the form attached hereto as Exhibit C from a commercial bank in Massachusetts reasonably acceptable to LESSOR.

If available to LESSEE, the Letter of Credit shall be the full term of this Lease. However, the Letter of Credit may be written on an annual basis with a provision that it may be

drawn upon if LESSEE fails to provide a renewal or replacement therefor forty-five (45) days prior to the expiration of the then existing Letter of Credit.

The Letter of Credit shall: (i) name LESSOR as beneficiary; (ii) be cancelable only with a minimum 30 days prior notice to LESSOR; and (iii) be substantially in the form attached hereto as Exhibit C and in all respects in form and substance reasonably satisfactory to LESSOR

LESSOR reserves the right, at any time at which the LESSOR has reasonable grounds to question the economic viability of the bank issuing the then existing Letter of Credit to require that the original Letter of Credit be replaced by another Letter of Credit issued by another commercial bank reasonably acceptable to LESSOR. LESSEE shall be required to make its substitution within fifteen (15) days from receipt of LESSOR's notice. Failure to provide said replacement Letter of Credit shall entitle LESSOR to draw on the existing Letter of Credit and hold the cash proceeds thereof as the Security Deposit hereunder.

LESSOR agrees that it shall not draw on the Security Deposit Amount hereunder except to the extent necessary to cure a default beyond applicable notice and cure periods of LESSEE hereunder, or upon failure to LESSEE to tender a replacement or renewal Letter of Credit as contemplated above. LESSOR agrees that it shall deliver the Security Deposit to any successor in interest to LESSOR's rights hereunder. *Provided* that LESSEE is not then in default under this Lease, the Security Deposit shall be refunded to LESSEE (or the original Letter of Credit returned) within thirty (30) days after the end of the Lease Term.

6. Use of Leased Premises.

LESSEE shall use the leased premises for general office, research and development and laboratory use, and any other use ancillary thereto only (the "**Permitted Uses**"), which uses LESSOR warrants and represents are currently allowed under local zoning regulations (subject to compliance with federal, state and municipal safety, healthy, building, and sanitary codes), and any encumbrance and restrictive instruments and agreements affecting the Building The LESSEE will use the Leased Premises in a safe manner and will not do or permit any act or thing which is contrary to any legal or insurance requirement referred to in Section 17 hereof or which constitutes a risk to the safety, health or well-being of other lessees in the Building, or the community, or creates a public or private nuisance or waste.

Except for the Permitted Items (as defined hereafter), LESSEE shall not be entitled, for research or testing purposes, to bring any animals (including without limitation laboratory mice, rats or other mammals or primates, reptiles or aquatic life); micro-organisms; or bacteriological, biological, or pathological agents; (collectively, "**Biological Items**") into the Building or the Leased Premises without prior written notice to LESSOR and LESSOR's express written consent; which consent shall not be unreasonably withheld, conditioned or delayed. LESSEE, at its sole cost and expense, shall comply with all applicable local, state and federal governmental statutes, regulations, rulings and orders applicable thereto (including procuring any required permits or authorizations) as to any of the foregoing Biological Items allowed under this Section 6. LESSOR may condition its consent to the presence of such animals based on quantity, type, arrangements for storage, sanitation, transportation, and other physical and logistical considerations as LESSOR may reasonably determine in each instance and from time

to time as circumstances may require. Notwithstanding any provision to the contrary herein, LESSOR hereby consents and agrees that LESSEE may keep the "**Permitted Items**" described on Exhibit D hereto at the Leased Premises and utilize them for the Permitted Uses hereunder, *provided however*, such consent by LESSOR does not relieve LESSEE from identifying, procuring in advance, and maintaining any and all municipal, state and federal permits or authorizations therefor (including without limitation the transport, storage and handling thereof), which shall be LESSEE's sole responsibility and the absence of which shall not in manner abrogate this Lease or reduce any of LESSEE's obligations to pay all Rent due hereunder or otherwise perform hereunder. Any material additions or changes to the Permitted Items shown on Exhibit D shall require LESSOR's further consent per the standards set forth above in this Section 6 and upon the giving of such further consent Exhibit D shall be deemed to be amended accordingly. LESSEE hereby indemnifies and holds harmless LESSOR from and against any and all damages, liabilities, claims, demands, actions or other losses arising from LESSEE's noncompliance with this clause, except to the extent the same results or arises from the negligence or willful misconduct of LESSOR. Other than for research and testing purposes as conditioned and set forth above, LESSEE shall not permit any other animals on the Leased Premises (with exception only for bona fide "service animals" subject to advance prior approval by LESSEE on a case by case basis).

LESSEE shall have access to the Leased Premises for LESSEE's use seven days per week and twenty four hours per day for each day of the Term, subject to the provisions of Section 7 hereof relative to overtime heat and air-conditioning. LESSEE shall keep the Leased Premises and adjacent areas in a clean and good condition equivalent to the standards reasonably set by LESSOR for the Building, reasonable wear and tear and casualty excepted. LESSEE shall be solely responsible to provide its own cleaning and janitorial services to the Leased Premises, at its sole cost and expense.

LESSEE shall be responsible for the prompt and proper disposal of all garbage, refuse, debris and other waste as mandated by reasonable and uniform Building regulations. LESSOR shall provide and maintain a trash dumpster and/or compactor at the Building loading dock, for the non-exclusive use of all tenants for disposal of non-hazardous/non controlled materials and substances. LESSEE may, but shall not be obligated to implement a recycling program, but its implementation, maintenance, or operation shall be without any cost or expense to LESSOR or any other tenants of the Building. LESSOR is not obligated to coordinate any such program in any respect.

7. Utilities.

LESSOR shall provide to the Leased Premises and also to the common areas and facilities which LESSEE enjoys the right to use in accordance with standards reasonably determined by LESSOR for the Building and set forth herein, the following services: (1) hot and cold running water from points of supply to the water faucets or taps in the Leased Premises for use by LESSEE, the cost of which shall be paid by LESSEE per the readings of the submeter(s) for the Leased Premises; (2) heat and air conditioning (as applicable) during Normal Business Hours (and at such other times requested by LESSEE in accordance with the provisions of this Section 7 set forth below); which heating and air conditioning systems (i) LESSEE controls (as to temperature settings in LESSEE's laboratory space above the base system settings); (ii)

LESSOR controls (as to temperature settings for the base system serving LESSEE's office space); and (iii) LESSOR shall repair and maintain (with direct separate charges passed on to the LESSEE) with respect to the supplemental laboratory systems); (3) ventilation and exhaust, and electricity (payable by LESSEE), sufficient for the Permitted Uses as they are generally stated; (4) maintenance and repair of the Building, Premises and Common Areas as set forth in Section 11 below; and (5) elevator service; (items (1) through (5) above are collectively referred to herein as "**Services**"). "**Normal Business Hours**" shall mean 8 AM to 6 PM Monday through Friday, except for the following holidays, only: Thanksgiving Day, Christmas Day, New Year's Day, Memorial Day, Fourth of July, and Labor Day.

Notwithstanding the foregoing, LESSEE shall pay all charges for electricity used on the Leased Premises per the existing submeter(s) for the Leased Premises (or alternatively, any submeters that need to be installed, which shall be installed at LESSOR's sole cost and expense), and as set forth below. LESSOR shall provide monthly estimates of use that are based upon actual use for the prior year (i.e. the estimates to be reset annually), to be confirmed by periodic check meter readings for the Leased Premises itself. LESSEE shall pay for such electrical charges upon receipt of its monthly invoice from LESSOR, to be rendered and paid based on those estimates within thirty (30) days of LESSEE's receipt of the invoice. Within one hundred twenty (120) days of the close of each calendar year, LESSOR shall adjust the LESSEE's prior year's electrical payments to account for the actual and properly accrued charges reflective of the actual check meter readings for such year, and shall issue LESSEE a refund or deficiency statement for that year, as appropriate. LESSEE shall pay any deficiency shown thereon within thirty (30) days of its receipt of said invoice. Any rebates due LESSEE (not contested by LESSOR) shall be credited toward then current monthly electrical charge invoices or paid to LESSEE within thirty (30) days

LESSOR shall maintain (a) an average temperature in the useable common areas of the Building generally between 65 degrees Fahrenheit and 75 degrees Fahrenheit at all times, and (b) an average temperature in the office portions of the Leased Premises generally between 65 degrees Fahrenheit and 75 degree Fahrenheit during Normal Business Hours (the "**HVAC Criteria**"). LESSEE hereby acknowledges that LESSEE controls the temperature in its own laboratory spaces; there shall be no requirement for LESSOR to maintain the foregoing standards with respect thereto; and LESSOR shall not be responsible for coordination of the relative temperatures within the Leased Premises, given LESSEE's control over such systems (however LESSOR shall be responsible for the balancing of the HVAC systems servicing the Leased Premises as of the beginning of LESSEE's occupancy under its Bluebird / Dimensions Sublease, with no obligation to do so thereafter) *provided*, *however,* that LESSOR shall be responsible for providing electricity and water to the HVAC equipment serving the laboratory spaces 24-hours per day, 7 days per week, such usual and customary electrical capacity and water volume to be in same quantities as are sufficient for the average office/laboratory tenant in the building without regard to any special requirements or specialized equipment (it being LESSEE's responsibility to make separate arrangements with LESSOR, at LESSEE's cost and expense, for any greater or more intense requirements). At any time, upon no less than thirty two (32) hours prior notice by LESSEE, LESSOR shall make available overtime heat and air-conditioning to LESSEE at the Premises in accordance with clause (b) of the HVAC criteria, and LESSEE shall pay as additional rent, overtime heat and air-conditioning for the office portions of the Leased Premises as may be requested by LESSEE for the Leased Premises on the basis of $150.00 per zone per

hour (subject to increase by the same percentage amount by which the standard electric rates are increased), as billed by LESSOR. LESSEE shall give LESSOR thirty two (32) hours prior notice of any requirements for specialized overtime heating and air-conditioning. LESSOR shall not be liable to LESSEE for any interruption, interference, damage or loss to LESSEE's research or experimentation occasioned as a result of any failure in the heating, ventilation, air conditioning, or electrical services or other utilities servicing the Building or the Leased Premises. No plumbing or electrical work of any type shall be done without LESSOR's approval which approval shall not be unreasonably withheld or delayed, and, if applicable, the appropriate municipal permit and/or inspector's approval. Water for domestic type sanitary purposes (only) shall be supplied at LESSOR's expense. There shall be separately metered and separately paid for by LESSEE, non-potable laboratory water and water for other particularized uses in the Leased Premises.

An "**Abatement Event**" shall be defined as an event or circumstance (other than those addressed in Section 18, or subject to Section 27 herein) caused by any of (i) LESSOR's negligence; (ii) LESSOR's willful misconduct; or (iii) any act or failure to act that is solely within LESSOR's control; that prevents LESSEE from accessing or using the Premises or any substantial portion thereof (other than temporary interruptions necessitated by LESSOR's performance of its obligations for maintenance and repairs as contemplated in Section 10 hereof). LESSEE shall give LESSOR notice ("**Abatement Notice**") of any such Abatement Event, and if such Abatement Event continues beyond the "Eligibility Period" (as that term is defined below), then the Annual Base Rent and LESSEE's other monetary obligations to LESSOR hereunder shall be abated entirely or reduced, as the case may be, after expiration of the Eligibility Period for such time that LESSEE continues to be so prevented from using the affected portion of the Premises in the proportion that the affected area of the Premises bears to the total rentable area of the entire Premises. The term "**Eligibility Period**" shall mean a period of five (5) consecutive business days after LESSOR's receipt of any Abatement Notice(s). In addition, but subject to the provisions of Section 18 hereof (which take precedence), if an Abatement Event continues for ninety (90) consecutive days after any Abatement Notice, LESSEE may terminate this Lease by written notice to LESSOR at any time prior to the date such Abatement Event is cured by LESSOR.

8. Compliance with Laws.

LESSEE acknowledges that no trade, occupation, or activity shall be conducted in the Leased Premises or use made thereof which will be unlawful, improper, noisy, offensive, or contrary to any federal or state law or administrative regulations, or any municipal ordinance or regulations in force at any time in Cambridge. LESSEE shall keep all employees working in the Leased Premises covered with Worker's Compensation Insurance, as applicable. Specifically, LESSEE shall be responsible for causing the Premises and any work conducted therein to be in full compliance with the Occupational Safety and Health Act of 1970 and any amendments thereto. LESSEE shall strictly adhere to any and all federal, state, and municipal laws, ordinances, and regulations governing the use of LESSEE's laboratory scientific experimentation. LESSEE shall be solely responsible for procuring and complying at all times with any and all necessary permits directly relating or incident to: the conduct of its office and research activities on the Premises; its scientific experimentation on the Premises; any transportation; storage; handling; use and disposal of any low level radioactive or bacteriological

or pathological substances or organisms or other hazardous wastes or environmentally dangerous substances or materials. LESSEE shall immediately give notice to LESSOR of any written warnings or violations relative to the above received from any federal, state, or municipal agency or by any Court of Law, and shall immediately take steps to cure the conditions causing any such violations; and LESSOR shall permit LESSEE to cure said harm or hazard prior to any active intervention by LESSOR (except where such intervention is necessitated by the emergency nature of the harm or hazard; or where the harm or hazard impairs the value of the Building, (directly or as collateral on any debt); interests with any other tenant's rights; or is required by any governmental agency or authority.

LESSEE shall fully indemnify and hold harmless in all respects LESSOR from any and all claims, demands, losses, liabilities, and damages (including all necessary and reasonable expenses for contractors, consultants, environmental engineers, attorneys, and other professionals utilized by LESSOR to evaluate and remediate any hazard or harm caused by LESSEE and which LESSEE has failed to cure; and further including any and all fines or fees assessed by any governmental agency relative to any hazard or harm), directly arising from the conduct of its research on the Leased Premises (especially relating to research involving hazardous substances), or LESSEE's obligations and responsibilities as set forth above and herein, and excepting liability for any claims and damages resulting from the acts or negligence of LESSOR or its agents or employees.

Notwithstanding the foregoing or any other provision of this Lease, however, LESSEE shall not be responsible for compliance with any such laws, regulations, or the like requiring (i) structural repairs or modifications or (ii) repairs or modifications to the base Building utilities running to the Leased Premises or (iii) installation of new Building service equipment, such as fire detection or suppression equipment, unless such repairs, modifications, or installations shall be due to LESSEE's particular manner or intensity of use of the Leased Premises (in contrast to the general office/laboratory use allowed under the Permitted Uses), or LESSEE's negligence or willful misconduct or that of its employees, agents or independent contractors.

9. Fire and General Insurance Requirements.

LESSEE shall not permit any use of the Leased Premises which will make voidable, increase any premium, or decrease any insurance on the Building and property of which the Leased Premises are a part, or on the contents of said Building, or which shall be contrary to any law, regulation, or order from time to time to established or issued by the local Fire Department, or any similar body, or any restriction contained in any of LESSOR's insurance policies as to the Building and property *provided, however* that LESSOR hereby represents and warrants that the Permitted Uses contemplated hereunder shall not violate any of the foregoing regulations or restrictions as of the Delivery Date. LESSEE shall, within ten (10) days of demand, reimburse LESSOR all extra insurance premiums caused by LESSEE's particular use of the Leased Premises (as opposed to Permitted Uses generally). After prior notice to LESSEE and an opportunity to cure, LESSEE shall pay LESSOR if LESSOR incurs any extraordinary costs or expenses to maintain the Leased Premises or any Building equipment servicing the same incurred as a direct result of LESSEE's vacating the Leased Premises or allowing the same to remain unoccupied for any extended periods of time during the Lease Term.

10. Maintenance of Leased Premises.

LESSOR shall be responsible for all exterior and structural maintenance of the Leased Premises (including without limitation exterior plate glass), the maintenance and repair of the Building, including without limitation the roof and foundation of the Building of which the Leased Premises are a part, and for the maintenance, repair and replacement of all common areas serving the Premises, and LESSOR's heating and cooling equipment, doors, locks, plumbing, and electrical wiring, and other Building systems serving the Premises and common areas of the Building; except for damage caused by the malicious, willful, or negligent acts of LESSEE, and chemical, water or corrosion damage from any source within the control of LESSEE (subject to the last paragraph of Section 17). Additionally, LESSOR warrants to repair or replace (in LESSOR's discretion in each instance) major components of the "**Premises Specific Mechanical Equipment**", which consists of: (i) the make-up air units in the laboratory area of the Leased Premises, and (ii) the exclusive supplemental HVAC units in the laboratory and office areas; from the Commencement Date forward (*provided* the same remain in good working order and condition during and at the end of the Bluebird / Dimensions Sublease; responsibility for which to be as determined under the Bluebird Lease up to the Commencement Date). In the discharge of LESSOR's responsibility for the Premises Specific Mechanical Equipment, LESSOR shall have the option to contract with a reputable service provider for a comprehensive preventative maintenance service plan, the cost and expense of which (as relates to the Leased Premises) shall be borne by LESSEE and promptly paid upon separate invoicing by LESSOR. Consequently, LESSOR's only warranty as to the Premises Specific Mechanical Equipment shall be for extraordinary major component failure and repair, and not for usual and ordinary maintenance and repairs.

LESSEE agrees to maintain at its expense all other elements and components of the Leased Premises in the same condition as they are at the Delivery Date, normal wear and tear and damage by fire or casualty only excepted, and whenever necessary, to replace light bulbs, interior plate glass and other glass therein, acknowledging that the Leased Premises upon delivery under the Bluebird / Dimensions Sublease, the Leased Premises) are in good order and repair and the light bulbs and glass whole. LESSOR shall be responsible for the periodic inspection, maintenance and repair of all Premises Specific Mechanical Equipment in the Leased Premises throughout the Lease Term (with direct separate charges passed on to the LESSEE), and LESSOR may retain the services of an outside third party maintenance contractor toward this end. LESSEE will properly control or vent all solvents, degreasers, and the like and shall not cause the area surrounding the Leased Premises to be in anything other than a neat and clean condition, depositing all waste in appropriate receptacles. LESSEE shall not permit the Leased Premises to be overloaded, damaged, stripped or defaced, suffer any waste of the Leased Premises. Any maintenance which is the responsibility of LESSOR and which is necessitated by some specific aspect of LESSEE's negligent or reckless use of the Leased Premises shall be at LESSEE's expense (subject to the last paragraph of Section 17).

All maintenance provided by LESSOR shall be performed as reasonably required at LESSOR's discretion and except for emergencies, during LESSOR's normal business hours. LESSEE shall be solely responsible for maintenance and operation of any and all of its systems installed by the LESSEE and shall waive any and all claims against LESSOR for any damage, impairment, or loss relative to these systems unless such damage is caused by the acts or

negligent or reckless acts of LESSOR. Specifically, LESSEE shall maintain, at its sole expense, and pay all charges for electrical service and use of all LESSEE's equipment associated with its operation.

LESSOR shall provide: (a) for maintenance, repair and upkeep for the landscaping on the property; (b) janitorial services in the common areas; (c) hot and cold water for lavatories, restrooms, kitchenettes and potable water; and (d) its standard security system into the Building, with LESSEE to be responsible for the installation, monitoring, maintenance and repair of its own security system into the Leased Premises from the adjacent common areas, and to coordinate the means of emergency access/egress to and from the Leased Premises with LESSOR, and with LESSOR to reasonably cooperate with LESSEE to the extent practicable (without any additional cost to LESSOR).

11. Delivery of Leased Premises to LESSEE - LESSEE's Alterations to Leased Premises - LESSEE's Rights to Certain Systems and Equipment.

(a) Initial Delivery, Possession and Occupancy of the Leased Premises. The Leased Premises are to be delivered to LESSEE initially under the Bluebird Dimensions Sublease as contemplated in Section 1 hereof. Consequently, LESSEE will be in possession and occupation thereof as of the Commencement Date of this Lease. LESSOR shall not have any obligations to make any improvements to the Leased Premises as of the Commencement Date hereof.

(b) LESSEE Improvements to the Leased Premises. LESSEE, whether during the time it is in possession and occupation of the Leased Premises under the Bluebird / Dimensions Sublease or after the Commencement Date, shall not make any structural alterations or additions of any kind to the Leased Premises, but may make nonstructural alterations provided LESSOR consents thereto in writing, said consent not to be unreasonably withheld, conditioned or delayed. Notwithstanding the foregoing, LESSEE may make alterations within the Leased Premises which are solely cosmetic in nature without LESSOR's consent. Plans and specifications for any of LESSEE's potential improvements requiring LESSOR's consent shall be submitted by LESSEE to LESSOR in each instance, in advance of any proposed work, in sufficient detail and scope to enable LESSOR to make a reasonable determination thereon. All such allowed alterations ("**LESSEE's Improvements**") shall be at LESSEE's expense and shall be in quality at least equal to the present construction. If LESSOR performs any services for LESSEE in connection with such alterations or otherwise, LESSEE shall reimburse LESSOR for LESSOR's actual and reasonable out-of-pocket costs for such services and any invoice therefor will be promptly paid. LESSEE shall be responsible to use such contractors as will ensure harmonious labor relations in the Building and on the site; and to prevent strikes, work stoppages, picketing and other labor actions. LESSEE shall submit a list of its contractors to LESSOR in advance. LESSEE shall provide LESSOR with acceptable general liability and builder's risk insurance certificates naming LESSOR and its lender as additional named insureds prior to the commencement of any work by LESSEE. LESSEE shall not permit any mechanics liens, or similar liens, to remain upon the Leased Premises in connection with work of any character performed or claimed to have been performed at the direction of LESSEE and shall cause any such lien to be released, removed or bonded forthwith without cost to LESSOR. Any alterations completed by LESSEE, including, without limitation, window blinds or other window treatment, shall be building standard unless LESSOR expressly agrees otherwise. Any and all

installations by LESSEE shall become a part of the Leased Premises and LESSEE shall not remove the same either during the Term or at the expiration or earlier termination of this Lease, unless directed to do so by LESSOR at the time such Alterations are approved; except that LESSEE shall have the right to remove any hardwired or hard-plumbed equipment purchased, paid for and installed by LESSEE itself, such as chemical fume hoods, as long as LESSEE restores the Leased Premises to the condition that it was in prior to the installation of such equipment. Notwithstanding the foregoing or any provision to the contrary contained herein LESSEE shall retain title to and be entitled to remove any movable office furniture, equipment, trade fixtures, and other personal property at the Premises, *provided* the Leased Premises and any common areas impacted thereby are restored to their original condition prior to such installations. LESSOR shall have the right at any time to change the arrangement of parking areas, stairs, walkways or other common areas of the Building of which the Leased Premises are a part, *provided* such changes do not interfere with LESSEE's use of the Leased Premises or access to such areas and facilities (including, without limitation, the Building and the Premises), or any other right of LESSEE hereunder.

(c) Shared Use of Certain Laboratory Support Systems. LESSEE shall have the right to share in the use of certain existing laboratory support systems (owned by LESSOR), including the compressed air/vacuum, during LESSEE's occupancy under the Bluebird / Dimensions Sublease and during the Lease Term, as they are currently servicing, shared, and used by other tenant(s) on the fourth and fifth floors of the Building. If LESSEE elects to use said systems: (i) LESSEE shall be responsible to share in the costs and expenses of repairs, maintenance, servicing and operation thereof, pro rata with other actual users; (ii) LESSOR shall replace capital components of such laboratory support systems so provided (duly depreciated by LESSOR over the useful life of said equipment, with the annual depreciation to be passed on to the users thereof during that year and allocated pro rata to them, payable separately to LESSOR upon invoice) and (iii) LESSEE shall enter into LESSOR's standard side agreement with respect thereto (attached hereto as Exhibit E). LESSOR shall ensure that said shared laboratory systems remain available to LESSEE for its shared use during LESSEE's occupancy under the Bluebird / Dimensions Sublease and throughout the Lease Term. LESSOR does not provide any representations or warranties relative to LESSEE's election to use or not use any of the shared laboratory support systems above, nor shall LESSOR be responsible, directly or indirectly, for any consequences arising from LESSEE's actual use of said systems or the suitability or performance of any of the equipment comprising said systems or related thereto, LESSEE to be solely responsible therefor at its sole risk.

(d) LESSEE's Option to Locate, Install and Use Certain Equipment and Systems. During the Lease Term LESSEE shall have the option to procure and install, at its sole cost and expense in all instances, additional HVAC equipment, antennas, satellite dishes and related accessory equipment and connections on the roof of the Building, in locations that LESSOR deems acceptable in its discretion, and to tie-in said equipment to the Leased Premises through areas of the Building that LESSOR deems acceptable in its discretion. LESSOR does not provide any representations or warranties relative to LESSEE's determination as to the foregoing, nor shall LESSOR be responsible, directly or indirectly, for any consequences arising from LESSEE's selection, placement, use or operation of the same, or the suitability or performance of any of such equipment or installations; LESSEE to be solely responsible therefor at its own risk.

(e) LESSEE's Shared Use of Emergency Generator. LESSEE shall have the right to share in the use of the existing gas fired emergency generator and controller currently installed and covering the Leased Premises, with other users on the fourth and fifth floors of the Building, during LESSEE's occupancy under the Bluebird / Dimensions Sublease and during the Lease Term. If LESSEE elects to use said emergency generator: (i) LESSEE shall be responsible to share in the costs and expenses of repairs, maintenance, servicing and operation thereof, pro rata with other actual users; (ii) LESSOR shall replace capital components of said emergency generator so provided (duly depreciated by LESSOR over the useful life of said equipment, with the annual depreciation to be passed on to the users thereof during that year and allocated pro rata to them, payable separately to LESSOR upon invoice) and (iii) LESSEE shall enter into LESSOR's standard side agreement with respect thereto (attached hereto as Exhibit E-1). LESSOR does not provide any representations or warranties relative to the foregoing, nor shall LESSOR be responsible, directly or indirectly, for any consequences arising from LESSEE's actual use of said emergency generator or the suitability or performance of said emergency generator; LESSEE to be solely responsible therefor at its sole risk, and LESSEE confirming that it has inspected the emergency generator to its satisfaction prior to the execution of this Lease and accepts the same in its current operating condition. LESSEE shall be solely responsible for the maintenance and operation of the emergency generator (on the shared basis stated above) during LESSEE's occupancy under the Bluebird / Dimensions Sublease and during the Lease Term. Alternatively, upon written request from LESSEE, LESSOR shall designate a location, to be mutually agreeable to LESSOR and LESSEE, for LESSEE to install, maintain, repair and operate its own separate emergency generator at LESSEE's sole cost and expense.

(f) LESSEE's Exclusive Use of Acid Neutralization System. LESSEE shall have the exclusive right to the use of the acid neutralization system currently installed for the Leased Premises, during LESSEE's occupancy under the Bluebird / Dimensions Sublease and during the Lease Term. LESSOR does not provide any representations or warranties relative to the foregoing, nor shall LESSOR be responsible, directly or indirectly, for any consequences arising from LESSEE's actual use of said acid neutralization system, or the suitability or performance of said acid neutralization system; LESSEE to be solely responsible therefor at its sole risk, and LESSEE confirming that it has inspected the acid neutralization system to its satisfaction prior to the execution of this Lease and accepts the same in its current operating condition. LESSEE shall be solely responsible for the maintenance and operation of the acid neutralization system during LESSEE's occupancy under the Bluebird / Dimensions Sublease and during the Lease Term.

(g) LESSEE's Responsibility for Permits. During the Lease Term LESSEE shall be solely responsible to apply for and procure and maintain any and all permits and government authorizations for its installation, operation and use of any of the equipment and systems set forth above in this Section 11 (e.g. MWRA permit for the acid neutralization system, etc.); and shall indemnify the LESSOR for any and all damages arising from its failure to do so.

12. Assignment and Subletting.

LESSEE covenants and agrees that neither this Lease nor the Term and estate hereby granted, nor any interest therein will be assigned, mortgaged, pledged, encumbered or otherwise transferred, and that neither the Leased Premises, nor any part thereof, will be encumbered in any

manner by reason or by act or omission of LESSEE, or used or occupied, or permitted to be used or occupied, by anyone other than LESSEE, its servants, agents, contractors and employees, or for any use or purpose other than as above stated, or be sublet, without in each case LESSOR's prior written consent, which shall not be unreasonably withheld or delayed. Notwithstanding the foregoing, LESSOR's prior written consent shall not be required for any assignment or sublet to a wholly or majority owned affiliate or subsidiary of the LESSEE, or any entity succeeding to LESSEE as a direct result of a merger or consolidation, acquisition, asset or stock transfer, or issuance of stock by LESSEE ("**Permitted Transfer**").

The grounds upon which LESSOR may reasonably withhold its consent are as follows:

(i) The prospective assignee's or sub-lessee's intended use of the Premises does not conform to the permitted uses set forth in the Lease; or,

(ii) The nature, character, class and standards of the prospective assignee's or sublessee's business will not be consistent with those of other lessees in the Building or will not conform to the mix of other lessees in the Building at that time; or,

(iii) The financial strength and reliability of the prospective assignee or sublessee, excluding any additional personal or corporate guarantees, is not sufficient, in LESSOR's reasonable business judgment, to meet all of such prospective assignee's or sublessee's obligations to be performed as of and from the date of said assignment or sub-letting. The prospective assignee or sub-lessee must produce to LESSOR's accountants a verified and current audited financial statement, (or if none has been prepared by said prospective assignee within the past three years, a CPA certified current financial statement), and such other documentation as is material in making such determination; which shall be kept confidential by them; or,

(iv) The operations of the prospective assignee or sub-lessee will violate any exclusive or other rights given any other lessees in the Building; or

(v) The failure of LESSOR's mortgage lender(s) to consent, if such consent is required under LESSOR's financing documents.

Except in the case of a Permitted Transfer, LESSOR, in addition to Annual Base Rent and all Additional Rent hereunder, shall be entitled to fifty (50%) percent of the full amount of any and all sums actually collected by LESSEE, in whatever form, attributable to or arising from the permitted subletting or assignment, after deduction for LESSEE's reasonable costs incurred in connection with the subletting or assignment, including alterations or improvements, marketing costs and reasonable brokerage commissions and/or reasonable legal costs actually incurred, (herein, "**Rent Mark-Up**").

Notwithstanding LESSOR's consent to the assignment or subletting, as contemplated above, LESSEE shall remain primarily liable to LESSOR for the payment of all Rent and for the full performance of the covenants and conditions of this Lease; and, upon a default by LESSEE hereunder, LESSOR may collect all sums due as Rent directly from the assignee/subtenant.

Notwithstanding the foregoing, in the event that LESSEE desires to sublet the Leased Premises, other than in connection with a Permitted Transfer, it shall in each instance notify the

LESSOR in writing, stating the intended effective date of the proposed sublet (which shall not be less than 60 days from the date of said notice to LESSOR). Subject to the preceding sentence, if the proposed sublease itself (or cumulatively with other approved subleases) accounts for the sublease of greater than fifty (50%) percent of the area of the Leased Premises, then LESSOR shall have a period of fifteen (15) days from the date it receives such notice to exercise an election to take back the Leased Premises being offered for sublease, in LESSOR's sole discretion and without any obligation to so elect, whatsoever, notwithstanding the circumstances, and without prejudice to or waiver of any of LESSOR's rights or LESSEE's continuing obligations hereunder. LESSEE shall provide LESSOR with all reasonably material information relative to LESSOR making an informed decision concerning said sublet, immediately upon LESSOR's request. If LESSOR elects to take back the Leased Premises so offered for sublease, it shall send written notice thereof to LESSEE within such fifteen (15) day period; and LESSEE shall be irrevocably bound to surrender and vacate the Leased Premises as if the Term of the Lease had expired on the date LESSEE had set to vacate as appears in the LESSEE's initial notice to LESSOR; and *provided* LESSEE vacates and surrenders on said date, without being in default (of which LESSEE has been provided written notice) of any provision hereof as of said date, this Lease shall be null and void and without recourse to either party hereto with respect to the Leased Premises (but for terms and conditions contemplated herein to survive termination of this Lease). LESSEE shall not be entitled to any payments, commissions, credits, offsets, or any kind or nature arising from said sublet, nor shall any individual or entity acting by, through, or under LESSEE be so entitled. Once an election is made by LESSOR, LESSEE shall be subject to the penalties for holding over set forth in this Lease, if it fails to vacate and surrender the leased Premises by the date LESSEE had set to vacate as appears said notice, or if it fails to discharge (or cause its lenders or others with which LESSEE has dealt to discharge) any and all recorded liens or other encumbrances, notices, or restrictions on its leasehold or contractual interest in and to the affected portion of the Premises as of said date. Nothing in this paragraph shall require LESSOR to make an election to take back the Leased Premises and nothing in the aforesaid process shall relieve LESSEE of its liability under this Lease should LESSOR elect not to take back the Leased Premises.

13. Subordination.

This Lease shall be subject and subordinate to any and all mortgages and related documents placed on the Building, Leased Premises or the real property in existence as of the date hereof or coming into existence at any time hereafter, without necessity for any confirming documentation. LESSOR shall use commercially reasonable efforts (which shall not be deemed to include the payment or expenditure of any sums whatsoever) to obtain a Subordination, Non-Disturbance and Attornment Agreement from its present and future mortgagees, in form and substance as typically issued by each such mortgage lender(s); but LESSOR shall not be liable to LESSEE in any manner (nor shall any of LESSEE's full and timely performance under this Lease be conditioned, waived, excused or altered in any manner whatsoever) if no SNDA is forthcoming, or if any of the terms and conditions of the same are not deemed acceptable.

14. LESSOR's Access to Leased Premises.

LESSOR or agents of LESSOR may at reasonable times and upon reasonable notice (except in case of emergency) enter to view the Leased Premises and may remove any signs not

approved and affixed as herein provided, and may make repairs and alterations as LESSOR is permitted to perform under this Lease and repairs which LESSEE is required but has failed to do (but only after notice and an opportunity to repair being provided to LESSEE), and may show the Leased Premises to prospective mortgagees and appraisers, and during the last nine (9) months of the Term to brokers, and others and to prospective tenants. Additionally, to the extent necessary to service other portions of the Premises or the common areas or other tenant spaces in the building; LESSOR may add, relocate, or maintain a chase, pipes, conduits, or ducts, within the Premises *provided* the aforesaid do not materially interfere with LESSEE's use of the Premises or its aesthetics. If any such addition or relocation reduces the space available for use by LESSEE, the amount of Annual Base Rent and LESSEE's Allocable Percentage for Operating Expenses and Taxes shall be reduced accordingly. Any entry by LESSOR onto the Premises for this purpose shall be done in such manner as to minimally interfere with the business conducted thereon by LESSEE, and undertaken with reasonable steps to protect LESSEE's property. Notwithstanding anything contained herein to the contrary, except in cases of emergency, LESSOR or any of its agents or employees shall not enter the laboratory portion of the premises unless accompanied by an authorized representative of LESSEE (except LESSOR may enter at reasonable times during the last nine (9) months of the tenancy to show the Leased Premises to prospective tenants, and may enter at reasonable times throughout the Term of this Lease to show the premises to prospective lenders or purchasers; and in each case LESSEE shall reasonably accommodate such requests). LESSEE shall comply with all security and safety measures enacted by LESSEE in connection with the laboratory space.

15. Snow Removal.

LESSOR will be responsible for the removal or other treatment of snow and ice on walkways, sidewalks, entryways and parking areas. Notwithstanding the foregoing however, LESSEE shall hold LESSOR harmless from and against claims by LESSEE's agents, representatives, employees or business invitees for damage or personal injury resulting in any way from snow or ice on any area serving the Building, *provided* LESSOR has performed this obligation absent LESSOR's negligence or willful misconduct.

16. Access and Parking.

LESSEE shall be granted the right, at current market rates (which may be increased from time to time to reflect market increases), to park up to twelve (12) motor vehicles in the Building's on-site indoor parking lot or facility on an unassigned and unreserved basis, in single or tandem spaces, or on a valet basis, which LESSOR in its sole discretion shall designate from time to time. LESSEE may, by providing thirty (30) days prior written notice (which must be effective as of the first calendar day of the next successive month after notice is given), increase or decrease the number of spaces it uses (up to the maximum of twelve (12) from time to time. The initial parking rate therefor shall be $ 225 per month, per car, which monthly rate may be changed by LESSOR in its discretion subject to and reflective of periodic market changes in accordance with this paragraph. All payments for these parking rights shall be considered to be Additional Rent under this Lease. The Building garage, plus any stairs, walkways or other means of ingress or egress controlled by the LESSOR shall not in any case be considered extensions of the Leased Premises. LESSEE will not obstruct in any manner any portion of the Building or the walkways or approaches to the Building, and will conform to all reasonable and

nondiscriminatory rules now or hereafter made by LESSOR for parking, and for the access and egress, security, care, use, or alteration of the Building, its facilities and approaches in connection with such parking, *provided* the same do not decrease LESSEE's parking rights hereunder. LESSEE further agrees that LESSEE will use reasonable efforts to not permit any employee or visitor to violate this or any other covenant or obligation to LESSEE. No vehicles shall be stored or left in any parking area for more than three nights without LESSOR's written approval. Unregistered or disabled vehicles, or storage trailers of any type, may not be parked overnight at any time. LESSEE agrees to assume all expense and risk for the towing of any misparked vehicle belonging to LESSEE or LESSEE's agents, employees, business invitees, or callers, at any time. For the purpose of this section the term "space" shall mean general access for one motor vehicle. All vehicles shall be parked and left on the premises at their owners' sole risk and LESSOR shall not be liable for any damages caused to said vehicles while they are parked or left on the premises, unless caused by its negligence or willful misconduct.

