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

FORM 10-K

[Mark One]

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

For the Fiscal Year Ended December 31, 2018

OR

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

Commission File No. 001-33057

CATALYST PHARMACEUTICALS, INC.
(Exact name of registrant as specified in its charter)

Delaware	**76-0837053**
(State of jurisdiction of incorporation or organization)	**(IRS Employer Identification No.)**
355 Alhambra Circle, Suite 1250 Coral Gables, Florida	**33134**
(Address of principal executive offices)	**(Zip Code)**

Registrant's telephone number, including area code: (305) 420-3200

Securities Registered Pursuant to Section 12(b) of the Act.

Common Stock, par value $0.001 per share	**Nasdaq Capital Market**
(Title of each class)	**(Name of exchange on which registered)**

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

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

Indicate by check mark if registrant is not required to file reports pursuant to Rule 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, every Interactive Data File required to be submitted 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 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 an 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:

Large accelerated filer	☐	Accelerated filer	☒
Non-accelerated filer	☐	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 pursuant to Section 13(a) of the Exchange Act ☐

As of June 30, 2018, the last business day of the Registrant's most recently completed second quarter, the aggregate market value of all voting, and non-voting common equity held by non-affiliates was $298,397,093.

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

Indicate the number of shares outstanding of each of the issuer's classes of common stock, as of the latest practicable date: 102,739,257 shares of common stock, $0.001 par value per share, were outstanding as of March 14, 2019.

Part III incorporates certain information by reference from the registrant's definitive proxy statement for the 2018 annual meeting of stockholders. The proxy statement with respect to the 2019 annual meeting of stockholders will be filed no later than 120 days after the close of the registrant's fiscal year ended December 31, 2018.

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EXHIBITS FILED WITH FORM 10-K

PART I

You are urged to read this Annual Report on Form 10-K ("Form 10-K") in its entirety. This Form 10-K contains forward-looking statements that involve risks and uncertainties. Our actual results may differ significantly from the projected results discussed in these forward-looking statements. Factors that may cause such a difference include, but are not limited to, those discussed below and in Item 1A, "Risk Factors."

"We," "our," "ours," "us," "Catalyst," or the "Company," when used herein, refers to Catalyst Pharmaceuticals, Inc., a Delaware corporation, and its wholly-owned subsidiary, Catalyst Pharmaceuticals Ireland, Ltd., a corporation organized in the Republic of Ireland.

Forward-Looking Statements

This Annual Report on Form 10-K contains "forward-looking statements", as that term is defined in the Private Securities Litigation Reform Act of 1995. These include statements regarding our expectations, beliefs, plans or objectives for future operations and anticipated results of operations. For this purpose, any statements contained herein that are not statements of historical fact may be deemed to be forward-looking statements. Without limiting the foregoing, "believes", "anticipates", "proposes", "plans", "expects", "intends", "may", and other similar expressions are intended to identify forward-looking statements. Such statements involve known and unknown risks, uncertainties and other factors that may cause our actual results, performance or other achievements to be materially different from any future results, performances or achievements expressed or implied by such forward-looking statements. Factors that might cause such differences include, but are not limited to, those discussed in the section entitled "Item 1A – Risk Factors" and those discussed in the section entitled "Item 7 – Management's Discussion and Analysis of Financial Condition and Results of Operations – Caution Concerning Forward-Looking Statements."

The successful commercialization of Firdapse® and the development of additional indications for Firdapse® and other drug candidates is highly uncertain. We cannot reasonably estimate or know the nature, timing, or estimated expenses of the efforts necessary to complete the development of, or the period in which material net cash inflows are expected to commence due to the numerous risks and uncertainties associated with commercializing and developing such products, including the uncertainty of:

- our estimates regarding anticipated capital requirements and our future needs for additional financing;
- the impact on Firdapse® of adverse changes in potential reimbursement and coverage policies from government and private payors such as Medicare, Medicaid, insurance companies, health maintenance organizations and other plan administrators, or the impact of pricing pressures enacted by industry organizations, the federal government or the government of any state, including as a result of increased scrutiny over pharmaceutical pricing or otherwise;
- the impact on our business and results of operations of recent public statements by Senator Bernie Sanders and a vocal group of LEMS patients who object to our pricing of Firdapse®;
- whether we will be able to successfully market Firdapse® while maintaining full compliance with applicable federal and state laws, rules and regulations;
- whether our estimates of the size of the market for our drug candidates will turn out to be accurate;
- whether we will be able to locate LEMS patients who are undiagnosed or who are misdiagnosed with other diseases;
- whether our efforts to commercialize Firdapse® will be successful and, even if they are successful, whether we can become profitable;
- whether payors will reimburse for our product;
- changes in the healthcare industry and the effect of political pressure from President Trump, Congress and/or medical professionals seeking to reduce prescription drug costs;
- changes to the healthcare industry occasioned by any future repeal and replacement of the Affordable Care Act, in laws relating to the pricing of drug products, or changes in the healthcare industry generally;

- the scope, rate of progress and expense of our clinical trials and studies, pre-clinical studies, proof-of-concept studies, and our other drug development activities, and whether our trials and studies will be successful;
- our ability to complete our trials and studies on a timely basis and within the budgets we establish for such trials and studies;
- whether the trials that we are currently undertaking to evaluate Firdapse® for the treatment of Congenital Myasthenic Syndromes (CMS), Anti-MuSK antibody positive myasthenia gravis (MuSK-MG) and Spinal Muscular Atrophy (SMA) Type 3, or any other trials that we undertake in the future, will be successful;
- whether Firdapse® will ever be approved for the treatment of CMS, MuSK-MG, SMA Type 3, or any other neuromuscular disease;
- the result of our currently ongoing arbitration action with Northwestern University regarding our license for CPP-115;
- whether our version of generic vigabatrin tablets will ever be approved by the United States Food and Drug Administration (FDA);
- even if vigabatrin tablets are approved for commercialization, whether Endo Ventures/Par Pharmaceutical will be successful in marketing the product;
- whether Catalyst will earn milestone payments on approval of an Abbreviated New Drug Application (ANDA) for generic vigabatrin tablets and royalties on sales of generic vigabatrin tablets; and
- the ability of our third-party suppliers and contract manufacturers to maintain compliance with current Good Manufacturing Practices (cGMP).

Our current plans and objectives are based on assumptions relating to the development of our current drug candidates, and particularly the development of additional indications for Firdapse®. Although we believe that our assumptions are reasonable, any of our assumptions could prove inaccurate. In light of the significant uncertainties inherent in the forward-looking statements we have made herein, which reflect our views only as of the date of this report, you should not place undue reliance upon such statements. We undertake no obligation to update or revise publicly any forward-looking statements, whether as a result of new information, future events or otherwise.

Item 1. Business

Overview

We are a biopharmaceutical company focused on developing and commercializing innovative therapies for people with rare, debilitating, chronic neuromuscular and neurological diseases. We are dedicated to making a meaningful impact on the lives of those suffering from rare diseases, and we believe in putting patients first in everything we do.

Firdapse®

In October 2012, we licensed the North American rights to Firdapse®, a proprietary form of amifampridine phosphate, or chemically known as 3,4-diaminopyridine phosphate, from BioMarin Pharmaceutical Inc. (BioMarin). When we acquired the rights to the product, it had already been granted orphan drug designation by the FDA for the treatment of patients with Lambert-Eaton Myasthenic Syndrome (LEMS), a rare and sometimes fatal autoimmune disease characterized by muscle weakness. Further, in August 2013, we were granted "breakthrough therapy designation" by the United States Food & Drug Administration (FDA), for Firdapse® for the treatment of LEMS. Further, the FDA has granted Orphan Drug Designation for Firdapse® for the treatment of patients with Congenital Myasthenic Syndromes (CMS) and Myasthenia Gravis (MG).

On November 28, 2018, we received approval from the FDA for Firdapse® 10 mg tablets for the treatment of adults with LEMS. Prior to that approval, the chemical entity, amifampridine (3,4-diaminopyridine, or 3,4-DAP), had never been approved by the FDA for any indication. Because amifampridine phosphate (Firdapse®) had previously been granted Orphan Drug designation for the treatment of LEMS, we have received seven years of marketing exclusivity for this indication. Further, since we were the first pharmaceutical company to obtain approval for a product containing amifampridine, we have also received five years of marketing exclusivity with respect to the use of this product for all indications, running concurrently with the seven years of orphan marketing exclusivity described above.

In January 2019, we launched Firdapse® in the United States, selling through a field force experienced in neurologic, central nervous system or rare disease products consisting of approximately 20 field personnel, including sales (Regional Account Managers), patient assistance and insurance navigation support (Patient Access Liaisons), and payer reimbursement (National Account Managers) personnel. We also have a field-based force of six medical science liaisons who are helping educate the medical communities and patients about LEMS and about our ongoing clinical trial activities evaluating Firdapse® for other ultra-orphan, neuromuscular diseases. Finally, we are working with several rare disease advocacy organizations (including Global Genes, the National Organization for Rare Disorders (NORD), and the Myasthenia Gravis Foundation of America) to help increase awareness and level of support for patients living with LEMS, CMS and MuSK antibody positive myasthenia gravis, or MuSK-MG, and to provide education for the physicians who treat these rare diseases and the patients they treat.

We are supporting the distribution of Firdapse® through "Catalyst Pathways™," our personalized treatment support program. "Catalyst Pathways" is a single source for personalized treatment support, education and guidance through the challenging dosing and titration regimen to an effective therapeutic dose. It also includes distributing the drug through a very small group of exclusive specialty pharmacies (primarily AnovoRx), which is consistent with the way that most pharmaceutical products for ultra-orphan diseases are distributed and dispensed to patients. We believe that by using specialty pharmacies in this way, the difficult task of navigating the health care system is far better for the patient needing treatment for their rare disease and the health care community in general.

In order to help patients afford their medication, we, like other pharmaceutical companies which are marketing drugs for ultra-orphan conditions, have developed an array of financial assistance programs that are available to reduce patient co-pays and deductibles to a nominal affordable amount. For eligible patients with commercial coverage, a co-pay assistance program designed to keep out-of-pocket costs to $10 or less per month is available for all LEMS patients prescribed Firdapse®. We are also donating, and committing to continue to donate, money to qualified, independent charitable foundations dedicated to providing assistance to LEMS patients in financial need. Our goal is to ensure that no LEMS patient is ever denied access to Firdapse® for financial reasons.

We are currently conducting a Phase 3 clinical trial evaluating Firdapse® for the treatment of certain types of CMS. This trial, which will include approximately 23 adult and pediatric subjects, is being conducted at trial sites around the United States and Canada. Details of this trial are available on www.clinicaltrials.gov (NCT02562066). Based on currently available information, we expect to report top-line results from this trial in the second half of 2019.

We are currently conducting a Phase 3 clinical trial evaluating Firdapse® for the treatment of MuSK-MG under a Special Protocol Assessment (SPA) with the FDA. The trial is a multi-site, international (United States and Italy), double-blind, placebo-controlled, clinical trial that is targeted to enroll approximately 60 subjects diagnosed with MuSK-MG. The trial will also enroll up to 10 generalized myasthenia gravis patients who will be assessed with the same clinical endpoints but achieving statistical significance in this subgroup of patients is not required and only summary statistics will be provided. We initiated this trial in January 2018 and are currently enrolling subjects. We currently expect to report top-line results from this trial in the second half of 2019. Details of this trial are available on www.clinicaltrials.gov (NCT03304054).