17. Liability Insurance.

Except to the extent caused by or arising as a result of the negligence or willful misconduct of Lessor or its agents, contractors or employees, LESSEE shall be solely responsible as between LESSOR and LESSEE for deaths or personal injuries to all persons whomsoever occurring in or on the Leased Premises from whatever cause arising, and damage to property to whomsoever belonging arising out of the use, control, condition or occupation of the Leased Premises by LESSEE; and LESSEE agrees to indemnify and save harmless LESSOR from any and all liability, reasonable expenses, damage, causes of action, suits, claims or judgments caused by or in any way growing out of any matters aforesaid. LESSOR shall be solely responsible as between LESSOR and LESSEE for deaths or personal injuries to all persons whomsoever occurring in or on the Leased Premises, Building, or the property on which the Building is located resulting or arising from any negligent act or omission by LESSOR, and damage to property to whomsoever belonging arising out of any negligent act or omission by LESSOR; and LESSOR agrees to indemnify and save harmless LESSEE from any and all liability, reasonable expenses, damage, causes of action, suits, claims or judgments caused by or in any way growing out of any matters aforesaid. LESSEE will secure and carry at its own expense a commercial general liability policy insuring LESSEE, LESSOR (and its lenders and any other entity reasonably requested in writing by LESSOR) against any claims based on bodily injury (including death) arising out of the condition of the Leased Premises or their use by LESSEE, such policy to insure LESSEE, LESSOR and said other entities against any claim up to Two Million ($2,000,000.00) Dollars per occurrence for personal injury or damage to property. LESSOR and its lenders shall be included in such policy as additional insureds. LESSEE will promptly file with LESSOR certificates showing that such insurance is in force, and thereafter will file renewal certificates prior to the expiration of any such policies. All such insurance certificates shall provide that such policies shall not be canceled without at least thirty (30) days prior written notice, except in the event of cancellation for non payment of premium, whereby ten (10) days' prior notice will be provided to each insured named therein.

LESSOR shall maintain in full force from the date upon which LESSEE first enters the Premises for any reason, throughout the Term, a policy of insurance upon the Building insuring against all risks of physical loss or damage under an All Risk coverage endorsement in an amount at least equal to the full replacement value of the Building insured, with an Agreed

Amount endorsement to satisfy co-insurance requirements, as well as insurance against breakdown of boilers and other machinery as customarily insured against. LESSOR shall supply to LESSEE from time to time upon request of LESSEE certificates of all such insurance issued by or on behalf of the insurers named therein by a duly authorized agent.

LESSOR and LESSEE waive all rights of recovery against the other and its respective officers, partners, members, managers, agents, representatives, and employees for loss or damage to its real and personal property kept in the Building which is required to be insured by such party hereunder. Each party shall notify the insurance carrier that the foregoing waiver is contained in this Lease and shall obtain an appropriate waiver of subrogation provision in the policies.

18. Fire, Casualty, Eminent Domain.

Should a substantial portion of the Leased Premises, or of the property of which they are a part, be substantially damaged by fire or other casualty, or be taken by eminent domain (in either case such that restoration of the Premises within six (6) months after such event is not practicable), LESSOR or LESSEE may elect to terminate this Lease by written notice. When such fire, casualty, or taking renders the Leased Premises substantially unsuitable for their intended use and no termination has been elected, a just and proportionate abatement of rent shall be made, and LESSEE may elect to terminate this Lease if: (a) LESSOR fails to give written notice within ninety (90) days of intention to restore Leased Premises, or (b) LESSOR fails to restore the Leased Premises to a condition substantially suitable for their intended use within one hundred eighty (180) days of said fire, casualty or taking. LESSOR reserves all rights for all damages or injury to the Leased Premises for any taking by eminent domain; except for damage to LESSEE's moveable fixtures, property or equipment, or moving expenses, which are specifically allocated to LESSEE by the taking authority or arbitrators.

19. Brokerage.

LESSEE and LESSOR each warrants and represents to the other that they have dealt with no broker or third person with respect to this Lease or the Leased Premises or Building entitled to a commission as a result of this Lease, other than Transwestern RBJ as LESSEE's representatives, whose fees shall be paid by LESSOR pursuant to a separate written agreement with LESSOR; and LESSOR and LESSEE each agree to indemnify and hold harmless the other from any fees, expenses, or damages arising from breach of the above warranty.

20. Signage.

LESSEE shall have the right to have its name included at LESSOR's expense in any central directory maintained by LESSOR listing the Building's other tenants. LESSOR authorizes LESSEE, if desired, to display one sign on LESSEE's office entrance door (at LESSEE's expense) consistent with similar signs of other tenants, and one sign at a mutually determined and agreed location off the elevator on the fourth (4^{th}) floor consistent with similar signs in the Building.

21. Default.

In the event that: (a) LESSEE shall default in the payment of the Security Deposit Amount or any installment of Annual Base Rent or any Additional Rent, and such default shall continue for five (5) days after written notice thereof; or (b) LESSEE shall default in the observance or performance of any other of LESSEE's covenants, agreements, or obligations hereunder and such default shall not be corrected within thirty (30) days after written notice thereof; *provided*, *however*, that if such failure cannot reasonably be cured within such 30-day period, then LESSEE shall not be in default if, and so long as, LESSEE commences such cure within such 30-day period and thereafter diligently pursues such cure to completion (*provided* there is no material interference with the operations of the Building or any tenant therein during such protracted cure period); (c) LESSEE shall be declared bankrupt or insolvent according to law, or if any voluntary or involuntary petition for bankruptcy is filed against LESSEE and not discharged within ninety (90) days from filing; or if any assignment shall be made of LESSEE's property for the benefit of creditors; then, while such default continues, and without demand or further notice (other than as may be required by law), LESSOR shall have the right to reenter and take complete possession of the Leased Premises, to declare the term of this Lease ended, and to remove LESSEE's effects, without being guilty of any manner of trespass and without prejudice to any remedies which might be otherwise used for arrears of rent and other default of breach of covenant. LESSEE shall indemnify LESSOR against all loss of Rent and other payments, which LESSOR may incur by reason of such termination during the remainder of the term, it being expressly understood that LESSOR shall use reasonable efforts to relet the Leased Premises and collect all rents from such reletting. If LESSEE shall default, after reasonable notice thereof, in the observance or performance of any conditions or covenants on LESSEE's part to be observed or performed under or by virtue of any one of the provisions in any section of this Lease, LESSOR, without being under any obligation to do so and without thereby waiving such default, may after the expiration of any applicable cure period, remedy same for the account and at the expense of LESSEE, (including but not limited to application of any or all of the Security Deposit held by LESSOR). If LESSOR pays or incurs any obligations for the payment of money in connection therewith, including but not limited to reasonable attorney's fees in instituting, prosecuting or defending any action or proceeding, such sums paid or obligations incurred, with interest at the rate of eight (8%) percent per annum and costs, shall be paid to LESSOR by LESSEE as additional rent. Upon default of this Lease by LESSEE (after the expiration of any applicable grace or cure period), and because the payment of Rent in Monthly installments is for the sole convenience of LESSEE, the entire balance of Rent which would accrue hereunder shall, at the option of the LESSOR, become immediately due and payable; subject however to LESSOR's obligation to use reasonable efforts to mitigate its damages occasioned by said default. LESSEE shall be responsible to pay reasonable attorneys fees incurred by LESSOR in any successful action by LESSOR for delinquent Rent or in the case of liquidated damages as aforesaid; and otherwise both LESSOR and LESSEE shall be entitled to such reasonable attorneys fees as a court of competent jurisdiction may award as part of its final judgment in the event of any dispute involving damages, injunctive relief or specific performance by either.

Notwithstanding any provision to the contrary contained herein, (i) in no event shall LESSEE be responsible for punitive or consequential damages incurred by LESSOR as a result of any act (or failure to act) by LESSEE, and (ii) in no event shall LESSOR be responsible for

punitive or consequential damages incurred by LESSEE as a result of any act (or failure to act) by LESSOR.

22. Notices.

Any notice from LESSOR to LESSEE relating to the Leased Premises or to the occupancy thereof shall be deemed duly served if sent to the Leased Premises by either certified mail, return receipt requested, postage prepaid, or by recognized overnight commercial delivery service (e.g. FedEx), addressed to LESSEE at the Leased Premises. Any notice from LESSEE to LESSOR relating to the Leased Premises or to the occupancy thereof shall be deemed duly served if delivered to LESSOR by certified mail, return receipt requested, postage prepaid, or by recognized overnight commercial delivery service (e.g. FedEx), addressed to: Rivertech Associates II, LLC (Attn: Dan Garvey, CFO) c/o The Abbey Group 575 Boylston Street, Boston, Massachusetts 02116, with a copy to Christopher C. Tsouros, Esq., Posternak Blankstein & Lund LLP Prudential Tower 800 Boylston Street Boston, Mass. 02199. Notices shall be deemed given at the earlier of the date of actual delivery, or if by certified mail, three (3) business days after posting with the U.S. Postal Service. Time is of the essence in delivery of any notice, and the performance of any obligations relating thereto. Either party may designate a different address to which notice is to be sent by providing a notice of address change to the other in accordance with this Section 22. Prior to the Delivery Date, LESSEE's notice address shall be LESSEE's address set forth at the beginning of this Lease.

23. Lessee's Occupancy.

In the event that LESSEE remains in any part of the Leased Premises after the agreed termination date of this Lease without the written permission of LESSOR, then all other terms of this Lease shall continue to apply during such holdover, except that LESSEE shall be liable to LESSOR for any loss, damages or expenses incurred by LESSOR, and all Annual Base Rent shall be due in monthly installments at a rate if two hundred (200%) percent of that which would otherwise be due under this Lease, it being understood between the parties that such extended occupancy as a tenant at sufferance.

24. Rules and Regulations.

LESSEE and LESSEE's servants, employees, agents, invitees and licensees shall observe faithfully and comply strictly with such reasonable and non-discriminatory rules and regulations governing the use of the Building and site and all common areas as LESSOR may from time to time, adopt, *provided* that a copy of such rules and regulations has been delivered to LESSEE.

25. Outside Area Limitations.

No goods or things of any type or description shall be held or stored outside the Leased Premises at any time without the express written approval of LESSOR, except bicycles which shall be stored only in the bicycle rack to be provided by LESSOR.

26. Environmental Compliance.

LESSEE will so conduct and operate the Leased Premises as not to interfere in any way with the use and enjoyment of other portions of the same or neighboring buildings by others, by reason of offensive odors, smells, noise, accumulation of garbage or trash, vermin or other pests or otherwise and will, at its expense, employ a professional pest control service if necessary as a result of LESSEE's operations. LESSEE agrees to maintain efficient and effective device for preventing damage to heating equipment from harmful solvents, degreasers, cutting oils, and the like, which may be used within the premises. Except in accordance with applicable laws and except as otherwise provided herein, no hazardous wastes, radioactive materials or chemical or harmful biological agents or materials of any sort shall be stored or allowed to remain within the Leased Premises at any time, without LESSOR's prior notice and consent, which consent shall not be unreasonably withheld or delayed.

Prior to vacating the Leased Premises at the end of the Term (or any applicable extension), or sooner in the event of a default hereunder, LESSEE at its sole cost and expense shall provide LESSOR and Owner with an environmental audit by qualified environmental engineering firm reasonably satisfactory to LESSOR (the "**Exit Study"**), showing the then existing environmental condition of the Leased Premises to be free from any harmful hazardous materials or contaminants, for which LESSEE is responsible (predicated upon LESSOR's and LESSEE's receipt of an acceptable exit study from Bluebird Bio, Inc. with the date of Bluebird Bio Inc.'s report marking the start of LESSEE's responsibilities.

27. Responsibility.

Neither LESSOR nor LESSEE shall be held liable to anyone for loss or damage caused in any way by the use, leakage or escape of water or, except as otherwise provided herein, for cessation of any service rendered customarily to said Leased Premises or buildings or agreed to by the terms of this Lease, due to labor difficulties, weather conditions, or mechanical breakdowns, to trouble or scarcity in obtaining fuel, electricity, service or supplies from the sources from which they are usually obtained for said Building, or to any cause beyond such party's reasonable control.

28. Surrender.

Subject to and without limiting Section 11 above, LESSEE shall at the expiration or other termination of this Lease remove all of LESSEE's goods and effects from the Leased Premises. Subject to and without limiting Section 11 above, LESSEE shall deliver to LESSOR the Leased Premises and all keys, locks, thereto, and other fixtures and equipment connected therewith, and all alterations, additions and improvements made to or upon the Leased Premises, including but not limited to any offices, partitions, cold room, plumbing and plumbing fixtures, air conditioning equipment and ductwork of any type, exhaust fans or heaters, burglar alarms, telephone wiring, wooden or metal shelving which has been bolted, welded or otherwise attached to any concrete or steel member of the Building, compressors, air or gas distribution piping, cabinetry, overhead cranes, hoists, trolleys or conveyors, counters or signs attached to walls or floors, and all electrical work, including but not limited to lighting fixtures of any type, wiring, conduit, EMT, distribution panels, bus ducts, raceways, outlets and disconnects, and excluding

the compressors, and any built-in component work stations that LESSEE may install during the term, but excluding any Alterations designated under Section 11 at the time of their approval to be removed by LESSEE and further excluding any hard-wired or hard-plumbed equipment purchased, paid for and installed by LESSEE, such as chemical fume hoods, as long as LESSEE restores the Leased Premises to the condition that it was in prior to the installation of such equipment. LESSEE shall deliver the Leased Premises reasonable wear and tear and damage by fire or other casualty only excepted. In the event of LESSEE's failure to remove any of LESSEE's property from the premises, LESSOR is hereby authorized, without liability to LESSEE for loss or damage thereto and at the sole risk of LESSEE to remove and store any such property at LESSEE's expense, or to retain same under LESSOR's control or to sell at public or private sale, without notice, any or all of the property not so removed and to apply the net proceeds of such sale to the payment of any sum due hereunder, or to destroy such property which shall be conclusively deemed to have been abandoned.

29. Quiet Enjoyment.

So long as this Lease is in full force and effect, LESSEE shall quietly enjoy the Leased Premises without hindrance or molestation by LESSOR or any party claiming by, through or under LESSOR or any party claiming a superior interest to the LESSOR.

30. Miscellaneous Provisions.

The invalidity or unenforceability of any provision of this Lease shall not affect or render invalid or unenforceable any other provision hereof. The obligations of this Lease shall run with the land, and this Lease shall be binding upon and inure to the benefit of the parties hereto and their respective successors and assigns, except that LESSOR shall be liable only for obligations occurring while LESSOR is landlord hereunder. The obligations of LESSOR and LESSEE hereunder shall not be binding upon any director, officer, shareholder, partner, Trustee or beneficiary of such party. Notwithstanding the definition herein of "**Commencement Date**", "**Termination Date**", or "**Term**", or LESSOR's obligations to deliver the Premises, this Lease shall be binding and enforceable as against the parties hereto as of the date of its execution.

31. Waivers and Legal Limitations.

No consent or waiver, express or implied, by LESSOR or LESSEE, to or of any other breach of the other party of any covenant, condition or duty of that party shall be construed as a consent or waiver to or of any other breach of the same or any other covenant, condition or duty. If LESSEE is several persons or a partnership, LESSEE's obligations are joint or partnership and also several. "**LESSOR**" and "**LESSEE**" mean the person or persons, natural or corporate, named above as LESSOR and as LESSEE respectively, and their respective heirs, executors, administrators, successors and assigns. In any case where either party is required to do any act other than the payment of Rent, delays caused by or resulting from acts of god, war, civil commotion, acts of terrorism, fire, flood or other casualty, labor strikes or picketing, shortages of labor, materials or equipment, unusual or onerous government regulations, unusually severe weather or other causes beyond such party's reasonable control shall not be counted in determining the time during which such act shall be completed, whether such time be designated

as a fixed date, a fixed time, or a "reasonable time" and such time shall be deemed to be extended by the period of such delay.

32. LESSEE's Acceptance of the Lease Premises, LESSEE's Initial Improvements, and LESSOR's Payment of a Tenant Allowance for LESSEE's Initial Improvements

LESSEE is accepting the Leased Premises as of the date hereof under the Bluebird / Dimensions Sublease, and consequently LESSEE accepts the Leased Premises in its "AS/IS" condition in all respects and without representations or warranties of any kind or nature both now and as of the Commencement Date; except (i) LESSOR represents the Leased Premises currently, as of the execution of this Lease, conforms to LESSOR's standard Building specifications and complies with applicable laws, codes and ordinances, including without limitation the Americans with Disabilities Act; (ii) all systems serving the Premises, including all shared equipment and systems, to the best of LESSOR's knowledge are in good working condition as of the execution of this Lease and (iii) there shall be code compliant demising walls and common area corridors appurtenant to the Leased Premises (which are to be completed under the terms of the Bluebird / Kew Sublease), for which Bluebird shall be solely responsible to LESSEE.

Prior to taking occupancy of the Bluebird Dimensions Sublease Space, LESSEE shall deliver to LESSOR, Bluebird's environmental exit report (as is required under the Bluebird Lease) showing that the Bluebird Dimensions Sublease Space is not in violation of any environmental laws or regulations and is free of any hazardous contaminants.

LESSEE shall have the right, at any time and from time to time during the period of the Bluebird Dimensions Sublease and up to the Commencement Date hereunder, to commence the design, construction and installation of certain initial improvements to the Leased Premises ("**LESSEE's Initial Improvements**"), pursuant to the provisions and procedures governing LESSEE's Improvements as set forth in Section 11 of this Lease.

Should LESSEE elect to perform any LESSEE's Initial Improvements, it will notify LESSOR and follow the procedures for approval under Section 11 of this Lease. Additionally, as to any such LESSEE's Initial Improvements, LESSEE shall be entitled to an allowance of up to Twenty Four Thousand Three Hundred Thirty ($24,330.00) Dollars (the "**Tenant Improvement Allowance**"), *provided* LESSEE submits a budget for LESSEE's Initial Improvements in reasonable detail and acceptable to the LESSOR as of the LESSOR's approval of LESSEE's plans under Section 11 hereof ("**LESSEE's Budget**").

When LESSEE has incurred actual third party costs for the LESSEE's Initial Improvements (inclusive of reasonable third party design, architectural, engineering and construction costs), LESSEE shall submit to LESSOR from time to time (but not more frequently than monthly, and not later than six (6) months after the Commencement Date, referred to herein as the "**TI Requisition Period**") copies of all third party requisitions for payment received by LESSEE for which LESSEE seeks reimbursement (in each instance, the "**Requisitioned Work**"), together with a partial lien waiver executed by LESSEE's general contractor (as applicable). LESSOR, within thirty (30) days following its receipt thereof, absent dispute, shall pay to LESSEE, from the Tenant Improvement Allowance an amount (the "**Tenant**

Allowance Payment") attributable to the ratio that the Requisitioned Work bears to the total LESSEE's Budget. For example, if the amount of the Requisitioned Work is twenty (20%) percent of the LESSEE's Budget, then the Tenant Allowance Payment on the Requisitioned Work shall represent twenty (20%) percent of the Tenant Improvement Allowance. This process shall repeat as LESSEE submits for Requisitioned Work up to the total amount of the Tenant Improvement Allowance, but LESSOR shall incur no liability to LESSEE (or any other party) for any sums above the Tenant Improvement Allowance (as defined above). If any lien is filed arising out of or in connection with LESSEE's Initial Improvements and such lien or encumbrance is not discharged, insured or bonded over or otherwise disposed of to LESSOR's reasonable satisfaction within ten (10) days after LESSEE shall have actual knowledge of the filing or establishment thereof, then LESSOR shall have no further obligation to disburse any funds from the Tenant Improvement Allowance to LESSEE unless and until the same is so discharged or otherwise disposed, in addition to and not in lieu of LESSORS rights and remedies and LESSEE's obligations on account thereof. LESSEE shall not be entitled to any unused portion of the Tenant Improvement Allowance that is not properly requisitioned or obligated to be paid as contemplated above.

33. Estoppel Certificates.

Upon not less than fifteen days prior written request by either party, the other party shall execute, acknowledge and deliver to the requesting party a statement in writing certifying that this Lease is unmodified and in full force and effect and that LESSEE has at the time of such statement no defenses, offsets or counterclaims against its obligations to pay Annual Base Rent and Additional Rent and any other charges (in the case of any such certificate to be delivered by LESSEE) and to perform its other covenants under this Lease (or, if there have been any modifications that the same is in full force and effect as modified and stating the modifications and, if there are any defenses, offsets or counterclaims, setting them forth in reasonable detail), and the dates to which the Annual Base Rent and Additional Rent and other charges have been paid. Any such statement delivered pursuant to this Section may be relied upon by any prospective purchase or mortgagee of the Premises, or any prospective assignee of any such mortgagee or, as applicable the LESSOR or LESSEE.

34. Governing Law.

This Lease constitutes the full and complete agreement between the parties shall be construed under and according to the laws of the Commonwealth of Massachusetts. Any provision of this Lease which is deemed void or unenforceable shall not invalidate or render void or unenforceable the entire Lease.

35. LESSEE's Extension Option.

LESSEE, *provided* there is then no outstanding default under this Lease beyond applicable notice and cure periods (nor have there been any such defaults (even if cured) more than two (2) times within any twelve (12) month period), shall have the option to extend the Term of this Lease as to the Leased Premises, on the terms and conditions herein, for one (1) additional period of twenty four (24) months (herein, the "**Extended Term**") at the then current "Market Rent" (including annual escalations thereon for each year of the extended term based on

increases in the Consumer Price Index or fixed increases, as the case may be, as determined by then prevailing market forces), but no less than an amount equal to the Annual Base Rent per rentable square foot of Leased Premises space as of the end of the second Lease Year under this direct Lease (the "**Extension Rent Floor**"). Said Extended Term shall commence, subject to proper exercise of LESSEE's option hereunder, on the Termination Date of the original Term (i.e. twenty four (24) full months from the Commencement Date), and shall terminate on that date which is twenty four (24) consecutive months after the original Termination Date. LESSEE shall exercise its option by delivering to LESSOR its written notice not later than nine (9) full months prior to the original Termination Date, time being of the essence (the "Extension Notice"). Once delivered, written notice to extend is irrevocable.

"**Market Rent**" as used herein shall be that rent charged for comparable first class research laboratory and office space in the mid-Cambridge submarket as of the end of the original Term. If, after good faith attempts prior to the expiration of the original Term, the LESSOR and LESSEE cannot agree on a figure representing Market Rent within thirty (30) days after LESSEE has delivered the Extension Notice, either party, upon written notice to the other, may request appraisal and arbitration of the issue as provided in this section. Within fourteen (14) days of the request for arbitration, each party shall submit to the other the name of one unrelated individual or entity with proven expertise in the leasing of commercial real estate in greater Boston/Cambridge to serve as that party's appraiser. Each appraiser shall be paid by the party selecting him or it. The two appraisers shall each submit their final reports to the parties within thirty (30) days of their selection making their determination as to Market Rent (subject however, to the Extension Rent Floor). The two appraisers shall meet within the next fourteen (14) days to reconcile their reports and collaboratively determine the Market Rent. They shall each make their determination in writing (subject however, to the Extension Rent Floor), including a statement if such is the case, that they are at an impasse. Such a statement of impasse shall be submitted to the parties along with the Market Rent figure which each appraiser has selected and his reasons and substantiation therefor. The appraisers, in case of an impasse, shall also agree on one unrelated individual or entity with expertise in commercial real estate in greater Boston, who shall evaluate the reports of the two original appraisers and within fourteen (14) days of submission of the issue to him, make his own determination as to a figure representing Market Rent (subject however, to the Extension Rent Floor). The determination of this individual or entity (i.e. arbitrator) absent, fraud, bias or undue prejudice shall be binding upon the parties.

Annual Base Rent and Additional Rent during any Extended Term shall be payable in advance, in equal monthly installments on the first day of each calendar month.

LESSEE in addition to the sums payable annually to LESSOR as Annual Base Rent, shall pay to LESSOR for each year of any Extended Term, as Additional Rent, LESSEE's Allocable Percentage (as determined by the approximate total rentable space leased) for Operating Expenses, Real Estate Taxes and Utilities as contemplated in Sections 3, 4 and 7 hereof.

36. Right of First Offer as to Contiguous Fourth Floor Space.

LESSEE, *provided* it is not then in default after notice and the expiration of any applicable cure period (and *provided* there have not been any such defaults (even if cured) more

than two (2) times within any twelve (12) month period), is hereby entitled to receive advance written notice from LESSOR during the Term of this Lease (as it may be extended) that certain contiguous space on the fourth (4th) floor of the Building (the "**Expansion Space**") will be offered to third parties for leasing (the "**ROFO Notice**"), which ROFO Notice shall set forth the "**Expansion Space Market Rent**" and other economic terms at which such space will be so offered.

LESSEE shall be entitled to receive a ROFO Notice and to exercise its ROFO Rights as set forth below, which exercise by LESSEE shall be pre-empted and superseded only by: (x) the exercise of any existing ROFO or expansion rights as to the Expansion Space (including rights to renew or extend its lease) that have been given to other tenants in the Building; or (y) LESSOR's right (hereby reserved to LESSOR) to lease said Expansion Space to any third parties in conjunction with the leasing of any other space in the Building.

LESSEE shall have the right, within thirty (30) days from the delivery of LESSOR's ROFO Notice, to elect to lease the Expansion Space, at the Expansion Space Market Rent and other economic terms specified in LESSOR's notice, and otherwise on the terms of this Lease for a lease term coterminous with the Term governing the Leased Premises (but not less than thirty six (36) months), or to negotiate with LESSOR and to execute a binding letter of intent to lease said space at a Rent and on other terms and conditions mutually agreeable to LESSOR and LESSEE (the LESSEE's "**ROFO Rights**"). If LESSEE shall not elect to lease such space or if no binding letter of intent with alternate Rent and terms is executed by LESSOR and LESSEE during that thirty (30) day period, for whatever reason, then LESSOR shall be free to market and lease the space offered by the ROFO Notice to any third party, in its sole discretion and without any continuing obligation to LESSEE under this Section 36 except as set forth below.

If LESSEE shall fail to elect to lease the Expansion Space offered by the ROFO Notice as aforesaid, then notwithstanding anything to the contrary contained in the preceding paragraph LESSOR may thereafter lease such space to any third party at a rent of not less than 90% of the Expansion Space Market Rent proposed to LESSEE in the applicable ROFO Notice; but if the proposed lease to any third party is less than 90% of the Expansion Space Market Rent proposed in the applicable ROFO Notice, or if LESSOR does not enter into a third party lease within three hundred sixty (360) days from the delivery of the ROFO Notice, then LESSOR shall be required to re-offer the space to LESSEE pursuant to this section.

Time is of the essence in the exercise of LESSEE's ROFO Rights as set forth above.

[**Execution Pages Follow**]

IN WITNESS WHEREOF, LESSOR AND LESSEE have hereunto set their hands and seals and intend to be legally bound hereby as of the date first set forth above.

LESSOR

RIVERTECH ASSOCIATES II, LLC
By Rivertech Associates II, Inc.,
its duly authorized Manager

By: /s/ Robert Epstein, President
Robert Epstein, President

LESSEE

DIMENSIONTHERAPEUTICS, INC.

By: /s/ Thomas Beck
President

By: _____
Treasurer

RIVERSIDE TECHNOLOGY CENTER
FIRST LEASE AMENDMENT
TO THE LEASE BETWEEN

RIVERTECH ASSOCIATES II LLC AND DIMENSION THERAPEUTICS, INC.

This First Lease Amendment entered into this 22nd day of October, 2014 (the "First Amendment") by and between **Rivertech Associates II LLC,** a Massachusetts limited liability company with a principal address c/o The Abbey Group, 575 Boylston Street Boston, Massachusetts 02116, (the "Lessor"); and **Dimension Therapeutics, Inc.,** with a business address at 840 Memorial Drive Cambridge, Massachusetts (the "Lessee"); relative to a certain Lease between Lessor and Lessee dated March 11, 2014,referred to herein as the "Existing Lease"), for certain research and development, laboratory and office space in the building at 840 Memorial Drive Cambridge, Massachusetts as identified in the Existing Lease (the "Leased Premises"). The Existing Lease, as modified by this First Amendment, hereafter shall be referred to herein as the "Lease" (as the context so permits).

WHEREAS, the Lessee desires to add certain additional space to the current Leased Premises which presently consists of approximately 8,110 rentable square feet consisting of approximately 8,060 rentable square feet located on the fourth (4th) floor of the Building, and approximately 50 rentable square feet located on the third (3rd) floor of the Building (herein, the "Existing Space");

WHEREAS, the additional space to be added to the current Leased Premises is approximately 6,839 rentable square feet consisting of approximately 6,814 rentable square feet located on the second (2nd) floor of the Building as shown on Exhibit A attached hereto, and approximately 25 rentable square feet in a space suitable for an acid neutralization room to be exclusively used by Lessee in an area to be mutually agreed upon between the parties, on a lower floor in the Building (herein, the "Expansion Space"); and

WHEREAS, the Lessee desires to extend the current term of the Existing Lease, which is to expire on March 31, 2017, such that there is a single coterminous end of Term covering both the Existing Space and the Expansion Space under Lease as modified by this First Amendment.

THEREFORE, in consideration of One ($1.00) Dollar and the other good and valuable consideration recited herein, effective and irrevocable as of the date hereof, the Lessor and Lessee hereby agree as follows:

1. Modification to Existing Lease / Extension of Lease Term

Lessee agrees to extend its lease and occupancy of the Leased Premises, commencing as of the end of the Term as stated under the Existing Lease, i.e. from April 1, 2017 (herein, the "First Extension Commencement Date"), which extended term as to the Leased Premises will expire thirty six full calendar (36) months from the Expansion Space Commencement Date as

determined in Section 3 below (the "First Extension Termination Date"). The period from the First Extension Commencement Date through the First Extension Termination Date is referred to as the "First Extended Term".

Further, Lessee agrees to lease the Expansion Space (in addition to the Leased Premises), commencing on the Expansion Space Commencement Date (as defined herein below) through and to the First Extension Termination Date. As of the Expansion Space Commencement Date, the Expansion Space shall be considered to be included in the term "Lease Premises" as used in the Lease.

Notwithstanding the Expansion Space Commencement Date, this First Amendment is to be considered a valid and binding obligation of the parties effective as of the date of execution of this First Amendment by the parties, with the Existing Lease to continue to govern the Lessee's use and occupancy of the Leased Premises hereunder up to the Expansion Space Commencement Date hereunder.

2. Expansion Space Added to the Leased Premises

Lessor shall deliver the Expansion Space for lease by Lessee (to be added to the space currently leased by Lessee under the Existing Lease and, once so delivered, as of the Expansion Space Commencement Date, in the aggregate to constitute the Leased Premises), upon Substantial Completion of Lessor's Work as defined herein below (which date of delivery shall be the "Expansion Space Commencement Date"); said space to be vacant and free of all personal property (consistent with Exhibits A, B and C hereto) and debris; with Lessor's Work having been performed in a good and workmanlike manner with all necessary municipal approvals and Cambridge building department "sign-offs" consistent with Lessor's certificate of occupancy; broom clean; and otherwise "AS/IS" in its current condition in all other respects. "Substantial Completion" shall mean that Landlord's Work has been completed (other than punchlist items) such that Lessee may conduct its business in the Expansion Space.

The target date for Lessor's delivery of the Expansion Space shall be approximately one hundred five (105) days from the full execution and delivery of this First Amendment; the actual date of delivery being referred to herein as the "Expansion Space Commencement Date". Lessor shall not be liable for any delay in delivery beyond the target date for the Expansion Space Delivery Date, provided Lessor undertakes reasonable and diligent efforts to meet that target date. Notwithstanding the foregoing, in the event that Expansion Space Commencement Date shall not have occurred by that date which is one hundred thirty five (135) days from the date this Lease is fully executed and delivered by the parties (the "Expansion Space Commencement Date Deadline") the Lessee shall be entitled to a waiver of Annual Base Rent and Additional Rent, on a day for day basis for each day of delay in the actual delivery of the Expansion Space beyond the Expansion Space Commencement Date Deadline, said waiver being Lessee's sole and exclusive remedy for any such delays in actual delivery. The foregoing waiver shall not apply to any delays caused by any Force Majeure occurrences. As used in Section 3 below, the term "Interim Period" shall mean that period of time from the Expansion Space Commencement Date up to the end of the calendar month in which such Expansion Space Commencement Date occurs.

All Lessee's Rent payments and other Lease obligations relating to the Expansion Space shall commence as of the Expansion Space Commencement Date; however all Lessee's Rent payments and other Lease obligations as to the Existing Space shall continue to run as per the Existing Lease. All terms and conditions of the Lease shall govern the Lessee's use and occupancy of the Expansion Space commencing as of the Expansion Space Commencement Date.

Lessor's delivery of the Expansion Space shall be evidenced by a written notice of delivery ("Lessor's Delivery Notice") given to Lessee on the actual date the Expansion Space is provided to Lessee. Lessee shall have five (5) business days to contest delivery if it does not conform with the foregoing paragraph by delivering its notice thereof in writing to Lessor; however, any listed items of a "punchlist" nature shall be agreed to by Lessor and Lessee and shall not be grounds to contest delivery, but nevertheless shall obligate Lessor to complete such punchlist items at the earliest practicable time under the circumstances, but completion shall not extend beyond thirty (30) days (subject to the availability of labor and materials).

The following conditions to the delivery of the Expansion Space to the Lessee by the Lessor shall be met by the Lessor, at its sole cost and expense, prior to the Expansion Space Commencement Date. The Lessor shall perform, at its sole cost and expense, such design and construction work as is necessary to deliver the Expansion Space to the Lessee in accord with: (i) the plan entitled "Revised Final Scope of Work — October 17, 2014" attached hereto as Exhibit A; (ii) the document entitled "Scope of Landlord's Work" dated October 20, 2014 attached hereto as Exhibit B; and (iii) the document entitled "Additional Costs" attached hereto as Exhibit C(collectively, the "Lessor's Work"), with demising walls and common area corridors to be compliant with state and municipal building codes; it being the intention of the parties that the Expansion Space be delivered in a "turnkey' condition as per the parameters for Lessor's Work. All utilities for the Expansion Space shall be in place and separately metered. The base building systems serving the Expansion Space shall be delivered in good operating condition and repair and suitable for office and laboratory use. The Building and the Expansion Space as delivered to the Lessee will be compliant with the Americans with Disabilities Act. Subject to the foregoing, Lessor shall not be responsible for any other design or construction work with respect to either the Leased Premises under the current Existing Lease, or the Expansion Space.

The work, equipment, fixtures and installations appearing on Exhibit C (the "Exhibit C Work") is included in Lessor's Work, and Lessee shall reimburse Lessor the sum of Twenty Thousand ($ 20,000) Dollars toward the costs of said Exhibit C Work. Said reimbursement for Exhibit C Work shall be paid to Lessor upon execution of this First Lease Amendment.

If and to the extent Lessee desires that Lessor perform any additional demolition, construction or installation beyond Lessor's Work, then it shall so inform Lessor in sufficient time and with sufficient detail to enable Lessor to evaluate the impact of the same on its Lessor's Work. Lessor shall be under no obligation to perform any such additional work beyond Lessor's Work, unless paid for by Lessee and provided performance thereof will not cause extension of the Expansion Space Commencement Date. Further, if the performance of any such additional work by the Lessor as contemplated above causes the Lessor to deliver the Expansion Space later than the

Expansion Space Commencement Date Deadline, there shall be no abatement of Annual Base Rent and Additional Rent as contemplated above, provided the Expansion Space is thereafter delivered in a reasonable time given the nature and scope of the additional work.

The Lessee shall be solely responsible, at its sole cost and expense, to perform such other specific design and construction work on the Expansion Space as it desires for its use and occupancy ("Lessee's Work"). Lessee shall be provided with access to the Expansion Space commencing upon execution of this First Amendment, coordinated through the Lessor, for the purpose of performing Lessee's Work and any preliminary work toward the installation of its equipment and wiring, provided such access, Lessee's Work and preliminary work does not materially interfere with Lessor's ability to perform and complete its Lessor's Work, which shall take precedence in all respects. Lessee's Work and all subsequent Lessee alterations to the Leased Premises that are performed by Lessee on or affecting the fire, life safety and/or sprinkler systems of the building shall be made in such a manner and under such conditions as to pose no adverse impact or interruption to such fire, life safety, and sprinkler systems, and so as not to delay, impair, or jeopardize the legal occupancy of other Lessees in the Building as determined by Lessor and municipal fire and building inspection officials.

3. Annual Base Rent and Additional Rent

Base Rent during the Term shall be as set forth below:

A. Existing Space - Annual Base Rent

As applied to the Existing Space, i.e. the current 8,110 rentable square feet) Annual Base Rent shall be as follows:

(i) for the balance of the Term prior to the First Extension Commencement Date, Annual Base Rent shall remain unchanged and shall be $ 369,005.00 per annum payable in monthly installments of $ 30,750.42, from April **1,** 2015 to March 31, 2016; and $ 381,170.00 per annum payable in monthly installments of $ 31,764.17, from April 1, 2016 to March 31, 2017 as stated in the Existing Lease; and,

(ii) for the portion of the Term commencing on April 1, 2017, Annual Base Rent shall be $ 393,335.00 per annum, payable in monthly installments of $ 32,777.92 each calendar month up to the First Extension Termination Date.

B. Expansion Space — Annual Base Rent

As applied to the Expansion Space i.e. the additional 6,839 rentable square feet) Annual Base Rent shall be as follows:

(i) For the first twelve (12) full calendar month period from the Expansion Space Commencement Date (including pro rata for any partial month in the Interim

Period), Annual Base Rent shall be $ 324,852.50 per annum, payable in monthly installments of $ 27,071.04 each calendar month; and,

(ii) For the second twelve (12) full calendar month period, Annual Base Rent shall be $ 335,111.00 per annum, payable in monthly installments of $ 27,925.92; and,

(iii) For the third twelve (12) full calendar month period, Annual Base Rent shall be $ 345,369.50 per annum, payable in monthly installments of $ 28,780.79.

In all instances under A and B above, Annual Base Rent shall be payable in the corresponding monthly installments set forth above, due on the first of each month, in advance, and in all other respects shall be subject to the same provisions relating to Annual Base Rent as set forth under the Existing Lease.

C. Additional Rent

In addition to Annual Base Rent, Lessee shall continue to be responsible to pay all Additional Rent (Operating Expenses) under Section 3 of the Existing Lease, and all Additional Rent (Taxes) under Section 4 thereof, as applicable to both the Existing Space and, commencing on the Expansion Space Commencement Date, the Expansion Space, up to the First Extension Termination Date as invoiced by Lessor.

As the concept is used in the Lease to compute Additional Rent, Lessee's allocable pro rata share ("Allocable Percentage") shall be as follows:

(a) Allocable Percentage for the Existing Space shall remain at 6.26%.

(b) Allocable Percentage for the Expansion Space, starting on the Expansion Space Commencement Date shall be 5.28%.

To the extent that the Expansion Space Commencement Date does not fall on the first calendar day of a month, then the first month in which the Expansion Space Commencement Date occurs will have Additional Rent attributable to the Expansion Space prorated on a per diem basis for that Interim Period.

D. Rent and other Costs and Expenses

All Annual Base Rent, Additional Rent and other sums due as Rent shall be payable and in all other respects shall be governed during the remainder of the Term under the Existing Lease and the First Extended Term as contemplated under the Existing Lease, except to the extent modified above. All other costs and expenses for utilities and services and attendant to operation of the Leased Premises, as applicable to both the current Leased Premises and the Expansion Space, shall continue to be borne by the respective parties during the First Extended Term as set forth in the Existing Lease.

E. Security Deposit

The Security Deposit, from the date of this First Amendment, shall consist of the following amounts: (a) The Security Deposit currently held by the Lessor in the amount of Sixty One Thousand Five Hundred and 67/100 ($ 61,500.67) Dollars; (b) with an additional payment installment due by Lessee on April 1, 2015 of Thirty Thousand Seven Hundred Fifty and 33/100 ($ 30,750.33) Dollars, as (a) and (b) are stated in the Existing Lease; and (c) with an additional payment to Lessor upon execution of this First Amendment in the additional amount of Eighty One Thousand Two Hundred Thirteen ($ 81,213.00) Dollars ; all to be held as the Security Deposit under the Lease. The additional amounts due above may be deposited by Lessee by check or in the form of a letter of credit (for that additional amount or the total amount).

4. Permitted Uses

The Permitted Uses in the Basic Data of the Existing Lease and all conditions attached thereto are hereby restated and affirmed and shall govern the use and occupancy of the entire Leased Premises from the Expansion Space Commencement Date through the First Extension Termination Date, as the same may be further extended in accordance with this First Amendment.

5. Leased Premises in "AS/IS" Condition — No Defaults

Lessee hereby acknowledges it is currently in possession of the Existing Space and accordingly accepts the same for the First Extended Term in its current "AS/IS" condition, without representation or warranty of any kind or nature arising from the extension of the Lease by Lessor and Lessee.

Lessor and Lessee each acknowledge that to the best of each of their respective knowledge, there are no material defaults by either presently existing under the Lease.

6. Brokers

The parties hereby agree there are no brokerage or other third party fees or costs involved in this transaction and each agrees to indemnify, defend and hold harmless the other from and against any claims for brokerage fees, commissions or other such payments arising from this transaction.

7. Parking

LESSEE shall be granted, at current rates (which may be increased for all tenants of the Building from time to time to reflect market increases, except in the event of any separately bargained for parking provisions contained in any lease, in which case said increases need not be uniform), the right (but not the obligation) to park up to twenty two (22) cars in total in the Building's on-site indoor parking lot or facility on an unassigned and unreserved basis, in single or tandem spaces

or on a valet basis which LESSOR in its sole discretion shall designate from time to time. The initial parking rate therefor shall be $ 225 per month, per car, which monthly rate may be changed by LESSOR in its discretion subject to and reflective of periodic market changes. All payments for these parking rights shall be considered to be Additional Rent under this Lease. This provision supersedes any contrary provisions in Section 16 of the Existing Lease and the specific numeric rights set forth above supplant the numeric rights set forth in Section 16 of the Existing Lease as of the Expansion Space Commencement Date; Lessee retaining however all parking rights under said Section 16 from the date of execution of this First Lease Amendment up to the Expansion Space Commencement Date.

8. Right of First Offer — Contiguous Second Floor Space

In addition to its ROFO Rights with respect to contiguous space on the fourth floor of the Building as set forth in Section 36 of the Lease (the "4th Floor ROFO Rights"), Lessee, provided it is not then in default after notice and the expiration of any applicable grace or cure periods, and further provided it shall not have defaulted beyond any applicable notice, grace and cure periods more than twice within any twelve (12) month period, is hereby entitled, fully subject and subordinate to any existing expansion rights held by other tenant's in the Building, to receive advance written notice from LESSOR during the Term of this Lease (as it may be extended) that any contiguous space on the second (2nd) floor (only) of the Building (the "ROFO Space") will be offered to third parties for leasing (the "ROFO Notice"). The Lessor's ROFO Notice to Lessee shall set forth the Annual Base Rent and other economic terms at which such space will be so offered, which shall be at Market Rent (as defined below) and incorporating market concessions and market tenant improvement allowances) as determined by Lessor and stated in the ROFO Notice (subject to Lessee's rights to appraisal and arbitration of Market Rent as set forth below).

Lessee shall have the right within thirty (30) days from the delivery of Lessor's ROFO Notice (the "ROFO Acceptance Period"), to elect to lease the ROFO Space by providing Lessor with a written notice accepting the ROFO Space (the "ROFO Acceptance") delivered prior to the expiration of said thirty (30) day period. If Lessee shall not elect to lease the ROFO Space, i.e. if no ROFO Acceptance notice electing to do so is delivered to Lessor during that thirty (30) day period, then Lessor shall be free to market and lease the space offered by the ROFO Notice to any third party, in its sole discretion and without any continuing obligation to Lessee under this Section 8; provided however that if Lessor does not enter into a lease with a thirty party within three hundred sixty (360) days from the delivery of the ROFO Notice (the "Reoffer Period"), or is not then engaged in any pending lease negotiations with a third party as of the expiration of said Reoffer Period, then Lessor shall be required to re-offer the space to Lessee pursuant to this Section 8. Once delivered to Lessor, Lessee's election to accept the ROFO Space shall be irrevocable, notwithstanding the determination of Market Rent as contemplated below. Time is of the essence in the exercise of Lessee's rights as set forth above.

If Lessee elects to exercise its rights to the ROFO Space (and/or for the 4th Floor ROFO Space), then the Term for such space will start as stated in the ROFO Notice, and shall be for a term coterminous with the Term (as it may have been extended) governing the Leased Premises but not less than three (3) years (including the Second Extension Term, if there is less than three

years left in the First Extended Term and Lessee agrees to exercise its option for the Second Extension Period, unless a longer term is requested by Lessee and agreed to by Lessor.

To the extent Lessee disagrees with the Lessor's determination of Market Rent as set forth in the ROFO Notice, then within the ROFO Acceptance Period, Lessee may: (i) negotiate a Market Rent and other terms and conditions mutually agreeable to Lessor and Lessee, or failing to reach agreement with Lessor; (ii) elect to determine Market Rent by an appraisal and arbitration process as set forth in Section 9 of this First Amendment, communicated to the Lessor in the Lessee's ROFO Acceptance (which, if not elected in said ROFO Acceptance, shall be deemed waived by Lessee). That process will be commenced by the selection of the contemplated appraiser by each party within fourteen (14) days of the delivery of the ROFO Acceptance notice, bypassing the requirement for good faith negotiations (which can occur but which are not required to occur). Additionally, the Extension Rent Floor concept shall not be applicable to the ROFO Space (except during the determinations of Annual Base Rent for the Second Extension Period), but instead Annual Base Rent for such ROFO Space during and up to the First Extension Termination Date shall not be less than Annual Base Rent per rentable square foot for the highest rent for other Leased Premises space under this Lease during such time.

9. Lessee's Option to Extend

Section 35 of the Lease is hereby deleted in its entirety and replaced with the following language:

Section 35. Lessee's Option to Extend.

Lessee, provided it is not then in default after notice and the expiration of any applicable grace or cure periods, and further provided it shall not have defaulted beyond any applicable notice, grace and cure periods more than twice within any twelve (12) months period, shall have the option to further extend the Term of this Lease as to the Leased Premises (i.e. inclusive of the Expansion Space and any additional space taken on by Lessee under Section 36 and under Section 8 of this First Amendment, but only as to the entirety of said Leased Premises and additional space taken, which shall be deemed included in the definition of Leased Premises as and when taken) on the terms and conditions herein, for one additional period of twenty four (24) months (herein, the "Second Extension Period"), at the then current "Market Rent" (including annual escalations thereon for each year of the extended term based on increases in the Consumer Price Index or fixed increases, as the case may be, as determined by then prevailing market forces), but no less than an amount equal to the Annual Base Rent per rentable square foot of highest rent for Leased Premises space during the final Lease Year hereunder (the "Extension Rent Floor"). Said Second Extension Period shall commence, subject to proper exercise of Lessee's option hereunder, at the end of the First Extension Termination Date and shall terminate on that date which is twenty four (24) consecutive months thereafter. Lessee shall exercise its option by delivering to Lessor its written notice not later than nine (9) full months (but not sooner than fifteen (15) full months, unless exercised earlier than said fifteen (15) months (in order to exercise its ROFO rights under the Lease) prior to the end of the First Extended Term. Once delivered, written notice to extend is irrevocable.

"Market Rent" as used herein, shall be that rent charged for comparable research laboratory and office space of similar age and condition in laboratory buildings in the mid-Cambridge submarket as of the end of the First Extended Term. If, after good faith attempts, the Lessor and Lessee cannot agree on a figure representing Market Rent within thirty (30) days after Lessee has delivered the Extension Notice, then either party, upon written notice to the other, may request appraisal and arbitration of the issue as provided in this section. Within fourteen (14) days of the request for arbitration, each party shall submit to the other the name of one unrelated individual or entity with proven expertise in the leasing of commercial real estate in greater Boston/Cambridge to serve as that party's appraiser. Each appraiser shall be paid by the party selecting him or it. The two appraisers shall each submit their final reports to the parties within thirty (30) days of their selection making their determination as to Market Rent (subject however, to the Extension Rent Floor). The two appraisers shall meet within the next fourteen (14) days to reconcile their reports and collaboratively determine the Market Rent. They shall each make their determination in writing (subject however, to the Extension Rent Floor), including a statement if such is the case, that they are at an impasse. Such a statement of impasse shall be submitted to the parties along with the Market Rent figure which each appraiser has selected and his reasons and substantiation therefor. The appraisers, in case of an impasse, shall also agree on one unrelated individual or entity with expertise in commercial real estate in greater Boston, who shall evaluate the reports of the two original appraisers and within fourteen (14) days of submission of the issue to him, make his own determination as to a figure representing Market Rent (subject however, to the Extension Rent Floor). The determination of this individual or entity (i.e. arbitrator) absent, fraud, bias or undue prejudice shall be binding upon the parties.

Annual Base Rent and Additional Rent during any Extended Term shall be payable in advance, in equal monthly installments on the first day of each calendar month.

Lessee, in addition to the sums payable annually to Lessor as Annual Base Rent, shall pay to Lessor for each year of the Second Extension Period, as Additional Rent, Lessee's Allocable Percentage (as determined by the approximate total rentable space leased) for Operating Expenses, Real Estate Taxes and utilities as contemplated in Section 4 hereof (and as may be impacted by Section 8 hereof).

10. Subordination

The Lease, as extended and modified by this First Amendment, shall be subject and subordinate to any and all mortgages and related documents placed on the Building, Leased Premises or the real property in existence as of the date hereof or coming into existence at any time hereafter, without necessity for any confirming documentation. Lessor shall use commercially reasonable efforts (which shall not be deemed to include the payment or expenditure of any sums whatsoever) to obtain a Subordination, Non-Disturbance and Attornment Agreement from its present and future mortgagees, in form and substance set forth as Exhibit D_hereto; but Lessor shall not be liable to Lessee in any manner (nor shall any of Lessee's full and timely performance under this Lease be conditioned, waived, excused or altered in any manner whatsoever) if no SNDA is forthcoming, or if any of the terms and conditions of the same are not

deemed acceptable. This provision supersedes any contrary provisions in Section 13 of the Existing Lease.

11. Shared Use of Laboratory Support Systems and Emergency Generator.

In addition to Lessee's rights to use the shared laboratory support systems and emergency generator and controller with other users on the fourth and fifth floor, Lessee shall have the right, in connection with its lease of the Expansion Space, to use the shared laboratory support systems and emergency generator and controller with other users on the second floor of the Building. Lessee's use of such shared systems shall be governed by the provisions of Section 11 (c) and (e).

12. Additional Signage

In addition to Lessee's signage rights under Section 20 of the Lease, Lessee shall have the right to display one sign at the entrance of the Expansion Space and one sign at a mutually determined and agreed location off the elevator on the 2nd floor, consistent with similar signs in the Building.

13. Integration of Documents; Supremacy

This First Amendment contains the full understanding and agreement between the parties. The parties hereto intend that this First Amendment operates to amend and modify the Existing Lease, and that those two documents shall be interpreted conjunctively; with any express conflict between the two to be resolved in favor of the stated terms of this First Amendment. Except as modified hereby, all other terms and conditions of the Existing Lease shall remain unchanged and enforceable in a manner consistent with this First Amendment, including Lessee's right to assignment and subletting of the Expansion Space as set forth therein.

This Agreement shall be governed by the laws of the Commonwealth of Massachusetts. Any provisions deemed unenforceable shall be severable, and the remainder of this First Lease Amendment and the Existing Lease shall be enforceable in accordance with their terms.

[Signature Pages Follow]

LESSOR

RIVERTECH ASSOCIATES II, LLC

By: Rivertech Associates II, Inc.,
its Manager

By: /s/ Robert Epstein
Name: Robert Epstein
Title: President

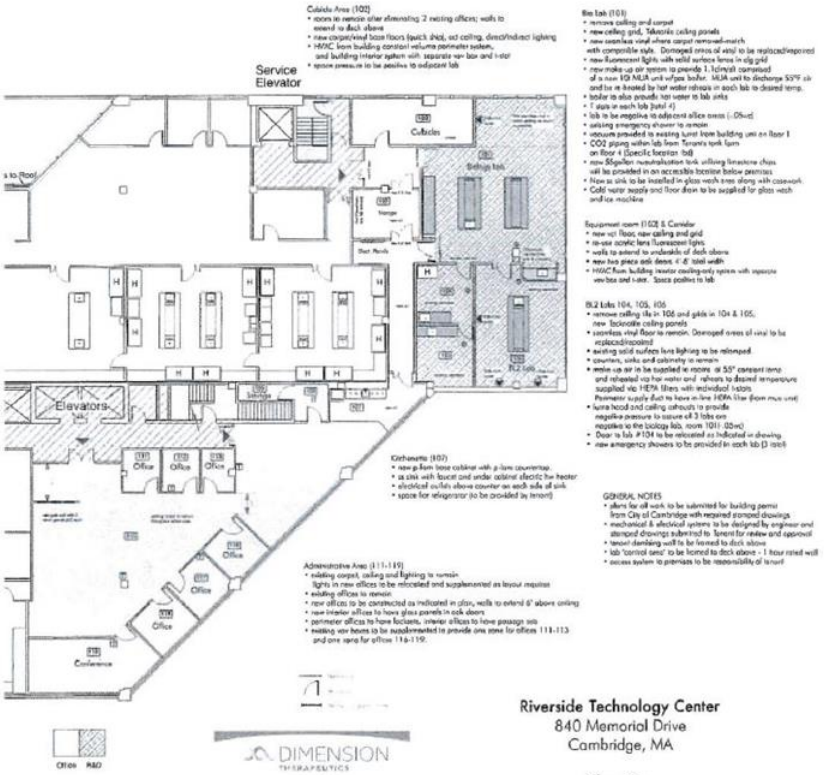
LESSEE

DIMENSION THERAPEUTICS, INC.

By: /s/ Annalisa Jenkins

its duly authorized, Chief Executive Officer
Name: Annalisa Jenkins
Title: CEO

EXHIBIT A



Riverside Technology Center
840 Memorial Drive
Cambridge, MA

Floor Two

EXHIBIT A
Revised Final Scope of Work
October 17, 2014

EXHIBIT B

DIMENSION THERAPEUTICS Floor Two
840 Memorial Drive
Cambridge, MA
October 20, 2014 **Final changes in bold.**

SCOPE OF LANDLORDS WORK FOR LAB AND OFFICES ON FLOOR TWO

Administrative Area
Partitions: Partitions for three new offices are to be added as indicated on the plans. Walls of new offices shall be insulated and extend to approximately 6" above the existing suspended ceiling.

Existing office walls are comprised of gwb over steel studs and extend from floor to the underside of the suspended ceiling.

The walls demising the Administrative areas from **adjacent tenancies and** R&D areas extend to the underside of the deck above and are constructed to have a one hour fire rating.

All new walls will be finished with two coats water based paint. Existing walls shall be patched and repainted as necessary but maintain existing paint color.

A new partion will be constructed approximately 8' from the existing main glass entry, extend 6" above the suspended ceiling, have three approximately 24"x24" clear glass vision panel insets and extend approximately 10' from the existing demising wall.

Glass Panels: Where they exist, glass panels to remain. Entry: Existing glass entry to remain.
Doors: All hardware are lever handles with brushed stainless finish. New doors in offices 111, 112, & 113 will be solid oak to match building standard. New office door hardware will consist of passage function latchsets with brushed stainless finish.

Floors: All carpeted areas in the administrative which are affected by construction will be protected and reused. 4" vinyl cove base will be installed at intersection of new walls and carpet/vct in new offices. VCT will be installed in an area adjacent to the new kitchenette.

Ceilings: All existing ceiling tiles will remain or be replaced as necessary. Any damaged ceiling tiles will be replaced with matching ceiling tiles. Any damage to ceiling grid will be repaired.

Lighting: Existing fluorescent lights will remain and be relocated and supplemented as necessary to accommodate the new configuration. All existing fluorescent lights will be inspected to insure proper functioning and be repaired or replaced as necessary.

HVAC: The base building HVAC distribution system will be inspected and adjusted as necessary to assure distribution, airflow, and proper operation of thermostats and variable air volume (VAV) boxes. There will be an adjustment of the system to accommodate the three new offices which shall be provided with a separate VAV and thermostat.

The premises will conform to the obligations with the Lease regarding temperatures within the office environment.

The existing supplemental ac unit feeding the conference room shall be inspected by the landlord and put in working order. The tenant will be responsible for maintaining and repairing all tenant specific supplemental mechanical equipment beyond a 6 month warranty period.

Kitchenette: A new kitchenette will be constructed as indicated in the drawings and consist of p.lam cabinets and counters, stainless steel sink and four (4) gfi 110v outlets on two 20amp circuits located above the counter. A copper water line will be provided for tenant to connect their coffee machine in a location on the counter tbd by tenant.

Electrical: Existing electrical outlets throughout the administration area and the office space in the R&D area in the form of existing and new 110v outlets to remain. All utilities servicing the tenant’s premises and equipment are separately metered and will be read monthly by the landlord for reimbursement by the tenant. New outlets will be installed to accommodate the new layout. Each new office will have a minimum of 3 120/20a 5-20R receptacles. All electrical circuits will be labeled via labels at the outlet, junction box, safety switch, or other corresponding electrical equipment and a corresponding label on the electrical panel indicating the appropriate circuit breaker.

Furnishings: No reception desk cubicles, work stations or furniture of any sort shall be provided by the landlord.

Fire Protection: Fire protection will be added as needed and required by Massachusetts Building code, NFPA and local Fire Code. Work included in this scope will comply with the Massachusetts Building Code, ASHRAE and NFPA.
R&D AREA

Demolition: Existing doors and walls required to be removed to accommodate new plan will be removed.

Partitions: Partitions enclosing laboratory from administrative & support spaces and laboratory from the three tissue culture suites shall consist of existing walls extending from floor to the underside of the deck and will be constructed to have a one hour fire rating. Walls and trim will be finished with two coats water based paint. Paint

finish in tissue culture rooms to be semi gloss.

Doors: New two piece oak doors of 4’ and 4’6” shall be installed as indicated on the plans. The existing metal door leading to tissue culture room #104 shall be relocated/ replaced as indicated in the plans.

Floors: Existing seamless vinyl in the lab areas shall remain and be repaired where the surface is compromised as reasonably requested by the tenant. In the rear of lab #101, the area where carpet has been removed shall be replaced by seamless vinyl in a style and color most compatible with the existing, being aware that the existing seamless vinyl is no longer manufactured.

The equipment room #103 shall be replaced with vct.

The cubicle area floor shall have carpet with vinyl base to match that in the administrative area of the premises.
Ceilings: Existing ceiling grid and act shall be removed and replaced along with solid surface ceiling tiles in the support area room #103. The cubicle area shall have existing grid where salvagable along with act.
New grid and washable ceiling tiles by Teknotile or equal shall be installed in the main laboratory and tissue culture areas. Lighting: Existing 2x4 and 2x2 fluorescent lights will be relamped and be solid surface type.
New solid surface lens type fluorescent lights will be used in the main laboratory #101.

BENCHES: A new p.lam bench with p.lam counter shall be provided in the main lab #101near the glasswash/autoclave area as shown in the plan. The new lab sink will have protected hot and cold water and deck mounted emergency eyewash stations.

HVAC: The base building HVAC distribution system will be inspected and adjusted as necessary to assure good operating condition and repair, distribution, airflow, and proper operation of thermostats and variable air volume (VAV) boxes. One house system VAV system shall serve the cubicle area and the lab services room #103. Perimeter constant volume heating/cooling shall remain in the cubicle area. The laboratory mechanical system shall consist of a self contained electric/natural gas fired 10ton make-up air unit located on the second floor roof ducted to the laboratory. A wall mounted gas fired boiler shall be located in room #103 and shall provide hot water to 5 sets of heating coils comprising 5 zones within the lab (one each to #104, #105, #106 and two ((interior and perimeter)) to #101). This system shall provide make up air to the labs at a constant volume of 1.1cfm/sft (approximately 6 air changes/hour) at approximately 55°F and be reheated as requested by the thermostats. All air to the laboratories spaces shall be introduced via 95% HEPA filters.

If determined by engineer to be needed, a supplemental 3 Ton air conditioning unit shall be located in the main laboratory #101 to provide additional cooling should it be necessary during peak cooling load periods. **Should such a unit be required, it shall be paid for by tenant and Lessor shall warrant that its presence shall assure the lab environment conforms to ASHRAE requirements.**

The landlord's engineer will perform load calculations to take into account insulation, square footage, occupancy and equipment heat loss to determine heating and cooling loads.

Expected equipment and occupant load shall be provided to the landlord's engineer for analysis and design of the HVAC system. The space will be balanced according to these calculations. All balancing will be conducted by a NEBB certified balancing technician.

All tenant specific mechanical systems shall be warranted for proper operation for a period of six months provided tenant enters into an appropriate preventive maintenance agreement for this equipment. Tenant specific mechanical equipment will be delivered in good operating condition.

All Tenant-specific mechanical equipment shall be put on a preventive maintenance agreement by the tenant and at Tenant's expense for the duration of the Lease. The tenant will be responsible for maintaining and repairing all tenant specific supplemental mechanical equipment beyond the 6 month warranty period.

Room #104 shall be negative to room #101 while room #105 shall be negative to room #104. **Room #106 negative to room #101**

Plumbing and Waste: The main cold water supply to the lab will be located in the "Lab support" room #103 which will also contain a hot water heater/storage tank, a water check meter and required backflow prevention devices. All lab waste will be contained in polyethylene piping and will lead to an acid waste system consisting of a 55 gallon tank with limestone chips located in an accessible location on the first floor directly below the premises.

The laboratory wastewater system will be maintained by the tenant who shall also be responsible for required municipal discharge permits, sampling and testing.

Safety showers will be added in rooms #104, #105 & #106. Requirements for safety showers and eyewash stations throughout the lab space will be made to comply with requirements of the City of Cambridge Plumbing Inspector. Showers and eye wash will be from the existing circulating protected tempered water line servicing the first and second floor of the building.

Autoclave, ice and glass-wash: The landlord will provide an area in lab #101 in which this equipment will be located. Water and drain will be provided. The actual equipment will be provided by the tenant as will the responsibility of final installation. The existing laboratory sink with protected hot and cold water and eyewash shall remain.

Electrical: Power to various locations within the laboratory exists **or will be installed** in the form of existing 110v and 208v outlets as required in the latest equipment **matrix.** Four (4) additional 208v15A outlets shall be provided as indicated in the plans.

A 100A 208v 3wire service panel from the existing back up generator located in the lower level of the garage shall be provided. In addition, the motor driving the roof mounted exhaust fan shall be placed on emergency backup.

Tenant shall share the cost of maintenance and repairs of the back up generator with any other tenants who are also connected to it.

All electrical power, natural gas and water to the tenant's premises and equipment will be separately metered and read monthly by the landlord for reimbursement by the tenant. All electrical circuits will be labeled via labels at the outlet, junction box, safety switch, or other corresponding electrical equipment and a corresponding label on the electrical panel indicating the appropriate circuit breaker.

CO2 Piping: Piping for tenants CO2 shall be brought to the premises from tenant's existing service located on the 4th floor. Gas regulators, if required, shall be provided by the tenant.

Existing vacuum air will be provided from the building system to existing turrets **and three biosafety cabinets.**

All new CO2 and vacuum piping shall consist of copper type 'L' with braised connections.

Fire Protection: Fire protection will be added as needed and required by Massachusetts Building Code, NFPA and local Fire Officials.

Dimension Therapeutics or their designee will have access to the space during renovation to inspect the progress and that the work being done conforms to this scope.

Work included in this scope will comply with both the Massachusetts Building Code and NFPA.

Drawings included in this scope of work are diagrammatic in nature. All pre-existing construction and new construction will be reviewed by the landlord's architect and engineer to insure indicated changes are made in accordance with Massachusetts Building Code and the NFPA. Stamped architectural and engineering drawings will be provided along with a "one line" electrical diagram indicating the power feed from the street into the tenant space.

All components of Lessor's Work will be completed in accordance with all applicable laws, rules and regulations, including but not limited to the latest requirements of NFPA, ANSI Standards, ASHRAE Standards, National Electrical Code, Massachusetts State Building Code, and regulations of the City of Cambridge. Lessor shall deliver the Expansion Space with the base Building systems serving the same and with Lessee's specific mechanical, electrical and plumbing systems as required in Lessor's Scope of Work (i.e. Exhibit A hereto), in good operating condition and repair, and suitable for their intended uses. All utilities for the Expansion Space shall be in place and separately metered. The

Building and the Expansion Space as delivered to the Lessee will be compliant with the Americans with Disabilities Act; NFPA compliant pursuant to the Massachusetts State Building Code; and with code compliant demising walls and common area corridors. Lessor shall provide Lessee with the environmental close-out report prepared by the former tenant for the Expansion Space, and said report shall not disclose any conditions as would materially impair Lessee's use of the Expansion Space. Subject to the foregoing, Lessor shall not be responsible for any other design or construction work with respect to either the Existing Premises under the Existing Lease, or the Expansion Space.

Dimension Added Costs 10/17/14

DIMENSION THERAPEUTICS
FLOOR 2
Additional Costs

Additional HEPA filters 8@ $350	$2,800	
Additional sink, eyewash & plumbing for autoclave area	$7,500	
Additional cabinetry for autoclave area	$2,500	
Additional water line and floor drain for autoclave/ice machine	$3,500	
Additional hw heater for lab sinks w/electric	$3,000	
Additional 3ton supplemental ac unit to provide ac not provided by house perimeter system designed by bldg engineer on original plan	$15,000	
Relocate door into BL2 lab #104	$750	
Place exhaust fan on backup power	$2,500	
Increase chip tank from 35 (code required) to 55 gallon plus 6 additional bags of limestone chips	$375	
Added engineering cost to redesign mech systems	$1,000	
Additional wall with 3 glass panels at entry to administrative area	$3,000	
Add 4 208v outlets in labs	$2,000	
Add copper water line in kitchenette	$500	
Add approx. 150sft vinyl floor at kitchenette	$500	
EXTRA COSTS	$44,925	
Credit for not building 5 offices (resusing doors, glass & hardware)	($17,500)	
ADDITIONAL COST		$ 27,425
AGREED UPON DUE FROM TENANT		**$ 20,000**

EXHIBIT D

NON-DISTURBANCE, ATTORNMENT AND SUBORDINATION AGREEMENT

THIS NON-DISTURBANCE, ATTORNMENT AND SUBORDINATION AGREEMENT (this "Agreement") is made and entered into as of this day of , 2014, by and among SANTANDER BANK, N.A. (hereinafter called the "Agent"), as administrative agent on behalf of itself and certain lenders (collectively, the "Lenders"), having an address at 75 State Street, Boston, Massachusetts 02109, a corporation (hereinafter called the "Tenant"), having an address at 840 Memorial Drive, Cambridge, MA 02139, and RIVERTECH ASSOCIATES II, LLC, a Massachusetts limited liability company (hereinafter called the "Landlord"), having an address at 575 Boylston Street, c/o The Abbey Group, Boston, Massachusetts 02116.

W I T N E S S E T H:

WHEREAS, Landlord owns certain real property commonly known as Riverside Technology Center located at 840 Memorial Drive, Cambridge, Massachusetts and more particularly described in Exhibit A attached hereto and made a part hereof (said property being hereinafter called the "Property"); and

WHEREAS, Landlord (or Landlord's predecessor interest) made and entered into that certain Lease. dated the 10th day of June, 2011, with respect to certain premises constituting a portion of the Property therein described (said Lease, as the same may be amended, restated or otherwise modified from time to time, hereinafter called the "Lease". and said premises hereinafter called the "Leased Premises"); and

WHEREAS, Landlord has entered into and delivered that certain Mortgage and Security Agreement in favor of Agent on behalf of Lenders and recorded, or to be recorded, with the Middlesex County Registry of Deeds (said Mortgage and Security Agreement, as the same may be amended, restated or otherwise modified from time to time, being hereinafter called the "Mortgage"), to secure the payment of a certain loan made by Lenders to Landlord (the "Loan"); and

WHEREAS, Landlord has entered into and delivered that certain Assignment of Leases and Rents in favor of Agent on behalf of Lenders and recorded, or to be recorded, with the Middlesex County Registry of Deeds (said Assignment of Leases and Rents, as the same may be amended, restated or otherwise modified from time to time, being hereinafter called the "Assignment of Rents"), assigning all of Landlord's right, title and interest as lessor under the Lease to further secure the Loan; and

WHEREAS, the parties hereto desire to enter into this Agreement;

NOW, THEREFORE, for and in consideration of the mutual covenants hereinafter set forth and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Agent, Tenant, and Landlord each hereby covenants and agrees as follows:

1. Estoppel. Tenant hereby certifies to Agent that (i) the Lease, as described above, is the true, correct and complete Lease, and has not been modified or amended and constitutes the entire agreement between Landlord and Tenant, and (ii) as far as is known to Tenant, there are no defaults of Landlord under the Lease and there are no existing circumstances which with the passage of time, or giving of notice, or both, would give rise to a default under the Lease and/or allow Tenant to terminate the Lease.

2. Non-Disturbance. So long as no default exists, nor any event has occurred which has continued to exist for such period of time (after notice, if any, required by the Lease) as would entitle the lessor under the Lease to terminate the Lease or would cause, without any further action on the part of such lessor, the termination of the Lease or would entitle such lessor to dispossess the lessee thereunder, the Lease shall not be terminated, nor shall such lessee's use, possession or enjoyment of the Leased Premises or rights under the Lease be interfered with in any foreclosure or other action or proceeding in the nature of foreclosure instituted under or in connection with the Mortgage or in the event that Agent takes possession of the Property pursuant to any provisions of the Mortgage or the Assignment of Rents, unless the lessor under the Lease would have had such right if the Mortgage or the Assignment of Rents had not been made, except that neither the person or entity acquiring the interest of the lessor under the Lease as a result of any such action or proceeding or deed in lieu of any such action or proceeding (hereinafter called the "Purchaser") nor Agent if Agent takes possession of the Property shall be (a) liable for any act or omission of any prior landlord (including the Landlord); or (b) liable for or incur any obligation with respect to the construction of the Property or any improvements of the Leased Premises or the Property, including, without limitation, the payment of any construction allowance pursuant to the Lease; or (c) subject to any offsets or defenses which Tenant might have against any prior landlord (including the Landlord); or (d) bound by any rent or additional rent which Tenant might have paid for more than the then current rental period to any prior landlord (including the Landlord); or (e) bound by any amendment or modification of the Lease, made without Agent's prior written consent; (f) except any assignment or sublet permitted under the Lease as to which Landlord's consent is not required, bound by any assignment or sublet, made without Agent's prior written consent; (g) bound by or responsible for any security deposit not actually received by Agent; (h) liable for or incur any obligation with respect to any breach of warranties or representations of any nature under the Lease or otherwise including without limitation any warranties or representations respecting use, compliance with zoning, Landlord's title, Landlord's authority, habitability and/or fitness for any purpose, or possession; (i) liable for consequential damages; or (j) personally liable for any default under the Lease or any covenant or obligation on its part to be performed thereunder as lessor, it being acknowledged and agreed that Tenant's sole remedy in the event of such default shall be to proceed against Purchaser's or Agent's interest in the Property. Notwithstanding anything contained herein to be contrary, Agent shall have absolutely no obligation to perform any of Landlord's construction covenants under the Lease, provided that if Agent shall not perform such covenants in the event of foreclosure or deed in lieu thereof and within a reasonable time following taking of possession by Agent, then Tenant shall have

the right to terminate its obligations under the Lease and to pursue any and all legal remedies it may have against Landlord and any third parties other than Agent.

3. Attornment. Unless the Lease is terminated in accordance with Paragraph 2, if the interests of the lessor under the Lease shall be transferred by reason of the exercise of the power of sale contained in the Mortgage (if applicable), or by any foreclosure or other proceeding for enforcement of the Mortgage, or by deed in lieu of foreclosure or such other proceeding, or if Agent takes possession of the Property pursuant to any provisions of the Mortgage or the Assignment of Rents, the lessee thereunder shall be bound to the Purchaser or Agent, as the case may be, under all of the terms, covenants and conditions of the Lease for the balance of the term thereof and any extensions or renewals thereof which may be effected in accordance with any option therefor in the Lease, with the same force and effect as if the Purchaser or Agent were the lessor under the Lease, and Tenant, as lessee under the Lease, does hereby attorn to the Purchaser and Agent if it takes possession of the Property, as its lessor under the Lease. Such attornment shall be effective and self-operative without the execution of any further instruments upon the succession by Purchaser to the interest of the lessor under the Lease or the taking of possession of the Property by Agent. Nevertheless, Tenant shall, from time to time, execute and deliver such instruments evidencing such attornment as Purchaser or Agent may require. The respective rights and obligations of Purchaser, Agent and of the lessee under the Lease upon such attornment, to the extent of the then remaining balance of the term of the Lease and any such extensions and renewals, shall be and are the same as now set forth in the Lease except as otherwise expressly provided in Paragraph 2.

4. Subordination. Subject to the other terms of this Agreement, Tenant hereby subordinates all of its right, title and interest as lessee under the Lease to the right, title and interest of Agent under the Mortgage, and Tenant further agrees that the Lease now is and shall at all times continue to be subject and subordinate in each and every respect to the Mortgage and to any and all increases, renewals, modifications, extensions, substitutions, replacements and/or consolidations of the Mortgage.

5. Assignment of Rents. Tenant hereby acknowledges that all of Landlord's right, title and interest as lessor under the Lease is being duly assigned to Agent pursuant to the terms of the Mortgage and the Assignment of Rents, and that pursuant to the terms thereof all rental payments under the Lease shall continue to be paid to Landlord in accordance with the terms of the Lease unless and until Tenant is otherwise notified in writing by Agent. Upon receipt of any such written notice from Agent, Tenant covenants and agrees to make payment of all rental payments then due or to become due under the Lease directly to Agent or to Agent's agent designated in such notice and to continue to do so until otherwise notified in writing by Agent. Landlord hereby irrevocably directs and authorizes Tenant to make rental payments directly to Agent following receipt of such notice, and Landlord covenants and agrees that Tenant shall have the right to rely on such notice without any obligation to inquire as to whether any default exists under the Mortgage or the Assignment of Rents or the indebtedness secured thereby, and notwithstanding any notice or claim of Landlord to the contrary, and that Landlord shall

have no right or claim against Tenant for or by reason of any rental payments made by Tenant to Agent following receipt of such notice. Tenant further acknowledges and agrees: (a) that under the provisions of the Mortgage and/or the Assignment of Rents, the Lease cannot be terminated (nor can Landlord accept any surrender of the Lease) or modified in any of its terms, or consent be given to the waiver or release of Tenant from the performance or observance of any obligation under the Lease, without the prior written consent of Agent, and without such consent no rent may be collected or accepted by Landlord more than one month in advance; and (b) that the interest of Landlord as lessor under the Lease has been assigned to Agent for the purposes specified in the Mortgage and the Assignment of Rents, and Agent assumes no duty, liability or obligation under the Lease, except only under the circumstances, terms and conditions specifically set forth in the Mortgage and/or the Assignment of Rents.

6. Notice of Default by Lessor. Tenant, as lessee under the Lease, hereby covenants and agrees to give Agent written notice properly specifying wherein the lessor under the Lease has failed to perform any of the covenants or obligations of the lessor under the Lease, simultaneously with the giving of any notice of such default to the lessor under the provisions of the Lease, Tenant agrees that Agent shall have the right, but not the obligation, within thirty (30) days after receipt by Agent of such notice (or within such additional time as is reasonably required to correct any such default) to correct or remedy, or cause to be corrected or remedied, each such default before the lessee under the Lease may take any action under the Lease by reason of such default. Such notices to Agent shall be delivered in duplicate to:

SANTANDER BANK, N.A.
75 State Street
Mail Code: MA1 SST 0412
Boston, Massachusetts 02109
Attention: John Everly
Telephone: 617-346-7297

With a copy to:

RIEMER & BRAUNSTEIN LLP
Three Center Plaza
Boston, MA 02108
Attention: Kevin J. Lyons, Esq.
Telephone: 617-880-3433

or to such other address as the Agent shall have designated to Tenant by giving written notice to Tenant at 840 Memorial Drive, Cambridge, MA 02139, Attention: Patrick Beattie, or to such other address as may be designated by written notice from Tenant to Agent.