Because the FDA has granted Orphan Drug Designation for Firdapse® for the treatment of patients with CMS and Myasthenia Gravis (MG), if we are the first to receive approvals in the future for Firdapse® for the treatment of CMS or MuSK-MG, we would be eligible to receive seven years of marketing exclusivity for those indications added to our Firdapse® label, of which there can be no assurance.

We are conducting a proof-of-concept clinical study evaluating Firdapse® as a symptomatic treatment for patients with Spinal Muscular Atrophy (SMA) Type 3, ambulatory. The study is designed as a randomized (1:1), double-blind, 2-period, 2-treatment, crossover, outpatient proof-of-concept study to evaluate the safety, tolerability and potential efficacy of amifampridine in ambulatory patients diagnosed with SMA Type 3. The study is planned to include approximately 12 patients, and we currently expect to report top-line results from this study in the first half of 2020. Details of this trial are available on www.clinicaltrials.gov (NCT03781479).

There can be no assurance that our currently ongoing trials evaluating Firdapse® for the treatment of CMS, MuSK-MG or SMA Type 3, or any trials we may undertake in the future to evaluate Firdapse® for the treatment of other rare neuromuscular diseases, will be successful. Further, there can be no assurance that we will ever be granted the right to commercialize Firdapse® for any of these indications.

Finally, we intend to take steps to seek approval for Firdapse® in Canada. We also intend as a longer term strategy to seek to develop a sustained release formulation for Firdapse®. There can be no assurance that we will be successful in these efforts.

Recent Developments Regarding Pricing for Firdapse®

The pricing of pharmaceutical products, in general, and of specialty drugs, in particular, has been a topic of concern in the United States Congress, where hearings have been held on the topic, and several bills have been introduced proposing a variety of actions to restrain the prices of drugs. The President of the United States has frequently discussed his intention to reduce drug prices. The Administration has solicited public comment on a variety of regulatory proposals to reduce drug prices, and has also issued several proposed regulations with that objective, such as a proposal to conduct a pilot test that involves tying reimbursement of separately paid drugs under Medicare Part B to an index of average prices of the drug in certain foreign countries, and a proposal to require drug companies to disclose the list price of a drug in direct-to-consumer television advertisements. It is possible that at least some of these legislative proposals will be enacted and some of the proposed regulations will be finalized. We cannot predict how any such laws or regulations, or new laws or regulations that have yet to be proposed, will affect the pricing of our product, of orphan drugs generally, or of pharmaceutical products generally.

We have established pricing for Firdapse® at an annual list price of $375,000 for a typical LEMS patient who remains 100% persistent and compliant with therapy for an entire year. We believe that the pricing of our product is in line with the pricing of other products that provide significant clinical benefits in treating an ultra-orphan disease of similar severity and in order to properly compensate companies for the costs associated with developing, manufacturing, and marketing an orphan drug in compliance with regulatory requirements. While there can be no assurance, we believe that our drug will be widely covered and reimbursed by private and public payors for the indicated small population of adult LEMS patients, as part of their mission to assure that rare disease patients receive timely treatment for proven medicines. Furthermore, forecasted rebates, discounts, patient commercial co-pay support, Medicare coverage gap subsidies, statutory Medicaid discounts and other governmental discounts will result in our net sale price being 15-20% lower than our annual list price for the product.

In early February 2019, we received a letter from Senator Bernie Sanders asking us to justify our pricing decision for Firdapse®. In the letter, Senator Sanders accuses us of "fleecing" Americans and "immoral exploitation" because of our decision regarding the pricing of Firdapse®. We have responded to Senator Sanders, who has issued a public statement in response asking FDA Commissioner Scott Gottlieb to allow pharmacies and manufacturers who were previously making this drug to be permitted to resume providing it.

In our response to Senator Sanders, we noted the following:

- There was a large unmet medical need for an FDA approved therapy to treat LEMS patients. Prior to initiating our development program for amifampridine phosphate, only about 200 LEMS patients were receiving an unapproved, investigational amifampridine product to treat their disease. Since the estimated prevalence of LEMS in the U.S. is about 3,000 patients (of which approximately 1,500 patients have been diagnosed with LEMS in claims data over the last two years), the vast majority of LEMS patients did not have access to an amifampridine-based product. With FDA approval, all adult LEMS patients, now have affordable access to Firdapse®.

- We have developed an array of financial assistance programs that are available to reduce patient co-pays and deductibles to a nominal affordable amount and, since the approval of Firdapse®, a physician can now simply write a prescription and Firdapse® will be delivered to the patient's door within 2-3 days and in most cases the patient's monthly out-of-pocket expense will be $10 or less.
- While a few patients may have had access to unapproved, investigational amifampridine, Firdapse® is not an "old drug" or a repurposed drug. Until Firdapse® was approved, an amifampridine-based product had never been approved in the U.S. for any indication, and thus our product has received a new chemical entity designation from the FDA. We believe that the orphan drug exclusivity that we received because we were the first amifampridine-based product approved in the U.S. is Congress' way of incentivizing pharmaceutical companies like ours to take the substantial risks associated with developing and obtaining approval of drugs to treat ultra-rare conditions.
- In order to gain FDA approval of our product, we were required to submit the results of more than 70 non-clinical and clinical studies, including two Phase 3 trials evaluating Firdapse® for the treatment of LEMS, at a cost of millions of dollars. Based on the evidence we presented, in November 2018 the FDA approved Firdapse® (amifampridine phosphate) for use in adults with LEMS. Now, for the first time, LEMS patients have confidence that their therapy is FDA approved and is safe and effective.
- We continue to spend millions of dollars per year evaluating Firdapse® in clinical trials as a potential treatment for other rare neuromuscular disorders where there is no current FDA approved drug to treat those disorders. While we are hopeful, we have no guarantees that our investment in the clinical trials for these other indications will be successful.
- We respectfully question the notion that the use of an experimental product not approved by the FDA is an acceptable standard of care for LEMS patients – or indeed for any patients. The distribution of products under compassionate use programs is only intended to allow dispensing of unapproved drugs for a limited period of time while companies undertake the necessary steps to obtain FDA review and approval of their product. This means of "distribution" was never intended to be a final or even a long term mechanism for making drugs available to patients under the law, and such a notion represents a dangerous precedent that runs counter to the entire FDA regulatory structure.

There can be no assurance as to how these matters will affect our business or results of operations.

We are also aware that the vocal group of neuromuscular physicians and some LEMS patients who have raised these issues in the past are continuing to raise concerns with the pricing of our product and with the appropriateness of the provisions in the Orphan Drug Act under which we were granted exclusivity for Firdapse®. A few of these patients continue to say negative things about us to the media, to the FDA and to politicians. We cannot assess the impact of these activities on our business.

Generic Sabril®

In September 2015, we announced the initiation of a project to develop generic versions of Sabril® (vigabatrin). Sabril® is marketed by Lundbeck Inc. in the United States in two dosage forms (powder sachets and tablets) for the treatment of infantile spasms and refractory complex partial seizures. Par Pharmaceutical brought the first generic version of the powder sachet to market, and, to date, several generic versions of the powder sachets have been approved. However, at this time, there is only one approved generic version of the tablets.

On December 18, 2018, we announced that we had signed a definitive agreement with Endo International PLC's subsidiary, Endo Ventures Limited ("Endo"), for the further development and commercialization of generic Sabril® tablets through Endo's United States Generic Pharmaceuticals segment, Par Pharmaceutical. Pursuant to the agreement, we have received an up-front payment, and we will receive milestone payments based on achievement of regulatory approvals, and a sharing of defined net profits upon commercialization and certain expenses for development.

There can be no assurance that our collaboration with Endo for the development of generic Sabril® (vigabatrin) tablets will be successful and that if an ANDA is approved for vigabatrin tablets in the future, that it will be profitable to us.

Capital Resources

At December 31, 2018, we had cash and investments of approximately $58.5 million. Based on our current financial condition and forecasts of available cash, we believe that we have sufficient funds to support our operations for at least the next 12 months. There can be no assurance that we will be successful in commercializing Firdapse® or become profitable, or as to whether we will require additional funding in the future (and whether any such required funding will be available). See Item 7. "Management's Discussion and Analysis of Financial Condition and Results of Operations – Liquidity and Capital Resources" below for further information on our liquidity and cash flow.

Our Strategy

Our goal is to develop and commercialize novel prescription drugs targeting rare (orphan) neuromuscular and neurological diseases and disorders. We are dedicated to making a meaningful impact on the lives of those suffering from rare diseases, and we believe in putting patients first in everything we do. Specifically, we intend to:

- Commercialize Firdapse® for the treatment of LEMS and improve disease awareness. We are currently commercializing Firdapse® in the United States. A cornerstone of our strategy is our development of Catalyst Pathways™, our personalized treatment support program, and our development of the patient assistance programs that are required to further our goal that no LEMS patient be denied access to Firdapse® for financial reasons within existing legal restrictions.
- Pursue approval of Firdapse® for CMS, MuSK-MG, SMA Type 3 and other neuromuscular indications. We are currently conducting clinical trials evaluating Firdapse® for the treatment of CMS, MuSK-MG and SMA Type 3. If our clinical trials are successful, we hope to add these additional indications to our labeling for Firdapse®. We also intend to seek to evaluate Firdapse® as a treatment for additional neuromuscular indications.
- Seek to develop a sustained release formulation for Firdapse®. We intend as a longer term strategy to seek to develop a Firdapse® sustained release formulation with meaningful patient benefits for patients with LEMS, CMS and MuSK-MG. There can be no assurance that we will be successful in these efforts.
- Seek approval for Firdapse® in Canada. We intend to take steps to seek approval for Firdapse® in Canada.
- Seek to acquire additional products. While our current focus is in evaluating Firdapse® for other neuromuscular indications, we may in the future seek to acquire additional relatively late stage orphan drug opportunities to add to our product portfolio. However, no agreements have been entered into to date and future product acquisitions would be subject to the availability of funding.

Firdapse® product overview

Firdapse® is Catalyst's and BioMarin's (depending on market region) registered trade name for amifampridine phosphate tablets. Amifampridine is the WHO (World Health Organization) registered INN (International Nonproprietary Name) and United States Adopted Name (USAN) for the chemical entity, 3,4-diaminopyridine, often abbreviated as 3,4-DAP or DAP. Firdapse® contains the phosphate salt of amifampridine, hence the name "amifampridine phosphate." We will refer to our drug by its trade name in the United States (Firdapse®), by the INN/USAN (amifampridine), or by the specific salt in our product (amifampridine phosphate), throughout this Form 10-K.

Amifampridine has been recommended as the first-line symptomatic treatment for LEMS by the European Federation of Neurological Societies (now known as the European Academy of Neurology). In December 2009, amifampridine phosphate received marketing approval from the European Commission (with the trade name Firdapse®) for the symptomatic treatment of patients with LEMS. Safety data from clinical data published over the last 30 years in patients with LEMS or other neurological disorders treated with amifampridine show that amifampridine is well tolerated at doses up to 80 mg per day. Among the 1,279 patients or healthy subjects assessed in the literature, the most frequently reported adverse events (AEs) were perioral and peripheral paresthesias (unusual sensations like pins and needles), and gastrointestinal disorders (abdominal pain, nausea, diarrhea, and epigastralgia (pain around the upper part of the stomach)). These events were typically mild or moderate in severity, and transient, seldom requiring dose reduction or withdrawal from treatment.

Lambert-Eaton Myasthenic Syndrome (LEMS)

Lambert-Eaton Myasthenic Syndrome, or LEMS, is a rare autoimmune neuromuscular disorder characterized primarily by muscle weakness of the limbs. The disease is caused by an autoimmune reaction where antibodies are formed against voltage-gated calcium channels on nerve endings, which damages the channels. These calcium channels are responsible for the transport of charged calcium atoms that activate the biochemical machinery responsible for releasing acetylcholine. Acetylcholine is the neurotransmitter responsible for causing muscles to contract and the failure to release enough of this neurotransmitter results in muscle weakness in LEMS patients. Additionally, LEMS is often associated with an underlying malignancy, most commonly small-cell lung cancer (SCLC), and in some individuals, LEMS is the first symptom of such malignancy.

LEMS generally affects the extremities, especially the legs. As LEMS most affects the parts of limbs closest to the trunk, difficulties with climbing stairs or rising from a sitting position are commonly reported. Physical exercise and high temperatures tend to worsen the symptoms. Other symptoms often seen include weakness of the muscles of the mouth, throat, and eyes. Individuals affected with LEMS also may have a disruption of the autonomic nervous system, including dry mouth, constipation, blurred vision, impaired sweating, and/or hypotension.

LEMS is managed by treating the symptoms or treating the underlying autoimmune attack on voltage gated calcium channels. Unapproved treatments include steroids, azathioprine and intravenous immunoglobulin, which work by suppressing the immune system; and pyridostigmine and amifampridine, which enhance neuromuscular transmission. Plasma exchange has also been used to attempt to remove antibodies from the body. Firdapse® is a symptomatic treatment and does not alter the underlying autoimmune condition. As a voltage gated potassium blocker, Firdapse® prevents charged potassium atoms from leaving the nerve cells, which prolongs the period of depolarization. This allows more charged calcium atoms to enter the nerves, which enables the nerves to release acetylcholine and causes muscles to contract and to restore lost muscle strength in LEMS patients.

Based on currently available information, we estimate that there are approximately 3,000 LEMS patients in the United States, approximately 1,500 of which are presently diagnosed and identified and approximately 1,500 of which we believe are undiagnosed or misdiagnosed. However, until awareness of the disease is increased, it is unlikely that the total number of LEMS patients in the United States can be determined with better certainty (as is typical of rare diseases), and the actual number of patients in the United States with LEMS may be higher or lower than our estimate.

Some of the factors that affect the size of the population with a rare disease such as LEMS include the number of patients actually diagnosed with the disease, the number of patients who are misdiagnosed with other diseases, and the number of patients who are simply undiagnosed. Additionally, while there is an antibody test that positively identifies patients with LEMS, the test is not particularly well known or utilized at this time by many neurologists. Further, many LEMS patients who have small cell lung cancer (SCLC) are not being treated for LEMS because many oncology medical professionals who treat SCLC patients are generally unfamiliar with how to diagnose and treat LEMS. All of these factors affect the ultimate number of patients who will benefit from treatment with Firdapse®.

Firdapse® is the only FDA approved, evidence-based therapy for the treatment of LEMS in adults.

Congenital Myasthenic Syndromes (CMS)

Congenital Myasthenic Syndromes, or CMS, are rare neuromuscular disorders comprising a spectrum of genetic defects and are characterized by fatigable weakness of skeletal muscles with onset at or shortly after birth or early childhood; in rare cases symptoms may not manifest themselves until later in childhood. Certain types of CMS are thought to be hereditary (autosomal recessive), while others have no known cause. The severity and course of the genetic disease types are variable, ranging from minor symptoms to progressive disabling weakness; symptoms may be mild, but sudden severe exacerbations of weakness or even sudden episodes of respiratory insufficiency also occur.

Patients with CMS may respond to unapproved pharmacologic intervention, including cholinesterase inhibitors, amifampridine (i.e. 3,4-DAP), ephedrine, fluoxetine or quinidine, and albuterol, alone or in combinations. The particular therapy is generally dictated by the diagnosed CMS type, as drugs beneficial in treating one type of CMS can be detrimental in patients with another type of CMS.

CMS is rare, and based on currently available information, we estimate that there are between 1,000 and 1,500 CMS patients in the United States. There is currently no drug therapy approved by the FDA for the treatment of CMS.

Anti-MuSK antibody positive myasthenia gravis (MuSK-MG)

Myasthenia Gravis, or MG, is a chronic autoimmune neuromuscular disorder that is characterized by fluctuating weakness of the voluntary muscle groups. The prevalence of MG in the United States is estimated to be about 20/100,000 population (equating to an estimate of approximately 64,000 patients in the United States). However, according to the Myasthenia Gravis Foundation of America, MG is probably under diagnosed and the prevalence may be higher. For example, patients with MuSK-MG may have focal or regional weakness and muscle atrophy that are more suggestive of motor neuron or muscle membrane (myopathy) disease. MG occurs in all races, both genders, and at any age. MG is not thought to be directly inherited (although it occasionally occurs in more than one member of the same family), nor is it contagious.

The voluntary muscles of the entire body are controlled by nerve impulses that arise in the brain. These nerve impulses travel down the nerves to the place where the nerves meet the muscle fibers. Nerve fibers do not actually connect with muscle fibers. There is a space between the nerve ending and muscle fiber; this space is called the neuromuscular junction. When the nerve impulse originating in the brain arrives at the nerve ending, it releases a chemical called acetylcholine. Acetylcholine travels across the space to the muscle fiber side of the neuromuscular junction where it attaches to many receptor sites. The muscle contracts when enough of the receptor sites have been activated by the acetylcholine. In MG, there can be as much as an 80% reduction in the number of these receptor sites. The reduction in the number of receptor sites is caused by an antibody that destroys or blocks the receptor site. Antibodies are proteins that play an important role in the immune system. They are normally directed at foreign proteins called antigens that attack the body. Such foreign proteins include bacteria and viruses. Antibodies help the body to protect itself from these foreign proteins. For reasons not well understood, the immune system of the person with MG makes antibodies against the receptor sites of the neuromuscular junction. Abnormal antibodies can be measured in the blood of many people with MG. The antibodies destroy the receptor sites more rapidly than the body can replace them. Muscle weakness occurs when acetylcholine cannot activate enough receptor sites at the neuromuscular junction.

About 15% of MG patients test negative for the acetylcholine receptor antibody. These patients have seronegative (SN) MG. Approximately 40-50% of these patients with SNMG test positive for antibodies against muscle-specific receptor tyrosine kinase (MuSK), a surface membrane component essential in the development of the neuromuscular junction. These patients are identified as having MuSK-MG. Anti-MuSK antibodies identify a clinically distinguishable, more severe form of MG. The disease is characterized by a prominent weakness of the neck, oro-bulbar and sometimes respiratory musculature. Although many patients with MuSK-MG are presently treated with standard MG treatments such as anticholinesterase inhibitors or immunosuppressants, such patients do not generally respond adequately to these treatments.

Based on currently available information, we estimate that there are between 3,000 and 4,800 MuSK-MG patients in the United States. There is currently no drug therapy approved by the FDA for the treatment of MuSK-MG.

Spinal Muscular Atrophy

Spinal Muscular Atrophy (SMA) is a spectrum of genetic disorders of the Survival Motor Neuron (SMN) protein that affects the function of the neuromuscular junction. The pathogenesis may, in part, progress due to the lack of retrograde signaling from dysfunctional neuromuscular junctions leading to nerve damage and ultimately nerve cell death. As a spectrum of genetic disorders of the SMN protein, the condition varies in severity and the disease has been classified into Types (SMA Types 1 through 4), based primarily on clinical symptoms of the disease. The overall incidence of SMA is believed to be 1 in 6,000 to 10,000 live births, with over half of the cases diagnosed as SMA Type 1. Due to the poor prognosis of SMA Type 1 patients, the actual prevalence is lower, since well over half of the SMA patients are Type 1 and have a very short life span.

SMA Type 3 (sometimes called Kugelberg-Welander disease) includes clinically heterogeneous patients. They typically reach all major motor milestones in childhood and independent walking by adulthood. However, during infancy they typically have proximal muscular weakness. Some might need wheelchair assistance in childhood, whereas others might continue to walk and live productive adult lives with minor muscular weakness. Patients who lose ambulation often develop scoliosis and other medical problems related to poor mobility and muscle tone, such as obesity and osteoporosis. Two subgroups of severity have been suggested based on the probability of being able to walk by age 10 and on the subsequent probability of losing the ability to walk by age 40. Significant differences in losing the ability to walk have been observed in relation to those with an onset of weakness before (SMA 3a) and after (SMA 3b) age 3.

Due to the heterogeneity of the disease and the variations in life expectancy, prevalence is difficult to determine and not well defined for the different types of SMA. Current estimates place the prevalence of SMA Types 2 and 3 at about 1.5 per 100,000 people, with the majority of these being SMA Type 3 due to the longer life span of SMA Type 3 patients. Based on currently available data, we estimate the prevalence of SMA Type 3 in the United States to be between 2,500 and 3,500 patients.

There is presently one FDA approved treatment for SMA Type 3 (Nusinersen). We believe that Firdapse® as a treatment for SMA Type 3 has the potential to slow down the progression of this disease and improve patients' quality of life, although there can be no assurance that any clinical trial we may conduct will show these effects. We also believe that Firdapse® may be an effective adjunct therapy with other medications to treat this disease.

License Agreement with BioMarin for Firdapse®

On October 26, 2012, we licensed the exclusive North American rights to Firdapse® pursuant to a License Agreement between us and BioMarin (the BioMarin License Agreement). BioMarin holds the worldwide rights to Firdapse® and sells the product in the European Union (EU). We believe that we remain in compliance with the BioMarin License Agreement.

Under the BioMarin License Agreement, we agreed to make the following payments:

- *Royalties:* We have agreed to pay (i) royalties to BioMarin for seven years from the first commercial sale of Firdapse® equal to 7% of net sales (as defined in the BioMarin License Agreement) in North America for any calendar year for sales up to $100 million, and 10% of net sales in North America in any calendar year in excess of $100 million; and (ii) royalties to the third-party licensor of the rights sublicensed to us for seven years from the first commercial sale of Firdapse® equal to 7% of net sales (as defined in the license agreement between BioMarin and the third-party licensor) in any calendar year.
- *Milestone Payments.* Under our license agreement with BioMarin, we agreed to pay certain milestone payments that BioMarin was obligated to pay to both a third-party licensor of the rights that have been sublicensed to us and to the former stockholders of Huxley Pharmaceuticals ("Huxley") under an earlier stock purchase agreement between BioMarin and the former Huxley stockholders. As of February 2019, all required milestone payments have been paid.
- *Cost Sharing Payments.* In the BioMarin License Agreement, we agreed to share in the cost of certain post-marketing studies of Firdapse® that were being conducted by BioMarin, and these commitments were fully satisfied several years ago.

Clinical trials supporting our NDA for Firdapse® for LEMS

Our first Phase 3 clinical trial evaluating Firdapse® for the treatment of LEMS

As part of the BioMarin License Agreement, we took over a Phase 3 clinical trial that BioMarin had previously begun in the United States and Europe evaluating Firdapse® for the treatment of LEMS. The trial was designed as a randomized double-blind, placebo-controlled discontinuation trial in approximately 36 LEMS patients. After patients were treated with amifampridine phosphate for at least 91 days, they were randomly assigned to either continue on amifampridine phosphate or be discontinued to placebo over a 2-week period. They were then returned to open label amifampridine phosphate treatment for a two-year follow-up period.