7. No Further Subordination. Except as expressly provided to the contrary in Paragraph 4 hereof, Landlord and Tenant covenant and agree with Agent that there shall be no further subordination of the interest of lessee under the Lease to any lender or to any other party without first obtaining the prior written consent of Agent. Any attempt to effect a further subordination of lessee's interest under the Lease without first obtaining the prior written consent of Agent shall be null and void.

8. As to Landlord and Tenant. As between Landlord and Tenant, Landlord and Tenant covenant and agree that nothing contained herein nor anything done pursuant to the provisions hereof shall be deemed or construed to modify the Lease.

9. As to Landlord and Agent. As between Landlord and Agent, Landlord and Agent covenant and agree that nothing contained herein nor anything done pursuant to the provisions hereof shall be deemed or construed to modify the Mortgage or the Assignment of Rents.

10. Title of Paragraphs. The titles of the paragraphs of this Agreement are for convenience and reference only, and the words contained therein shall in no way be held to explain, modify, amplify or aid in the interpretation, construction or meaning of the provisions of this Agreement.

11. Governing Law. This Agreement shall be governed by and construed in accordance with the laws of the Commonwealth of Massachusetts.

12. Provisions Binding. The terms and provisions hereof shall be binding upon and shall inure to the benefit of the heirs, executors, administrators, successors and permitted assigns, respectively, of Agent, Tenant and Landlord. The reference contained to successors and assigns of Tenant is not intended to constitute and does not constitute consent by Landlord or Agent to an assignment by Tenant, but has reference only to those instances in which the lessor under the Lease and Agent shall have given written consent to a particular assignment by Tenant thereunder.

[Signature page to follow]

IN WITNESS WHEREOF, the parties have hereunto set their respective hands and seals as of the day, month and year first above written.

AGENT:

SANTANDER BANK, N.A., as Agent on behalf of Lenders

By: _____
Name: John Everly
Title: Senior Vice President

STATE OF _____)
) ss.:
COUNTY OF _____)

On the day of in the year 2014, before me, the undersigned, a notary public in and for said state, personally appeared John Everly, personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his capacity, and that by his signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

_____
Notary Public

My Commission Expires:

TENANT:

STATE OF

COUNTY OF

On the day of in the year 2014, before me, the undersigned, a notary public in and for said state, personally appeared personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his capacity, and that by his signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

Notary Public

My Commission Expires:

LANDLORD:

RIVERTECH ASSOCIATES II, LLC, a Massachusetts limited liability company

By: _____
Name:
Title:

STATE OF _____)
) ss.:
COUNTY OF _____)

On the day of in the year 2014, before me, the undersigned, a notary public in and for said state, personally appeared , personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his capacity, and that by his signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

_____
Notary Public

My Commission Expires:

_____

EXHIBIT A

Property Legal Description

The land and the buildings thereon known as 840 Memorial Drive (a/k/a 18 Blackstone Street) situated in Cambridge, Middlesex County, Massachusetts, more particularly described as follows:

WESTERLY: by the Easterly line of Memorial Drive (formerly Charles River Road) twenty six and 21/100 feet;

NORTHERLY: by the Southerly line of said Road, three and 96/100 feet;

WESTERLY: by the Easterly line of said Road, one hundred twenty six and 59/100 feet;

NORTHERLY: by the Southerly line of Albro Street, three hundred thirty two and 31/100 feet;

EASTERLY: by the Westerly line of Blackstone Street, one hundred and fifty three feet; and

SOUTHERLY: by lot 2 as shown on plan hereinafter mentioned, three hundred fifty one and 45/100 feet.

Said parcel is shown as Lot 1 on the plan filed as Plan No. 8817C, with Certificate 154579 in Book 903, Page 29 of the Middlesex South Registry District of the Land Court.

Containing an area of 52,062 square feet.

The above described land is subject to and has the benefit of the provisions of an indenture dated September 20, 1922, recorded in Book 4564, Page 561, affected by Releases, filed as Document Nos. 598776 and 598777.

RIVERSIDE TECHNOLOGY CENTER

SECOND LEASE AMENDMENT

TO THE LEASE BETWEEN

RIVERTECH ASSOCIATES II, LLC AND DIMENSION THERAPEUTICS, INC.

This Second Lease Amendment (the "Second Amendment") entered into this 28th day of April, 2017 by and between **Rivertech Associates II, LLC,** a Massachusetts limited liability company with a principal address c/o The Abbey Group, 177 Huntington Avenue 24th Floor Boston, MA 02115 (herein the "Lessor"), and **Dimension Therapeutics, Inc.,** with a business address at 840 Memorial Drive Cambridge, Massachusetts (herein the "Lessee"); with respect to a certain Lease dated March 11, 2014 (the "Original Lease") for certain office and laboratory space in the building at 840 Memorial Drive Cambridge, Massachusetts, as amended by a certain First Lease Amendment dated October 22, 2014 (the "First Amendment"); collectively referred to herein as the "Existing Lease").

WHEREAS, Lessor and Lessee are the current parties to the Existing Lease; and,

WHEREAS, the current term under the Existing Lease is set to expire on January 31, 2018 (the "Current Term Expiration Date"); and,

WHEREAS, under the Existing Lease the Lessee leases and occupies approximately 14,949 rentable square feet of space in the Building, consisting of approximately 8,110 rentable square feet of space on the fourth floor of the Building, and approximately 6,839 rentable square feet of space on the second floor of the Building, (the " Existing Premises"); and,

WHEREAS, Lessor and Lessee seek by this current agreement to extend the Term of the lease and tenancy for one (1) additional period of two (2) years from the Current Term Expiration Date;

THEREFORE, in consideration of One ($1.00) Dollar and the other good and valuable consideration recited herein, effective and irrevocable as of the date hereof the Lessor and Lessee hereby agree as follows:

1. Modification to Existing Lease / Extension of Current Term

Lessee hereby extends its tenancy as to the Existing Premises for a twenty four (24) month period (the "Extended Term") from the Current Term Expiration Date through January 31, 2020 (the "Modified Term Termination Date").

2. Terms and Conditions

Lessee shall continue to lease the Existing Premises up to the Modified Term Termination Date, on the same terms and conditions of the Existing Lease with exception only for those provisions as to which Lessor and Lessee have already performed their obligations as of the date hereof (for example, Lessor has heretofore delivered the Existing Premises and Lessee has accepted the same).

The Existing Premises is leased in the same "AS/IS" condition as it is as of the execution of this Second Amendment, and Lessee acknowledges Lessor is under no obligation to make any improvements or modifications thereto, in any manner whatsoever.

Lessor and Lessee each acknowledge that to the best of the respective knowledge of each, there are no material defaults by either party presently existing under the Existing Lease.

3. Condition of Existing Premises

The Existing Premises shall be leased for the Extended Term in its "AS/IS" condition, in all respects, without any representations or warranties by Lessor of any kind or nature, except as otherwise currently exist in the Lease.

4. Annual Base Rent / Additional Rent / Security Deposit

A. Annual Base Rent

Annual Base Rent for the balance of the current Term up to the Current Term Expiration Date shall be as set forth in the Existing Lease.

Annual Base Rent for the Extended Term, commencing as of February 1, 2018, shall be as follows:

Extended Term Lease Year	Annual Base Rent	Monthly Installment
February 1, 2018 – January 31, 2019	$ 956,736.00	$ 79,728.00
February 1, 2019 – January 31, 2020	$ 986,634.00	$ 82,219.50

B. Additional Rent

In addition to Annual Base Rent, Lessee shall continue to be responsible to pay all Additional Rent, inclusive of "Additional Rent (Operating Expenses)" under Section 3 of the Existing Lease, and all "Additional Rent (Taxes)" under Section 4 thereof, as invoiced by Lessor up through the Extended Term Termination Date.

As the concept is used in the Lease to compute Additional Rent Lessee's allocable pro rata share ("Allocable Percentage") shall be as last stated under the First Amendment (i.e. a combined 11.54%).

C. Rent Payment and other Costs and Expenses

Determination and payment of all Annual Base Rent, Additional Rent and other sums due as Rent shall be payable and in all other respects shall be governed during the remainder of the current Term, and for the Extended Term, as contemplated under the Existing Lease, except to the extent modified and supplemented herein.

D. Security Deposit

The Security Deposit currently held by the Lessor shall continue to be held by Lessor as a Security Deposit during the Extended Term.

5. Permitted Uses

The Permitted Uses in the Basic Data of the Original Lease, and all conditions attached thereto, are hereby restated and affirmed and shall continue to govern the use and occupancy of the Existing Premises through to the end of the Extended Term (as it may be further extended hereunder).

6. Parking

Lessee shall have the right to continue to access twenty two (22) parking spaces (i.e. its currently permitted allocation) during the Extended Term (as it may be further extended hereunder), on the terms and conditions set forth in the First Amendment.

7. Brokers

The parties hereby agree there are no brokerage or other third-party fees or costs involved in this transaction other than to Transwestern RBJ, and each agrees to indemnify, defend and hold harmless the other from and against any other claims for brokerage fees, commissions or other such payments arising from this transaction. Commissions/fees owing to Transwestern RBJ from this transaction shall be paid by Lessor pursuant to a separate agreement between Lessor and said company.

8. Lessee's Further Option to Extend

Lessee, provided there is not then any existing default by Lessee under the Lease (beyond applicable notice grace and cure periods), and further provided there have not been any prior material defaults (beyond applicable notice, grace and cure periods) more than twice in any twelve (12) month period, shall have the option to further extend the Term of the Lease as to the Existing Premises (inclusive of any ROFO Space as may have been elected by Lessee under the provisions of the First Amendment). If timely elected the extension shall be for one (1) additional period of sixty (60) months (herein, the "Additional Term Extension Period") beginning as of the end of the Extended Term, at the then-current "Market Rent", including annual escalations thereon for each year of the Additional Term Extension Period (based on increases in the Consumer Price Index or fixed increases as the case may be as determined by then-prevailing market forces; but no less than an amount equal to the Annual Base Rent per square foot as of the final full

month of the last Lease Year of the Extended Term (the "Extension Rent Floor"),) Said Additional Term Extension Period shall commence, subject to proper exercise of Lessee's option hereunder, at the end of the Extended Term (i.e. on February 1, 2020) and shall terminate on that date which is sixty (60) consecutive months thereafter (i.e. January 31, 2025).

Lessee shall exercise its option by delivering to Lessor its written notice of said exercise not later than nine (9) full months (but not sooner than twelve (12) full months) prior to the end of the Extended Term. Once delivered, written notice to extend is irrevocable. Time is of the essence in the exercise of Lessee's rights as set forth above.

"Market Rent" as used herein, shall be that rent charged for comparable research laboratory and office space of similar age and condition in laboratory buildings the mid-Cambridge submarket as of the end of the Extended Term. If, after good faith attempts prior to the expiration of the original Term, the Lessor and Lessee cannot agree on a figure representing Market Rent, then either party, upon written notice to the other, may request appraisal and arbitration of the issue as provided in this section. Within fourteen (14) days of the request for arbitration, each party shall submit to the other the name of one unrelated individual or entity with proven expertise in the leasing of commercial real estate in Cambridge to serve as that party's appraiser. Each appraiser shall be paid by the party selecting him or it. The two appraisers shall each submit their final reports to the parties within thirty (30) days of their selection making their determination as to Market Rent (subject however, to the Extension Rent Floor). The two appraisers shall meet within the next fourteen (14) days to reconcile their reports and collaboratively determine the Market Rent. They shall each make their determination in writing (subject however, to the Extension Rent Floor), including a statement if such is the case, that they are at an impasse. Such a statement of impasse shall be submitted to the parties along with the Market Rent figure which each appraiser has selected and his reasons and substantiation therefor. The appraisers, in case of an impasse, shall also agree on one unrelated individual or entity with expertise in commercial real estate in Cambridge who shall evaluate the reports of the two original appraisers and, within fourteen (14) days of submission of the issue to him, make his own determination as to a figure representing Market Rent (subject however, to the Extension Rent Floor). The determination of this individual or entity (i.e. arbitrator) absent, fraud, bias or undue prejudice shall be binding upon the parties.

Annual Base Rent and Additional Rent during any Additional Term Extension Period shall be payable in advance, in equal monthly installments on the first day of each calendar month.

Lessee, in addition to the sums payable annually to Lessor as Annual Base Rent, shall pay to Lessor for each year of the Additional Term Extension Period, as Additional Rent, Lessee's Allocable Percentage for Operating Expenses, Real Estate Taxes and utilities as contemplated in Section 4 hereof.

9. Integration of Documents; Supremacy

This Second Amendment contains the full understanding and agreement between the parties with respect to the subject matter hereof. The parties hereto intend that this Second Amendment operates to amend and modify the Existing Lease in the manner stated herein, and that the Existing Lease and this Second Amendment shall be interpreted conjunctively; with any express conflict between the three to be resolved in favor of the stated terms of this Second Amendment. Except as modified hereby, all other terms and conditions of the Existing Lease shall remain unchanged and enforceable in a manner consistent with this Second Amendment.

This Agreement shall be governed by the laws of the Commonwealth of Massachusetts. Any provisions deemed unenforceable shall be severable, and the remainder of this Second Amendment and the Existing Lease shall be enforceable in accordance with their terms.

[Signature Pages Follow]

Executed as of the date first written above.

LESSOR

RIVERTECH ASSOCIATES II, LLC

By: /s/ David Epstein

its duly authorized Manager

LESSEE

DIMENSION THERAPEUTICS, INC.

By: /s/ Annalisa Jenkins MBBS, FRCP

its duly authorized President

By /s/ Jean Franchi

Its duly authorized Treasurer

LEASE AGREEMENT

THIS LEASE AGREEMENT (this "**Lease**") is made this 2nd day of November, 2015, between **ARE-MA REGION NO. 20, LLC**, a Delaware limited liability company ("**Landlord**"), and **DIMENSION THERAPEUTICS, INC.**, a Delaware corporation ("**Tenant**").

Building:	19 Presidential Way, Woburn, Massachusetts
Premises:	That portion of the Building, consisting of (i) approximately 17,475 rentable square feet of laboratory/office space on the second floor of the Building, and (ii) approximately 108 rentable square feet of storage space on the first floor of the Building, all as determined by Landlord, as shown on **Exhibit A**.
Project:	The real property on which the Building in which the Premises are located, together with all improvements thereon and appurtenances thereto as described on **Exhibit B**.
Base Rent:	$26.00 per rentable square foot of the Premises per annum, subject to adjustment pursuant to Section 4 hereof.
Rentable Area of Premises:	17,583 sq. ft., subject to adjustment pursuant to Section 5
Rentable Area of Project:	144,892 sq. ft.
Tenant's Share of Operating Expenses:	12.14%
Security Deposit:	$114,289.50
Target Commencement Date:	April 1, 2016; provided, however, that the Target Commencement Date shall be delayed 1 day for each day after November 4, 2015, that this Lease has not been mutually executed and delivered by the parties
Rent Adjustment Amount:	$1.00 per rentable square foot of the Premises per year
Base Term:	Beginning on the Commencement Date and ending 60 months from the first day of the first full month commencing on or after the Commencement Date.
Permitted Use:	With respect to the laboratory/office portion of the Premises, research and development laboratory, related office and other related uses consistent with the character of the Project and otherwise in compliance with the provisions of Section 7 hereof. With respect to the storage area portion of the Premises, the storage of flammable materials of Tenant in compliance with the provision of Section 7.

Address for Rent Payment:
P. O. Box 975383
Dallas, TX 75397-5383

Landlord's Notice Address:
385 E. Colorado Boulevard, Suite 299
Pasadena, CA 91101
Attention: Corporate Secretary

Tenant's Notice Address:
19 Presidential Way, Suite 202
Woburn, MA 01801
Attention: Lease Administrator

The following Exhibits and Addenda are attached hereto and incorporated herein by this reference:

[X] **EXHIBIT A** - PREMISES DESCRIPTION
[X] **EXHIBIT B** - DESCRIPTION OF PROJECT
[X] **EXHIBIT C** - WORK LETTER
[X] **EXHIBIT D** - COMMENCEMENT DATE
[X] **EXHIBIT E** - RULES AND REGULATIONS
[X] **EXHIBIT F** - TENANT'S PERSONAL PROPERTY
[X] **EXHIBIT G** - STORAGE AREA

1. **Lease of Premises**. Upon and subject to all of the terms and conditions hereof, Landlord hereby leases the Premises to Tenant and Tenant hereby leases the Premises from Landlord. The portions of the Project which are for the non-exclusive use of tenants of the Project are collectively referred to herein as the "**Common Areas**." The Common Areas shall include, without limitation, all common lobbies, entrances, stairs, elevators, restrooms, walkways, sidewalks, loading areas and recreation areas located at the Project. Tenant shall have the non-exclusive right to use the Common Areas. Landlord reserves the right to modify Common Areas, provided that such modifications do not materially adversely affect Tenant's use of or access to the Premises for the Permitted Use. From and after the Commencement Date through the expiration of the Term, Tenant shall have access to the Building and the Premises 24 hours a day, 7 days a week, except in the case of emergencies, as the result of Legal Requirements, the performance by Landlord of any installation, maintenance or repairs, or any other temporary interruptions, and otherwise subject to the terms of this Lease.

2. **Delivery; Acceptance of Premises; Commencement Date**. Landlord shall use reasonable efforts to deliver the Premises to Tenant on or before the Target Commencement Date, with Landlord's Work Substantially Completed ("**Delivery**" or "**Deliver**"). If Landlord fails to Deliver the Premises on or before the Target Commencement Date, Landlord shall not be liable to Tenant for any loss or damage resulting therefrom, and this Lease shall not be void or voidable except as provided herein. Notwithstanding anything to the contrary contained herein, if Landlord fails to Deliver the Premises to Tenant (i) on or before the date that is 30 days after the Target Commencement Date (as such date may be extended for Force Majeure delays and Tenant Delays) ("**Initial Abatement Date**"), Base Rent shall be abated 1 day for each day after the Initial Abatement Date (as such date may be extended for Force Majeure delays and Tenant Delays) that Landlord fails to Deliver the Premises to Tenant, and (ii) on or before the date that is 60 days after the Target Commencement Date (as such date may be extended for Force Majeure delays and Tenant Delays) ("**Second Abatement Date**"), Base Rent shall be abated 2 days for each day after the Second Abatement Date (as such date may be extended for Force Majeure delays and Tenant Delays) that Landlord fails to Deliver the Premises to Tenant. If Landlord does not Deliver the Premises within 120 days of the Target Commencement Date for any reason other than Force Majeure delays and Tenant Delays, this Lease may be terminated by Tenant by written notice to Landlord, and if so terminated by Tenant: (a) the Security Deposit, or any balance thereof (i.e., after deducting therefrom all amounts to which Landlord is entitled under the provisions of this Lease), shall be returned to Tenant, and (b) neither Landlord nor Tenant shall have any further rights, duties or obligations under this Lease, except with respect to provisions which expressly survive termination of this Lease. As used herein, the terms "**Landlord's Work**," "**Tenant Delays**" and "**Substantially Completed**" shall have the meanings set forth for such terms in the Work Letter. If Tenant does not elect to terminate this Lease within 5 business days of the lapse of such 120 day period, such right to terminate this Lease shall be waived and this Lease shall remain in full force and effect.

The "**Commencement Date**" shall be the earliest of: (i) the date Landlord Delivers the Premises to Tenant; (ii) the date Landlord could have Delivered the Premises but for Tenant Delays; and (iii) the date Tenant conducts any business in the Premises or any part thereof. Upon request of Landlord, Tenant shall execute and deliver a written acknowledgment of the Commencement Date and the expiration date of the Term when such are established in the form of the "Acknowledgement of Commencement Date" attached to this Lease as **Exhibit D**; provided, however, Tenant's failure to execute and deliver such acknowledgment shall not affect Landlord's rights hereunder. The "**Term**" of this Lease shall be the Base Term, as defined above on the first page of this Lease and any Extension Term which Tenant may elect pursuant to Section 39 hereof.

Subject to the provisions of Section 6 of the Work Letter, Landlord shall permit Tenant access to the Premises for a period of 30 days prior to the Commencement Date for Tenant's installation and setup of furniture, fixtures, tele/data cabling and equipment ("**FF&E Installation**"), provided that such FF&E Installation is coordinated with Landlord, and Tenant complies with the Lease and all other reasonable restrictions and conditions Landlord may impose. All such access shall be during normal business hours. Any access to the Premises by Tenant before the Commencement Date shall be subject to all of the terms and conditions of this Lease, excluding the obligation to pay Base Rent or Operating Expenses.

Except as set forth in the Work Letter: (i) Tenant shall accept the Premises in their condition as of the Commencement Date, subject to all applicable Legal Requirements (as defined in Section 7 hereof); (ii) Landlord shall have no obligation for any defects in the Premises; and (iii) Tenant's taking possession of the Premises shall be conclusive evidence that Tenant accepts the Premises and that the Premises were in good condition at the time possession was taken.

For the period of 30 consecutive days after the Commencement Date, Landlord shall, at its sole cost and expense (which shall not constitute an Operating Expense), be responsible for any repairs that are required to be made to the Building or Building Systems

(as defined in Section 13), unless Tenant or any Tenant Party was responsible for the cause of such repair, in which case Tenant shall pay the cost.

Tenant agrees and acknowledges that neither Landlord nor any agent of Landlord has made any representation or warranty with respect to the condition of all or any portion of the Premises or the Project, and/or the suitability of the Premises or the Project for the conduct of Tenant's business, and Tenant waives any implied warranty that the Premises or the Project are suitable for the Permitted Use. This Lease constitutes the complete agreement of Landlord and Tenant with respect to the subject matter hereof and supersedes any and all prior representations, inducements, promises, agreements, understandings and negotiations which are not contained herein. Landlord in executing this Lease does so in reliance upon Tenant's representations, warranties, acknowledgments and agreements contained herein.

3. **Rent**.

(a) **Base Rent**. The Security Deposit shall be due and payable on delivery to Landlord of an executed original of this Lease executed by Tenant. The first month's Base Rent shall be due and payable on February 15, 2016. Tenant shall pay to Landlord in advance, without demand, abatement, deduction or set-off, equal monthly installments of Base Rent on or before the first day of each calendar month during the Term hereof, in lawful money of the United States of America, at the office of Landlord for payment of Rent set forth above, or to such other person or at such other place as Landlord may from time to time designate in writing. Payments of Base Rent for any fractional calendar month shall be prorated. The obligation of Tenant to pay Base Rent and other sums to Landlord and the obligations of Landlord under this Lease are independent obligations. Tenant shall have no right at any time to abate, reduce, or set-off any Rent (as defined in Section 5) due hereunder except for any abatement as may be expressly provided in this Lease.

(b) **Additional Rent**. In addition to Base Rent, Tenant agrees to pay to Landlord as additional rent ("**Additional Rent**"): (i) Tenant's Share of "Operating Expenses" (as defined in Section 5), and (ii) any and all other amounts Tenant assumes or agrees to pay under the provisions of this Lease, including, without limitation, any and all other sums that may become due by reason of any default of Tenant or failure to comply with the agreements, terms, covenants and conditions of this Lease to be performed by Tenant, after any applicable notice and cure period.

4. **Base Rent Adjustments**.

(a) **Annual Adjustments**. Base Rent shall be increased on each annual anniversary of the first day of the first full month following the Commencement Date (each an "**Adjustment Date**") by adding the Rent Adjustment Amount to the per square foot Base Rent payable for the Premises per annum immediately before such Adjustment Date. Base Rent, as so adjusted, shall thereafter be due as provided herein. Base Rent adjustments for any fractional calendar month shall be prorated.

(b) **Additional TI Allowance**. In addition to the Tenant Improvement Allowance (as defined in the Work Letter), Landlord shall, subject to the terms of the Work Letter, make available to Tenant the Additional Tenant Improvement Allowance (as defined in the Work Letter). Commencing on the Commencement Date and continuing thereafter on the first day of each month during the Base Term, Tenant shall pay the amount necessary to fully amortize the portion of the Additional Tenant Improvement Allowance actually funded by Landlord, if any, in equal monthly payments with interest at a rate of 8% per annum over the Base Term, which interest shall begin to accrue on the Commencement Date.

5. **Operating Expense Payments**. Landlord shall deliver to Tenant a written estimate of Operating Expenses for each calendar year during the Term (the "**Annual Estimate**"), which may be revised by Landlord from time to time during such calendar year. During each month of the Term, on the same date that Base Rent is due, Tenant shall pay Landlord an amount equal to 1/12th of Tenant's Share of the Annual Estimate. Payments for any fractional calendar month shall be prorated.

The term "**Operating Expenses**" means all costs and expenses of any kind or description whatsoever incurred or accrued each calendar year by Landlord with respect to the Project (including, without duplication, Taxes (as defined in Section 9), Permitted Capital Repairs and Improvements (as defined below) amortized over the lesser of 10 years and the useful life of such Permitted Capital Repairs and Improvements, transportation services and the costs of Landlord's third party property manager (not to exceed $1.00 per rentable square foot of the Premises per year) or, if there is no third party property manager, administration rent in the amount of $1.00 per rentable square foot of the Premises per year), excluding only:

(a) the original construction costs of the Project and renovation prior to the date of the Lease and costs of correcting defects in such original construction or renovation;

(b) capital expenditures except for capital expenditures (i) which are required in order to comply with Legal Requirements; (ii) which are intended to reduce Operating Expenses or maintain or improve the utility, efficiency or capacity of the Building or any Building Systems, and/or (iii) which are intended to improve safety (collectively, "**Permitted Capital Repairs and Improvements**");

(c) interest, principal payments of Mortgage (as defined in Section 27) debts of Landlord, financing costs and amortization of funds borrowed by Landlord, whether secured or unsecured;

(d) depreciation of the Project (except for capital improvements, the cost of which are includable in Operating Expenses);

(e) advertising, legal and space planning expenses and leasing commissions and other costs and expenses incurred in procuring and leasing space to tenants for the Project, including any leasing office maintained in the Project, free rent and construction allowances for tenants;

(f) legal and other expenses incurred in the negotiation or enforcement of leases;

(g) completing, fixturing, improving, renovating, painting, redecorating or other work, which Landlord pays for or performs for other tenants within their premises, and costs of correcting defects in such work;

(h) costs to be reimbursed by other tenants of the Project or Taxes to be paid directly by Tenant or other tenants of the Project, whether or not actually paid;

(i) salaries, wages, benefits and other compensation paid to officers and employees of Landlord who (x) do not have day to day responsibility for the operating, managing or servicing of the Building or the Project or (y) are above the level of senior vice president, provided that the expense of any personnel not dedicated exclusively to the Building or the Project shall be equitably prorated to reflect time spent on operating, managing or otherwise servicing the Building or the Project vis-a-vis time spent on matters unrelated to operating, managing or otherwise servicing the Building or the Project;

(j) general organizational, administrative and overhead costs relating to maintaining Landlord's existence, either as a corporation, partnership, or other entity, including general corporate, legal and accounting expenses;

(k) costs (including attorneys' fees and costs of settlement, judgments and payments in lieu thereof) incurred in connection with disputes with tenants, other occupants, or prospective tenants, and costs and expenses, including legal fees, incurred in connection with negotiations or disputes with employees, consultants, management agents, leasing agents, purchasers or mortgagees of the Building;

(l) costs incurred by Landlord due to the violation by Landlord, its employees, agents or contractors or any tenant of the terms and conditions of any lease of space in the Project or any Legal Requirement (as defined in Section 7);

(m) penalties, fines or interest incurred as a result of Landlord's inability or failure to make payment of Taxes and/or to file any tax or informational returns when due, or from Landlord's failure to make any payment of Taxes required to be made by Landlord hereunder before delinquency;

(n) overhead and profit increment paid to Landlord or to subsidiaries or affiliates of Landlord for goods and/or services in or to the Project to the extent the same exceeds the costs of such goods and/or services rendered by unaffiliated third parties on a competitive basis;

(o) costs of Landlord's charitable or political contributions, or of fine art maintained at the Project;

(p) costs in connection with services (including electricity), items or other benefits of a type which are not standard for the Project and which are not available to Tenant without specific charges therefor, but which are provided to another tenant or occupant of the Project, whether or not such other tenant or occupant is specifically charged therefor by Landlord;

(q) costs incurred in the sale or refinancing of the Project;

(r) net income taxes of Landlord or the owner of any interest in the Project, franchise, capital stock, gift, estate or inheritance taxes or any federal, state or local documentary taxes imposed against the Project or any portion thereof or interest therein; and

(s) any expenses otherwise includable within Operating Expenses to the extent actually reimbursed by persons other than tenants of the Project under leases for space in the Project.

Within 90 days after the end of each calendar year (or such longer period as may be reasonably required), Landlord shall furnish to Tenant a statement (an "**Annual Statement**") showing in reasonable detail: (a) the total and Tenant's Share of actual Operating Expenses for the previous calendar year, and (b) the total of Tenant's payments in respect of Operating Expenses for such year. If Tenant's Share of actual Operating Expenses for such year exceeds Tenant's payments of Operating Expenses for such year, the excess shall be due and payable by Tenant as Rent within 30 days after delivery of such Annual Statement to Tenant. If Tenant's payments of Operating Expenses for such year exceed Tenant's Share of actual Operating Expenses for such year Landlord shall pay the excess to Tenant within 30 days after delivery of such Annual Statement, except that after the expiration, or earlier termination of the Term or if Tenant is delinquent in its obligation to pay Rent, Landlord shall pay the excess to Tenant after deducting all other amounts due Landlord. Landlord's and Tenant's obligations to pay any overpayments or deficiencies due pursuant to this paragraph shall survive the expiration or earlier termination of this Lease.

The Annual Statement shall be final and binding upon Tenant unless Tenant, within 90 days after Tenant's receipt thereof, shall contest any item therein by giving written notice to Landlord, specifying each item contested and the reason therefor. If, during such 90 day period, Tenant reasonably and in good faith questions or contests the accuracy of Landlord's statement of Tenant's Share of Operating Expenses, Landlord will provide Tenant with access to Landlord's books and records relating to the operation of the Project and such information as Landlord reasonably determines to be responsive to Tenant's questions (the "**Expense Information**"). If after Tenant's review of such Expense Information, Landlord and Tenant cannot agree upon the amount of Tenant's Share of Operating Expenses, then Tenant shall have the right to have an independent regionally recognized public accounting firm selected by Tenant and approved by Landlord (which approval shall not be unreasonably withheld or delayed), working pursuant to a fee arrangement other than a contingent fee (at Tenant's sole cost and expense), audit and/or review the Expense Information for the year in question (the "**Independent Review**"). The results of any such Independent Review shall be binding on Landlord and Tenant. If the Independent Review shows that the payments actually made by Tenant with respect to Operating Expenses for the calendar year in question exceeded Tenant's Share of Operating Expenses for such calendar year, Landlord shall at Landlord's option either (i) credit the excess amount to the next succeeding installments of estimated Operating Expenses or (ii) pay the excess to Tenant within 30 days after delivery of such statement, except that after the expiration or earlier termination of this Lease or if Tenant is delinquent in its obligation to pay Rent, Landlord shall pay the excess to Tenant after deducting all other amounts due Landlord. If the Independent Review shows that Tenant's payments with respect to Operating Expenses for such calendar year were less than Tenant's Share of Operating Expenses for the calendar year, Tenant shall pay the deficiency to Landlord within 30 days after delivery of such statement. If the Independent Review shows that Tenant has overpaid with respect to Operating Expenses by more than 5% then Landlord shall reimburse Tenant for all costs incurred by Tenant for the Independent Review. Operating Expenses for the calendar years in which Tenant's obligation to share therein begins and ends shall be prorated. Notwithstanding anything set forth herein to the contrary, if the Project is not at least 95% occupied on average during any year of the Term, Tenant's Share of Operating Expenses for such year shall be computed as though the Project had been 95% occupied on average during such year.

"**Tenant's Share**" shall be the percentage set forth on the first page of this Lease as Tenant's Share as reasonably adjusted by Landlord for changes in the physical size of the Premises or the Project occurring thereafter. Landlord may equitably increase Tenant's Share for any item of expense or cost reimbursable by Tenant that relates to a repair, replacement, or service that benefits only the Premises or only a portion of the Project that includes the Premises or that varies with occupancy or use. Base Rent, Tenant's Share of Operating Expenses and all other amounts payable by Tenant to Landlord hereunder are collectively referred to herein as "**Rent**."

6. **Security Deposit**. Tenant shall deposit with Landlord, upon delivery of an executed copy of this Lease to Landlord, a security deposit (the "**Security Deposit**") for the performance of all of Tenant's obligations hereunder in the amount set forth on page 1 of this Lease, which Security Deposit shall be in the form of an unconditional and irrevocable letter of credit (the "**Letter of Credit**"): (i) in form and substance reasonably satisfactory to Landlord, (ii) naming Landlord as beneficiary, (iii) expressly allowing Landlord to draw upon it at any time from time to time by delivering to the issuer notice that Landlord is entitled to draw thereunder, (iv) issued by an FDIC-insured financial institution satisfactory to Landlord, and (v) redeemable by presentation of a sight draft in the Commonwealth of Massachusetts. If Tenant does not provide Landlord with a substitute Letter of Credit complying with all of the requirements hereof at least 10 days before the stated expiration date of any then current Letter of Credit, Landlord shall have the right to draw the full amount of the current Letter of Credit and hold the funds drawn in cash without obligation for interest thereon as the Security Deposit. The Security Deposit shall be held by Landlord as security for the performance of Tenant's obligations under this Lease. The Security Deposit is not an advance rental deposit or a measure of Landlord's damages in case of Tenant's default. Upon each occurrence of a Default (as defined in Section 20), Landlord may use all or any part of the Security Deposit to pay delinquent payments due under this Lease, future rent damages, and the cost of any damage, injury, expense or liability caused by such Default, without prejudice to any other remedy provided herein or provided by law. Landlord's right to use the Security Deposit under this Section 6 includes the right to use the Security Deposit to pay future rent damages following the termination of this Lease pursuant to Section 21(c) below. Upon

any use of all or any portion of the Security Deposit, Tenant shall pay Landlord on demand the amount that will restore the Security Deposit to the amount set forth on Page 1 of this Lease. Tenant hereby waives the provisions of any law, now or hereafter in force which provide that Landlord may claim from a security deposit only those sums reasonably necessary to remedy defaults in the payment of Rent, to repair damage caused by Tenant or to clean the Premises, it being agreed that Landlord may, in addition, claim those sums reasonably necessary to compensate Landlord for any other loss or damage, foreseeable or unforeseeable, caused by the act or omission of Tenant or any officer, employee, agent or invitee of Tenant. Upon bankruptcy or other debtor-creditor proceedings against Tenant, the Security Deposit shall be deemed to be applied first to the payment of Rent and other charges due Landlord for periods prior to the filing of such proceedings. If Tenant shall fully perform every provision of this Lease to be performed by Tenant, the Security Deposit, or any balance thereof (i.e., after deducting therefrom all amounts to which Landlord is entitled under the provisions of this Lease), shall be returned to Tenant (or, at Landlord's option, to the last assignee of Tenant's interest hereunder) within 60 days after the expiration or earlier termination of this Lease.

If Landlord transfers its interest in the Project or this Lease, Landlord shall either (a) transfer any Security Deposit then held by Landlord to a person or entity assuming Landlord's obligations under this Section 6, or (b) return to Tenant any Security Deposit then held by Landlord and remaining after the deductions permitted herein. Upon such transfer to such transferee or the return of the Security Deposit to Tenant, Landlord shall have no further obligation with respect to the Security Deposit, and Tenant's right to the return of the Security Deposit shall apply solely against Landlord's transferee. The Security Deposit is not an advance rental deposit or a measure of Landlord's damages in case of Tenant's default. Landlord's obligation respecting the Security Deposit is that of a debtor, not a trustee, and no interest shall accrue thereon.

7. **Use**. The Premises shall be used solely for the Permitted Use set forth in the basic lease provisions on page 1 of this Lease, and in compliance with all laws, orders, judgments, ordinances, regulations, codes, directives, permits, licenses, covenants and restrictions now or hereafter applicable to the Premises, and to the use and occupancy thereof, including, without limitation, the Americans With Disabilities Act, 42 U.S.C. § 12101, et seq. (together with the regulations promulgated pursuant thereto, "**ADA**") (collectively, "**Legal Requirements**" and each, a "**Legal Requirement**"). Tenant shall, upon 5 days' written notice from Landlord, discontinue any use of the Premises which is declared by any Governmental Authority (as defined in Section 9) having jurisdiction to be a violation of a Legal Requirement. Tenant will not use or permit the Premises to be used for any purpose or in any manner that would void Tenant's or Landlord's insurance, increase the insurance risk, or cause the disallowance of any sprinkler or other credits. Tenant shall reimburse Landlord promptly upon demand for any additional premium charged for any such insurance policy by reason of Tenant's failure to comply with the provisions of this Section or otherwise caused by Tenant's use and/or occupancy of the Premises. Tenant will use the Premises in a careful, safe and proper manner and will not commit or permit waste, overload the floor or structure of the Premises, subject the Premises to use that would damage the Premises or obstruct or interfere with the rights of Landlord or other tenants or occupants of the Project, including conducting or giving notice of any auction, liquidation, or going out of business sale on the Premises, or using or allowing the Premises to be used for any unlawful purpose. Tenant shall cause any equipment or machinery to be installed in the Premises so as to reasonably prevent sounds or vibrations from the Premises from extending into Common Areas, or other space in the Project. Tenant shall not place any machinery or equipment weighing 500 pounds or more in or upon the Premises or transport or move such items through the Common Areas of the Project or in the Project elevators without the prior written consent of Landlord. Except as may be provided under the Work Letter, Tenant shall not, without the prior written consent of Landlord, use the Premises in any manner which will require ventilation, air exchange, heating, gas, steam, electricity or water beyond the existing capacity of the Project as proportionately allocated to the Premises based upon Tenant's Share as usually furnished for the Permitted Use.