On September 29, 2014, we reported top-line results from this trial. The primary endpoint of change in quantitative myasthenia gravis score, or QMG, at day 14 reached statistical significance (p=0.0452), with a worsening of 2.2 points observed in the placebo group and a worsening of 0.4 points observed in the treatment group. Further, the primary endpoint of change in subject global impression, or SGI, at day 14 was highly statistically significant (p=0.0028), with a worsening of 2.6 points observed in the placebo group and a worsening of 0.8 points observed in the treatment group. The results of this trial were published in 2016 in *Muscle & Nerve* (Muscle Nerve, 2016, 53(5):717-725).

First NDA submission and Refuse-to-File Letter

On July 22, 2015, we announced that we had initiated a rolling submission of an NDA for Firdapse® for the treatment of LEMS and CMS, and on December 17, 2015, we announced the completion of that submission. On February 17, 2016, we announced that we had received a Refuse-to-File (RTF) letter from the FDA regarding our NDA submission. The RTF letter stated that after a preliminary review, the FDA has found that our application was not sufficiently complete and requested additional supporting information, including the requirement that we perform three abuse liability studies for Firdapse®. The letter did not comment on the acceptability of the submitted clinical data, and no judgment was made in the letter on the efficacy or safety of Firdapse®.

On April 26, 2016, we announced that we met with the FDA to discuss the RTF letter. During that meeting, the FDA advised us that in addition to the results of our first Phase 3 trial, we would need to submit positive results from a second adequate and well-controlled study in patients with LEMS.

Our second Phase 3 clinical trial (LMS-003)

Our second Phase 3 trial evaluating Firdapse® for the treatment of LEMS (designated as LMS-003) was conducted at sites in Miami, Florida and Los Angeles, California. The double-blind, placebo-controlled withdrawal trial had the same co-primary endpoints as our first Phase 3 trial evaluating Firdapse® for the treatment of LEMS. Further, the FDA allowed us to enroll patients from our Expanded Access Program (EAP) as study subjects in this second trial. This second Phase 3 trial was conducted under a Special Protocol Assessment (SPA) with the FDA for the protocol design, clinical endpoints, and statistical analysis approach to be taken in the trial. Details of the LMS-003 trial are available on www.clinicaltrials.gov (NCT02970162). Enrollment in this trial, which included 26 subjects, was completed in October 2017.

On November 27, 2017, we reported positive top-line results from this trial. This trial had two prospectively defined co-primary endpoints. The first of these, quantitative myasthenia gravis score (QMG), reached statistical significance (p=0.0004), and the second, subject global impression (SGI), reached statistical significance (p=0.0003). More importantly, a clinically significant difference of 6.4 points was observed between the Firdapse® and placebo groups for the QMG endpoint. Firdapse® was well tolerated and showed a similar safety profile to that seen in earlier studies. All p-values reported are based on the entire intent to treat (ITT) population of patients that enrolled in this trial.

The prospectively defined secondary endpoint for the physician's clinical global impression of improvement (CGI-I) achieved statistical significance (p=0.0020). Further, the exploratory endpoints of triple timed up and go (3TUG, p=0.0112) and the evaluation of the QMG-Limb domains endpoint (p=0.0010) were also statistically significant. The exploratory endpoint of most bothersome symptom (MBS) (p=0.0572) was not significant, but shows a trend.

The results of this trial were published in March 2019 in the Journal of Clinical Neuromuscular Disease (J. Clin Neuromusc Dis 2019; 20:111-119).

Approval of Firdapse® for the treatment of LEMS in the United States

In March 2018, we submitted an NDA seeking approval of Firdapse® for the treatment of LEMS. Our NDA was accepted for filing in May 2018 and, on November 28, 2018, the FDA granted approval of Firdapse® for the treatment of LEMS in adult patients.

Post-Approval Required Studies

As part of its approval of our NDA for Firdapse® for LEMS, the FDA is requiring us to conduct a clinical trial to evaluate the effect of hepatic impairment on the exposure of amifampridine after oral administration of Firdapse® relative to that in subjects with normal hepatic function. We expect to submit the final protocol for this trial in the first quarter of 2020 and to complete this trial in 2021. The FDA has also asked us to perform a carcinogenicity study of amifampridine phosphate in a second species of mice and to establish a pregnancy surveillance program to collect and analyze information for a minimum of ten (10) years on pregnancy complications and birth outcomes in women exposed to Firdapse®.

Expanded access program

We currently operate an expanded access program (EAP) that makes Firdapse® available to qualifying patients diagnosed with LEMS, CMS or Downbeat Nystagmus in the United States who meet the inclusion and exclusion criteria, with Firdapse® being provided to patients at no cost until sometime after FDA approval. We continue to inform neuromuscular physicians on the availability of the Firdapse® EAP and also to work with various rare disease advocacy organizations to inform patients and other physicians about the program.

Prior to the approval of our NDA for Firdapse® for LEMS, adult LEMS patients were also eligible to participate in our EAP program, and we are currently in the process of migrating adult LEMS patients who were in our EAP program to our commercial product. We intend to finish the migration of adult LEMS patients from our EAP to Catalyst Pathways™ by the second quarter of 2019.

Sales, Marketing and Distribution

Launch of Firdapse® in January 2019

In January 2019, we launched Firdapse® in the United States through a field force of approximately 20 personnel who are experienced in neurologic, central nervous system or rare diseases in sales, patient support and payer reimbursement. The sales representatives (Regional Account Managers) who are part of the field force are targeting the approximately 1,250 physicians who are either neuromuscular specialists or general neurologists with a known adult LEMS patient or specific training in neuromuscular diseases. We also have as part of the field force Patient Access Liaisons who are working with the patients and provider offices to help navigate the insurance landscape, as well as National Account Managers who are working directly with the payors to ensure comprehensive coverage for Firdapse® across the commercial and governmental plans in the United States. We also have a field-based force of six medical science liaisons who are helping educate the medical communities and patients about LEMS and about our company's ongoing clinical trial activities. Further, we work closely with several rare disease advocacy organizations (including Global Genes, the National Organization for Rare Disorders (NORD), and the Myasthenia Gravis Foundation of America) to help increase awareness and the level of support for patients living with LEMS, CMS and MuSK antibody positive myasthenia gravis, and to provide education for the physicians who treat these rare diseases and the patients they treat.

We are supporting the distribution of Firdapse® through "Catalyst Pathways," our personalized treatment support program. "Catalyst Pathways" is a single source for personalized treatment support, education and guidance through the challenging dosing and titration regimen to an effective therapeutic dose. It also includes distributing the drug through a very small group of exclusive specialty pharmacies (primarily AnovoRx), which is consistent with the way that most pharmaceutical products for ultra-orphan diseases are distributed and dispensed to patients. By using specialty pharmacies in this way, the difficult task of navigating the health care system is far better for the patient needing treatment for their rare disease and the health care community in general.

In addition, "Catalyst Pathways" is the gateway for our free bridge medication for patients during transitioning from investigational product while they are waiting for a coverage determination or, later on, for patients whose access is threatened by the bureaucratic complications arising from a change of insurer. The "Catalyst Pathways" program is also the access point for our Patient Assistance Program, which provides longer-term free medication for those who are uninsured or functionally uninsured with respect to Firdapse® because they may be unable to obtain coverage from their payer despite having health insurance.

The cornerstone of our initial sales efforts is to transition patients who have been in our EAP program and patients who have been taking investigational or compounded 3,4-DAP to our approved product. The level of effort to generate awareness to these patients and their physicians is low, given that they are already aware of 3,4-DAP and Firdapse®. We expect the majority of these patients will quickly transition to Firdapse® by the end of the second quarter of 2019. At the same time, we are beginning efforts on the longer, slower process to identify patients and their physicians who have diagnosed LEMS, but have not had access, awareness or understanding of this treatment for their rare disease. These patients often do not see their physician frequently, have many questions about changing treatment(s), and may not perceive the need to change to a new therapy. Further, we expect during the latter part of 2019 and into future years to focus our commercial efforts to locate misdiagnosed and undiagnosed LEMS patients and provide educational and sales activities to help improve the diagnosis, understanding of the treatment, and information on the prescribing process. We plan to continue to support LEMS and rare disease patient organizational groups' efforts to generate awareness and educate patients and physicians on the diagnosis of LEMS, the impact of the disease, and the support services and treatments available.

Pricing of and access to Firdapse®

We have established pricing for Firdapse® at an annual list price of $375,000 for a typical LEMS patient who remains 100% persistent and compliant with therapy for an entire year. We believe that the pricing of our product is in line with the pricing of other products that provide significant clinical benefits in treating an ultra-orphan disease of similar severity and in order to properly compensate companies for the costs associated with developing, manufacturing, and marketing an orphan drug in compliance with regulatory requirements. We believe that our drug will be widely covered and reimbursed by private and public payors for the indicated small population of adult LEMS patients, as part of their mission to assure that rare disease patients receive timely treatment for proven medicines. Furthermore, forecasted rebates, discounts, patient commercial co-pay support, Medicare coverage gap subsidies, statutory Medicaid discounts and other governmental discounts will result in our net sale price being 15-20% lower than our annual list price for the product.

In order to help patients afford their medication, we, like other pharmaceutical companies who are marketing drugs for ultra-orphan conditions, have developed an array of financial assistance programs that are available to reduce patient co-pays and deductibles to a nominal affordable amount. For eligible patients with commercial coverage, a co-pay assistance program designed to keep out-of-pocket costs to $10 or less per month is available for all LEMS patients prescribed Firdapse®. We are also donating, and committing to continue to donate, money to qualified, independent charitable foundations dedicated to providing assistance to LEMS patients in financial need. Our goal is to ensure that no LEMS patient is ever denied access to Firdapse® for financial reasons.

Further, we have taken steps to make sure that we have sufficient supply of both finished drug product and amifampridine API to meet all of our patient requirements and the needs for product for our ongoing clinical trials. In that regard, based on available information, we currently estimate that we have sufficient finished drug product and API on hand to supply all current Firdapse® patients (including those we anticipate for the remainder of 2019) for at least 18 months. We have also recently ordered more API to ensure a long-term uninterrupted supply of Firdapse® for all patients, including additional new patients.

Third-Party Reimbursement

Sales of pharmaceutical products depend in significant part on the availability of coverage and adequate reimbursement by third party payors, such as state and federal governments, including Medicare and Medicaid, managed care providers, private commercial insurance plans and pharmacy benefit management (PBM) plans. Decisions regarding the extent of coverage and the amount of reimbursement to be provided for Firdapse® are expected to be made on a plan-by-plan, and in some cases, on a patient-by-patient basis. Particularly given the rarity of LEMS, CMS, and MuSK-MG, we anticipate that securing coverage and appropriate reimbursement from third-party payors will require targeted education and highly skilled insurance navigation experts that have experience with rare disease launches and medical exception processes at insurance companies to provide patient coverage for important rare disease therapies. To that end, we have engaged a dedicated team of field-based market access account managers and reimbursement experts as well as a patient service center staffed with experienced personnel focused on ensuring that clinically-qualified patients have access to our product.

There can be no assurance, however, as to whether payors will agree to cover our product and, if so, what level of payment will they make for Firdapse®. In that regard, we have advised payors that we will provide free medication to support titration and confirm patient therapeutic benefit. Further, now that we have launched our product, we are providing patients with access to therapy at no charge while those patients are awaiting coverage decisions.

Our efforts to develop Firdapse® as a treatment of additional indications

We are currently evaluating Firdapse® for the treatment of three additional neuromuscular indications, CMS, MuSK-MG, and SMA Type 3. The current status of our clinical trials evaluating Firdapse® for these additional indications is as follows:

Ongoing phase 3 clinical trial evaluating Firdapse® for the treatment of CMS

We are currently conducting a Phase 3 clinical trial evaluating Firdapse® for the treatment of certain types of CMS. This trial, which will include approximately 23 adult and pediatric subjects, is being conducted at trial sites around the United States and Canada. Details of this trial are available on www.clinicaltrials.gov (NCT02562066). Based on currently available information, we expect to report top-line results from this trial in the second half of 2019. There can be no assurance that any trial we conduct evaluating Firdapse ® for the treatment of CMS will be successful or whether any NDA or NDA supplement that we may submit for Firdapse ® for the treatment of CMS in the future will be filed by the FDA for review and approved.

Previously completed MuSK-MG proof-of-concept study

In February 2016, we announced the initiation of an investigator-sponsored, randomized, double-blind, placebo-controlled, crossover proof-of-concept clinical trial evaluating the safety, tolerability and potential efficacy of Firdapse® as a symptomatic treatment for patients with MuSK-MG. Seven patients participated in this proof-of-concept trial. We provided study drug, placebo, and financial support for this study.

On March 15, 2017, we reported top-line results from this trial. Both of the co-primary efficacy endpoints of change from baseline (CFB) in total Quantitative Myasthenia Gravis (QMG) score (p=0.0003) and CFB in total Myasthenia Gravis Activities of Daily Living (MG-ADL) score (p=0.0006) were statistically and clinically significant in this trial. Several secondary efficacy measures also achieved statistical significance. Amifampridine phosphate was well tolerated in this population of patients.

The results of this study were recently published in SAGE Open Medicine and can be accessed at https://journals.sagepub.com/doi/pdf/10.1177/2050312118819013.

Ongoing phase 3 clinical trial evaluating Firdapse® for the treatment of MuSK-MG

We are currently conducting a Phase 3 clinical trial evaluating Firdapse® for the treatment of MuSK-MG under a SPA with the FDA. The trial is a multi-site, international (United States and Italy), double-blind, placebo-controlled, clinical trial that is targeted to enroll approximately 60 subjects diagnosed with MuSK-MG. The trial will also enroll up to 10 generalized myasthenia gravis patients who will be assessed with the same clinical endpoints but achieving statistical significance in this subgroup of patients is not required and only summary statistics will be provided. The trial will employ a primary endpoint of Myasthenia Gravis Activities of Daily Living (MG-ADL) and a secondary endpoint of Quantitative Myasthenia Gravis Score (QMG).

We initiated this trial in January 2018 and are currently enrolling subjects. We currently expect to report top-line results from this trial in the second half of 2019. Details of this trial are available on www.clinicaltrials.gov (NCT03304054).

Proof-of-concept clinical trial evaluating Firdapse® for the treatment of SMA Type 3

We are currently conducting a proof-of-concept clinical study evaluating Firdapse® as a symptomatic treatment for patients with SMA Type 3. The study is designed as a randomized (1:1), double-blind, 2-period, 2-treatment, crossover, outpatient proof-of-concept study to evaluate the safety, tolerability and potential efficacy of amifampridine in ambulatory patients diagnosed with SMA Type 3. The study is planned to include approximately 12 patients, and we currently expect to report top-line results from this study in the first half of 2020. Details of this trial are available on www.clinicaltrials.gov (NCT03781479).

Other potential indications

We are continuing to identify additional neuromuscular diseases for which Firdapse® may be an effective treatment, and we hope to commence additional clinical studies and trials to evaluate Firdapse® for the treatment of those diseases. There can be no assurance that any of these studies or trials will be successful.

Intellectual property and regulatory exclusivity protections for Firdapse®

Under the BioMarin License Agreement, we licensed two pending patents and certain trademarks for Firdapse®. One of the licensed patents is a pending composition of matter patent that, if issued, will protect Firdapse® until February 2027, which includes five years of patent term extension that is expected under the Patent Term Restoration Act. This application was initially rejected following an appeal to the Patent Trial and Appeal Board. The application was refiled with new claims. The new claims were the subject of an office action in which the claims were rejected. A response to the rejection was filed and a final rejection was issued. The application was refiled and we are awaiting an office action. There can be no assurance that this patent will be issued. The second patent claims methods of administering Firdapse®. Substantive examination has begun on this patent application and a final rejection was issued and the application was refiled. We are awaiting the next office action. We may also pursue other patents in order to seek to protect the exclusivity of the drug, dosage forms and methods of administration.

Until Firdapse® was approved in November 2018, no drug product containing amifampridine for any indication had been approved by the FDA. Therefore, our version of amifampridine has received five-year new chemical entity exclusivity, which provides a five-year period of marketing exclusivity for all indications.

We believe that when Firdapse® was approved for commercialization, Jacobus Pharmaceutical may have had a pending NDA filed with the FDA seeking approval of their version of 3,4-DAP for the treatment of CMS. We do not control the FDA's decision on any NDA previously filed by Jacobus, but if the FDA were to approve it, there can be no assurance as to the impact that any such approval would have on our business and on our commercialization of Firdapse®.

We are in the early stages of developing a sustained release formulation of Firdapse®. If we are successful, we will seek to add additional patent protections for that sustained release product, to the extent available. There can be no assurance that we will be successful in those efforts.

We have licensed the Firdapse® trademark from BioMarin, and the trademark was registered in the United States in March 2015.

Protection of our intellectual property and regulatory exclusivities is a strategic priority for our business. We rely on a combination of patent, trademark, copyright and trade secret laws, along with regulatory exclusivity and institutional know-how and continuing technological advancement, to develop and maintain our competitive position. Our ability to protect and use our intellectual property rights and regulatory exclusivity in the future development and commercialization of our products, operate without infringing the proprietary rights of others, and prevent others from infringing our proprietary rights, is crucial to our future success. See Item 1A. "Risk Factors – Risks Related to Our Intellectual Property."

Generic Sabril®

In September 2015, we announced the launch of a program to develop our version of vigabatrin (CPP-109) as a generic version of Sabril®, which is marketed in the United States by Lundbeck. Lundbeck's exclusivity for Sabril® expired on April 26, 2018.

On December 18, 2018, we announced that we had signed a definitive agreement with Endo International plc's subsidiary, Endo Ventures Limited, for the further development and commercialization of generic Sabril® tablets through Endo's United States Generic Pharmaceuticals segment, Par Pharmaceutical. Pursuant to the agreement, we have received an up-front payment, and we will receive milestone payments based on achievement of regulatory approvals, and a sharing of defined net profits upon commercialization and certain expenses for development.

Vigabatrin comes in two dosage forms – a powder sachet and a tablet. Par Pharmaceutical brought the first generic version of the powder sachet to market, and since then several additional generic versions of this product have been approved. However, there is only one approved generic version of the tablets at this time.

There can be no assurance that our collaboration with Endo/Par for generic Sabril® will be successful.

CPP-115

For the last few years, we had been developing CPP-115, a GABA aminotransferase inhibitor. We licensed this product from Northwestern University (Northwestern) in 2009, under which we acquired worldwide rights to commercialize new GABA aminotransferase inhibitors and derivatives of vigabatrin which had been discovered and patented by Northwestern. Under the terms of the license agreement, Northwestern granted us an exclusive worldwide license to United States composition of matter patents related to the new class of inhibitors and a patent application relating to derivatives of vigabatrin. This included United States patent number 6,794,413 covering the composition of matter for CPP-115.

During 2018, we became aware that certain patents granted to Northwestern in 2018 (which patents have been licensed by Northwestern to an unaffiliated pharmaceutical company for a new GABA aminotransferase inhibitor) were derived from CPP-115. As a result, it is our position that Northwestern has violated the license agreement based on its failure to transfer these new patent rights to us as part of the existing license agreement. It is also our position that Northwestern's publication of information about the new patents in violation of the license agreement has damaged us. On October 26, 2018, we notified Northwestern that we were terminating the license agreement and seeking damages for Northwestern's breach of the license agreement. Further, on the same date, we filed a claim for damages in arbitration against Northwestern for Northwestern's breaches of the license agreement.

On November 5, 2018, Northwestern advised us that in its view, Northwestern has a right to terminate the license agreement with us because we allegedly breached the license agreement by failing to pay certain milestones and by allegedly failing to use commercially reasonable efforts to develop and commercialize any products. Northwestern has also advised us that, in its view, we have engaged in wrongful conduct and communications with the unrelated pharmaceutical company that licensed the new patents from Northwestern, and that such communications have damaged Northwestern's relationship with that party. We dispute Northwestern's allegations and intend to vigorously defend ourselves against claims that Northwestern has brought against us in the arbitration proceeding.

The arbitration is currently pending and there can be no assurance as to the outcome of this matter. See Item 3. *Legal Proceedings*.

Manufacturing and Supply

We are licensed in Florida as a virtual drug manufacturer, which means that we have no in-house manufacturing capacity and we are obligated to rely on contract manufacturers and packagers. We have no plans to build or acquire the manufacturing capability needed to manufacture any of our research materials or commercial products, and we expect that our drug products and drug substances will be prepared by contractors with suitable capabilities for these tasks and that we will enter into appropriate supply agreements with these contractors at appropriate times in the development and commercialization of our products. Because we will use contractors to manufacture and supply our products, we will be reliant on such contractors. Further, the contractors selected would have to be inspected by the FDA and found to be in substantial compliance with federal regulations in order for a drug application for one of our drug candidates to be approved, and there can be no assurance that the contractors we select would pass such an inspection.

We have entered into agreements with a supplier of the active pharmaceutical ingredient (API) contained in Firdapse® for future requirements and we have contracted with third-party contract manufacturers who are manufacturing Firdapse® tablets for us.

Any significant change that we make for Firdapse® must be approved by the FDA in a supplemental NDA (sNDA). If the manufacturing plan and data are insufficient, any sNDA we submit will not be approved. Before an sNDA can be approved, our manufacturers must also demonstrate compliance with FDA's current Good Manufacturing Practices (cGMPs) regulations and policies. Further, even if we receive approval of any sNDAs for Firdapse®, if our manufacturers do not follow cGMPs in the manufacture of our products, it may delay product launches or shipments and adversely affect our business.

Since we contract with third parties to manufacture our products, our contract manufacturers are required to comply with all applicable environmental laws and regulations that affect the manufacturing process. As a result, we do not believe that we will have any significant direct exposure to environmental issues.

Competition

The pharmaceutical industry is intensely competitive, and any product candidate developed or licensed by us would likely compete with currently marketed and potentially new drugs and therapies even though they are not indicated for these conditions. There are many pharmaceutical companies, biotechnology companies, public and private universities, government agencies and research organizations that compete with us in developing various approaches to the treatment of orphan diseases. Many of these organizations have substantially greater financial, technical, marketing and manufacturing resources than we have.

LEMS is currently treated with unapproved drugs and therapies including steroids, azathioprine, other immunosuppressants and intravenous immunoglobulin, which work by suppressing the immune system, and pyridostigmine. Plasma exchange has also been used in an attempt to remove antibodies from the body. Further, one other product, guanidine HCl tablets, was approved many years ago (during a period when drugs were not required to be reviewed by the FDA for both safety and effectiveness) for use in the treatment of LEMS. However, this drug has significant side effects and is not currently viewed as an effective treatment for LEMS. Notwithstanding, drugs may be prescribed by physicians for the treatment of LEMS whether or not they are considered effective.