Landlord shall be responsible for the compliance of the Premises and the Common Areas of the Project with Legal Requirements as of the Commencement Date. Following the Commencement Date, Landlord shall, as an Operating Expense (to the extent such Legal Requirement is generally applicable to similar buildings in the area in which the Project is located) and at Tenant's expense (to the extent such Legal Requirement is triggered by reason of Tenant's, as compared to other tenants of the Project, specific use of the Premises or Tenant's Alterations) make any alterations or modifications to the Common Areas or the exterior of the Building that are required by Legal Requirements. Following the Commencement Date, Tenant, at its sole expense, shall make any alterations or modifications to the interior or the exterior of the Premises or the Project that are required by Legal Requirements (including, without limitation, compliance of the Premises with the ADA) related to Tenant's specific use or occupancy of the Premises. Notwithstanding any other provision herein to the contrary, Tenant shall be responsible for any and all demands, claims, liabilities, losses, costs, expenses, actions, causes of action, damages or judgments, and all reasonable expenses incurred in investigating or resisting the same (including, without limitation, reasonable attorneys' fees, charges and disbursements and costs of suit) (collectively, "**Claims**") arising out of or in connection with Legal Requirements related to Tenant's specific use or occupancy of the Premises or Tenant's Alterations, and Tenant shall indemnify, defend, hold and save Landlord harmless from and against any and all Claims arising out of or in connection with any failure of the Premises to comply with any Legal Requirement related to Tenant's specific use or occupancy of the Premises or Tenant's Alterations.

8. **Holding Over**. If, with Landlord's express written consent, Tenant retains possession of the Premises after the termination of the Term, (i) unless otherwise agreed in such written consent, such possession shall be subject to immediate termination by Landlord at any time, (ii) all of the other terms and provisions of this Lease (including, without limitation, the adjustment of Base Rent pursuant to Section 4 hereof) shall remain in full force and effect (excluding any expansion or renewal option or other similar right or option) during such holdover period, (iii) Tenant shall continue to pay Base Rent in the amount payable upon the date of the expiration or earlier termination of this Lease or such other amount as Landlord may indicate, in Landlord's sole and absolute discretion, in such written consent, and (iv) all other payments shall continue under the terms of this Lease. If Tenant remains in possession of the Premises after the expiration or earlier termination of the Term without the express written consent of Landlord, (A) Tenant shall become a tenant at sufferance upon the terms of this Lease except that, following the first 30 days of such holdover, the monthly rental shall be equal to 150% of Rent in effect during the last 30 days of the Term, and (B) Tenant shall be responsible for all damages suffered by Landlord resulting from or occasioned by Tenant's holding over, including consequential damages. No holding over by Tenant, whether with or without consent of Landlord, shall operate to extend this Lease except as otherwise expressly provided, and this Section 8 shall not be construed as consent for Tenant to retain possession of the Premises. Acceptance by Landlord of Rent after the expiration of the Term or earlier termination of this Lease shall not result in a renewal or reinstatement of this Lease.

9. **Taxes**. Landlord shall pay, as part of Operating Expenses, all taxes, levies, fees, assessments and governmental charges of any kind, existing as of the Commencement Date or thereafter enacted with respect to the Project (collectively referred to as "**Taxes**"), imposed by any federal, state, regional, municipal, local or other governmental authority or agency, including, without limitation, quasi-public agencies (collectively, "**Governmental Authority**") during the Term, including, without limitation, all Taxes: (i) imposed on or measured by or based, in whole or in part, on rent payable to (or gross receipts received by) Landlord under this Lease and/or from the rental by Landlord of the Project or any portion thereof, or (ii) based on the square footage, assessed value or other measure or evaluation of any kind of the Premises or the Project, or (iii) assessed or imposed by or on the operation or maintenance of any portion of the Premises or the Project, including parking, or (iv) assessed or imposed by, or at the direction of, or resulting from Legal Requirements, or interpretations thereof, promulgated by any Governmental Authority, or (v) imposed as a license or other fee, charge, tax, or assessment on Landlord's business or occupation of leasing space in the Project. Landlord may contest by appropriate legal proceedings the amount, validity, or application of any Taxes or liens securing Taxes. Taxes shall not include any net income taxes imposed on Landlord or any franchise, capital stock, gift, estate or inheritance taxes or any federal, state or local documentary taxes imposed against the Project or any portion thereof. If any such Tax is levied or assessed directly against Tenant, then Tenant shall be responsible for and shall pay the same at such times and in such manner as the taxing authority shall require. Tenant shall pay, prior to delinquency, any and all Taxes levied or assessed against any personal property or trade fixtures placed by Tenant in the Premises, whether levied or assessed against Landlord or Tenant. If any Taxes on Tenant's personal property or trade fixtures are levied against Landlord or Landlord's property, or if the assessed valuation of the Project is increased by a value attributed by the taxing authority to improvements in or alterations to the Premises, whether owned by Landlord or Tenant and whether or not affixed to the real property so as to become a part thereof, higher than the base valuation on which Landlord from time-to-time allocates Taxes to all tenants in the Project, Landlord shall have the right, but not the obligation, to pay such Taxes. Landlord's determination of any excess assessed valuation shall be binding and conclusive, absent manifest error. The amount of any such payment by Landlord shall constitute Additional Rent due from Tenant to Landlord immediately upon demand.

10. **Parking**. Subject to all matters of record, Force Majeure, a Taking (as defined in Section 19 below) and the exercise by Landlord of its rights hereunder, Tenant shall have the right, at no additional cost, in common with other tenants of the Project pro rata in accordance with the rentable area of the Premises and the rentable areas of the Project occupied by such other tenants (which pro rata share is equal to 3.2 parking spaces per 1,000 rentable square feet of the Premises), to park in those areas designated for non-reserved parking, subject in each case to Landlord's rules and regulations (which rules and regulations shall not be enforced in a discriminatory manner). Landlord may allocate parking spaces among Tenant and other tenants in the Project pro rata as described above if Landlord determines that such parking facilities are becoming crowded. Landlord shall in no event grant rights to other tenants of the Project to use more parking spaces in the surface parking lot than, together with the spaces allocated to Tenant pursuant to this Section 10, are available for use by tenants of the Project in the surface parking lot.

11. **Utilities, Services**.

(a) **General**. Landlord shall provide, subject to the terms of this Section 11, water, electricity, heat, light, power, sewer, compressed air and vacuum systems, HVAC, and other utilities (including gas and fire sprinklers to the extent the Project is plumbed for such services), refuse and trash collection and janitorial services (collectively, "**Utilities**"). Landlord shall pay, as Operating Expenses or subject to Tenant's reimbursement obligation, for all Utilities used on the Premises, all maintenance charges for Utilities, and any storm sewer charges or other similar charges for Utilities imposed by any Governmental Authority or Utility provider, and any taxes, penalties, surcharges or similar charges thereon. The Premises are separately metered to measure Tenant's usage of electricity for lights and plugs in the Premises. Landlord may cause, at Landlord's expense, any other Utilities to be separately metered or charged directly to Tenant by the provider. Tenant shall pay directly to the Utility provider, prior to delinquency, any separately metered Utilities and services which may be furnished to Tenant or the Premises during the Term. Tenant shall pay, as part

of Operating Expenses, its share of all charges for jointly metered Utilities based upon consumption, as reasonably determined by Landlord. No interruption or failure of Utilities, from any cause whatsoever other than Landlord's willful misconduct, shall result in eviction or constructive eviction of Tenant, termination of this Lease or, except as expressly set forth in the immediately following paragraph, the abatement of Rent. Tenant agrees to limit use of water and sewer with respect to Common Areas to normal restroom use.

Notwithstanding anything to the contrary set forth herein, if (i) a stoppage of an Essential Service (as defined below) to the Premises shall occur and such stoppage is due solely to the gross negligence or willful misconduct of Landlord and not due in any part to any act or omission on the part of Tenant or any Tenant Party or any matter beyond Landlord's reasonable control (any such stoppage of an Essential Service being hereinafter referred to as a "**Service Interruption**"), and (ii) such Service Interruption continues for more than 5 consecutive business days after Landlord shall have received written notice thereof from Tenant, and (iii) as a result of such Service Interruption, the conduct of Tenant's normal operations in the Premises are materially and adversely affected, then there shall be an abatement of one day's Base Rent for each day during which such Service Interruption continues after such 5 business day period; provided, however, that if any part of the Premises is reasonably useable for Tenant's normal business operations or if Tenant conducts all or any part of its operations in any portion of the Premises notwithstanding such Service Interruption, then the amount of each daily abatement of Base Rent shall only be proportionate to the nature and extent of the interruption of Tenant's normal operations or ability to use the Premises. The rights granted to Tenant under this paragraph shall be Tenant's sole and exclusive remedy resulting from a failure of Landlord to provide services, and Landlord shall not otherwise be liable for any loss or damage suffered or sustained by Tenant resulting from any failure or cessation of services. For purposes hereof, the term "**Essential Services**" shall mean the following services: HVAC service, water, sewer and electricity, but in each case only to the extent that Landlord has an obligation to provide same to Tenant under this Lease. The provisions of this paragraph shall only apply as long as the original Tenant is the tenant occupying the Premises under this Lease and shall not apply to any assignee or sublessee.

(b) **Emergency Generator**. Landlord's sole obligation for either providing emergency generators or providing emergency back-up power to Tenant shall be: (i) to provide emergency generators with not less than the capacity to provide 4 watts of electricity per rentable square foot of the Premises, and (ii) to contract with a third party deemed by Landlord to be reputable to maintain the emergency generators as per the manufacturer's standard maintenance guidelines. Notwithstanding anything to the contrary contained herein, Landlord shall, at least once per month as part of the maintenance of the Building, run the emergency generator for a period reasonably determined by Landlord for the purpose of determining whether it operates when started. Landlord shall, upon written request from Tenant, make available the maintenance contract and maintenance records for the emergency generators for the 12 month period immediately preceding Landlord's receipt of Tenant's written request. Landlord shall have no obligation to supervise, oversee or confirm that the third party maintaining the emergency generators is maintaining the generators as per the manufacturer's standard guidelines or otherwise. During any period of replacement, repair or maintenance of the emergency generators when the emergency generators are not operational, including any delays thereto due to the inability to obtain parts or replacement equipment, Landlord shall have no obligation to provide Tenant with an alternative back-up generator or generators or alternative sources of back-up power. Tenant expressly acknowledges and agrees that Landlord does not guaranty that such emergency generators will be operational at all times or that emergency power will be available to the Premises when needed.

(c) **Compressed Air and Vacuum**. Landlord's sole obligation for either providing compressed air and vacuum systems to Tenant shall be to contract with a third party to maintain the compressed air and vacuum systems as per the manufacturer's standard maintenance guidelines. Notwithstanding anything to the contrary contained herein, Landlord shall, at least once per month as part of the maintenance of the Building, run the compressed air and vacuum systems for a period reasonably determined by Landlord for the purpose of determining whether it operates when started. Landlord shall have no obligation to supervise, oversee or confirm that the third party maintaining the compressed air and vacuum systems is maintaining the compressed air and vacuum systems as per the manufacturer's standard guidelines or otherwise. During any period of replacement, repair or maintenance of the compressed air and vacuum systems when the compressed air and vacuum systems are not operational, including any delays thereto due to the inability to obtain parts or replacement equipment, Landlord shall have no obligation to provide Tenant with an alternative compressed air and vacuum systems. Tenant expressly acknowledges and agrees that Landlord does not guaranty that such compressed air and vacuum systems will be operational at all times or that compressed air and vacuum systems will be available to the Premises when needed.

(d) **Freight Elevator/Loading Dock**. Tenant may use the freight elevator and loading dock in common with others entitled thereto at no additional charge during the regular hours of operation of the freight elevator and loading dock, which are 24 hours per day, 7 days per week, subject to downtime for maintenance and repairs.

(e) **Acid Neutralization System**. During the Term, Landlord shall provide Tenant with access to and use of the acid neutralization system existing as of the date of this Lease ("**Acid Neutralization System**") pursuant to the terms and conditions of this Lease. Tenant acknowledges and agrees that the Acid Neutralization System shall be shared with other tenants of the Project. Tenant's obligation to pay its share of ongoing operation costs shall be allocated among Tenant and other user tenants on a pro rata basis, with Tenant's share based on the ratio of the rentable square footage of the Premises to the sum of the rentable square footages of the

Premises and the premises of all other user tenants. Landlord's sole obligations for providing the Acid Neutralization System, or any acid neutralization system facilities, to Tenant shall be (the "**Acid Neutralization Obligations**") to (i) use commercially reasonable efforts to obtain and maintain the permit required from the Massachusetts Water Resources Authority for discharge through the Acid Neutralization System (the "**Discharge Permit**"), provided that Tenant cooperates with Landlord and provides all information and documents necessary in connection with the Discharge Permit, and (ii) contract with a third party to maintain the Acid Neutralization System as operating as per the manufacturer's standard maintenance guidelines. Notwithstanding anything herein to the contrary, if the Acid Neutralization System must be replaced and the cost thereof is not included in such third party maintenance contract, then, Landlord shall replace the Acid Neutralization System, it being acknowledged, however, that Tenant shall be responsible for its share of all costs incurred in connection as an Operating Expense.

Tenant shall be solely responsible for the use of the Acid Neutralization System by Tenant, its employees, any sublessees, invitees or any party other than Landlord or Landlord's contractors, and Tenant shall be jointly and severally responsible for the use of the Acid Neutralization System with the other user tenants. Tenant shall use, and cause other parties under its control or for which it is responsible to use, the Acid Neutralization System in accordance with this Lease and in accordance with all applicable Legal Requirements, the Discharge Permit and any permits and approvals from Governmental Authorities for or applicable to Tenant's use of the Acid Neutralization System. Tenant shall not take any action or make any omission that would result in a violation of the Discharge Permit or any other permit or Legal Requirements applicable to the Acid Neutralization System. The scope of the Surrender Plan (as defined in Section 28 of this Lease) shall include all actions for the proper cleaning, decommissioning and cessation of Tenant's use of the Acid Neutralization System, and all requirements under this Lease for the surrender of the Premises shall also apply to Tenant's cessation of use of the Acid Neutralization System, in each case whether at Lease expiration, termination or prior thereto (but Tenant shall not be required to complete the decommissioning of the Acid Neutralization System if other tenants or occupants will continue to use the same after the expiration or earlier termination of the Lease, nor shall Tenant be responsible for or bear any costs of decommissioning arising from the use of the Acid Neutralization System by any party other than Tenant; it being agreed that if multiple tenants use the Acid Neutralization System, then Landlord shall be responsible for completing the decommissioning thereof, and Tenant shall pay to Landlord within thirty (30) days after invoice therefor Tenant's share of the reasonable, actual costs of decommissioning based on the ratio of the rentable square footage of the Premises to the rentable square footage of the Premises and the premises of all other user tenants). The obligations of Tenant under this Lease with respect to the Acid Neutralization System shall be joint and several with such other tenants as aforesaid, except in the event that Tenant can prove to Landlord's reasonable satisfaction that neither Tenant nor any Tenant Party caused, contributed to or exacerbated the matter for which Tenant would otherwise be responsible but for this exception. Without in any way limiting the Acid Neutralization Obligations, Landlord shall have no obligation to provide Tenant with operational emergency or back-up acid neutralization facilities or to supervise, oversee or confirm that the third party maintaining the Acid Neutralization System is maintaining such system as per the manufacturer's standard guidelines or otherwise. During any period of replacement, repair or maintenance of the Acid Neutralization System when such system is not operational, including any delays thereto due to the inability to obtain parts or replacement equipment, Landlord shall have no obligation to provide Tenant with an alternative back-up system or facilities. Tenant expressly acknowledges and agrees that Landlord does not guaranty that such Acid Neutralization System will be operational at all times or that such system will be available to the Premises when needed. Without in any way limiting the Acid Neutralization Obligations, in no event shall Landlord be liable to Tenant or any other party for any damages of any type, whether actual or consequential, suffered by Tenant or any such other person in the event that the Acid Neutralization System or back-up system, if any, or any replacement thereof fails or does not operate in a manner that meets Tenant's requirements.

12. **Alterations and Tenant's Property**. Any alterations, additions, or improvements made to the Premises by or on behalf of Tenant, including additional locks or bolts of any kind or nature upon any doors or windows in the Premises, but excluding installation, removal or realignment of furniture systems (other than removal of furniture systems owned or paid for by Landlord) not involving any modifications to the structure or connections (other than by ordinary plugs or jacks) to Building Systems (as defined in Section 13) ("**Alterations**") shall be subject to Landlord's prior written consent, which may be given or withheld in Landlord's sole discretion if any such Alteration affects the structure or Building Systems and shall not be otherwise unreasonably withheld, conditioned or delayed. Tenant may construct nonstructural Alterations in the Premises without Landlord's prior approval if the aggregate cost of all such work in any 12 month period does not exceed $50,000 (a "**Notice-Only Alteration**"), provided Tenant notifies Landlord in writing of such intended Notice-Only Alteration, and such notice shall be accompanied by plans, specifications, work contracts and such other information concerning the nature and cost of the Notice-Only Alteration as may be reasonably requested by Landlord, which notice and accompanying materials shall be delivered to Landlord not less than 15 business days in advance of any proposed construction. If Landlord approves any Alterations, Landlord may impose such conditions on Tenant in connection with the commencement, performance and completion of such Alterations as Landlord may deem appropriate in Landlord's reasonable discretion. Any request for approval shall be in writing, delivered not less than 15 business days in advance of any proposed construction, and accompanied by plans, specifications, bid proposals, work contracts and such other information concerning the nature and cost of the alterations as may be reasonably requested by Landlord, including the identities and mailing addresses of all persons performing work or supplying materials. Landlord's right to review plans and specifications and to monitor construction shall be solely for its own benefit, and Landlord shall have no duty to ensure that such plans and specifications or

construction comply with applicable Legal Requirements. Tenant shall cause, at its sole cost and expense, all Alterations to comply with insurance requirements and with Legal Requirements and shall implement at its sole cost and expense any alteration or modification required by Legal Requirements as a result of any Alterations. Tenant shall pay to Landlord, as Additional Rent, on demand an amount equal to Landlord's reasonable out-of-pocket expenses for plan review, coordination, scheduling and supervision. Before Tenant begins any Alteration, Landlord may post on and about the Premises notices of non-responsibility pursuant to applicable law. Tenant shall reimburse Landlord for, and indemnify and hold Landlord harmless from, any expense incurred by Landlord by reason of faulty work done by Tenant or its contractors, delays caused by such work, or inadequate cleanup.

With respect to any Alterations in excess of $100,000, Tenant shall furnish security or make other arrangements satisfactory to Landlord to assure payment for the completion of all Alterations work free and clear of liens. With respect to all Alterations, Tenant shall provide (and cause each contractor or subcontractor to provide) certificates of insurance for workers' compensation and other coverage in amounts and from an insurance company satisfactory to Landlord protecting Landlord against liability for personal injury or property damage during construction. Upon completion of any Alterations, Tenant shall deliver to Landlord: (i) sworn statements setting forth the names of all contractors and subcontractors who did the work and final lien waivers from all such contractors and subcontractors; and (ii) "as built" plans for any such Alteration if the nature of such Alterations is such that such plans are typically prepared.

Except for Removable Installations (as hereinafter defined), all Installations (as hereinafter defined) shall be and shall remain the property of Landlord during the Term and following the expiration or earlier termination of the Term, shall not be removed by Tenant at any time during the Term, and shall remain upon and be surrendered with the Premises as a part thereof. Notwithstanding the foregoing, Landlord may, at the time its approval of any such Installation is requested, or at the time it receives notice of a Notice-Only Alteration, notify Tenant that Landlord requires that Tenant remove such Installation upon the expiration or earlier termination of the Term, in which event Tenant shall remove such Installation in accordance with the immediately succeeding sentence. Upon the expiration or earlier termination of the Term, Tenant shall remove (i) all wires, cables or similar equipment which Tenant has installed in the Premises or in the risers or plenums of the Building, (ii) any Installations for which Landlord has given Tenant notice of removal in accordance with the immediately preceding sentence, and (iii) all of Tenant's Property (as hereinafter defined), and Tenant shall restore and repair any damage caused by or occasioned as a result of such removal, including, without limitation, capping off all such connections behind the walls of the Premises and repairing any holes. During any restoration period beyond the expiration or earlier termination of the Term, Tenant shall pay Rent to Landlord as provided herein as if said space were otherwise occupied by Tenant. If Landlord is requested by Tenant or any lender, lessor or other person or entity claiming an interest in any of Tenant's Property to waive any lien Landlord may have against any of Tenant's Property, and Landlord consents to such waiver, then Landlord shall be entitled to be paid as administrative rent a fee of $1,000 per occurrence for its time and effort in preparing and negotiating such a waiver of lien.

For purposes of this Lease, (x) "**Removable Installations**" means any items listed on **Exhibit F** attached hereto and any items agreed by Landlord in writing to be included on **Exhibit F** in the future, (y) "**Tenant's Property**" means Removable Installations and, other than Installations, any personal property or equipment of Tenant that may be removed without material damage to the Premises, and (z) "**Installations**" means all property of any kind paid for with the TI Fund, all Alterations, all fixtures, and all partitions, hardware, built-in machinery, built-in casework and cabinets and other similar additions, equipment, property and improvements built into the Premises so as to become an integral part of the Premises, including, without limitation, fume hoods which penetrate the roof or plenum area, built-in cold rooms, built-in warm rooms, walk-in cold rooms, walk-in warm rooms, deionized water systems, chillers, built-in plumbing, electrical and mechanical equipment and systems, and any power generator and transfer switch.

13. **Landlord's Repairs**. Landlord, as an Operating Expense, shall maintain and repair all of the structural, exterior, parking and other Common Areas of the Building and the Project, including HVAC, plumbing, fire sprinklers, elevators and all other building systems serving the Premises and other portions of the Project including, without limitation, the emergency generators (subject to Section 11(b)), the compressed air and vacuum systems (subject to Section 11(c)) and the acid neutralization system (subject to Section 11(e)) ("**Building Systems**"), in good operating order and good repair, reasonable wear and tear and uninsured losses and damages caused by Tenant, or by any of Tenant's agents, servants, employees, invitees and contractors (collectively, "**Tenant Parties**") excluded. Losses and damages caused by Tenant or any Tenant Party shall be repaired by Landlord, to the extent not covered by insurance, at Tenant's sole cost and expense. Landlord reserves the right to stop Building Systems services when necessary (i) by reason of accident or emergency, or (ii) for planned repairs, alterations or improvements, which are, in the judgment of Landlord, desirable or necessary to be made, until said repairs, alterations or improvements shall have been completed. Landlord shall have no responsibility or liability for failure to supply Building Systems services during any such period of interruption; provided, however, that Landlord shall, except in case of emergency, make a commercially reasonable effort to give Tenant 48 hours advance notice of any planned stoppage of Building Systems services for routine maintenance, repairs, alterations or improvements. Tenant shall promptly give Landlord written notice of any repair required by Landlord pursuant to this Section, after which Landlord shall make a commercially reasonable effort to effect such repair within a reasonable timeframe. Landlord shall use reasonable efforts to minimize interference with Tenant's operations in the Premises during such planned stoppages of Building Systems. Landlord shall

not be liable for any failure to make any repairs or to perform any maintenance unless such failure shall persist for an unreasonable time after Tenant's written notice of the need for such repairs or maintenance. Tenant waives its rights under any state or local law to terminate this Lease or to make such repairs at Landlord's expense and agrees that the parties' respective rights with respect to such matters shall be solely as set forth herein. Repairs required as the result of fire, earthquake, flood, vandalism, war, or similar cause of damage or destruction shall be controlled by Section 18.

14. **Tenant's Repairs**. Subject to Section 13 hereof, Tenant, at its expense, shall repair, replace and maintain in good condition all non-structural portions of the Premises, including, without limitation, entries, doors, ceilings, interior windows, interior walls, and the interior side of demising walls (and not including any Building Systems serving the Premises and any other portion of the Project), reasonable wear and tear and damage by casualty excluded. Should Tenant fail to make any such repair or replacement or fail to so maintain the Premises, Landlord shall give Tenant notice of such failure. If Tenant fails to commence cure of such failure within 30 days of Landlord's notice, and thereafter diligently prosecute such cure to completion, Landlord may perform such work and shall be reimbursed by Tenant within 30 days after demand therefor; provided, however, that if such failure by Tenant creates or could create an emergency, Landlord may immediately commence cure of such failure and shall thereafter be entitled to recover the costs of such cure from Tenant. Subject to Sections 17 and 18, Tenant shall bear the full uninsured cost of any repair or replacement to any part of the Project that results from damage caused by Tenant or any Tenant Party and any repair that benefits only the Premises.

15. **Mechanic's Liens**. Tenant shall discharge, by bond or otherwise, any mechanic's lien filed against the Premises or against the Project for work claimed to have been done for, or materials claimed to have been furnished to, Tenant within 15 days after Tenant receives written notice of the filing thereof, at Tenant's sole cost and shall otherwise keep the Premises and the Project free from any liens arising out of work performed, materials furnished or obligations incurred by Tenant. Should Tenant fail to discharge any lien described herein, Landlord shall have the right, but not the obligation, to pay such claim or post a bond or otherwise provide security to eliminate the lien as a claim against title to the Project and the cost thereof shall be immediately due from Tenant as Additional Rent. If Tenant shall lease or finance the acquisition of office equipment, furnishings, or other personal property of a removable nature utilized by Tenant in the operation of Tenant's business, Tenant warrants that any Uniform Commercial Code Financing Statement filed as a matter of public record by any lessor or creditor of Tenant will upon its face or by exhibit thereto indicate that such Financing Statement is applicable only to removable personal property of Tenant located within the Premises. In no event shall the address of the Project be furnished on the statement without qualifying language as to applicability of the lien only to removable personal property, located in an identified suite held by Tenant.

16. **Indemnification**. Tenant hereby indemnifies and agrees to defend, save and hold Landlord harmless from and against any and all Claims for injury or death to persons or damage to property occurring within or about the Premises, arising directly or indirectly out of use or occupancy of the Premises or a breach or default by Tenant in the performance of any of its obligations hereunder, unless caused solely by the willful misconduct or negligence of Landlord. Landlord shall not be liable to Tenant for, and Tenant assumes all risk of damage to, personal property (including, without limitation, loss of records kept within the Premises). Tenant further waives any and all Claims for injury to Tenant's business or loss of income relating to any such damage or destruction of personal property (including, without limitation, any loss of records). Landlord shall not be liable for any damages arising from any act, omission or neglect of any tenant in the Project or of any other third party.

17. **Insurance**. Landlord shall maintain all risk property and, if applicable, sprinkler damage insurance covering the full replacement cost of the Project or such lesser coverage amount as Landlord may elect provided such coverage amount is not less than 90% of such full replacement cost. Landlord shall further procure and maintain commercial general liability insurance with a single loss limit of not less than $2,000,000 for bodily injury and property damage with respect to the Project. Landlord may, but is not obligated to, maintain such other insurance and additional coverages as it may deem necessary, including, but not limited to, flood, environmental hazard and earthquake, loss or failure of building equipment, errors and omissions, rental loss during the period of repair or rebuilding, workers' compensation insurance and fidelity bonds for employees employed to perform services and insurance for any improvements installed by Tenant or which are in addition to the standard improvements customarily furnished by Landlord without regard to whether or not such are made a part of the Project. All such insurance shall be included as part of the Operating Expenses. The Project may be included in a blanket policy (in which case the cost of such insurance allocable to the Project will be determined by Landlord based upon the insurer's cost calculations). Tenant shall also reimburse Landlord for any increased premiums or additional insurance which Landlord reasonably deems necessary as a result of Tenant's use of the Premises.

Tenant, at its sole cost and expense, shall maintain during the Term: all risk property insurance with business interruption and extra expense coverage, covering the full replacement cost of all property and improvements installed or placed in the Premises by Tenant at Tenant's expense; workers' compensation insurance with no less than the minimum limits required by law; employer's liability insurance with such limits as required by law; and commercial general liability insurance, with a minimum limit of not less than $2,000,000 per occurrence for bodily injury and property damage with respect to the Premises. The commercial general liability insurance policy shall name Alexandria Real Estate Equities, Inc., and Landlord, its officers, directors, employees, managers, agents, invitees and contractors (collectively, "**Landlord Parties**"), as additional insureds; insure on an occurrence and not a claims-made

basis; be issued by insurance companies which have a rating of not less than policyholder rating of A and financial category rating of at least Class X in "Best's Insurance Guide"; shall not be cancelable for nonpayment of premium unless 30 days prior written notice shall have been given to Landlord from the insurer; not contain a hostile fire exclusion; contain a contractual liability endorsement; and provide primary coverage to Landlord (any policy issued to Landlord providing duplicate or similar coverage shall be deemed excess over Tenant's policies). Copies of such policies (if requested by Landlord), or certificates of insurance showing the limits of coverage required hereunder and showing Landlord as an additional insured, along with reasonable evidence of the payment of premiums for the applicable period, shall be delivered to Landlord by Tenant prior to (i) the earlier to occur of (x) the Commencement Date, or (y) the date that Tenant accesses the Premises under this Lease, and (ii) each renewal of said insurance. Tenant's policy may be a "blanket policy" with an aggregate per location endorsement which specifically provides that the amount of insurance shall not be prejudiced by other losses covered by the policy. Tenant shall, at least 5 days prior to the expiration of such policies, furnish Landlord with renewal certificates.

In each instance where insurance is to name Landlord as an additional insured, Tenant shall upon written request of Landlord also designate and furnish certificates so evidencing Landlord as additional insured to: (i) any lender of Landlord holding a security interest in the Project or any portion thereof, (ii) the landlord under any lease wherein Landlord is tenant of the real property on which the Project is located, if the interest of Landlord is or shall become that of a tenant under a ground or other underlying lease rather than that of a fee owner, and/or (iii) any management company retained by Landlord to manage the Project.

The property insurance obtained by Landlord and Tenant shall include a waiver of subrogation by the insurers and all rights based upon an assignment from its insured, against Landlord or Tenant, and their respective officers, directors, employees, managers, agents, invitees and contractors ("**Related Parties**"), in connection with any loss or damage thereby insured against. Neither party nor its respective Related Parties shall be liable to the other for loss or damage caused by any risk insured against under property insurance required to be maintained hereunder, and each party waives any claims against the other party, and its respective Related Parties, for such loss or damage. The failure of a party to insure its property shall not void this waiver. Landlord and its respective Related Parties shall not be liable for, and Tenant hereby waives all claims against such parties for, business interruption and losses occasioned thereby sustained by Tenant or any person claiming through Tenant resulting from any accident or occurrence in or upon the Premises or the Project from any cause whatsoever. If the foregoing waivers shall contravene any law with respect to exculpatory agreements, the liability of Landlord or Tenant shall be deemed not released but shall be secondary to the other's insurer.

Landlord may require insurance policy limits to be raised to conform with requirements of Landlord's lender and/or to bring coverage limits to levels then being generally required of new tenants within the Project.

18. **Restoration**. If, at any time during the Term, the Project or the Premises are damaged or destroyed by a fire or other insured casualty, Landlord shall notify Tenant within 60 days after discovery of such damage as to the amount of time Landlord reasonably estimates it will take to restore the Project or the Premises, as applicable (the "**Restoration Period**"). If the Restoration Period is estimated to exceed 9 months (the "**Maximum Restoration Period**"), Landlord may, in such notice, elect to terminate this Lease as of the date that is 75 days after the date of discovery of such damage or destruction; provided, however, that notwithstanding Landlord's election to restore, Tenant may elect to terminate this Lease by written notice to Landlord delivered within 5 business days of receipt of a notice from Landlord estimating a Restoration Period for the Premises longer than the Maximum Restoration Period. Unless either Landlord or Tenant so elects to terminate this Lease, Landlord shall, subject to receipt of sufficient insurance proceeds (with any deductible to be treated as a current Operating Expense), promptly restore the Premises (excluding the improvements installed by Tenant or by Landlord and paid for by Tenant), subject to delays arising from the collection of insurance proceeds, from Force Majeure events or as needed to obtain any license, clearance or other authorization of any kind required to enter into and restore the Premises issued by any Governmental Authority having jurisdiction over the use, storage, handling, treatment, generation, release, disposal, removal or remediation of Hazardous Materials (as defined in Section 30) in, on or about the Premises (collectively referred to herein as "**Hazardous Materials Clearances**"); provided, however, that if repair or restoration of the Premises is not substantially complete as of the end of the Maximum Restoration Period or, if longer, the Restoration Period, Landlord may, in its sole and absolute discretion, elect not to proceed with such repair and restoration, or Tenant may by written notice to Landlord delivered within 5 business days of the expiration of the Maximum Restoration Period or, if longer, the Restoration Period, elect to terminate this Lease, in which event Landlord shall be relieved of its obligation to make such repairs or restoration and this Lease shall terminate as of the date that is 75 days after the later of: (i) discovery of such damage or destruction, or (ii) the date all required Hazardous Materials Clearances are obtained, but Landlord shall retain any Rent paid and the right to any Rent payable by Tenant prior to such election by Landlord or Tenant.

Tenant, at its expense, shall promptly perform, subject to delays arising from the collection of insurance proceeds, from Force Majeure (as defined in Section 34) events or to obtain Hazardous Material Clearances, all repairs or restoration not required to be done by Landlord and shall promptly re-enter the Premises and commence doing business in accordance with this Lease. Notwithstanding the foregoing, either Landlord or Tenant may terminate this Lease upon written notice to the other if the Premises are damaged during the last year of the Term and Landlord reasonably estimates that it will take more than 2 months to repair such damage; provided,

however, that such notice is delivered within 10 business days after the date that Landlord provides Tenant with written notice of the estimated Restoration Period. Notwithstanding anything to the contrary contained herein, Landlord shall also have the right to terminate this Lease if insurance proceeds are not available for such restoration. Rent shall be abated from the date all required Hazardous Material Clearances are obtained until the Premises are repaired and restored, in the proportion which the area of the Premises, if any, which is not usable by Tenant bears to the total area of the Premises, unless Landlord provides Tenant with other space during the period of repair that is suitable for the temporary conduct of Tenant's business. In the event that no Hazardous Material Clearances are required to be obtained by Tenant with respect to the Premises, rent abatement shall commence on the date of discovery of the damage or destruction. Such abatement shall be the sole remedy of Tenant, and except as provided in this Section 18, Tenant waives any right to terminate the Lease by reason of damage or casualty loss.

The provisions of this Lease, including this Section 18, constitute an express agreement between Landlord and Tenant with respect to any and all damage to, or destruction of, all or any part of the Premises, or any other portion of the Project, and any statute or regulation which is now or may hereafter be in effect shall have no application to this Lease or any damage or destruction to all or any part of the Premises or any other portion of the Project, the parties hereto expressly agreeing that this Section 18 sets forth their entire understanding and agreement with respect to such matters.

19. **Condemnation**. If the whole or any material part of the Premises or the Project is taken for any public or quasi-public use under governmental law, ordinance, or regulation, or by right of eminent domain, or by private purchase in lieu thereof (a "**Taking**" or "**Taken**"), and the Taking would in Landlord's reasonable judgment, materially interfere with or impair Landlord's ownership or operation of the Project or would in the reasonable judgment of Landlord and Tenant either prevent or materially interfere with Tenant's use of the Premises (as resolved, if the parties are unable to agree, by arbitration by a single arbitrator with the qualifications and experience appropriate to resolve the matter and appointed pursuant to and acting in accordance with the rules of the American Arbitration Association), then upon written notice by Landlord or Tenant to the other this Lease shall terminate and Rent shall be apportioned as of said date. If part of the Premises shall be Taken, and this Lease is not terminated as provided above, Landlord shall promptly restore the Premises and the Project as nearly as is commercially reasonable under the circumstances to their condition prior to such partial Taking and the rentable square footage of the Building, the rentable square footage of the Premises, Tenant's Share of Operating Expenses and the Rent payable hereunder during the unexpired Term shall be reduced to such extent as may be fair and reasonable under the circumstances. Upon any such Taking, Landlord shall be entitled to receive the entire price or award from any such Taking without any payment to Tenant, and Tenant hereby assigns to Landlord Tenant's interest, if any, in such award. Tenant shall have the right, to the extent that same shall not diminish Landlord's award, to make a separate claim against the condemning authority (but not Landlord) for such compensation as may be separately awarded or recoverable by Tenant for moving expenses and damage to Tenant's trade fixtures, if a separate award for such items is made to Tenant. Tenant hereby waives any and all rights it might otherwise have pursuant to any provision of state law to terminate this Lease upon a partial Taking of the Premises or the Project.

20. **Events of Default**. Each of the following events shall be a default ("**Default**") by Tenant under this Lease:

(a) **Payment Defaults**. Tenant shall fail to pay any installment of Rent or any other payment hereunder when due; provided, however, that Landlord will give Tenant notice and an opportunity to cure any failure to pay Rent within 3 days of any such notice not more than once in any 12 month period and Tenant agrees that such notice shall be in lieu of and not in addition to, or shall be deemed to be, any notice required by law.

(b) **Insurance**. Any insurance required to be maintained by Tenant pursuant to this Lease shall be canceled or terminated or shall expire or shall be reduced or materially changed, or Landlord shall receive a notice of nonrenewal of any such insurance and Tenant shall fail to obtain replacement insurance at least 20 days before the expiration of the current coverage.