Further, we are aware that Jacobus Pharmaceutical has been making its 3,4-DAP product available to LEMS patients under compassionate use Investigational New Drug applications (INDs) for a number of years and, based on current information, we believe that approximately 200 adult LEMS patients in the United States were receiving the drug under their program at the time our NDA for Firdapse® was approved. Even though we were the first to obtain an FDA approval for this product and its associated exclusivity protections, we may not be able to stop Jacobus Pharmaceutical from continuing to supply its existing patients under compassionate use INDs.

Finally, we are aware that amifampridine has been available from compounding pharmacies for many years and may remain available, even though we have obtained FDA approval of Firdapse®. Compounded amifampridine is likely to be substantially less expensive than Firdapse®. The Food and Drug Administration Modernization Act of 1997 included a new section, which clarified the status of pharmacy compounding under Federal law. Under Section 503A, drug products that are compounded by a pharmacist or physician for an individual patient may be entitled to exemptions from three key provisions of the act: (1) the adulteration provision of section 501(a)(2)(B) (concerning FDA's cGMP regulations); (2) the misbranding provision of section 502(f)(1) (concerning the labeling of drugs with adequate directions for use); and (3) the new drug provision of section 505 (concerning the approval of drugs under new drug or abbreviated new drug applications).

To qualify for these statutory exemptions, a compounded drug product must satisfy several legal requirements. One of these requirements restricted the universe of bulk drug substances that a compounder may use; i.e., that every bulk drug substance used in compounding: (1) must comply with an applicable and current USP or NF drug monograph, if one exists, as well as the current USP chapters on pharmacy compounding; (2) if such a monograph does not exist, the bulk drug substance must be a component of an FDA-approved drug; or (3) if a monograph does not exist and the bulk drug substance is not a component of an FDA-approved drug, it must appear on a list of bulk drug substances that may be used in compounding (i.e., the bulk substances list). While the advertising provisions in Section 503A were ruled unconstitutional in part in the United States by the Supreme Court in 2002, the FDA has in the last five years aggressively regulated and exercised oversight over the practice of pharmacy compounding since a compounding incident at the New England Compounding Center in Massachusetts sickened hundreds and killed over 60 individuals.

In 2013, Congress removed the unconstitutional advertising provisions in Section 503A when it passed the Drug Quality and Security Act of 2013 (DQSA), Title I (The Compounding Quality Act). The DQSA also created "outsourcing facilities" under Section 503B of the Federal Food, Drug, and Cosmetic Act, which are drug compounders that voluntarily register with FDA and may produce compounded formulations for office use (at least one of which must be sterile), but must comply with FDA's cGMP regulations and other requirements set forth in Section 503B. Section 503B outsourcing facilities may also only compound from bulk substances if the product is on FDA's drug shortage list, or the substance is on FDA's Section 503B list of bulk substances that may be used in compounding (Bulk Substances List 1).

While the FDA has been aggressively enforcing Section 503A since its re-enactment, compounders may still compound near copies of approved drug products, under Section 503A, so long as the prescriber makes a change to the compounded formulation that produces for that patient a significant difference between the commercially available drug and the compounded version. Compounders may also copy commercially available products if they do not do so in "regular or inordinate amounts." In January 2018, FDA published a Final Guidance document titled, "Compounded Drug Products That Are Essentially Copies of a Commercially Available Drug Product Under Section 503A of the Federal Food, Drug, and Cosmetic Act." This Final Guidance sets forth FDA's enforcement policy concerning those compounders that make essentially copies of commercially available drug products. FDA has defined the term "regular or inordinate" in the Final Guidance to mean: "a drug product that is essentially a copy of a commercially available drug product is compounded regularly or in inordinate amounts if it is compounded more frequently than needed to address unanticipated, emergency circumstances, or in more than the small quantities needed to address unanticipated, emergency circumstances." FDA has further stated it will not take enforcement action, considering all the facts and circumstances, against a compounder that compounds less than four "essentially copies" of a commercially available drug product in a calendar month.

Recently, Senator Bernie Sanders issued a public statement asking FDA Commissioner Scott Gottlieb to allow pharmacies and manufacturers who were previously making 3,4-DAP to be permitted to resume providing it. We cannot assess the impact of this statement on our business.

We are taking all available steps to try to enforce our exclusivity rights. However, we cannot determine with certainty what impact these factors will have on the market for our product. While there can be no assurance, we expect that, despite these factors, we will be able to successfully market our product.

Generic Sabril®

Sabril® is marketed by Lundbeck in the United States for infantile spasms and for refractory complex partial seizures. Lundbeck's sales of Sabril® (tablets and sachets) were approximately $229 million in 2017 and $204 million in 2018. One generic version of Sabril® tablets has been approved to date in the United States, as have numerous generic version of the powder form. We have entered into a definitive agreement with Endo/Par for the further development and commercialization of generic Sabril® tablets.

Factors affecting competition generally

In general, our ability to compete will depend in large part upon:

- our ability to complete clinical development and obtain regulatory approvals for our drug candidates;
- the demonstrated efficacy, safety and reliability of our drug candidates;
- the timing and scope of regulatory approvals;
- product acceptance by physicians and other health care providers;
- protection of our proprietary rights and the level of generic competition;
- the speed at which we develop drug candidates;
- our ability to supply commercial quantities of a product to the market;
- our ability to obtain reimbursement from private and/or public insurance entities for product use in approved indications;
- our ability to recruit and retain skilled employees; and
- the availability of capital resources to fund our development and commercialization activities, including the availability of funding from the federal government.

Regulatory Matters

Government regulation and product approval

Government authorities in the United States, at the federal, state and local level, and in other countries extensively regulate, among other things, the research, development, testing, manufacture, labeling, record-keeping, promotion, storage, advertising, distribution, marketing and export and import of products such as those we are developing. Our drugs must be approved by the FDA through the NDA process before they may be legally marketed in the United States.

In the United States, drugs are subject to rigorous regulation by the FDA under the Federal Food, Drug, and Cosmetic Act, or FDCA, and implementing regulations, as well as other federal and state statutes. 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. Failure to comply with the applicable United States requirements at any time during the product development process, approval process, or after approval, may subject an applicant to administrative or judicial sanctions. These sanctions could include the FDA's refusal to approve pending applications, license suspension or revocation, withdrawal of an approval, a clinical hold, warning letters, product recalls, product seizures, total or partial suspension of production or distribution, injunctions, fines, civil penalties or criminal prosecution. Any agency or judicial enforcement action could have a material adverse effect on us. The process required by the FDA before a drug may be marketed in the United States generally involves the following:

- completion of pre-clinical laboratory tests, animal studies and formulation studies according to the FDA's good laboratory practice, or GLP, regulations;
- submission of an investigational new drug application, or IND, which must become effective before human clinical trials may begin and which must include approval by an institutional review board, or IRB, at each clinical site before the trials are initiated;
- performance of adequate and well-controlled human clinical trials to establish the safety and efficacy of the proposed drug for its intended use conducted in compliance with federal regulations and good clinical practice, or GCP, an international standard meant to protect the rights and health of patients and to define the roles of clinical trial sponsors, administrators, and monitors;
- submission to, and acceptance by, the FDA of an NDA;
- satisfactory completion of an FDA inspection of the manufacturing facility or facilities at which the drug is produced to assess compliance with current good manufacturing practice, or cGMP, regulations to assure that the facilities, methods and controls are adequate to preserve the drug's identity, strength, quality and purity;
- potential FDA audit of the non-clinical and clinical trial sites that generated the data in support of the NDA; and
- FDA review and approval of the NDA.

United States drug development process

Once a pharmaceutical candidate is identified for development it enters the pre-clinical testing stage. Pre-clinical tests include laboratory evaluations of product chemistry, toxicity and formulation, as well as animal studies. Prior to beginning human clinical trials, an IND sponsor must submit an IND to the FDA. The IND sponsor must submit the results of the pre-clinical tests, together with manufacturing information and analytical data, to the FDA as part of the IND. Some pre-clinical or non-clinical testing may continue even after the IND is submitted. In addition to including the results of the pre-clinical studies, the IND will also include a protocol detailing, among other things, the objectives of the clinical trial, the parameters to be used in monitoring safety and the effectiveness criteria to be evaluated, if the trial lends itself to an efficacy evaluation. The IND automatically becomes effective 30 days after receipt by the FDA, unless the FDA, within the 30–day time period, raises concerns or questions about the conduct of the trial. In such a case, the IND sponsor and the FDA must resolve any outstanding concerns before the clinical trial can begin. The FDA may, at any time, impose a clinical hold on ongoing clinical trials. If the FDA imposes a clinical hold, clinical trials cannot commence or recommence without FDA authorization and then only under terms authorized by the FDA.

Clinical trials involve the administration of the investigational new drug to healthy volunteers or patients under the supervision of one or more qualified investigators in accordance with federal regulations and GCP.

Clinical trials must be conducted under protocols detailing the objectives of the trial and the safety and effectiveness criteria to be evaluated. Each protocol must be submitted to the FDA as part of the IND. Further, an Institutional Review Board (IRB) at each institution participating in the clinical trial must review and approve each protocol before any clinical trial commences at that institution. All research subjects must provide informed consent, and informed consent information must be submitted to the IRB for approval prior to initiation of the trial. Progress reports detailing the results of the clinical trials must be submitted at least annually to the FDA and more frequently if adverse events or other certain types of other changes occur.

Human clinical trials are typically conducted in three phases. A fourth, or post-approval, phase may include additional clinical studies. These phases generally include the following, and may be sequential, or may overlap or be combined:

- Phase 1 clinical trials involve the initial introduction of the drug into human subjects. These studies are designed to determine the safety of usually single doses of the compound and determine any dose limiting intolerance, as well as evidence of the metabolism and pharmacokinetics of the drug in humans.
- Phase 2 clinical trials usually involve studies in a limited patient population to evaluate the safety and efficacy of the drug for specific, targeted indications, to determine dosage tolerance and optimal dosage, and to identify possible adverse effects and safety risks.
- In Phase 3, if a compound is found to be potentially effective and to have an acceptable safety profile in Phase 2 (or occasionally Phase 1) studies, the Phase 3 studies will be conducted to further confirm clinical efficacy, optimal dosage and safety within an expanded population which may involve geographically diverse clinical trial sites. Generally, but not always, two adequate and well-controlled Phase 3 clinical trials are required by the FDA for approval of an NDA.
- Phase 4 clinical trials are studies required of or agreed to by a sponsor that are conducted after the FDA has approved a product for marketing. These studies are used to gain additional experience from the treatment of patients in the intended therapeutic indication and to document a clinical benefit in the case of drugs approved under accelerated approval regulations. If the FDA approves a product while a company has ongoing clinical trials that were not necessary for approval, a company may be able to use the data from these clinical trials to meet all or part of any Phase 4 clinical trial requirement. Failure to promptly conduct Phase 4 clinical trials where necessary could result in withdrawal of approval for products approved under accelerated approval regulations.

While Phase 1, Phase 2, and Phase 3 tests are generally required for approval of an NDA, certain drugs may not require one or more steps in the process depending on other testing and the situation involved. Additionally, the FDA, an IRB, or the sponsor may stop testing at any time if results show patients being exposed to unnecessary health risks or overly dangerous side effects.

In addition, the manufacturer of an investigational drug in a Phase 2 or Phase 3 clinical trial for a serious or life-threatening disease is required to make available, such as by posting on its website, its policy on evaluating and responding to requests for expanded access to such investigational drug.

Concurrent with clinical trials, companies usually complete additional animal studies and must also develop additional information about the chemistry and physical characteristics of the drug and finalize a process for manufacturing the product in accordance with cGMP requirements. The manufacturing process must be capable of consistently producing quality batches of the drug candidate and, among other requirements, the manufacturer must develop methods for testing the identity, strength, quality and purity of the final drug. Additionally, appropriate packaging must be selected and tested and stability studies must be conducted to demonstrate that the drug candidate does not undergo unacceptable deterioration over its shelf life.

United States review and approval process

FDA approval of an NDA is required before marketing of the product may begin in the United States. The NDA must include the results of product development, pre-clinical studies and clinical studies, together with other detailed information, including information on the chemistry, manufacture and composition of the product. The FDA has 60 days from its receipt of the NDA to review the application to ensure that it is sufficiently complete for substantive review before accepting it for filing. The FDA may request additional information rather than accept an NDA for filing. In this event, the NDA must be resubmitted with the additional information. The resubmitted application also is subject to review before the FDA accepts it for filing. Once the submission is accepted for filing, the FDA begins an in-depth substantive review. The submission of an NDA is also subject to the payment of a substantial application fee (for FDA fiscal year 2019 this fee is $2,588,478), although a waiver of such fee may be obtained under certain limited circumstances, including when the drug that is subject of the application has received Orphan Drug Designation for the indication sought. Further, the sponsor of an approved NDA is subject to an annual program fee, which for FDA fiscal year 2019 is $309,915 per prescription drug product. Beginning in fiscal year 2019, this annual program fee replaces the annual product and establishment fees. User fees typically increase annually. The approval process is lengthy and difficult and the FDA may refuse to approve an NDA if the applicable regulatory criteria are not satisfied or may require additional clinical or other data and information. Even if such data and information is submitted, the FDA may ultimately decide that the NDA does not satisfy the criteria for approval. The FDA may also refer applications for novel drug products or drug products which present difficult questions of safety or efficacy to an advisory committee, typically a panel that includes clinicians and other experts, for review, evaluation and a recommendation as to whether the application should be approved. The FDA is not bound by the recommendation of an advisory committee. The FDA reviews an NDA to determine, among other things, whether a product is safe and effective for its intended use. Before approving an NDA, the FDA will inspect the facility or facilities where the product is manufactured to determine whether its manufacturing is cGMP–compliant to assure and preserve the product's identity, strength, quality, purity and stability.

If the FDA's evaluation of the NDA submission or manufacturing facilities is not favorable, the FDA will issue a complete response letter. The complete response letter outlines the deficiencies in the submission and often requires additional testing or information in order for the FDA to reconsider the application. Even after submitting this additional information, the FDA ultimately may decide that the application does not satisfy the regulatory criteria for approval. With limited exceptions, the FDA may withhold approval of a NDA regardless of prior advice it may have provided or commitments it may have made to the sponsor.

Once an NDA is approved, changes to the conditions of approval, including additional indications, are made by the submission of a supplement to the NDA. The supplemental NDA, or sNDA, must contain all of the information necessary to support the change. In the case of a new indication, that information usually consists of at least one clinical trial, and often more. Like an NDA, FDA determines whether the sNDA is sufficiently complete to permit review before it files the sNDA. FDA then reviews the sNDA. Like an NDA, FDA can either approve the sNDA or issue a complete response letter outlining the deficiencies in the sNDA.

Special Protocol Assessments

An SPA is a process in which sponsors may request to meet with the FDA to reach agreement on the design and size of certain clinical trials, clinical studies, or animal trials to determine if they adequately address scientific and regulatory requirements. As part of this process, sponsors submit specific questions about protocol design and scientific and regulatory requirements. After the FDA completes the review of an SPA request, the FDA may issue a SPA Letter, including an assessment of the protocol, agreement or non-agreement with the proposed protocol, and answers to the sponsor's relevant questions.

An SPA agreement indicates concurrence by the FDA with the adequacy and acceptability of specific critical elements of overall protocol design (e.g., entry criteria, dose selection, endpoints, and planned analyses). These elements are critical to ensuring that the trial conducted under the protocol has the potential to support a future submitted application's ability to meet regulatory requirements for approval. Feedback on these issues provides the greatest benefit to sponsors in planning late-phase development strategy. However, an SPA agreement does not indicate FDA concurrence on every protocol detail. Further, the FDA may rescind an SPA if the director of the FDA reviewing division determines that a substantial scientific issue essential to determining the safety or efficacy of the drug was identified after the trial began. Thus, an SPA is not binding on the FDA if, for example, the Agency identifies a safety concern related to the product or its pharmacological class, if the FDA or the scientific community recognizes a paradigm shift in disease diagnosis or management, if the relevant data or assumptions provided by the sponsor in the SPA submission are found to be false or misstated, or if the sponsor fails to follow the protocol that was agreed upon with the FDA. The FDA retains significant latitude and discretion in interpreting the terms of an SPA agreement and the data and results from the applicable clinical trial.

Because an SPA provides for the evaluation of protocols for trials that have not been initiated, the conduct and results of the subsequent trial are not part of the evaluation. Therefore, the existence of an SPA agreement does not guarantee that the FDA will accept an NDA, or that the trial results will be adequate to support approval. Those issues are addressed during the review of a submitted application; however, it is hoped that trial quality will be improved by the SPA process.

Post-approval requirements and consideration

Once an NDA is approved, a product will be subject to certain post-approval requirements. For instance, the FDA closely regulates the post-approval marketing and promotion of drugs, including standards and regulations for direct-to-consumer advertising, off-label promotion, industry-sponsored scientific and educational activities and promotional activities involving the internet. As a condition of NDA approval, the FDA may also require a risk evaluation and mitigation strategy, or REMS, to help ensure that the benefits of the drug outweigh the potential risks. REMS can include medication guides, communication plans for the healthcare professionals, and other Elements To Assure Safe Use, or ETASU. ETASU can include, but are not limited to, special training or certification for prescribing or dispensing, dispensing only under certain circumstances, special monitoring, and the use of patient registries. The requirement for a REMS can materially affect the potential market and profitability of the drug.

Drugs may be marketed only for the approved indications and in accordance with the provisions of the approved labeling. Changes to some of the conditions established in an approved application, including changes in indications, labeling, or manufacturing processes or facilities, require submission and FDA approval of a new NDA or NDA supplement before the change can be implemented. An NDA supplement for a new indication typically requires clinical data similar to that in the original application, and the FDA uses the same procedures and actions in reviewing NDA supplements as it does in reviewing NDAs.

Adverse event reporting and submission of periodic reports is required following FDA approval of an NDA. The FDA also may require post-marketing testing, known as Phase 4 testing, and surveillance to monitor the effects of an approved product or place conditions on an approval that could restrict the distribution or use of the product. In addition, quality control as well as drug manufacture, packaging, and labeling procedures must continue to conform to cGMPs after approval. Drug manufacturers and certain of their subcontractors are required to register their establishments with the FDA and certain state agencies, and are subject to periodic unannounced inspections by the FDA during which the agency inspects manufacturing facilities to assess compliance with cGMPs. Accordingly, manufacturers must continue to expend time, money and effort in the areas of production and quality control to maintain compliance with cGMPs. Regulatory authorities may withdraw product approvals or request product recalls if a company fails to comply with regulatory standards, if it encounters problems following initial marketing, or if previously unrecognized problems are subsequently discovered.

The Hatch-Waxman Amendments

Orange Book Listing

In seeking approval for a drug through an NDA, applicants are required to list with the FDA each patent with claims covering the applicant's product or approved methods of using the product. Upon approval of a drug, each of the patents listed in the application for the drug are then published in the FDA's Approved Drug Products with Therapeutic Equivalence Evaluations, commonly known as the Orange Book. Drugs listed in the Orange Book can, in turn, be cited by potential generic competitors in support of approval of an abbreviated new drug application, or ANDA. An ANDA provides for marketing of a drug product that has the same active ingredients in the same strengths and dosage form as the listed drug and has been shown to be bioequivalent to the listed drug. Other than the requirement for bioequivalence testing, ANDA applicants are not required to conduct, or submit results of, pre-clinical or clinical tests to prove the safety or effectiveness of their drug product. Drugs approved in this way are commonly referred to as "generic equivalents" to the listed drug, and can often be substituted by pharmacists under prescriptions written for the original listed drug.

The ANDA applicant is required to certify to the FDA concerning any patents listed for the approved product in the FDA's Orange Book. Specifically, the applicant must certify that: (i) the required patent information has not been filed; (ii) the listed patent has expired; (iii) the listed patent has not expired, but will expire on a particular date and approval is sought after patent expiration; or (iv) the listed patent is invalid or will not be infringed by the new product. The ANDA applicant may also elect to submit a section viii statement certifying that its proposed ANDA label does not contain (or carves out) any language regarding the patented method-of-use rather than certify to a listed method-of-use patent. If the applicant does not challenge the listed patents, the ANDA application will not be approved until all the listed patents claiming the referenced product have expired.

A certification that the new product will not infringe the already approved product's listed patents, or that such patents are invalid, is called a Paragraph IV certification. 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 of the receipt of a Paragraph IV certification automatically prevents the FDA from approving the ANDA until the earlier of 30 months, expiration of the patent, settlement of the lawsuit, or a decision in the infringement case that is favorable to the ANDA applicant.

The ANDA application also will not be approved until any applicable non-patent exclusivity listed in the Orange Book for the referenced product has expired.

Exclusivity

Upon NDA approval of a new chemical entity (NCE), which is a drug that contains no active moiety that has been approved by FDA in any other NDA, that drug receives five years of marketing exclusivity during which FDA cannot receive any ANDA seeking approval of a generic version of that drug. A drug may obtain a three-year period of exclusivity for a particular condition of approval, or change to a marketed product, such as a new formulation for the previously approved product, if one or more new clinical studies (other than bioavailability or bioequivalence studies) was essential to the approval of the application and was conducted/sponsored by the applicant. During this period of exclusivity, FDA cannot approve an ANDA for a generic drug that includes the change.

An ANDA may be submitted one year before NCE exclusivity expires if a Paragraph IV certification is filed. If there is no listed patent in the Orange Book, there may not be a Paragraph IV certification, and, thus, no ANDA may be filed before the expiration of the exclusivity period.

Section 505(b)(2) New Drug Applications

Most drug products obtain FDA marketing approval pursuant to an NDA or an ANDA. A third alternative is a special type of NDA, commonly referred to as a Section 505(b)(2), or 505(b)(2), NDA, which enables the applicant to rely, in part, on FDA's previous approval of a similar product, or published literature, in support of its application.

505(b)(2) NDAs often provide an alternate path to FDA approval for new or improved formulations or new uses of previously approved products. Section 505(b)(2) permits the filing of an NDA where at least some of the information required for approval comes from studies not conducted by, or for, the applicant and for which the applicant has not obtained a right of reference. If the Section 505(b)(2) applicant can establish that reliance on FDA's prior findings of safety and effectiveness or published literature is scientifically appropriate, it may eliminate the need to conduct certain pre-clinical or clinical studies of the new product.

The FDA may also require companies to perform additional studies or measurements to support the change from the approved product. The FDA may then approve the new product candidate for all, or some, of the label indications for which the referenced product has been approved, as well as for any new indication sought by the Section 505(b)(2) applicant.

To the extent that the Section 505(b)(2) applicant is relying on studies conducted for an already approved product, the applicant is required to certify to the FDA concerning any patents listed for the approved product in the Orange Book to the same extent that an ANDA applicant would. A Section 505(b)(2) NDA may be eligible for three years of marketing exclusivity to the same extent that a Section 505(b)(1) NDA is.