(c) **Abandonment**. Tenant shall abandon the Premises. Tenant shall not be deemed to have abandoned the Premises if (i) Tenant provides Landlord with reasonable advance notice prior to vacating and, at the time of vacating the Premises, Tenant completes Tenant's obligations with respect to the Surrender Plan in compliance with Section 28, (ii) Tenant has made reasonable arrangements with Landlord for the security of the Premises for the balance of the Term, and (iii) Tenant continues during the balance of the Term to satisfy all of its obligations under the Lease as they come due.

(d) **Improper Transfer**. Tenant shall assign, sublease or otherwise transfer all or any portion of Tenant's interest in this Lease or the Premises in violation of the provisions of this Lease, or Tenant's interest in this Lease shall be attached, executed upon, or otherwise judicially seized and such action is not released within 90 days of the action.

(e) **Liens**. Tenant shall fail to discharge or otherwise obtain the release of any lien placed upon the Premises in violation of this Lease within 15 days after Tenant receives written notice that any such lien is filed against the Premises.

(f) **Insolvency Events**. Tenant or any guarantor or surety of Tenant's obligations hereunder shall: (A) make a general assignment for the benefit of creditors; (B) commence any case, proceeding or other action seeking to have an order for relief entered on its behalf as a debtor or to adjudicate it a bankrupt or insolvent, or seeking reorganization, arrangement, adjustment, liquidation, dissolution or composition of it or its debts or seeking appointment of a receiver, trustee, custodian or other similar official for it or for all or of any substantial part of its property (collectively a "**Proceeding for Relief**"); (C) become the subject of any Proceeding for Relief which is not dismissed within 90 days of its filing or entry; or (D) die or suffer a legal disability (if Tenant, guarantor, or surety is an individual) or be dissolved or otherwise fail to maintain its legal existence (if Tenant, guarantor or surety is a corporation, partnership or other entity).

(g) **Estoppel Certificate or Subordination Agreement**. Tenant fails to execute any document required from Tenant under Sections 23 or 27 within 5 days after a second notice requesting such document.

(h) **Other Defaults**. Tenant shall fail to comply with any provision of this Lease other than those specifically referred to in this Section 20, and, except as otherwise expressly provided herein, such failure shall continue for a period of 30 days after written notice thereof from Landlord to Tenant.

Any notice given under Section 20(h) hereof shall: (i) specify the alleged default, (ii) demand that Tenant cure such default, (iii) be in lieu of, and not in addition to, or shall be deemed to be, any notice required under any provision of applicable law, and (iv) not be deemed a forfeiture or a termination of this Lease unless Landlord elects otherwise in such notice; provided that if the nature of Tenant's default pursuant to Section 20(h) is such that it cannot be cured by the payment of money and reasonably requires more than 30 days to cure, then Tenant shall not be deemed to be in default if Tenant commences such cure within said 30 day period and thereafter diligently prosecutes the same to completion; provided, however, that such cure shall be completed no later than 60 days from the date of Landlord's notice.

21. **Landlord's Remedies**.

(a) **Payment By Landlord; Interest**. Upon a Default by Tenant hereunder, Landlord may, without waiving or releasing any obligation of Tenant hereunder, make such payment or perform such act to the extent necessary to sure such Default. All sums so paid or incurred by Landlord, together with interest thereon, from the date such sums were paid or incurred, at the annual rate equal to 12% per annum or the highest rate permitted by law (the "**Default Rate**"), whichever is less, shall be payable to Landlord on demand as Additional Rent. Nothing herein shall be construed to create or impose a duty on Landlord to mitigate any damages resulting from Tenant's Default hereunder.

(b) **Late Payment Rent**. Late payment by Tenant to Landlord of Rent and other sums due will cause Landlord to incur costs not contemplated by this Lease, the exact amount of which will be extremely difficult and impracticable to ascertain. Such costs include, but are not limited to, processing and accounting charges and late charges which may be imposed on Landlord under any Mortgage covering the Premises. Therefore, if any installment of Rent due from Tenant is not received by Landlord within 5 days after the date such payment is due, Tenant shall pay to Landlord an additional sum equal to 6% of the overdue Rent as a late charge. Notwithstanding the foregoing, before assessing a late charge the first time in any calendar year, Landlord shall provide Tenant written notice of the delinquency and will waive the right if Tenant pays such delinquency within 5 days thereafter. The parties agree that this late charge represents a fair and reasonable estimate of the costs Landlord will incur by reason of late payment by Tenant. In addition to the late charge, Rent not paid when due shall bear interest at the Default Rate from the 5th day after the date due until paid.

(c) **Other Remedies**. Upon and during the continuance of a default (beyond applicable notice and cure periods), Landlord, at its option, without further notice or demand to Tenant, shall have in addition to all other rights and remedies provided in this Lease, at law or in equity, the option to pursue any one or more of the following remedies, each and all of which shall be cumulative and nonexclusive, without any notice or demand whatsoever. No cure in whole or in part of such Default by Tenant after Landlord has taken any action beyond giving Tenant notice of such Default to pursue any remedy provided for herein (including retaining counsel to file an action or otherwise pursue any remedies) shall in any way affect Landlord's right to pursue such remedy or any other remedy provided Landlord herein or under law or in equity, unless Landlord, in its sole discretion, elects to waive such Default.

(i) This Lease and the Term and estate hereby granted are subject to the limitation that whenever a Default shall have happened and be continuing, Landlord shall have the right, at its election, then or thereafter while any such Default shall continue and notwithstanding the fact that Landlord may have some other remedy hereunder or at law or in equity, to give Tenant written notice of Landlord's intention to terminate this Lease on a date specified in such notice, which date shall be not less than 5 days after the giving of such notice, and upon the date so specified, this Lease and the estate hereby granted shall expire and terminate with the same force and effect as if the date specified in such notice were the date hereinbefore fixed for the expiration of this Lease, and all right of Tenant hereunder shall expire and terminate, and Tenant shall be liable as hereinafter in this Section 21(c) provided. If any such notice is given, Landlord shall have, on such date so specified, the right of

re-entry and possession of the Premises and the right to remove all persons and property therefrom and to store such property in a warehouse or elsewhere at the risk and expense, and for the account, of Tenant. Should Landlord elect to re-enter as herein provided or should Landlord take possession pursuant to legal proceedings or pursuant to any notice provided for by law, Landlord may from time to time re-let the Premises or any part thereof for such term or terms and at such rental or rentals and upon such terms and conditions as Landlord may deem advisable, with the right to make commercially reasonable alterations in and repairs to the Premises.

(ii) In the event of any termination of this Lease as in this Section 21 provided or as required or permitted by law or in equity, Tenant shall forthwith quit and surrender the Premises to Landlord, and Landlord may, without further notice, enter upon, re-enter, possess and repossess the same by summary proceedings, ejectment or otherwise, and again have, repossess and enjoy the same as if this Lease had not been made, and in any such event Tenant and no person claiming through or under Tenant by virtue of any law or an order of any court shall be entitled to possession or to remain in possession of the Premises. Landlord, at its option, notwithstanding any other provision of this Lease, shall be entitled to recover from Tenant, as and for liquidated damages, the sum of;

(A) all Base Rent, Additional Rent and other amounts payable by Tenant hereunder then due or accrued and unpaid: and

(B) the amount equal to the aggregate of all unpaid Base Rent and Additional Rent which would have been payable if this Lease had not been terminated prior to the end of the Term then in effect, discounted to its then present value in accordance with accepted financial practice using a rate of 5% per annum, for loss of the bargain; and

(C) all other damages and expenses (including reasonable attorneys' fees and expenses), if any, which Landlord shall have sustained by reason of the breach of any provision of this Lease; less

(D) the net proceeds of any re-letting actually received by Landlord and (ii) the amount of damages which Tenant proves could have been avoided had Landlord taken reasonable steps to mitigate its damages.

(iii) Nothing herein contained shall limit or prejudice the right of Landlord, in any bankruptcy or insolvency proceeding, to prove for and obtain as liquidated damages by reason of such termination an amount equal to the maximum allowed by any bankruptcy or insolvency proceedings, or to prove for and obtain as liquidated damages by reason of such termination, an amount equal to the maximum allowed by any statute or rule of law whether such amount shall be greater or less than the excess referred to above.

(iv) Nothing in this Section 21 shall be deemed to affect the right of either party to indemnifications pursuant to this Lease.

(v) If Landlord terminates this Lease upon the occurrence of a Default, Tenant will quit and surrender the Premises to Landlord or its agents, and Landlord may, without further notice, enter upon, re-enter and repossess the Premises by summary proceedings, ejectment or otherwise. The words "enter", "re-enter", and "re-entry" are not restricted to their technical legal meanings.

(vi) If either party shall be in default in the observance or performance of any provision of this Lease, and an action shall be brought for the enforcement thereof in which it shall be determined that such party was in default, the party in default shall pay to the other all fees, costs and other expenses which may become payable as a result thereof or in connection therewith, including attorneys' fees and expenses.

(vii) If Tenant shall default in the keeping, observance or performance of any covenant, agreement, term, provision or condition herein contained, Landlord, without thereby waiving such default, may perform the same for the account and at the expense of Tenant (a) immediately or at any time thereafter and without notice in the case of emergency or in case such default will result in a violation of any legal or insurance requirements, or in the imposition of any lien against all or any portion of the Premises, and (b) in any other case if such default continues after any applicable cure period provided in Section 20. All reasonable costs and expenses incurred by Landlord in connection with any such performance by it for the account of Tenant and also all reasonable costs and expenses, including reasonable attorneys' fees and disbursements incurred by Landlord in any action or proceeding (including any summary dispossess proceeding) brought by Landlord to enforce any obligation of Tenant under this Lease and/or right of Landlord in or to the Premises, shall be paid by Tenant to Landlord within 10 days after demand.

(viii) In the event that Tenant is in breach or Default under this Lease, whether or not Landlord exercises its right to terminate or any other remedy, Tenant shall reimburse Landlord within 10 days after demand for any costs and expenses that Landlord may incur in connection with any such breach or Default, as provided in this Section 21(c). Such costs shall include reasonable legal fees and costs incurred for the negotiation of a settlement, enforcement of rights or otherwise. Tenant shall also indemnify Landlord against and hold Landlord harmless from all costs, expenses, demands and liability, including without limitation, reasonable legal fees and costs Landlord shall incur if Landlord shall become or be made a party to any claim or

action instituted by Tenant against any third party, or by any third party against Tenant, or by or against any person holding any interest under or using the Premises by license of or agreement with Tenant.

Except as otherwise provided in this Section 21, no right or remedy herein conferred upon or reserved to Landlord is intended to be exclusive of any other right or remedy, and every right and remedy shall be cumulative and in addition to any other legal or equitable right or remedy given hereunder, or now or hereafter existing. No waiver of any provision of this Lease shall be deemed to have been made unless expressly so made in writing. Landlord shall be entitled, to the extent permitted by law, to seek injunctive relief in case of the violation, or attempted or threatened violation, of any provision of this Lease, or to seek a decree compelling observance or performance of any provision of this Lease, or to seek any other legal or equitable remedy. Notwithstanding any contrary provision of this Lease, Tenant shall not be liable to Landlord for any indirect, special or consequential damages, arising from a default by Tenant under this Lease; provided that this sentence shall not apply to Landlord's damages (x) as expressly provided for in Section 8, and/or (y) in connection with Tenant's obligations as more fully set forth in Section 30. In no event shall the foregoing limit the damages to which Landlord is entitled under this Section 21 including, without limitation, the liquidated damages provided for in Section 21(c)(ii).

22. **Assignment and Subletting**.

(a) **General Prohibition**. Subject to the terms of Section 22(b) below, Tenant shall not, without Landlord's prior written consent, directly or indirectly, voluntarily or by operation of law, assign this Lease or sublease the Premises or any part thereof or mortgage, pledge, or hypothecate its leasehold interest or grant any concession or license within the Premises, and any attempt to do any of the foregoing shall be void and of no effect. If Tenant is a corporation, partnership or limited liability company, the shares or other ownership interests thereof which are not actively traded upon a stock exchange or in the over-the-counter market, a transfer or series of transfers whereby 50% or more of the issued and outstanding shares or other ownership interests of such corporation are, or voting control is, transferred (but excepting transfers upon deaths of individual owners) from a person or persons or entity or entities which were owners thereof at time of execution of this Lease to persons or entities who were not owners of shares or other ownership interests of the corporation, partnership or limited liability company at time of execution of this Lease, shall be deemed an assignment of this Lease requiring the consent of Landlord as provided in this Section 22.

(b) **Permitted Transfers**. If Tenant desires to assign, sublease, hypothecate or otherwise transfer this Lease or sublet the Premises (or any portion thereof) other than pursuant to a Permitted Assignment (as defined below), then at least 15 business days, but not more than 45 business days, before the date Tenant desires the assignment or sublease to be effective (the "**Assignment Date**"), Tenant shall give Landlord a notice (the "**Assignment Notice**") containing such information about the proposed assignee or sublessee, including the proposed use of the Premises and any Hazardous Materials proposed to be used, stored handled, treated, generated in or released or disposed of from the Premises, the Assignment Date, any relationship between Tenant and the proposed assignee or sublessee, and all material terms and conditions of the proposed assignment or sublease, including a copy of any proposed assignment or sublease in its final form, and such other information as Landlord may deem reasonably necessary or appropriate to its consideration whether to grant its consent. Landlord may, by giving written notice to Tenant within 15 business days after receipt of the Assignment Notice: (i) grant such consent (provided that Landlord shall further have the right to review and approve or disapprove the proposed form of sublease prior to the effective date of any such subletting), (ii) refuse such consent, in its reasonable discretion; or (iii) if the assignment or sublease is for the remainder of the Term, terminate this Lease with respect to the space described in the Assignment Notice as of the Assignment Date (an "**Assignment Termination**"). Among other reasons, it shall be reasonable for Landlord to withhold its consent in any of these instances: (1) the proposed assignee or subtenant is a governmental agency; (2) in Landlord's reasonable judgment, the use of the Premises by the proposed assignee or subtenant would entail any alterations that would lessen the value of the leasehold improvements in the Premises, or would require increased services by Landlord; (3) in Landlord's reasonable judgment, the proposed assignee or subtenant is engaged in areas of scientific research or other business concerns that are controversial such that they may (i) attract or cause negative publicity for or about the Building or the Project, (ii) negatively affect the reputation of the Building, the Project or Landlord, (iii) attract protestors to the Building or the Project, or (iv) lessen the attractiveness of the Building or the Project to any tenants or prospective tenants, purchasers or lenders; (4) in Landlord's reasonable judgment, the proposed assignee or subtenant lacks the creditworthiness to support the financial obligations it will incur under the proposed assignment or sublease; (5) in Landlord's reasonable judgment, the character, reputation, or business of the proposed assignee or subtenant is inconsistent with the desired tenant-mix or the quality of other tenancies in the Project or is inconsistent with the type and quality of the nature of the Building; (6) Landlord has experienced previous defaults by or is in litigation with the proposed assignee or subtenant; (7) the use of the Premises by the proposed assignee or subtenant will violate any applicable Legal Requirement; (8) the proposed assignee or subtenant is an entity with whom Landlord is then negotiating to lease space in the Project; or (9) the assignment or sublease is prohibited by Landlord's lender. If Landlord delivers notice of its election to exercise an Assignment Termination, Tenant shall have the right to withdraw such Assignment Notice by written notice to Landlord of such election within 5 business days after Landlord's notice electing to exercise the Assignment Termination. If Tenant withdraws such Assignment Notice, this Lease shall continue in full force and effect. If Tenant does not withdraw such Assignment Notice, this Lease, and the term and estate herein granted, shall terminate as of the Assignment Date with respect to the space described in such Assignment Notice. No failure of

Landlord to exercise any such option to terminate this Lease, or to deliver a timely notice in response to the Assignment Notice, shall be deemed to be Landlord's consent to the proposed assignment, sublease or other transfer. Tenant shall pay to Landlord a fee equal to One Thousand Five Hundred Dollars ($1,500) in connection with its consideration of any Assignment Notice and/or its preparation or review of any consent documents. Notwithstanding the foregoing, Landlord's consent to an assignment of this Lease or a subletting of any portion of the Premises to any entity controlling, controlled by or under common control with Tenant (a "**Control Permitted Assignment**") shall not be required, provided, however, that Tenant and it assignee or sublessee shall execute Landlord's standard form of consent to assignment or sublease, as the case may be. In addition, Tenant shall have the right to assign this Lease, upon 30 days prior written notice to Landlord but without obtaining Landlord's prior written consent, to a corporation or other entity which is a successor-in-interest to Tenant, by way of merger, consolidation or corporate reorganization, or by the purchase of all or substantially all of the assets or the ownership interests of Tenant provided that (i) such merger or consolidation, or such acquisition or assumption, as the case may be, is for a good business purpose and not principally for the purpose of transferring the Lease, and (ii) the net worth (as determined in accordance with generally accepted accounting principles ("**GAAP**")) of the assignee is not less than the net worth (as determined in accordance with GAAP) of Tenant as of the Commencement Date, and (iii) such assignee shall agree in writing to assume all of the terms, covenants and conditions of this Lease (a "**Corporate Permitted Assignment**"). Control Permitted Assignments and Corporate Permitted Assignments are hereinafter referred to as "**Permitted Assignments**."

(c) **Additional Conditions**. As a condition to any such assignment or subletting, whether or not Landlord's consent is required, Landlord may require:

(i) that any assignee or subtenant agree, in writing at the time of such assignment or subletting, that if Landlord gives such party notice that Tenant is in default under this Lease, such party shall thereafter make all payments otherwise due Tenant directly to Landlord, which payments will be received by Landlord without any liability except to credit such payment against those due under the Lease, and any such third party shall agree to attorn to Landlord or its successors and assigns should this Lease be terminated for any reason; provided, however, in no event shall Landlord or its successors or assigns be obligated to accept such attornment; and

(ii) A list of Hazardous Materials, certified by the proposed assignee or sublessee to be true and correct, which the proposed assignee or sublessee intends to use, store, handle, treat, generate in or release or dispose of from the Premises, together with copies of all documents relating to such use, storage, handling, treatment, generation, release or disposal of Hazardous Materials by the proposed assignee or subtenant in the Premises or on the Project, prior to the proposed assignment or subletting, including, without limitation: permits; approvals; reports and correspondence; storage and management plans; plans relating to the installation of any storage tanks to be installed in or under the Project (provided, said installation of tanks shall only be permitted after Landlord has given its written consent to do so, which consent may be withheld in Landlord's sole and absolute discretion); and all closure plans or any other documents required by any and all federal, state and local Governmental Authorities for any storage tanks installed in, on or under the Project for the closure of any such tanks. Neither Tenant nor any such proposed assignee or subtenant is required, however, to provide Landlord with any portion(s) of the such documents containing information of a proprietary nature which, in and of themselves, do not contain a reference to any Hazardous Materials or hazardous activities.

(d) **No Release of Tenant, Sharing of Excess Rents**. Notwithstanding any assignment or subletting, Tenant and any guarantor or surety of Tenant's obligations under this Lease shall at all times remain fully and primarily responsible and liable for the payment of Rent and for compliance with all of Tenant's other obligations under this Lease. Except in connection with a Permitted Assignment, if the Rent due and payable by a sublessee or assignee (or a combination of the rental payable under such sublease or assignment plus any bonus or other consideration therefor or incident thereto in any form) exceeds the sum of the rental payable under this Lease, (excluding however, any Rent payable under this Section) the unamortized amount of Excess TI Costs (as defined in the Work Letter) paid for by Tenant pursuant to the Work Letter amortized on a straight line basis over the Term, actual and reasonable brokerage commissions, attorneys' costs, free rent periods granted to the assignee or subtenant, any tenant allowances or any design and construction fees and costs directly related to and required pursuant to the terms of any such sublease) ("**Excess Rent**"), then Tenant shall be bound and obligated to pay Landlord as Additional Rent hereunder 50% of such Excess Rent within 10 days following receipt thereof by Tenant. If Tenant shall sublet the Premises or any part thereof, Tenant hereby immediately and irrevocably assigns to Landlord, as security for Tenant's obligations under this Lease, all rent from any such subletting, and Landlord as assignee for Tenant, or a receiver for Tenant appointed on Landlord's application, may collect such rent and apply it toward Tenant's obligations under this Lease; except that, until the occurrence of a Default, Tenant shall have the right to collect such rent.

(e) **No Waiver**. The consent by Landlord to an assignment or subletting shall not relieve Tenant or any assignees of this Lease or any sublessees of the Premises from obtaining the consent of Landlord to any further assignment or subletting nor shall it release Tenant or any assignee or sublessee of Tenant from full and primary liability under the Lease. The acceptance of Rent hereunder, or the acceptance of performance of any other term, covenant, or condition thereof, from any other person or entity shall not be deemed to be a waiver of any of the provisions of this Lease or a consent to any subletting, assignment or other transfer of the Premises.

(f) **Prior Conduct of Proposed Transferee**. Notwithstanding any other provision of this Section 22, if (i) the proposed assignee or sublessee of Tenant has been required by any prior landlord, lender or Governmental Authority to take remedial action in connection with Hazardous Materials contaminating a property, where the contamination resulted from such party's action or use of the property in question, (ii) the proposed assignee or sublessee is subject to an enforcement order issued by any Governmental Authority in connection with the use, storage, handling, treatment, generation, release or disposal of Hazardous Materials (including, without limitation, any order related to the failure to make a required reporting to any Governmental Authority), or (iii) because of the existence of a pre-existing environmental condition in the vicinity of or underlying the Project, the risk that Landlord would be targeted as a responsible party in connection with the remediation of such pre-existing environmental condition would be materially increased or exacerbated by the proposed use of Hazardous Materials by such proposed assignee or sublessee, Landlord shall have the absolute right to refuse to consent to any assignment or subletting to any such party.

23. **Estoppel Certificate**. Tenant shall, within 10 business days of written notice from Landlord, execute, acknowledge and deliver a statement in writing in any form reasonably requested by a proposed lender or purchaser, (i) certifying that this Lease is unmodified and in full force and effect (or, if modified, stating the nature of such modification and certifying that this Lease as so modified is in full force and effect) and the dates to which the rental and other charges are paid in advance, if any, (ii) acknowledging that there are not any uncured defaults on the part of Landlord hereunder, or specifying such defaults if any are claimed, and (iii) setting forth such further information with respect to the status of this Lease or the Premises as may be reasonably requested thereon. Any such statement may be relied upon by any prospective purchaser or encumbrancer of all or any portion of the real property of which the Premises are a part. Tenant's failure to deliver such statement within such time shall, at the option of Landlord, constitute a Default under this Lease, and, in any event, shall be conclusive upon Tenant that the Lease is in full force and effect and without modification except as may be represented by Landlord in any certificate prepared by Landlord and delivered to Tenant for execution.

24. **Quiet Enjoyment**. So long as Tenant is not in Default under this Lease, Tenant shall, subject to the terms of this Lease, at all times during the Term, have peaceful and quiet enjoyment of the Premises against any person claiming by, through or under Landlord.

25. **Prorations**. All prorations required or permitted to be made hereunder shall be made on the basis of a 360 day year and 30 day months.

26. **Rules and Regulations**. Tenant shall, at all times during the Term and any extension thereof, comply with all reasonable rules and regulations at any time or from time to time established by Landlord covering use of the Premises and the Project. The current rules and regulations are attached hereto as **Exhibit E**. If there is any conflict between said rules and regulations and other provisions of this Lease, the terms and provisions of this Lease shall control. Landlord shall not have any liability or obligation for the breach of any rules or regulations by other tenants in the Project and shall not enforce such rules and regulations in a discriminatory manner.

27. **Subordination**. This Lease and Tenant's interest and rights hereunder are hereby made and shall be subject and subordinate at all times to the lien of any Mortgage now existing or hereafter created on or against the Project or the Premises, and all amendments, restatements, renewals, modifications, consolidations, refinancing, assignments and extensions thereof, without the necessity of any further instrument or act on the part of Tenant; provided, however that so long as there is no Default hereunder, Tenant's right to possession of the Premises shall not be disturbed by the Holder of any such Mortgage. Tenant agrees, at the election of the Holder of any such Mortgage, to attorn to any such Holder. Tenant agrees upon demand to execute, acknowledge and deliver such instruments, confirming such subordination, and such instruments of attornment as shall be requested by any such Holder, provided any such instruments contain appropriate non-disturbance provisions assuring Tenant's quiet enjoyment of the Premises as set forth in Section 24 hereof. Notwithstanding the foregoing, any such Holder may at any time subordinate its Mortgage to this Lease, without Tenant's consent, by notice in writing to Tenant, and thereupon this Lease shall be deemed prior to such Mortgage without regard to their respective dates of execution, delivery or recording and in that event such Holder shall have the same rights with respect to this Lease as though this Lease had been executed prior to the execution, delivery and recording of such Mortgage and had been assigned to such Holder. The term "Mortgage" whenever used in this Lease shall be deemed to include deeds of trust, security assignments and any other encumbrances, and any reference to the "Holder" of a Mortgage shall be deemed to include the beneficiary under a deed of trust. As of the date of this Lease, there is no existing Mortgage encumbering the Project.

28. **Surrender.** Upon the expiration of the Term or earlier termination of Tenant's right of possession, Tenant shall surrender the Premises to Landlord in the same condition as received, subject to any Alterations or Installations permitted by Landlord to remain in the Premises, free of Hazardous Materials brought upon, kept, used, stored, handled, treated, generated in, or released or disposed of from, the Premises by any person other than a Landlord Party (collectively, "Tenant **HazMat Operations")** and released of all Hazardous Materials Clearances, broom clean, ordinary wear and tear and casualty loss and condemnation covered by Sections 18 and

19 excepted. At least 3 months prior to the surrender of the Premises, Tenant shall deliver to Landlord a narrative description of the actions proposed (or required by any Governmental Authority) to be taken by Tenant in order to surrender the Premises (including any Installations permitted by Landlord to remain in the Premises) at the expiration or earlier termination of the Term, free from any residual impact from the Tenant HazMat Operations and otherwise released for unrestricted use and occupancy (the "Surrender **Plan")**. Such Surrender Plan shall be accompanied by a current listing of (i) all Hazardous Materials licenses and permits held by or on behalf of any Tenant Party with respect to the Premises, and (ii) all Hazardous Materials used, stored, handled, treated, generated, released or disposed of from the Premises, and shall be subject to the review and approval of Landlord's environmental consultant. In connection with the review and approval of the Surrender Plan, upon the request of Landlord, Tenant shall deliver to Landlord or its consultant such additional non-proprietary information concerning Tenant HazMat Operations as Landlord shall request. On or before such surrender, Tenant shall deliver to Landlord evidence that the approved Surrender Plan shall have been satisfactorily completed and Landlord shall have the right, subject to reimbursement at Tenant's expense as set forth below, to cause Landlord's environmental consultant to inspect the Premises and perform such additional procedures as may be deemed reasonably necessary to confirm that the Premises are, as of the effective date of such surrender or early termination of the Lease, free from any residual impact from Tenant HazMat Operations. Tenant shall reimburse Landlord, as Additional Rent, for the actual out-of pocket expense incurred by Landlord for Landlord's environmental consultant to review and approve the Surrender Plan and to visit the Premises and verify satisfactory completion of the same, which cost shall not exceed $5,000. Landlord shall have the unrestricted right to deliver such Surrender Plan and any report by Landlord's environmental consultant with respect to the surrender of the Premises to third parties.

If Tenant shall fail to prepare or submit a Surrender Plan approved by Landlord, or if Tenant shall fail to complete the approved Surrender Plan, or if such Surrender Plan, whether or not approved by Landlord, shall fail to adequately address any residual effect of Tenant HazMat Operations in, on or about the Premises, Landlord shall have the right to take such actions as Landlord may deem reasonable or appropriate to assure that the Premises and the Project are surrendered free from any residual impact from Tenant HazMat Operations, the cost of which actions shall be reimbursed by Tenant as Additional Rent, without regard to the limitation set forth in the first paragraph of this Section 28.

Tenant shall immediately return to Landlord all keys and/or access cards to parking, the Project, restrooms or all or any portion of the Premises furnished to or otherwise procured by Tenant. If any such access card or key is lost, Tenant shall pay to Landlord, at Landlord's election, either the cost of replacing such lost access card or key or the cost of reprogramming the access security system in which such access card was used or changing the lock or locks opened by such lost key. Any Tenant's Property, Alterations and property not so removed by Tenant as permitted or required herein shall be deemed abandoned and may be stored, removed, and disposed of by Landlord at Tenant's expense, and Tenant waives all claims against Landlord for any damages resulting from Landlord's retention and/or disposition of such property. All obligations of Tenant hereunder not fully performed as of the termination of the Term, including the obligations of Tenant under Section 30 hereof, shall survive the expiration or earlier termination of the Term, including, without limitation, indemnity obligations, payment obligations with respect to Rent and obligations concerning the condition and repair of the Premises.

29. **Waiver of Jury Trial**. TO THE EXTENT PERMITTED BY LAW, TENANT AND LANDLORD WAIVE ANY RIGHT TO TRIAL BY JURY OR TO HAVE A JURY PARTICIPATE IN RESOLVING ANY DISPUTE, WHETHER SOUNDING IN CONTRACT, TORT, OR OTHERWISE, BETWEEN LANDLORD AND TENANT ARISING OUT OF THIS LEASE OR ANY OTHER INSTRUMENT, DOCUMENT, OR AGREEMENT EXECUTED OR DELIVERED IN CONNECTION HEREWITH OR THE TRANSACTIONS RELATED HERETO.

30. **Environmental Requirements**.

(a) **Prohibition/Compliance/Indemnity**. Tenant shall not cause or permit any Hazardous Materials (as hereinafter defined) to be brought upon, kept, used, stored, handled, treated, generated in or about, or released or disposed of from, the Premises or the Project in violation of applicable Environmental Requirements (as hereinafter defined) by Tenant or any Tenant Party. If Tenant breaches the obligation stated in the preceding sentence, or if the presence of Hazardous Materials in the Premises during the Term or any holding over results in contamination of the Premises, the Project or any adjacent property or if contamination of the Premises, the Project or any adjacent property by Hazardous Materials brought into, kept, used, stored, handled, treated, generated in or about, or released or disposed of from, the Premises by anyone other than Landlord and Landlord's employees, agents and contractors otherwise occurs during the Term or any holding over, Tenant hereby indemnifies and shall defend and hold Landlord, its officers, directors, employees, agents and contractors harmless from any and all actions (including, without limitation, remedial or enforcement actions of any kind, administrative or judicial proceedings, and orders or judgments arising out of or resulting therefrom), costs, claims, damages (including, without limitation, punitive damages and damages based upon diminution in value of the Premises or the Project, or the loss of, or restriction on, use of the Premises or any portion of the Project), expenses (including, without limitation, attorneys', consultants' and experts' fees, court costs and amounts paid in settlement of any claims or actions), fines, forfeitures or other civil, administrative or criminal penalties, injunctive or other relief (whether or not based upon personal injury, property damage, or contamination of, or adverse effects upon, the environment, water tables or natural resources), liabilities or losses (collectively, "**Environmental Claims**") which arise during or after the Term as a result of such contamination. This indemnification of Landlord by Tenant includes, without limitation, costs incurred in connection with any investigation of site conditions or any cleanup, treatment, remedial, removal, or restoration work required by any federal, state or local Governmental Authority because of Hazardous Materials present in the air, soil or ground water above, on, or under the Premises. Without limiting the foregoing, if the presence of any Hazardous Materials on the Premises, the Project or any adjacent property caused or permitted by Tenant or any Tenant Party results in any contamination of the Premises, the Project or any adjacent property, Tenant shall promptly take all actions at its sole expense and in accordance with applicable Environmental Requirements as are necessary to return the Premises, the Project or any adjacent property to the condition existing prior to the time of such contamination, provided that Landlord's approval of such action shall first be obtained, which approval shall not unreasonably be withheld so long as such actions would not potentially have any material adverse long-term or short-term effect on the Premises or the Project. Notwithstanding anything to the contrary contained in Section 28 or this Section 30, Tenant shall not be responsible for, and the indemnification and hold harmless obligation set forth in this paragraph shall not apply to (i) contamination in the Premises which Tenant can prove existed in the Premises immediately prior to the Commencement Date, (ii) the presence of any Hazardous Materials in the Premises which Tenant can prove migrated from outside of the Premises into the Premises, or (iii) contamination caused by Landlord or any Landlord's employees, agents and contractors, unless in any case, the presence of such Hazardous Materials (x) is the result of a breach by Tenant of any of its obligations under this Lease, or (y) was caused, contributed to or exacerbated by Tenant or any Tenant Party.

(b) **Business**. Landlord acknowledges that it is not the intent of this Section 30 to prohibit Tenant from using the Premises for the Permitted Use. Tenant may operate its business according to prudent industry practices so long as the use or presence of Hazardous Materials is strictly and properly monitored according to all then applicable Environmental Requirements. As a material inducement to Landlord to allow Tenant to use Hazardous Materials in connection with its business, Tenant agrees to deliver to Landlord prior to the Commencement Date a list identifying each type of Hazardous Materials to be brought upon, kept, used, stored, handled, treated, generated on, or released or disposed of from, the Premises and setting forth any and all governmental approvals or permits required in connection with the presence, use, storage, handling, treatment, generation, release or disposal of such Hazardous Materials on or from the Premises ("**Hazardous Materials List**"). Tenant shall deliver to Landlord an updated list at any additional time that Tenant is required to deliver a Hazardous Materials List to any Governmental Authority (e.g., the fire department) in connection with its use or occupancy of the Premises. Tenant shall deliver to Landlord true and correct copies of the following documents (the "**Haz Mat Documents**") relating to the use, storage, handling, treatment, generation, release or disposal of Hazardous Materials prior to the Commencement Date, or if unavailable at that time, concurrent with the receipt from or submission to a Governmental Authority: permits; approvals; reports and correspondence; storage and management plans, notice of violations of any Legal Requirements; plans relating to the installation of any storage tanks to be installed in or under the Project (provided, said installation of tanks shall only be permitted after Landlord has given Tenant its written consent to do so, which consent may be withheld in Landlord's sole and absolute discretion); all closure plans or any other documents required by any and all federal, state and local Governmental Authorities for any storage tanks installed in, on or under the Project for the closure of any such tanks; and a Surrender Plan (to the extent surrender in accordance with Section 28 cannot be accomplished in 3 months). Tenant is not required, however, to provide Landlord with any portion(s) of the Haz Mat Documents containing information of a proprietary nature which, in and of themselves, do not contain a reference to any Hazardous Materials or hazardous activities. It is not the intent of this Section to provide Landlord with information which could be detrimental to Tenant's business should such information become possessed by Tenant's competitors.

(c) **Tenant Representation and Warranty**. Tenant hereby represents and warrants to Landlord that (i) neither Tenant nor any of its legal predecessors has been required by any prior landlord, lender or Governmental Authority at any time to take remedial action

in connection with Hazardous Materials contaminating a property which contamination was permitted by Tenant of such predecessor or resulted from Tenant's or such predecessor's action or use of the property in question, and (ii) Tenant is not subject to any enforcement order issued by any Governmental Authority in connection with the use, storage, handling, treatment, generation, release or disposal of Hazardous Materials (including, without limitation, any order related to the failure to make a required reporting to any Governmental Authority). If Landlord determines that this representation and warranty was not true as of the date of this lease, Landlord shall have the right to terminate this Lease in Landlord's sole and absolute discretion.

(d) **Testing**. Landlord shall have the right to conduct annual tests of the Premises to determine whether any contamination of the Premises or the Project has occurred as a result of Tenant's use. Tenant shall be required to pay the cost of such annual test of the Premises if there is a violation of this Section 30 or if contamination for which Tenant is responsible under this Section 30 is identified; provided, however, that if Tenant conducts its own tests of the Premises using third party contractors and test procedures acceptable to Landlord which tests are certified to Landlord, Landlord shall accept such tests in lieu of the annual tests to be paid for by Tenant. In addition, at any time, and from time to time, prior to the expiration or earlier termination of the Term, Landlord shall have the right to conduct appropriate tests of the Premises and the Project to determine if contamination has occurred as a result of Tenant's use of the Premises. In connection with such testing, upon the request of Landlord, Tenant shall deliver to Landlord or its consultant such non-proprietary information concerning the use of Hazardous Materials in or about the Premises by Tenant or any Tenant Party. If contamination has occurred for which Tenant is liable under this Section 30, Tenant shall pay all reasonable costs to conduct such tests. If no such contamination is found, Landlord shall pay the costs of such tests (which shall not constitute an Operating Expense). Landlord shall provide Tenant with a copy of all third party, non-confidential reports and tests of the Premises made by or on behalf of Landlord during the Term without representation or warranty and subject to a confidentiality agreement. Tenant shall, at its sole cost and expense, promptly and satisfactorily remediate any environmental conditions identified by such testing in accordance with all Environmental Requirements. Landlord's receipt of or satisfaction with any environmental assessment in no way waives any rights which Landlord may have against Tenant.

(e) **Control Areas**. Tenant shall be allowed to utilize up to its pro rata share of the Hazardous Materials inventory within any control area or zone (located within the Premises), as designated by the applicable building code, for chemical use or storage. As used in the preceding sentence, Tenant's pro rata share of any control areas or zones located within the Premises shall be determined based on the rentable square footage that Tenant leases within the applicable control area or zone. For purposes of example only, if a control area or zone contains 10,000 rentable square feet and 2,000 rentable square feet of a tenant's premises are located within such control area or zone (while such premises as a whole contains 5,000 rentable square feet), the applicable tenant's pro rata share of such control area would be 20%.

(f) **Underground Tanks**. Tenant shall have no right to use or install any underground or other storage tanks at the Project.

(g) **Tenant's Obligations**. Tenant's obligations under this Section 30 shall survive the expiration or earlier termination of the Lease. During any period of time after the expiration or earlier termination of this Lease required by Tenant or Landlord to complete the removal from the Premises of any Hazardous Materials (including, without limitation, the release and termination of any licenses or permits restricting the use of the Premises and the completion of the approved Surrender Plan), Tenant shall continue to pay the full Rent in accordance with this Lease for any portion of the Premises not relet by Landlord in Landlord's sole discretion, which Rent shall be prorated daily.

(h) **Definitions**. As used herein, the term "**Environmental Requirements**" means all applicable present and future statutes, regulations, ordinances, rules, codes, judgments, orders or other similar enactments of any Governmental Authority regulating or relating to health, safety, or environmental conditions on, under, or about the Premises or the Project, or the environment, including without limitation, the following: the Comprehensive Environmental Response, Compensation and Liability Act; the Resource Conservation and Recovery Act; and all state and local counterparts thereto, and any regulations or policies promulgated or issued thereunder. As used herein, the term "**Hazardous Materials**" means and includes any substance, material, waste, pollutant, or contaminant listed or defined as hazardous or toxic, or regulated by reason of its impact or potential impact on humans, animals and/or the environment under any Environmental Requirements, asbestos and petroleum, including crude oil or any fraction thereof, natural gas liquids, liquefied natural gas, or synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas). As defined in Environmental Requirements, Tenant is and shall be deemed to be the "**operator**" of Tenant's "**facility**" and the "**owner**" of all Hazardous Materials brought on the Premises by Tenant or any Tenant Party, and the wastes, by-products, or residues generated, resulting, or produced therefrom.

31. **Tenant's Remedies/Limitation of Liability**. Landlord shall not be in default hereunder unless Landlord fails to perform any of its obligations hereunder within 30 days after written notice from Tenant specifying such failure (unless such performance will, due to the nature of the obligation, require a period of time in excess of 30 days, then after such period of time as is reasonably necessary). Upon any default by Landlord, Tenant shall give notice by registered or certified mail to any Holder of a Mortgage covering the Premises and to any landlord of any lease of property in or on which the Premises are located (to the extent Tenant has

received notice of the same) and Tenant shall offer such Holder and/or landlord a reasonable opportunity to cure the default, including time to obtain possession of the Project by power of sale or a judicial action if such should prove necessary to effect a cure; provided Landlord shall have furnished to Tenant in writing the names and addresses of all such persons who are to receive such notices. All obligations of Landlord hereunder shall be construed as covenants, not conditions; and, except as may be otherwise expressly provided in this Lease, Tenant may not terminate this Lease for breach of Landlord's obligations hereunder.

Subject to the terms of the next sentence, all obligations of Landlord under this Lease will be binding upon Landlord only during the period of its ownership of the Premises and not thereafter. The term "**Landlord**" in this Lease shall mean only the owner for the time being of the Premises. Upon the transfer by such owner of its interest in the Premises, such owner shall thereupon be released and discharged from all obligations of Landlord thereafter accruing, but such obligations shall be binding during the Term upon each new owner for the duration of such owner's ownership.

32. **Inspection and Access**. Landlord and its agents, representatives, and contractors may enter the Premises at any reasonable time to inspect the Premises and to make such repairs as may be required or permitted pursuant to this Lease and for any other reasonable business purpose. Landlord and Landlord's representatives may enter the Premises during business hours on not less than 48 hours advance written notice (except in the case of emergencies in which case no such notice shall be required and such entry may be at any time) for the purpose of effecting any such repairs, inspecting the Premises, showing the Premises to prospective purchasers and, during the last year of the Term, to prospective tenants or for any other business purpose. Landlord may erect a suitable sign on the Premises stating the Premises are available to let or that the Project is available for sale. Landlord may grant easements, make public dedications, designate Common Areas and create restrictions on or about the Premises, provided that no such easement, dedication, designation or restriction materially, adversely affects Tenant's use or occupancy of the Premises for the Permitted Use. At Landlord's request, Tenant shall execute such instruments as may be reasonably necessary for such easements, dedications or restrictions. Tenant shall at all times, except in the case of emergencies, have the right to escort Landlord or its agents, representatives, contractors or guests while the same are in the Premises, provided such escort does not materially and adversely affect Landlord's access rights hereunder.

33. **Security**. Tenant acknowledges and agrees that security devices and services, if any, while intended to deter crime may not in given instances prevent theft or other criminal acts and that Landlord is not providing any security services with respect to the Premises. Tenant agrees that Landlord shall not be liable to Tenant for, and Tenant waives any claim against Landlord with respect to, any loss by theft or any other damage suffered or incurred by Tenant in connection with any unauthorized entry into the Premises or any other breach of security with respect to the Premises. Tenant shall be solely responsible for the personal safety of Tenant's officers, employees, agents, contractors, guests and invitees while any such person is in, on or about the Premises and/or the Project. Tenant shall at Tenant's cost obtain insurance coverage to the extent Tenant desires protection against such criminal acts.

34. **Force Majeure**. Except for the payment of Rent, neither Landlord nor Tenant shall be held responsible or liable for delays in the performance of its obligations hereunder when caused by, related to, or arising out of acts of God, sinkholes or subsidence, strikes, lockouts, or other labor disputes, embargoes, quarantines, weather, national, regional, or local disasters, calamities, or catastrophes, inability to obtain labor or materials (or reasonable substitutes therefor) at reasonable costs or failure of, or inability to obtain, utilities necessary for performance, governmental restrictions, orders, limitations, regulations, or controls, national emergencies, delay in issuance or revocation of permits, enemy or hostile governmental action, terrorism, insurrection, riots, civil disturbance or commotion, fire or other casualty, and other causes or events beyond their reasonable ("**Force Majeure**").

35. **Brokers**. Landlord and Tenant each represents and warrants that it has not dealt with any broker, agent or other person (collectively, "**Broker**") in connection with this transaction and that no Broker brought about this transaction, other than Transwestern RBJ and Colliers International. Landlord and Tenant each hereby agrees to indemnify and hold the other harmless from and against any claims by any Broker, other than the broker, if any named in this Section 35, claiming a commission or other form of compensation by virtue of having dealt with Tenant or Landlord, as applicable, with regard to this leasing transaction.

36. **Limitation on Landlord's Liability**. NOTWITHSTANDING ANYTHING SET FORTH HEREIN OR IN ANY OTHER AGREEMENT BETWEEN LANDLORD AND TENANT TO THE CONTRARY: (A) LANDLORD SHALL NOT BE LIABLE TO TENANT OR ANY OTHER PERSON FOR (AND TENANT AND EACH SUCH OTHER PERSON ASSUME ALL RISK OF) LOSS, DAMAGE OR INJURY, WHETHER ACTUAL OR CONSEQUENTIAL TO: TENANT'S PERSONAL PROPERTY OF EVERY KIND AND DESCRIPTION, INCLUDING, WITHOUT LIMITATION TRADE FIXTURES, EQUIPMENT, INVENTORY, SCIENTIFIC RESEARCH, SCIENTIFIC EXPERIMENTS, LABORATORY ANIMALS, PRODUCT, SPECIMENS, SAMPLES, AND/OR SCIENTIFIC, BUSINESS, ACCOUNTING AND OTHER RECORDS OF EVERY KIND AND DESCRIPTION KEPT AT THE PREMISES AND ANY AND ALL INCOME DERIVED OR DERIVABLE THEREFROM; (B) THERE SHALL BE NO PERSONAL RECOURSE TO LANDLORD FOR ANY ACT OR OCCURRENCE IN, ON OR ABOUT THE PREMISES OR ARISING IN ANY WAY UNDER THIS LEASE OR ANY OTHER AGREEMENT BETWEEN LANDLORD AND TENANT WITH RESPECT TO THE SUBJECT MATTER HEREOF AND ANY LIABILITY OF LANDLORD

HEREUNDER SHALL BE STRICTLY LIMITED SOLELY TO LANDLORD'S INTEREST IN THE PROJECT OR ANY PROCEEDS FROM SALE OR CONDEMNATION THEREOF AND ANY INSURANCE PROCEEDS PAYABLE IN RESPECT OF LANDLORD'S INTEREST IN THE PROJECT OR IN CONNECTION WITH ANY SUCH LOSS; AND (C) IN NO EVENT SHALL ANY PERSONAL LIABILITY BE ASSERTED AGAINST LANDLORD IN CONNECTION WITH THIS LEASE NOR SHALL ANY RECOURSE BE HAD TO ANY OTHER PROPERTY OR ASSETS OF LANDLORD OR ANY OF LANDLORD'S OFFICERS, DIRECTORS, EMPLOYEES, AGENTS OR CONTRACTORS. UNDER NO CIRCUMSTANCES SHALL LANDLORD OR ANY OF LANDLORD'S OFFICERS, DIRECTORS, EMPLOYEES, AGENTS OR CONTRACTORS BE LIABLE FOR INJURY TO TENANT'S BUSINESS OR FOR ANY LOSS OF INCOME OR PROFIT THEREFROM.

37. **Severability**. If any clause or provision of this Lease is illegal, invalid or unenforceable under present or future laws, then and in that event, it is the intention of the parties hereto that the remainder of this Lease shall not be affected thereby. It is also the intention of the parties to this Lease that in lieu of each clause or provision of this Lease that is illegal, invalid or unenforceable, there be added, as a part of this Lease, a clause or provision as similar in effect to such illegal, invalid or unenforceable clause or provision as shall be legal, valid and enforceable.

38. **Signs; Exterior Appearance**. Tenant shall not, without the prior written consent of Landlord, which may be granted or withheld in Landlord's reasonable discretion: (i) attach any awnings, exterior lights, decorations, balloons, flags, pennants, banners, painting or other projection to any outside wall of the Project, (ii) use any curtains, blinds, shades or screens other than Landlord's standard window coverings, (iii) coat or otherwise sunscreen the interior or exterior of any windows with materials not approved by Landlord (which approval shall not be unreasonably withheld), (iv) place any bottles, parcels, or other articles on the window sills, (v) place any equipment, furniture or other items of personal property on any exterior balcony, or (vi) paint, affix or exhibit on any part of the Premises or the Project any signs, notices, window or door lettering, placards, decorations, or advertising media of any type which can be viewed from the exterior of the Premises. Interior signs on doors and the directory tablet shall be inscribed, painted or affixed for Tenant by Landlord at the sole cost and expense of Tenant, and shall be of a size, color and type reasonably acceptable to Landlord. Nothing may be placed on the exterior of corridor walls or corridor doors other than Landlord's standard lettering. The directory tablet shall be provided exclusively for the display of the name and location of tenants.

39. **Right to Extend Term**. Tenant shall have the right to extend the Term of the Lease upon the following terms and conditions:

(a) **Extension Rights**. Tenant shall have 1 right ("**Extension Right**") to extend the term of this Lease for 5 years (the "**Extension Term**") on the same terms and conditions as this Lease (other than with respect to Base Rent and the Work Letter) by giving Landlord written notice of its election to exercise each Extension Right at least 9 months prior to the expiration of the Base Term of the Lease.

Upon the commencement of the Extension Term, Base Rent shall be payable at the Market Rate (as defined below). Base Rent shall thereafter be adjusted on each annual anniversary of the commencement of such Extension Term by a percentage as determined by Landlord and agreed to by Tenant at the time the Market Rate is determined. As used herein, "**Market Rate**" shall mean the rate that comparable landlords of comparable buildings have accepted in current transactions from non-equity (i.e., not being offered equity in the buildings) and nonaffiliated tenants of similar financial strength for space of comparable size and quality (including all Tenant Improvements, Alterations and other improvements) in lab/office buildings of similar quality to the Building in the Route 128 North marketplace for a comparable term, with the determination of the Market Rate to take into account all relevant factors, including tenant inducements, parking costs, leasing commissions, allowances or concessions, if any. Notwithstanding the foregoing, the Market Rate shall in no event be less than the average Base Rent payable during the Base Term.

If, on or before the date which is 180 days prior to the expiration of the Base Term of this Lease, Tenant has not agreed with Landlord's determination of the Market Rate and the rent escalations during the Extension Term after negotiating in good faith, Tenant shall be deemed to have elected arbitration as described in Section 39(b). Tenant acknowledges and agrees that, if Tenant has elected to exercise the Extension Right by delivering notice to Landlord as required in this Section 39(a), Tenant shall have no right thereafter to rescind or elect not to extend the term of the Lease for the Extension Term.

(b) **Arbitration**.

(i) Within 30 days of Tenant's notice to Landlord of its election (or deemed election) to arbitrate Market Rate and escalations, each party shall deliver to the other a proposal containing the Market Rate and escalations that the submitting party believes to be correct ("**Extension Proposal**"). If either party fails to timely submit an Extension Proposal, the other party's submitted proposal shall determine the Base Rent and escalations for the Extension Term. If both parties submit Extension Proposals, then Landlord and Tenant shall meet within 7 days after delivery of the last Extension Proposal and make a good faith attempt to mutually appoint a single Arbitrator (and defined below) to determine the Market Rate and escalations. If Landlord and Tenant are unable to agree upon a single Arbitrator, then each shall, by written notice delivered to the other within 10 days after the meeting, select an Arbitrator. If either party fails to timely give notice of its selection for an Arbitrator, the other party's submitted proposal shall determine the Base Rent for the Extension Term. The 2 Arbitrators so appointed shall, within 5 business days after their appointment, appoint a third Arbitrator. If the 2 Arbitrators so selected cannot agree on the selection of the third Arbitrator within the time above specified, then either party, on behalf of both parties, may request such appointment of such third Arbitrator by application to any state court of general jurisdiction in the jurisdiction in which the Premises are located, upon 10 days prior written notice to the other party of such intent.

(ii) The decision of the Arbitrator(s) shall be made within 30 days after the appointment of a single Arbitrator or the third Arbitrator, as applicable. The decision of the single Arbitrator shall be final and binding upon the parties. The average of the two closest Arbitrators in a three Arbitrator panel shall be final and binding upon the parties. Each party shall pay the fees and expenses of the Arbitrator appointed by or on behalf of such party and the fees and expenses of the third Arbitrator shall be borne equally by both parties. If the Market Rate and escalations are not determined by the first day of the Extension Term, then Tenant shall pay Landlord Base Rent in an amount equal to the Base Rent in effect immediately prior to the Extension Term and increased by the Rent Adjustment Amount until such determination is made. After the determination of the Market Rate and escalations, the parties shall make any necessary adjustments to such payments made by Tenant. Landlord and Tenant shall then execute an amendment recognizing the Market Rate and escalations for the Extension Term.

(iii) An "**Arbitrator**" shall be any person appointed by or on behalf of either party or appointed pursuant to the provisions hereof and: (i) shall be (A) a member of the American Institute of Real Estate Appraisers with not less than 10 years of experience in the appraisal of improved life sciences real estate in the greater Boston metropolitan area, or (B) a licensed commercial real estate broker with not less than 15 years experience representing landlords and/or tenants in the leasing of life sciences space in the greater Boston metropolitan area, (ii) devoting substantially all of their time to professional appraisal or brokerage work, as applicable, at the time of appointment and (iii) be in all respects impartial and disinterested.

(c) **Rights Personal**. The Extension Right is personal to Tenant and is not assignable without Landlord's consent, which may be granted or withheld in Landlord's sole discretion separate and apart from any consent by Landlord to an assignment of Tenant's interest in the Lease, except that they may be assigned in connection with any Permitted Assignment of this Lease.

(d) **Exceptions**. Notwithstanding anything set forth above to the contrary, the Extension Right shall, at Landlord's option, not be in effect and Tenant may not exercise any of the Extension Right:

(i) during any period of time that Tenant is in Default under any provision of this Lease; or

(ii) if Tenant has been in Default under any provision of this Lease 3 or more times, whether or not the Defaults are cured, during the 12 month period immediately prior to the date that Tenant intends to exercise the Extension Right, whether or not the Defaults are cured.

(e) **No Extensions**. The period of time within which the Extension Rights may be exercised shall not be extended or enlarged by reason of Tenant's inability to exercise the Extension Right.

(f) **Termination**. The Extension Right shall, at Landlord's option, terminate and be of no further force or effect even after Tenant's due and timely exercise of the Extension Right, if, after such exercise, but prior to the commencement date of the Extension Term, (i) Tenant fails to timely cure any default by Tenant under this Lease; or (ii) Tenant has Defaulted 3 or more times during the period from the date of the exercise of the Extension Right to the date of the commencement of the Extension Term, whether or not such Defaults are cured.

40. **Intentionally Omitted**.

41. **Storage Area**. Subject to Tenant complying with all of the provisions of this Lease and all applicable Legal Requirements and Landlord's rules and regulations, Tenant shall have the right to use, at Tenant's sole cost and expense, a storage area for non-hazardous materials and equipment of Tenant in the location designated on **Exhibit G** attached hereto (the "**Storage Area**"), in connection with Tenant's occupancy of the Premises. Tenant shall have all of the obligations under this Lease with respect to the

Storage Area as though the Storage Area were part of the Premises; provided, however, that the Base Rent payable with respect to the Storage Area shall be $10.00 per rentable square foot of the Storage Area per year. Landlord shall have no obligation to make any repairs or improvements to the Storage Area and Tenant shall maintain the same, at Tenant's sole cost and expense, in good repair and condition during the Term as though the same were part of the Premises. Landlord shall have the right, upon 30 days notice to Tenant, to either (i) relocate the Storage Area to another section of the Project, or (ii) terminate the Lease with respect to the Storage Area, in which case Tenant shall have no further rights with respect to the Storage Area. At the expiration or earlier termination of the Term, Tenant shall, at Tenant's sole cost and expense, remove all of Tenant's personal property from the Storage Area and deliver the Storage Area to Landlord free of any debris and trash and free of any Hazardous Materials.

42. **Miscellaneous**.

(a) **Notices**. All notices or other communications between the parties shall be in writing and shall be deemed duly given upon delivery or refusal to accept delivery by the addressee thereof if delivered in person, or upon actual receipt if delivered by reputable overnight guaranty courier, addressed and sent to the parties at their addresses set forth above. Landlord and Tenant may from time to time by written notice to the other designate another address for receipt of future notices.

(b) **Joint and Several Liability**. If and when included within the term "**Tenant**," as used in this instrument, there is more than one person or entity, each shall be jointly and severally liable for the obligations of Tenant.

(c) **Financial Information**. Tenant shall furnish Landlord with true and complete copies of (i) Tenant's most recent audited annual financial statements within 90 days of the end of each of Tenant's fiscal years during the Term, (ii) Tenant's most recent unaudited quarterly financial statements within 45 days of the end of each of Tenant's first three fiscal quarters of each of Tenant's fiscal years during the Term, (iii) at Landlord's request from time to time, updated business plans, including cash flow projections and/or pro forma balance sheets and income statements, all of which shall be treated by Landlord as confidential information belonging to Tenant, (iv) corporate brochures and/or profiles prepared by Tenant for prospective investors, and (v) any other financial information or summaries that Tenant typically provides to its lenders or shareholders. Notwithstanding the foregoing, in no event shall Tenant be required to provide any financial information to Landlord which Tenant does not otherwise prepare (or cause to be prepared) for its own purposes. So long as Tenant is a "public company" and its financial information is publicly available, then the foregoing delivery requirements of this Section 42(c) shall not apply.

(d) **Recordation**. Neither this Lease nor a memorandum of lease shall be filed by or on behalf of Tenant in any public record. Landlord may prepare and file, and upon request by Landlord Tenant will execute, a memorandum of lease.

(e) **Interpretation**. The normal rule of construction to the effect that any ambiguities are to be resolved against the drafting party shall not be employed in the interpretation of this Lease or any exhibits or amendments hereto. Words of any gender used in this Lease shall be held and construed to include any other gender, and words in the singular number shall be held to include the plural, unless the context otherwise requires. The captions inserted in this Lease are for convenience only and in no way define, limit or otherwise describe the scope or intent of this Lease, or any provision hereof, or in any way affect the interpretation of this Lease.

(f) **Not Binding Until Executed**. The submission by Landlord to Tenant of this Lease shall have no binding force or effect, shall not constitute an option for the leasing of the Premises, nor confer any right or impose any obligations upon either party until execution of this Lease by both parties.

(g) **Limitations on Interest**. It is expressly the intent of Landlord and Tenant at all times to comply with applicable law governing the maximum rate or amount of any interest payable on or in connection with this Lease. If applicable law is ever judicially interpreted so as to render usurious any interest called for under this Lease, or contracted for, charged, taken, reserved, or received with respect to this Lease, then it is Landlord's and Tenant's express intent that all excess amounts theretofore collected by Landlord be credited on the applicable obligation (or, if the obligation has been or would thereby be paid in full, refunded to Tenant), and the provisions of this Lease immediately shall be deemed reformed and the amounts thereafter collectible hereunder reduced, without the necessity of the execution of any new document, so as to comply with the applicable law, but so as to permit the recovery of the fullest amount otherwise called for hereunder.

(h) **Choice of Law**. Construction and interpretation of this Lease shall be governed by the internal laws of the state in which the Premises are located, excluding any principles of conflicts of laws.

(i) **Time**. Time is of the essence as to the performance of Tenant's obligations under this Lease.

(j) **OFAC**. Tenant and all beneficial owners of Tenant are currently (a) in compliance with and shall at all times during the Term of this Lease remain in compliance with the regulations of the Office of Foreign Assets Control ("**OFAC**") of the U.S. Department of

Treasury and any statute, executive order, or regulation relating thereto (collectively, the "**OFAC Rules**"), (b) not listed on, and shall not during the term of this Lease be listed on, the Specially Designated Nationals and Blocked Persons List, Foreign Sanctions Evaders List, or the Sectoral Sanctions Identification List, which are all maintained by OFAC and/or on any other similar list maintained by OFAC or other governmental authority pursuant to any authorizing statute, executive order, or regulation, and (c) not a person or entity with whom a U.S. person is prohibited from conducting business under the OFAC Rules.

(k) **Incorporation by Reference**. All exhibits and addenda attached hereto are hereby incorporated into this Lease and made a part hereof. If there is any conflict between such exhibits or addenda and the terms of this Lease, such exhibits or addenda shall control.

(l) **Entire Agreement**. This Lease, including the exhibits attached hereto, constitutes the entire agreement between Landlord and Tenant pertaining to the subject matter hereof and supersedes all prior and contemporaneous agreements, understandings, letters of intent, negotiations and discussions, whether oral or written, of the parties, and there are no warranties, representations or other agreements, express or implied, made to either party by the other party in connection with the subject matter hereof except as specifically set forth herein.

(m) **No Accord and Satisfaction**. No payment by Tenant or receipt by Landlord of a lesser amount than the monthly installment of Base Rent or any Additional Rent will be other than on account of the earliest stipulated Base Rent and Additional Rent, nor will any endorsement or statement on any check or letter accompanying a check for payment of any Base Rent or Additional Rent be an accord and satisfaction. Landlord may accept such check or payment without prejudice to Landlord's right to recover the balance of such Rent or to pursue any other remedy provided in this Lease.

(n) **Hazardous Activities**. Notwithstanding any other provision of this Lease, Landlord, for itself and its employees, agents and contractors, reserves the right to refuse to perform any repairs or services in any portion of the Premises which, pursuant to Tenant's routine safety guidelines, practices or custom or prudent industry practices, require any form of protective clothing or equipment other than safety glasses. In any such case, Tenant shall contract with parties who are acceptable to Landlord, in Landlord's reasonable discretion, for all such repairs and services, and Landlord shall, to the extent required, equitably adjust Tenant's Share of Operating Expenses in respect of such repairs or services to reflect that Landlord is not providing such repairs or services to Tenant.

[Signatures on next page]

IN WITNESS WHEREOF, Landlord and Tenant have executed this Lease as of the day and year first above written.

TENANT:

DIMENSION THERAPEUTICS, INC.,
a Delaware corporation

By: /s/ Annalisa Jenkins
Its: President and CEO

LANDLORD:

ARE-MA REGION NO. 20, LLC,
a Delaware limited liability company

By: ALEXANDRIA REAL ESTATE EQUITIES, L.P.,
a Delaware limited partnership,
managing member

By: ARE-QRS CORP.,
a Maryland corporation,
general partner

By: /s/ Eric S. Johnson
Its: Senior Vice President RE Legal Affairs

EXHIBIT A TO LEASE

DESCRIPTION OF PREMISES

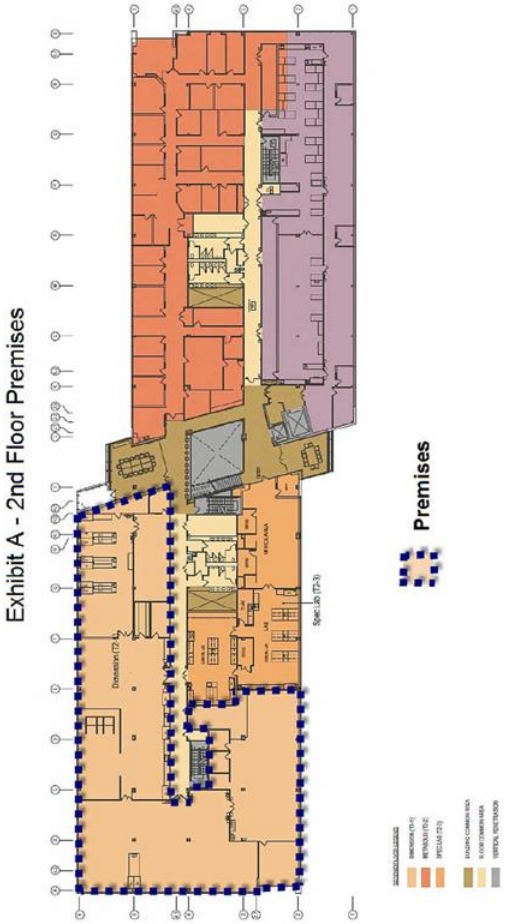


Exhibit A - 2nd Floor Premises
Premises

EXHIBIT B TO LEASE

DESCRIPTION OF PROJECT

Parcel 1:

A parcel of land near Presidential Way, Woburn, Middlesex County, Massachusetts, shown as Lot 5B-1 on a plan entitled “Subdivision Plan of Land in Woburn, Massachusetts,” prepared for Eastern Development dated January 16, 2001 by Vanasse Hangen Brustlin, Inc. recorded in Middlesex South Registry of Deeds in Plan Book 32475, Page 319.

Parcels 2 and 3:

Two contiguous parcels of Registered Land on Presidential Way, Woburn, Middlesex County, Massachusetts shown as Lot 11 and Lot 12 on Land Court Plan 36099-D, a copy of which is filed with the Middlesex South Registry District with Certificate No. 212009.

Together with the right to use Presidential Way for all purposes for which streets and ways are commonly used in the City of Woburn.

Together with the benefit of and subject to provisions of Easement and Agreement dated December 7, 2000, by and between 500 MetroNorth Corporate Center LLC and MetroNorth Corporate Center LLC recorded in Book 32138, Page 391 and filed as Document No. 1158395.

EXHIBIT C TO LEASE

WORK LETTER

THIS WORK LETTER dated November 2, 2015 (this "**Work Letter**") is made and entered into by and between **ARE-MA REGION NO. 20, LLC**, a Delaware limited liability company ("**Landlord**"), and **DIMENSION THERAPEUTICS, INC.**, a Delaware corporation ("**Tenant**"), and is attached to and made a part of the Lease Agreement dated November 2, 2015 (the "**Lease**"), by and between Landlord and Tenant. Any initially capitalized terms used but not defined herein shall have the meanings given them in the Lease.

1. **General Requirements**.

(a) **Tenant's Authorized Representative**. Tenant designates Jean Franchi and Amanda McCann (either such individual acting alone, "**Tenant's Representative**") as the only persons authorized to act for Tenant pursuant to this Work Letter. Landlord shall not be obligated to respond to or act upon any request, approval, inquiry or other communication ("**Communication**") from or on behalf of Tenant in connection with this Work Letter unless such Communication is in writing from Tenant's Representative. Tenant may change either Tenant's Representative at any time upon not less than 5 business days advance written notice to Landlord. Neither Tenant nor Tenant's Representative shall be authorized to direct Landlord's contractors in the performance of Landlord's Work (as hereinafter defined).

(b) **Landlord's Authorized Representative**. Landlord designates Tim White and Mike Carli (either such individual acting alone, "**Landlord's Representative**") as the only persons authorized to act for Landlord pursuant to this Work Letter. Tenant shall not be obligated to respond to or act upon any request, approval, inquiry or other Communication from or on behalf of Landlord in connection with this Work Letter unless such Communication is in writing from Landlord's Representative. Landlord may change either Landlord's Representative at any time upon not less than 5 business days advance written notice to Tenant. Landlord's Representative shall be the sole persons authorized to direct Landlord's contractors in the performance of Landlord's Work.

(c) **Architects, Consultants and Contractors**. Landlord and Tenant hereby acknowledge and agree that: (i) The Richmond Group shall be the general contractor for the Tenant Improvements, (ii) R.H. Dineen shall be the architect (the "**TI Architect**") for the Tenant Improvements, and (iii) any subcontractors for the Tenant Improvements shall be selected by Landlord, subject to Tenant's approval, which approval shall not be unreasonably withheld, conditioned or delayed.

2. **Tenant Improvements**.

(a) **Tenant Improvements Defined**. As used herein, "**Tenant Improvements**" shall mean all improvements to the Project of a fixed and permanent nature as shown on the TI Construction Drawings, as defined in Section 2(c) below, and the alteration or update, as reasonably determined by Landlord, of the HVAC control system serving the Premises. Other than Landlord's Work (as defined in Section 3(a) below, Landlord shall not have any obligation whatsoever with respect to the finishing of the Premises for Tenant's use and occupancy.

(b) **Tenant's Space Plans**. Landlord and Tenant acknowledge and agree that the space plans attached to this Work Letter as **Schedule 1** (the "**Space Plans**") have been approved by both Landlord and Tenant. Landlord and Tenant further acknowledge and agree that any changes to the Space Plans constitute a Change Request the cost of which changes shall be paid for out of the TI Fund.

(c) **Working Drawings**. Not later than 15 days following the mutual execution and delivery of the Lease, Landlord shall cause the TI Architect to prepare and deliver to Tenant for review and comment construction plans, specifications and drawings for the Tenant Improvements ("**TI Construction Drawings**"), which TI Construction Drawings shall be prepared substantially in accordance with the Space Plans. Tenant shall be solely responsible for ensuring that the TI Construction Drawings reflect Tenant's requirements for the Tenant Improvements. Tenant shall deliver its written comments on the TI Construction Drawings to Landlord not later than 10 business days after Tenant's receipt of the same; provided, however, that Tenant may not disapprove any matter that is substantially in accordance with the Space Plans without submitting a Change Request. Landlord and the TI Architect shall consider all such comments in good faith and shall, within 10 business days after receipt, notify Tenant how Landlord proposes to respond to such comments, but Tenant's review rights pursuant to the foregoing sentence shall not delay the design or construction schedule for the Tenant Improvements. Any disputes in connection with such comments shall be resolved in accordance with Section 2(d) hereof. Provided that the design reflected in the TI Construction Drawings is substantially in accordance with the Space Plans, Tenant shall approve the TI Construction Drawings submitted by Landlord, unless Tenant submits a Change Request. Once approved by Tenant, subject to the provisions of Section 4 below, Landlord shall not materially modify the TI Construction Drawings except as may be reasonably required in connection with the issuance of the TI Permit (as defined in Section 3(b) below).

(d) **Approval and Completion**. It is hereby acknowledged by Landlord and Tenant that the TI Construction Drawings must be completed and approved not later than November 20, 2015, in order for the Landlord's Work to be Substantially Complete by the Target Commencement Date (as defined in the Lease). Upon any dispute regarding the design of the Tenant Improvements, which is not settled within 10 business days after notice of such dispute is delivered by one party to the other, Tenant may make the final decision regarding the design of the Tenant Improvements, provided (i) Tenant acts reasonably and such final decision is either consistent with or a compromise between Landlord's and Tenant's positions with respect to such dispute, (ii) that all costs and expenses resulting from any such decision by Tenant shall be payable out of the TI Fund (as defined in Section 5(d) below), and (iii) Tenant's decision will not affect the base Building, structural components of the Building or any Building systems. Any changes to the TI Construction Drawings following Landlord's and Tenant's approval of same requested by Tenant shall be processed as provided in Section 4 hereof.

3. **Performance of Landlord's Work**.

(a) **Definition of Landlord's Work**. As used herein, "**Landlord's Work**" shall mean the work of constructing the Tenant Improvements.

(b) **Commencement and Permitting**. Landlord shall commence construction of the Tenant Improvements upon obtaining a building permit (the "**TI Permit**") authorizing the construction of the Tenant Improvements consistent with the TI Construction Drawings approved by Tenant. The cost of obtaining the TI Permit shall be payable from the TI Fund. Tenant shall assist Landlord in obtaining the TI Permit. If any Governmental Authority having jurisdiction over the construction of Landlord's Work or any portion thereof shall impose terms or conditions upon the construction thereof that: (i) are inconsistent with Landlord's obligations hereunder, (ii) increase the cost of constructing Landlord's Work, or (iii) will materially delay the construction of Landlord's Work, Landlord and Tenant shall reasonably and in good faith seek means by which to mitigate or eliminate any such adverse terms and conditions.

(c) **Completion of Landlord's Work**. On or before the Target Commencement Date (subject to Tenant Delays and Force Majeure delays), Landlord shall substantially complete or cause to be substantially completed Landlord's Work in a good and workmanlike manner, in accordance with the TI Permit subject, in each case, to Minor Variations and normal "punch list" items of a non-material nature that do not interfere with the use of the Premises and with a certificate or temporary certificate of occupancy (or an equivalent approval having been issued) for the Premises permitting lawful occupancy of the Premises (but specifically excluding any permits, licenses or other governmental approvals required to be obtained in connection with Tenant's operations in the Premises)("**Substantial Completion**" or "**Substantially Complete**"). Upon Substantial Completion of Landlord's Work, Landlord shall require the TI Architect and the general contractor to execute and deliver, for the benefit of Tenant and Landlord, a Certificate of Substantial Completion in the form of the American Institute of Architects ("**AIA**") document G704. For purposes of this Work Letter, "**Minor Variations**" shall mean any modifications reasonably required: (i) to comply with all applicable Legal Requirements and/or to obtain or to comply with any required permit (including the TI Permit); (ii) to comply with any request by Tenant for modifications to Landlord's Work; (iii) to comport with good design, engineering, and construction practices that are not material; or (iv) to make reasonable adjustments for field deviations or conditions encountered during the construction of Landlord's Work.

(d) **Selection of Materials**. Where more than one type of material or structure is indicated on the TI Construction Drawings approved by Landlord and Tenant, the option will be selected at Landlord's sole and absolute subjective discretion. As to all building materials and equipment that Landlord is obligated to supply under this Work Letter, Landlord shall select the manufacturer thereof in its sole and absolute subjective discretion, unless a specific manufacturer has been identified during the design process.

(e) **Delivery of the Premises**. When Landlord's Work is Substantially Complete, subject to the remaining terms and provisions of this Section 3(e), Tenant shall accept the Premises. Tenant's taking possession and acceptance of the Premises shall not constitute a waiver of: (i) any warranty with respect to workmanship (including installation of equipment) or material (exclusive of equipment provided directly by manufacturers), (ii) any non-compliance of Landlord's Work with applicable Legal Requirements, or (iii) any claim that Landlord's Work was not completed substantially in accordance with the TI Construction Drawings (subject to Minor Variations and such other changes as are permitted hereunder) (collectively, a "**Construction Defect**"). Tenant shall have one year after Substantial Completion within which to notify Landlord of any such Construction Defect discovered by Tenant, and Landlord shall use reasonable efforts to remedy or cause the responsible contractor to remedy any such Construction Defect within 30 days thereafter. Notwithstanding the foregoing, Landlord shall not be in default under the Lease if the applicable contractor, despite Landlord's reasonable efforts, fails to remedy such Construction Defect within such 30-day period. If the contractor fails to remedy such Construction Defect within a reasonable time, Landlord shall use reasonable efforts to remedy the Construction Defect within a reasonable period.

Tenant shall be entitled to receive the benefit of all construction warranties and manufacturer's equipment warranties relating to equipment installed in the Premises. If requested by Tenant, Landlord shall attempt to obtain extended warranties from manufacturers

and suppliers of such equipment, but the cost of any such extended warranties shall be borne solely out of the TI Fund. Landlord shall promptly undertake and complete, or cause to be completed, all punch list items.

(f) **Commencement Date Delay**. Except as otherwise provided in the Lease, Delivery of the Premises shall occur when Landlord's Work has been Substantially Completed, except to the extent that completion of Landlord's Work shall have been actually delayed by any one or more of the following causes ("**Tenant Delay**"):

(i) Tenant's Representative was not reasonably available to give or receive any Communication or to take any other action required to be taken by Tenant hereunder;

(ii) Tenant's request for Change Requests (as defined in Section 4(a) below) whether or not any such Change Requests are actually performed;

(iii) Construction of any Change Requests;

(iv) Tenant's request for materials, finishes or installations requiring unusually long lead times, provided that Landlord has advised Tenant of such long lead time items and Tenant continued to require such long lead time items;

(v) Tenant's delay in reviewing, revising or approving plans and specifications beyond the periods set forth herein;

(vi) Tenant's delay in providing information critical to the normal progression of the Project. Tenant shall provide such information as soon as reasonably possible, but in no event longer than one week after receipt of any request for such information from Landlord;

(vii) Tenant's delay in making payments to Landlord for Excess TI Costs (as defined in Section 5(d) below); or

(viii) Any other act or omission by Tenant or any Tenant Party (as defined in the Lease), or persons employed by any of such persons that continues for more than 1 day after Landlord's notice thereof to Tenant.

If Delivery is delayed for any of the foregoing reasons, then Landlord shall cause the TI Architect to certify the date on which the Tenant Improvements would have been Substantially Completed but for such Tenant Delay and such certified date shall be the date of Delivery.

4. **Changes**. Any changes requested by Tenant to the Tenant Improvements shall be requested and instituted in accordance with the provisions of this Section 4 and shall be subject to the written approval of Landlord and the TI Architect, such approval not to be unreasonably withheld, conditioned or delayed.

(a) **Tenant's Request For Changes**. If Tenant shall request changes to the Tenant Improvements ("**Changes**"), Tenant shall request such Changes by notifying Landlord in writing in substantially the same form as the AIA standard change order form (a "**Change Request**"), which Change Request shall detail the nature and extent of any such Change. Such Change Request must be signed by Tenant's Representative. Landlord shall, before proceeding with any Change, use commercially reasonable efforts to respond to Tenant as soon as is reasonably possible with an estimate of: (i) the time it will take, and (ii) the architectural and engineering fees and costs that will be incurred, to analyze such Change Request (which costs shall be paid from the TI Fund to the extent actually incurred, whether or not such change is implemented). Landlord shall thereafter submit to Tenant in writing, within 5 business days of receipt of the Change Request (or such longer period of time as is reasonably required depending on the extent of the Change Request), an analysis of the additional cost or savings involved, including, without limitation, architectural and engineering costs and the period of time, if any, that the Change will extend the date on which Landlord's Work will be Substantially Complete. Any such delay in the completion of Landlord's Work caused by a Change, including any suspension of Landlord's Work while any such Change is being evaluated and/or designed, shall be Tenant Delay.

(b) **Implementation of Changes**. If Tenant: (i) approves in writing the cost or savings and the estimated extension in the time for completion of Landlord's Work, if any, and (ii) deposits with Landlord any Excess TI Costs required in connection with such Change, Landlord shall cause the approved Change to be instituted. Notwithstanding any approval or disapproval by Tenant of any estimate of the delay caused by such proposed Change, the TI Architect's determination of the amount of Tenant Delay in connection with such Change shall be final and binding on Landlord and Tenant.

5. **Costs**.

(a) **Budget For Tenant Improvements**. Before the commencement of construction of the Tenant Improvements, Landlord shall obtain and submit to Tenant for approval (which approval shall not be unreasonably withheld, conditioned or delayed), a detailed breakdown by trade of the costs incurred or that will be incurred in connection with the design and construction of the Tenant Improvements (the "**Budget**"). The Budget may be amended from time to time but shall be submitted to Tenant each time for its approval, which approval shall not be unreasonably withheld, conditioned or delayed. Notwithstanding anything to the contrary

contained herein, if Tenant does not approve or disapprove the Budget or any amended Budget within 2 days after Landlord's delivery to Tenant of such Budget or amended Budget, Tenant shall be deemed to have approved such Budget or amended Budget.

(b) **TI Allowance**. Landlord shall provide to Tenant a tenant improvement allowance (collectively, the "**TI Allowance**") as follows:

1. a "**Tenant Improvement Allowance**" in the maximum amount of $35.00 per rentable square foot in the Premises, which is included in the Base Rent set forth in the Lease; and

2. an "**Additional Tenant Improvement Allowance**" in the maximum amount of $25.00 per rentable square foot in the Premises, which shall, to the extent used, result in adjustments to the Base Rent as set forth in the Lease.

Within 10 days after receipt of the approved Budget, Tenant shall notify Landlord how much Additional Tenant Improvement Allowance Tenant has elected to receive from Landlord. Such election shall be final and binding on Tenant, and may not thereafter be modified without Landlord's consent, which may be granted or withheld in Landlord's sole and absolute subjective discretion. The TI Allowance shall be disbursed in accordance with this Work Letter.

Tenant shall have no right to the use or benefit (including any reduction to or payment of Base Rent) of any portion of the TI Allowance not required for the hard and soft costs of the design and construction of (i) the Tenant Improvements described in the TI Construction Drawings approved pursuant to Section 2(d) or (ii) any Changes pursuant to Section 4.

(c) **Costs Includable in TI Fund**. The TI Fund shall be used solely for the payment of design, engineering, permits and construction costs in connection with the construction of the Tenant Improvements, including, without limitation, the cost of preparing the Space Plan and the TI Construction Drawings, all costs set forth in the Budget, including Landlord's Administrative Rent, Landlord's out-of-pocket expenses, costs resulting from Tenant Delays and the cost of Changes (collectively, "**TI Costs**"). Notwithstanding anything to the contrary contained herein, the TI Fund shall not be used to purchase any furniture, personal property or other non-Building system materials or equipment, including, but not limited to, Tenant's voice or data cabling, non-ducted biological safety cabinets and other scientific equipment not incorporated into the Tenant Improvements.

(d) **Excess TI Costs**. Landlord shall have no obligation to bear any portion of the cost of any of the Tenant Improvements except to the extent of the TI Allowance. If at any time and from time-to-time, the remaining TI Costs under the Budget exceed the remaining unexpended TI Allowance ("**Excess TI Costs**"), monthly disbursements of the TI Allowance shall be made in the proportion that the remaining TI Allowance bears to the outstanding TI Costs under the Budget, and Tenant shall fund the balance of each such monthly draw. For purposes of any litigation instituted with regard to such amounts, those amounts required to be paid by Tenant will be deemed Rent under the Lease. The TI Allowance and Excess TI Costs are herein referred to as the "**TI Fund**." Notwithstanding anything to the contrary set forth in this Section 5(d), Tenant shall be fully and solely liable for TI Costs and the cost of Minor Variations in excess of the TI Allowance.

(e) **Construction Contract**. The contract for construction of the Tenant Improvements shall be written substantially on Landlord's standard form of construction agreement with modifications reasonably acceptable to Landlord where the contract sum is the costs of the work plus a fee not to exceed a "Guaranteed Maximum Price" in an amount equal to the construction costs and contingencies set forth in the Budget (which Budget shall be based upon completed permit drawings and shall not include comments raised by Governmental Authorities as part of their permit review) subject to the terms of such contract and subject to any increases resulting from Changes and any changes to the permit drawings required by Governmental Authorities implemented after approval of the Budget.

6. **Tenant Access**.

(a) **Tenant's Access Rights**. Landlord hereby agrees to permit Tenant access, at Tenant's sole risk and expense, to the Building (i) 30 days prior to the Commencement Date to perform any work ("**Tenant's Work**") required by Tenant other than Landlord's Work, provided that such Tenant's Work is coordinated with the TI Architect and the general contractor, and complies with the Lease and all other reasonable restrictions and conditions Landlord may impose, and (ii) prior to the completion of Landlord's Work, to inspect and observe work in process; all such access shall be during normal business hours or at such other times as are reasonably designated by Landlord. Notwithstanding the foregoing, Tenant shall have no right to enter onto the Premises or the Project unless and until Tenant shall deliver to Landlord evidence reasonably satisfactory to Landlord demonstrating that any insurance reasonably required by Landlord in connection with such pre-commencement access (including, but not limited to, any insurance that Landlord may require pursuant to the Lease) is in full force and effect. Any entry by Tenant shall comply with all established safety practices of Landlord's contractor and Landlord until completion of Landlord's Work and acceptance thereof by Tenant.

(b) **No Interference**. Neither Tenant nor any Tenant Party (as defined in the Lease) shall interfere with the performance of Landlord's Work, nor with any inspections or issuance of final approvals by applicable Governmental Authorities, and upon any such interference, Landlord shall have the right to exclude Tenant and any Tenant Party from the Premises and the Project until Substantial Completion of Landlord's Work.

(c) **No Acceptance of Premises**. The fact that Tenant may, with Landlord's consent, enter into the Project prior to the date Landlord's Work is Substantially Complete for the purpose of performing Tenant's Work shall not be deemed an acceptance by Tenant of possession of the Premises, but in such event Tenant shall defend with counsel reasonably acceptable by Landlord, indemnify and hold Landlord harmless from and against any loss of or damage to Tenant's property, completed work, fixtures, equipment, materials or merchandise, and from liability for death of, or injury to, any person, caused by the act or omission of Tenant or any Tenant Party.

7. **Miscellaneous**.

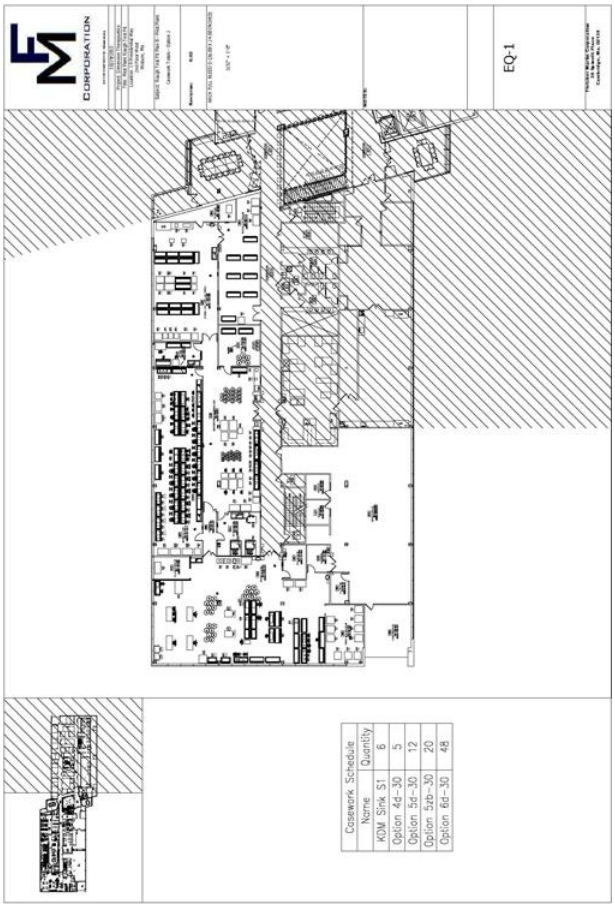
(a) **Consents**. Whenever consent or approval of either party is required under this Work Letter, that party shall not unreasonably withhold, condition or delay such consent or approval, unless expressly set forth herein to the contrary.

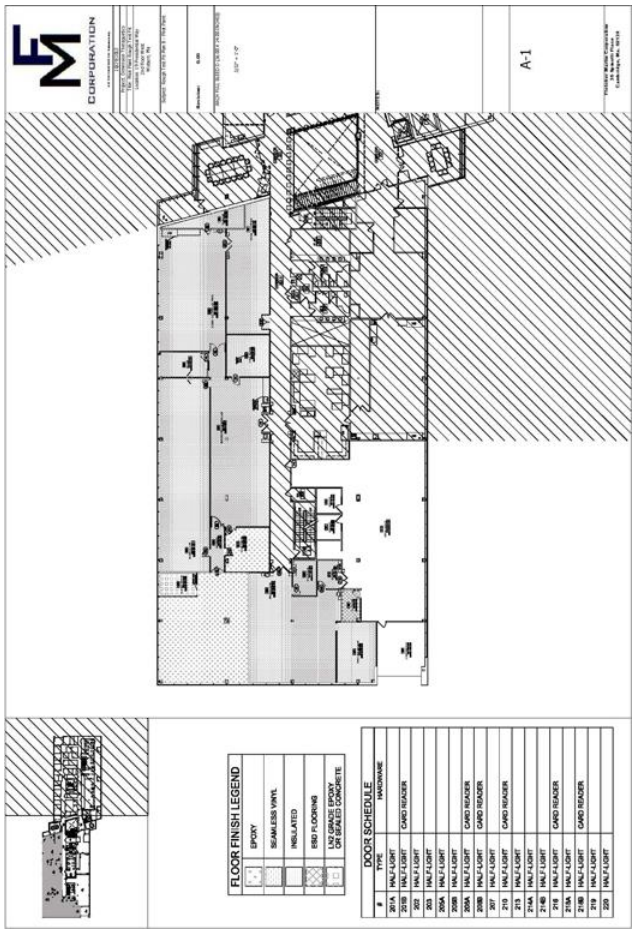
(b) **Modification**. No modification, waiver or amendment of this Work Letter or of any of its conditions or provisions shall be binding upon Landlord or Tenant unless in writing signed by Landlord and Tenant.

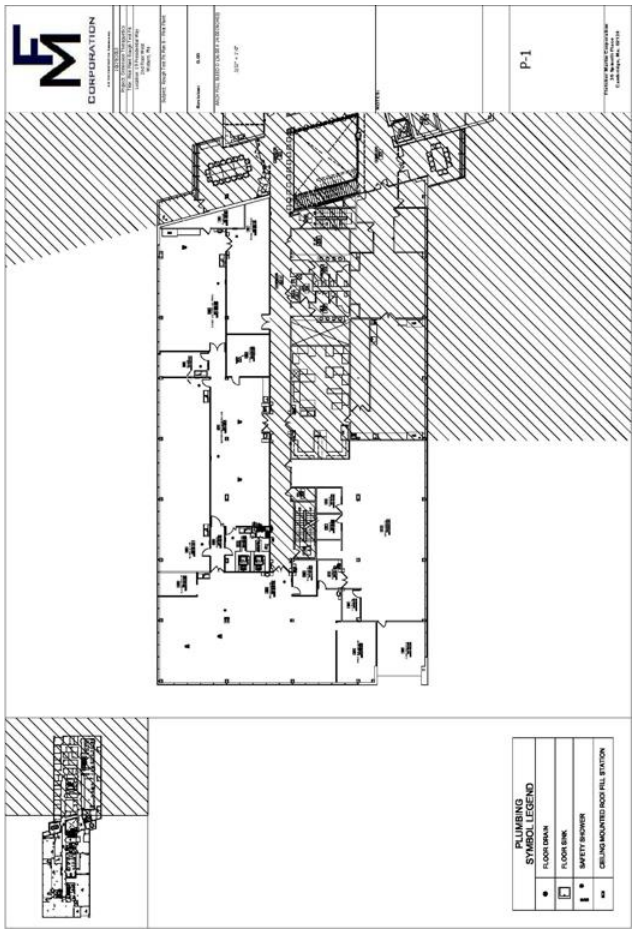
(c) **Default**. Notwithstanding anything set forth herein or in the Lease to the contrary, Landlord shall not have any obligation to perform any work hereunder or to fund any portion of the TI Costs during any period that there is a Default by Tenant under the Lease.

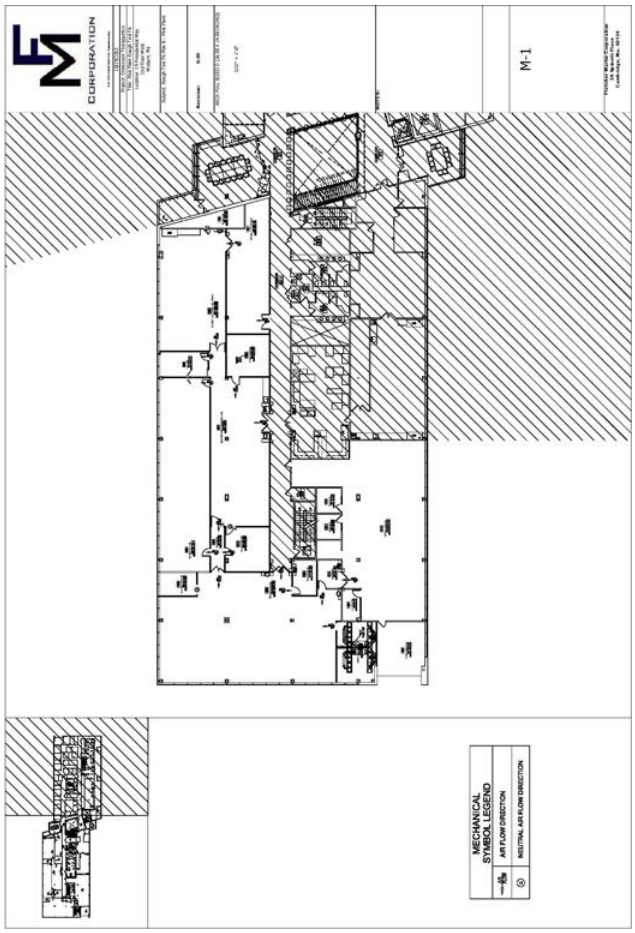
Schedule 1

Space Plans




CORPORATION
A-1
FLOOR FINISH LEGEND
EPOXY
SEAMLESS VINYL
INSULATED
ESD FLOORING
LN2 GRADE EPOXY OR SEALED CONCRETE
DOOR SCHEDULE
TYPE HARDWARE
201A HALF-LIGHT
203B HALF-LIGHT CARD READER
203 HALF-LIGHT
203 HALF-LIGHT
205A HALF-LIGHT
208B HALF-LIGHT
208A HALF-LIGHT CARD READER
208B HALF-LIGHT CARD READER
207 HALF-LIGHT
210 HALF-LIGHT CARD READER
213 HALF-LIGHT
214A HALF-LIGHT
214B HALF-LIGHT
216 HALF-LIGHT CARD READER
216A HALF-LIGHT
216B HALF-LIGHT CARD READER
219 HALF-LIGHT
220 HALF-LIGHT


CORPORATION
P-1
PLUMBING
SYMBOL LEGEND
FLOOR DRAIN
FLOOR SINK
SAFETY SHOWER
GROUND MOUNTED ROOF FILL STATION


CORPORATION
M-1
MECHANICAL
SYMBOL LEGEND
AIR FLOW DIRECTION
NEUTRAL AIR FLOW DIRECTION

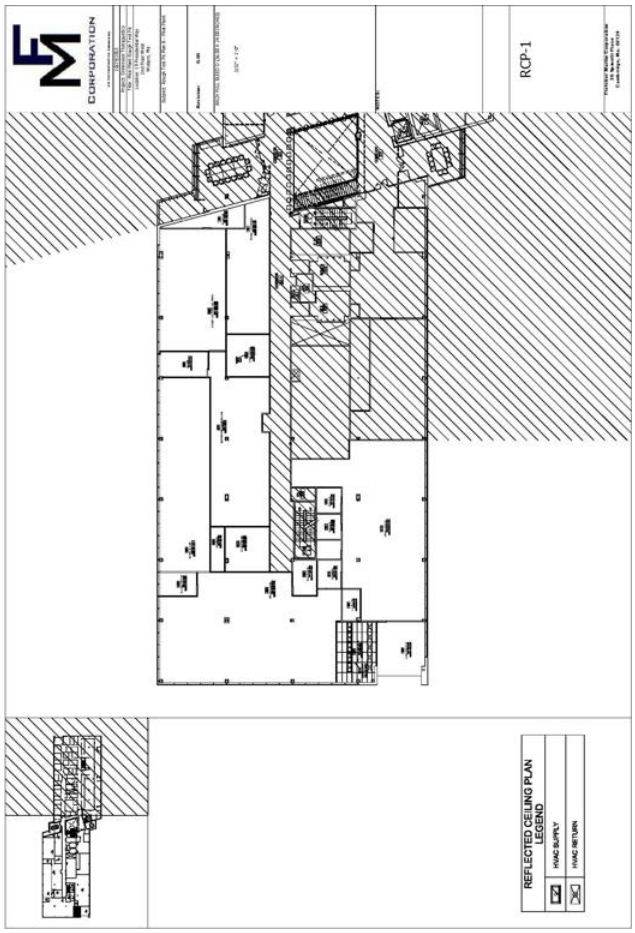

CORPORATION
RCP-1
REFLECTED CEILING PLAN
LEGEND
HVAC SUPPLY
HVAC RETURN

EXHIBIT D TO LEASE

ACKNOWLEDGMENT OF COMMENCEMENT DATE

This **ACKNOWLEDGMENT OF COMMENCEMENT DATE** is made this day of , , between **ARE-MA REGION NO. 20, LLC**, a Delaware limited liability company ("**Landlord**"), and **DIMENSION THERAPEUTICS, INC.**, a Delaware corporation ("**Tenant**"), and is attached to and made a part of the Lease dated , (the "**Lease**"), by and between Landlord and Tenant. Any initially capitalized terms used but not defined herein shall have the meanings given them in the Lease.

Landlord and Tenant hereby acknowledge and agree, for all purposes of the Lease, that the Commencement Date of the Base Term of the Lease is , and the termination date of the Base Term of the Lease shall be midnight on , . In case of a conflict between the terms of the Lease and the terms of this Acknowledgment of Commencement Date, this Acknowledgment of Commencement Date shall control for all purposes.

IN WITNESS WHEREOF, Landlord and Tenant have executed this ACKNOWLEDGMENT OF COMMENCEMENT DATE to be effective on the date first above written.

TENANT:

DIMENSION THERAPEUTICS, INC.,
a Delaware corporation

By: _____
Its: _____

LANDLORD:

ARE-MA REGION NO. 20, LLC,
a Delaware limited liability company

By: ALEXANDRIA REAL ESTATE EQUITIES, L.P.,
a Delaware limited partnership,
managing member

By: ARE-QRS CORP.,
a Maryland corporation,
general partner

By: _____
Its: _____

EXHIBIT E TO LEASE

Rules and Regulations

1. The sidewalk, entries, and driveways of the Project shall not be obstructed by Tenant, or any Tenant Party, or used by them for any purpose other than ingress and egress to and from the Premises.

2. Tenant shall not place any objects, including antennas, outdoor furniture, etc., in the parking areas, landscaped areas or other areas outside of its Premises, or on the roof of the Project.

3. Except for animals assisting the disabled, no animals shall be allowed in the offices, halls, or corridors in the Project.

4. Tenant shall not disturb the occupants of the Project or adjoining buildings by the use of any radio or musical instrument or by the making of loud or improper noises.

5. If Tenant desires telegraphic, telephonic or other electric connections in the Premises, Landlord or its agent will direct the electrician as to where and how the wires may be introduced; and, without such direction, no boring or cutting of wires will be permitted. Any such installation or connection shall be made at Tenant's expense.

6. Tenant shall not install or operate any steam or gas engine or boiler, or other mechanical apparatus in the Premises, except as specifically approved in the Lease. The use of oil, gas or inflammable liquids for heating, lighting or any other purpose is expressly prohibited. Explosives or other articles deemed extra hazardous shall not be brought into the Project.

7. Parking any type of recreational vehicles is specifically prohibited on or about the Project. Except for the overnight parking of operative vehicles, no vehicle of any type shall be stored in the parking areas at any time. In the event that a vehicle is disabled, it shall be removed within 48 hours. There shall be no "For Sale" or other advertising signs on or about any parked vehicle. All vehicles shall be parked in the designated parking areas in conformity with all signs and other markings. All parking will be open parking, and no reserved parking, numbering or lettering of individual spaces will be permitted except as specified by Landlord.

8. Tenant shall maintain the Premises free from rodents, insects and other pests.

9. Landlord reserves the right to exclude or expel from the Project any person who, in the judgment of Landlord, is intoxicated or under the influence of liquor or drugs or who shall in any manner do any act in violation of the Rules and Regulations of the Project.

10. Tenant shall not cause any unnecessary labor by reason of Tenant's carelessness or indifference in the preservation of good order and cleanliness. Landlord shall not be responsible to Tenant for any loss of property on the Premises, however occurring, or for any damage done to the effects of Tenant by the janitors or any other employee or person.

11. Tenant shall give Landlord prompt notice of any defects in the water, lawn sprinkler, sewage, gas pipes, electrical lights and fixtures, heating apparatus, or any other service equipment affecting the Premises.

12. Tenant shall not permit storage outside the Premises, including without limitation, outside storage of trucks and other vehicles, or dumping of waste or refuse or permit any harmful materials to be placed in any drainage system or sanitary system in or about the Premises.

13. All moveable trash receptacles provided by the trash disposal firm for the Premises must be kept in the trash enclosure areas, if any, provided for that purpose.

14. No auction, public or private, will be permitted on the Premises or the Project.

15. No awnings shall be placed over the windows in the Premises except with the prior written consent of Landlord.

16. The Premises shall not be used for lodging, sleeping or cooking or for any immoral or illegal purposes or for any purpose other than that specified in the Lease. No gaming devices shall be operated in the Premises.

17. Tenant shall ascertain from Landlord the maximum amount of electrical current which can safely be used in the Premises, taking into account the capacity of the electrical wiring in the Project and the Premises and the needs of other tenants, and shall not

use more than such safe capacity. Landlord’s consent to the installation of electric equipment shall not relieve Tenant from the obligation not to use more electricity than such safe capacity.

18. Tenant assumes full responsibility for protecting the Premises from theft, robbery and pilferage.

19. Tenant shall not install or operate on the Premises any machinery or mechanical devices of a nature not directly related to Tenant’s ordinary use of the Premises and shall keep all such machinery free of vibration, noise and air waves which may be transmitted beyond the Premises.

EXHIBIT F TO LEASE

TENANT'S PERSONAL PROPERTY

2 Autoclaves

Glass Wash

EXHIBIT G TO LEASE

STORAGE AREA

Exact location to be determined and mutually agreed upon.

CONSENT TO ASSIGNMENT

This Consent to Assignment (this "**Consent**") is made as of January 30, 2018, by ARE-MA REGION NO. 20, LLC, a Delaware limited liability company, having an address of 385 East Colorado Boulevard, Suite 299, Pasadena, CA 91101 ("**Landlord**"), to DIMENSION THERAPEUTICS, INC., a Delaware corporation, having an address of 19 Presidential Way, Suite 202, Woburn, MA 01801 ("**Tenant**"), and ULTRAGENYX PHARMACEUTICAL INC., a Delaware corporation, having an address of 60 Leveroni Court, Novato, CA 94949 ("**Assignee**"), with reference to the following Recitals.

R E C I T A L S

A. Tenant is the holder of the tenant's interest in, to, and under that certain Lease Agreement dated on or about October 30, 2015 (the "**Lease**"), by and between Landlord, as landlord, and Tenant, as tenant.

B. Tenant desires to assign its interest in the Lease, the premises demised thereunder, and any security deposit held by Landlord thereunder to Assignee, all as more particularly described in and pursuant to the provisions of that certain Assignment and Assumption Agreement dated as of January 29, 2018 (the "**Assignment**"), a copy of which is attached hereto as Exhibit A.

C. Tenant desires to obtain Landlord's consent to the Assignment.

NOW, THEREFORE, in consideration of the foregoing and the agreements contained herein, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Landlord hereby consents to the assignment of the Lease to Assignee; such consent being subject to and upon the following terms and conditions to which Tenant and Assignee hereby agree:

1. All initially capitalized terms not otherwise defined in this Consent shall have the meanings set forth in the Lease unless the context clearly indicates otherwise.

2. This Consent shall not be effective and the Assignment shall not be valid nor shall Assignee take possession of the Premises unless and until Landlord shall have received: (a) a fully executed counterpart of the Assignment, (b) a fully executed counterpart of this Consent, and (c) an insurance certificate from Assignee, as insured, evidencing no less than the insurance requirements set forth in the Lease. Tenant and Assignee represent and warrant to Landlord that the copy of the Assignment attached hereto as Exhibit A is true, correct and complete in all material respects.

3. Landlord neither approves nor disapproves the terms, conditions and agreements contained in the Assignment, all of which shall be subordinate and at all times subject to all of the covenants, agreements, terms, provisions and conditions contained in the Lease.

4. Nothing contained herein or in the Assignment shall be construed to modify, waive, impair, or affect any of the terms, covenants or conditions contained in the Lease (including Assignee's obligation to obtain any required consents for any other or future assignments or sublettings), or to waive any breach thereof, or any rights or remedies of Landlord under the Lease against any person, firm, association or corporation liable for the performance thereof, or to enlarge or increase Landlord's obligations or liabilities under the Lease (including, without limitation, any liability to Tenant for any portion of the security deposit held by Landlord under the Lease, all interests in which have been assigned by Tenant to Assignee), and all terms, covenants and conditions of the Lease are hereby declared by each of Landlord, Tenant and Assignee to be in full force and effect. **Tenant shall remain liable and responsible for the due keeping, performance and observance of all the terms, covenants and conditions set forth in the Lease on the**

part of the Tenant to be kept, performed and observed and for the payment of the annual rent, additional rent and all other sums now and hereafter becoming payable thereunder.

5. Landlord agrees that (i) the provisions of the second paragraph of Section 11(a) of the Lease will continue to apply to, and for the benefit of, Assignee on and after the effective date of the Assignment ; (ii) the provisions of Section 39 of the Lease will continue to apply to, and for the benefit of, Assignee on and after the effective date of the Assignment; and (iii) the Assignment is a "Control Permitted Assignment" and a "Permitted Assignment" under the Lease.

6. Notwithstanding anything in the Assignment to the contrary:

(a) Assignee does hereby expressly assume and agree to be bound by and to perform and comply with, for the benefit of Landlord, each and every obligation of Tenant under the Lease arising after the effective date of the assignment of the Lease to Assignee.

(b) Tenant and Assignee agree to each of the terms and conditions of this Consent, and upon any conflict between the terms of the Assignment and this Consent, the terms of this Consent shall control.

7. Upon a default by Assignee under the Lease, Landlord may proceed directly against Assignee, Tenant, any guarantors or anyone else liable under the Lease or the Assignment without first exhausting Landlord's remedies against any other person or entity liable thereon to Landlord. The mention in this Consent of any particular remedy shall not preclude Landlord from any other remedy in law or in equity.

8. Tenant shall pay any broker commissions or fees that may be payable as a result of the Assignment and Tenant hereby indemnifies and agrees to hold Landlord harmless from and against any loss or liability arising therefrom or from any other commissions or fees payable in connection with the Assignment which result from the actions of Tenant. Assignee hereby indemnifies and agrees to hold Landlord harmless from and against any loss or liability arising from any commissions or fees payable in connection with the Assignment which result from the actions of Assignee.

9. Tenant and Assignee agree that the Assignment will not be modified or amended in any way without the prior written consent of Landlord. Any modification or amendment of the Assignment without Landlord's prior written consent shall be void and of no force or effect.

10. This Consent may not be changed orally, but only by an agreement in writing signed by Landlord and the party against whom enforcement of any change is sought.

11. This Consent may be executed in any number of counterparts, each of which shall be deemed an original, but all of which when taken together shall constitute but one and the same instrument.

12. This Consent and the legal relations between the parties hereto shall be governed by and construed and enforced in accordance with the internal laws of the State in which the Property is located, without regard to its principles of conflicts of law.

13. Each of Tenant and Assignee, and all of the respective beneficial owners of each of Tenant and Assignee, as applicable, are currently (a) in compliance with and, with respect to the Assignee, shall at all times during the Term of the Lease remain, in compliance with the regulations of the Office of Foreign Assets Control ("**OFAC**") of the U.S. Department of Treasury and any statute, executive order, or regulation relating thereto (collectively, the "**OFAC Rules**"), (b) not listed on, and, with respect to the Assignee, shall not during the term of the Lease be listed on, the Specially Designated Nationals and

Blocked Persons List, Foreign Sanctions Evaders List or the Sectoral Sanctions Identifications List, which are all maintained by OFAC and/or on any other similar list maintained by OFAC or other governmental authority pursuant to any authorizing statute, executive order, or regulation, and (c) not a person or entity with whom a U.S. person is prohibited from conducting business under the OFAC Rules.

[Signatures are on the next page.]

IN WITNESS WHEREOF, Landlord, Tenant and Assignee have caused their duly authorized representatives to execute this Consent as of the date first above written.

LANDLORD: ARE-MA REGION NO. 20, LLC,
a Delaware limited liability company

By: ALEXANDRIA REAL ESTATE EQUITIES, L.P.,
a Delaware limited partnership,
managing member

By: ARE-QRS CORP.,
a Maryland corporation,
general partner

By: /s/ Jackie Clem
Jackie Clem
Senior Vice President

RE Legal Affairs

TENANT: DIMENSION THERAPEUTICS, INC.,
a Delaware corporation

By: /s/ Karah Parschauer
Its: Vice President and Secretary

ASSIGNEE: ULTRAGENYX PHARMACEUTICAL INC.,
a Delaware corporation

By: /s/ Karah Parschauer
Its: EVP and General Counsel

ASSIGNMENT AND ASSUMPTION AGREEMENT

This ASSIGNMENT AND ASSUMPTION AGREEMENT ("Agreement"), dated as of January 29, 2018 (the "Effective Date"), is made between Dimension Therapeutics, Inc., a Delaware corporation ("Assignor") and Ultragenyx Pharmaceutical Inc., a Delaware corporation ("Assignee").

WHEREAS, Assignor and ARE-MA REGION NO. 20, LLC, a Delaware limited liability company (the "Landlord"), are parties to that certain Lease Agreement dated on or about October 30, 2015 (the "Lease");

WHEREAS, Assignor merged with and into a wholly-owned subsidiary of Assignee, such that Assignor became a wholly-owned subsidiary of Assignee on November 7, 2017;

WHEREAS, Landlord requested that Assignor assign, sell, transfer, set over and deliver unto Assignee all of Assignor's estate, right, title and interest in and to the Lease; and

WHEREAS, Assignor now wishes to assign, sell, transfer, set over and deliver unto Assignee all of Assignor's estate, right, title and interest in and to the Lease;

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Assignor and Assignee hereby agree as follows:

1.Assignor hereby assigns, sells, transfers, sets over and delivers unto Assignee all of Assignor's estate, right, title and interest in and to the Lease, including, for the avoidance of doubt, the provisions of the second paragraph of Section 11(a) of the Lease and the provisions of Section 39 of the Lease (the "Assignment").

2.Assignee hereby accepts the foregoing assignment and hereby assumes and agrees to be bound by the terms, conditions and restrictions set forth in the Lease to the extent arising out of the period commencing on, or accruing from or after, the Effective Date.

3.The provisions of this Agreement shall be binding upon and inure to the benefit of Assignor and Assignee and their respective successors and assigns.

4.Assignor and Assignee agree to execute, or to cause to be executed, all documents and instruments reasonably required in order to consummate the assignment herein contemplated, and each and every one of the transactions contemplated hereby.

5.This Agreement may be executed in several counterparts and all such executed counterparts shall constitute one agreement, binding on all of the parties hereto, notwithstanding that all of the parties hereto are not signatories to the original or to the same counterpart.

6.The validity, construction and operational effect of this Agreement shall be governed by the internal laws of the State of Massachusetts, without regard for its choice of law principles.

7.If any portion of this Agreement is held to be unenforceable by a court of competent jurisdiction, the remainder of this Agreement shall remain in full force and effect.

8.Nothing in this Agreement is intended, nor will be deemed, to confer rights or remedies upon any person or legal entity not a party to this Agreement.

[The remainder of this page has been intentionally left blank.]

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

DIMENSION THERAPEUTICS, INC.

By:/s/ Karah Parschauer
Name: Karah Parschauer
Title: Vice President and Secretary

ULTRAGENYX PHARMACEUTICAL INC.

By:/s/ Karah Parschauer
Name: Karah Parschauer
Title: EVP and General Counsel

Exhibit 21.1

Significant Subsidiaries of Ultragenyx Pharmaceutical Inc.

Name of Subsidiary	Jurisdiction of Incorporation
Ultragenyx Holdco LLC	Delaware
Ultragenyx UK Ltd	United Kingdom
Ultragenyx International Ltd.	Cayman Islands
Ultragenyx International UX001 Ltd.	Cayman Islands
Ultragenyx International UX003 Ltd.	Cayman Islands
Ultragenyx International UX007 Ltd.	Cayman Islands
Ultragenyx International UX0023 Ltd.	Cayman Islands
Ultragenyx Europe GmbH	Switzerland
Ultragenyx Germany GmbH	Germany
Ultragenyx Brasil Farmacêutica Ltda.	Brazil
Ultragenyx Argentina SRL	Argentina
Ultragenyx Colombia SAS	Colombia
Ultragenyx Netherlands B.V.	Netherlands
Ultragenyx France SAS	France
Dimension Therapeutics, Inc.	Delaware
Dimension Securities Corporation	Massachusetts

Exhibit 23.1

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the incorporation by reference in the following Registration Statements:

(1) Registration Statement (Form S-3 No. 333-201838) of Ultragenyx Pharmaceutical Inc., and

(2) Registration Statement (Form S-8 Nos. 333-201843, 333-194773, 333-209729 and 333-216110) pertaining to the 2011 Equity Incentive Plan, as amended, 2014 Incentive Plan and 2014 Employee Stock Purchase Plan of Ultragenyx Pharmaceutical Inc.;

(3) Registration Statement (Form S-8 No. 333-221381) pertaining to the Dimension Therapeutics, Inc. 2015 Stock Option and Incentive Plan and the Dimension Therapeutics, Inc. 2013 Stock Plan, both as assumed by Ultragenyx Pharmaceutical Inc.;

of our reports dated February 21, 2018, with respect to the consolidated financial statements of Ultragenyx Pharmaceutical Inc. and the effectiveness of internal control over financial reporting of Ultragenyx Pharmaceutical Inc. included in this Annual Report (Form 10-K) of Ultragenyx Pharmaceutical Inc. for the year ended December 31, 2017.

/s/ ERNST & YOUNG LLP

San Jose, California

February 21, 2018

Exhibit 31.1

CERTIFICATION PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Emil D. Kakkis, certify that:

1. I have reviewed this Annual Report on Form 10-K of Ultragenyx Pharmaceutical Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Dated: February 21, 2018

/s/ Emil D Kakkis

Emil D. Kakkis, M.D., Ph.D.
President and Chief Executive Officer
(Principal Executive Officer)

Exhibit 31.2

CERTIFICATION PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Shalini Sharp, certify that:

1. I have reviewed this Annual Report on Form 10-K of Ultragenyx Pharmaceutical Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Dated: February 21, 2018

/s/ Shalini Sharp
Shalini Sharp
Chief Financial Officer and Executive Vice President
(Principal Financial Officer)

Exhibit 32.1

CERTIFICATION PURSUANT TO SECTION 906 OF
THE SARBANES-OXLEY ACT OF 2002 (18 U.S.C. SECTION 1350)

In connection with the accompanying Annual Report of Ultragenyx Pharmaceutical Inc. (the "Company") on Form 10-K for the year ended December 31, 2017 (the "Report"), I, Emil D. Kakkis, M.D., Ph.D., as President and Chief Executive Officer of the Company, and Shalini Sharp, as Chief Financial Officer and Executive Vice President of the Company, certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that:

(1) The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

(2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Dated: February 21, 2018

/s/ Emil D. Kakkis
Emil D. Kakkis, M.D., Ph.D.
President and Chief Executive Officer
(Principal Executive Officer)

Dated: February 21, 2018

/s/ Shalini Sharp
Shalini Sharp
Chief Financial Officer and Executive Vice President
(Principal Financial Officer)