Abbreviated new drug applications

Generic drugs may enter the market after the approval of an ANDA. The ANDA development process typically does not require new pre-clinical or clinical studies, but it does typically require one or more bioequivalence studies to show that the ANDA drug is bioequivalent to the previously approved brand name reference listed drug. Bioequivalence studies compare the bioavailability of the proposed drug product with that of the approved listed product containing the same active ingredient. Bioavailability is a measure of the rate and extent to which the active ingredient or active moiety is absorbed from a drug product and becomes available at the site of action. A demonstration of bioequivalence means that the rate and extent of absorption of the ANDA drug is not significantly different from the rate and extent of absorption of the brand name reference listed drug when administered at the same molar dose under similar experimental conditions.

As noted above, generic drug products are generally introduced to the marketplace at the expiration of patent protection and non-patent market exclusivity for the reference listed drug. However, if an ANDA applicant is the first ANDA applicant to submit an ANDA containing a Paragraph IV certification, that ANDA may be eligible for a period of generic marketing exclusivity on approval. This exclusivity, which under certain circumstances must be shared with other ANDA applicants with Paragraph IV certifications, lasts for 180 days, during which the FDA cannot grant final approval to other ANDA sponsors of an application for a generic equivalent to the same reference drug. Under certain circumstances, eligibility for 180-day exclusivity may be forfeited.

Various types of changes to an approved ANDA must be requested in a prior approval supplement. In addition, some changes may only be approved only after new bioequivalence studies are conducted or other requirements are satisfied. In addition, the ANDA applicant must demonstrate that manufacturing procedures and operations conform to FDA cGMP requirements. Facilities, procedures, operations, and/or testing of products are subject to periodic inspection by the FDA and other authorities. In addition, the FDA conducts pre-approval and post-approval reviews and inspections to determine whether the systems and processes are in compliance with cGMP and other FDA regulations.

There are also user fees for ANDA applicants, sponsors, and manufacturers. For fiscal year 2019, the application fees are $178,799 per ANDA application and the facility fees are $211,305 per domestic finished dosage form facility, $226,305 per foreign finished dosage form facility, $44,226 per domestic active pharmaceutical ingredient facility, and $59,226 per foreign active pharmaceutical ingredient facility. In addition, there is a new annual program fee based on the size of the generic drug applicant. These user fees typically increase each fiscal year.

Other regulatory requirements

In addition to regulation by the FDA and certain state regulatory agencies, we are also subject to a variety of foreign regulations governing clinical trials and the marketing of other products. Outside of the United States, our ability to market a product depends upon receiving a marketing authorization from the appropriate regulatory agencies. The requirements governing the conduct of clinical trials, marketing authorization, pricing and reimbursement vary widely from country to country. In any country, however, we will only be permitted to commercialize our products if the appropriate regulatory agency is satisfied that we have presented adequate evidence of safety, quality and efficacy. Whether or not FDA approval has been obtained, approval of a product by the comparable regulatory authorities of foreign countries must be obtained prior to the commencement of marketing of the product in those countries. The regulatory approval and oversight process in other countries includes all of the risks associated with regulation by the FDA and certain state regulatory agencies as described above.

Under the European Union regulatory system, applications for drug approval may be submitted either in a centralized or decentralized manner. Under the centralized procedure, a single application to the European Medicines Agency leads to an approval granted by the European Commission which permits marketing of the product throughout the European Union. The decentralized procedure provides for mutual recognition of nationally approved decisions and is used for products that do not comply with requirements for the centralized procedure. Under the decentralized procedure, the holders of national marketing authorization in one of the countries within the European Union may submit further applications to other countries within the European Union, who will be requested to recognize the original authorization based on an assessment report provided by the country in which marketing authorization is held.

Pharmaceutical pricing and reimbursement

In both United States and foreign markets, our ability to commercialize our products successfully, and to attract commercialization partners for our products, depends in significant part on the availability of adequate financial coverage and reimbursement from third-party payors, including, in the United States, governmental payors such as Medicare and Medicaid, managed care organizations, private commercial health insurers and PBMs. Third party payors are increasingly challenging the prices charged for medicines and examining their cost effectiveness, in addition to their safety and efficacy. We may need to conduct expensive pharmacoeconomic or other studies in order to further demonstrate the value of our products. Even with the availability of such studies, our products may be considered less safe, less effective or less cost-effective than alternative products, and third-party payors may not provide coverage and reimbursement for our drug candidates, in whole or in part.

Political, economic and regulatory influences are subjecting the health care industry in the United States to fundamental changes. There have been, and we expect there will continue to be, legislative and regulatory proposals to change the healthcare system in ways that could significantly affect our business, including the Patient Protection and Affordable Care Act of 2010 (the "Affordable Care Act"). In fact, there continue to be efforts in Congress to repeal the Affordable Care Act and replace it with another law, and President Trump has stated that he supports repeal of all or portions of the Affordable Care Act. As a result, there is great uncertainty as to what changes will be made to United States healthcare laws and there can be no assurance how changes to those laws may affect our business.

We anticipate that in the United States, Congress, state legislatures, and private sector entities will continue to consider and may adopt healthcare policies intended to curb rising healthcare costs. These cost containment measures could include:

- controls on government-funded reimbursement for drugs;
- controls on healthcare providers;
- controls on pricing of pharmaceutical products, including the possible reference of the pricing of United States drugs to non-United States drug pricing for the same product;
- challenges to the pricing of drugs or limits or prohibitions on reimbursement for specific products through other means;
- reform of drug importation laws;
- entering into contractual agreements with payors; and
- expansion of use of managed-care systems in which healthcare providers contract to provide comprehensive healthcare for a fixed cost per person.

We are unable to predict what additional legislation, regulations or policies, if any, relating to the healthcare industry or third-party coverage and reimbursement may be enacted in the future or what effect such legislation, regulations or policies would have on our business. Any cost containment measures, including those listed above, or other healthcare system reforms that are adopted may have a material adverse effect on our business prospects.

Further, the pricing of pharmaceutical products generally, and particularly the pricing of orphan drugs, has recently received scrutiny from the press, from members of Congress in both parties, and from President Trump. Some members of the medical community and one U.S. Senator have also made statements in the press on the potential pricing of orphan drugs generally and on the pricing of our product specifically. The impact of this scrutiny on us and on the pricing of orphan drugs and other pharmaceutical products generally cannot be determined with any certainty at this time.

Orphan Drug Exclusivity and Pediatric Exclusivity Designation

Some jurisdictions, including the United States and Europe, may designate drugs for relatively small patient populations as orphan drugs. Under the Orphan Drug Act of 1983 (ODA), 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 more than 200,000 individuals in the United States and for which there is no reasonable expectation that the cost of developing and making available in the United States a drug for this type of disease or condition will be recovered from sales in the United States for that drug. In the United States, Orphan Drug Designation must be requested before submitting an application for marketing approval. An Orphan Drug Designation does not shorten the duration of the regulatory review and approval process. The grant of an Orphan Drug Designation request does not alter the standard regulatory requirements and process for obtaining marketing approval. Safety and efficacy of a compound must be established through adequate and well-controlled studies. If a product which has been granted Orphan Drug Designation subsequently receives the first FDA approval for the indication for which it has such designation, the product is entitled to an orphan drug exclusivity period, 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 where an alternative product demonstrates clinical superiority to the product with orphan exclusivity. In addition, holders of exclusivity for orphan drugs are expected to assure the availability of sufficient quantities of their orphan drugs to meet the needs of patients. Failure to do so could result in the withdrawal of marketing exclusivity for the drug.

The orphan drug exclusivity contained in the ODA has been the subject of recent scrutiny from the press, from some members of Congress and from some in the medical community. There can be no assurance that the exclusivity granted in ODA to orphan drugs approved by the FDA will not be modified in the future, and as to how any such change might affect our products, if approved.

Pediatric exclusivity is another type of non-patent exclusivity in the United States and, if granted, provides for the attachment of an additional six months of marketing protection to the term of any existing regulatory exclusivity, including the five-year and three-year non-patent and seven-year orphan exclusivities. This six-month exclusivity may be granted if an NDA sponsor submits pediatric data that fairly responds to a written request from the FDA for such data. The data do not need to show the product to be effective in the pediatric population studied. If the FDA determines that information relating to the use of the new drug in the pediatric population may produce health benefits in the population, the clinical study is deemed to fairly respond to the FDA's request and the reports of FDA-requested pediatric studies are submitted to and accepted by the FDA within the statutory time limits, whatever statutory or regulatory periods of exclusivity or patent protection covering the product are extended by six months. This is not a patent term extension, but it effectively extends the regulatory period during which the FDA cannot approve another application relying on the NDA sponsor's data.

The European Orphan Drug Regulation is considered for drugs intended to diagnose, prevent or treat a life-threatening or very serious condition afflicting five or fewer per 10,000 people in the EU, including compounds that for serious and chronic conditions would likely not be marketed without incentives due to low market return on the sponsor's development investment. The medicinal product considered should be of significant benefit to those affected by the condition. Benefits of being granted Orphan Medicinal Product Designation are significant, including eight years of data exclusivity, two years of marketing exclusivity and a potential one-year extension of both. The EU Community and Member States may not accept or grant for ten years a new marketing authorization or application for another drug for the same therapeutic indication as the orphan drug, although the ten year period can be reduced to six years if, after the end of the fifth year, available evidence establishes that the product is sufficiently profitable not to justify maintenance of the marketing exclusivity. A supplementary protection certificate may extend the protection six months beyond patent expiration if that is later than the orphan drug exclusivity period. To apply for the supplementary protection, a pediatric investigation plan, or PIP, must be included in the market application. In Europe all drugs now seeking marketing authorization need to have a PIP agreed with the European Medicines Agency (EMA) before it can be approved, even if it is a drug being developed specifically for a pediatric indication. If a product is developed solely for use in the pediatric population, then a Pediatric Use Marketing Authorization, or PUMA, may provide eight years of data exclusivity and ten years of marketing exclusivity.

Breakthrough Therapy Designation

Breakthrough therapy designation is intended to expedite the development and review of drugs for serious or life-threatening conditions. The criteria for breakthrough therapy designation require preliminary clinical evidence that demonstrates the drug may have substantial improvement on at least one clinically significant endpoint over available therapy. A breakthrough therapy designation conveys all of the fast track program features (see below for more details on fast track designation), as well as more intensive FDA guidance on an efficient drug development program. The FDA also has an organizational commitment to involve senior management in such guidance. Actions taken to expedite development may include the following actions, as appropriate:

- holding meetings with the sponsor and review team throughout the development of the drug;
- providing timely advice to, and interactive communication with, the sponsor regarding the development of the drug to ensure that the development program to gather the non-clinical and clinical data necessary for approval is as efficient as possible;
- taking steps to ensure that the design of the clinical trials is as efficient as practicable, when scientifically appropriate, such as by minimizing the number of patients exposed to a potentially less efficacious treatment;
- assigning a cross-disciplinary project lead for the FDA review team to facilitate an efficient review of the development program and to serve as a scientific liaison between the cross-discipline members of the review team (i.e., clinical, pharmacology-toxicology, chemistry, manufacturing and control (CMC), compliance) for coordinated internal interactions and communications with the sponsor through the review division's Regulatory Health Project Manager; and
- involving senior managers and experienced review staff, as appropriate, in a collaborative, cross-disciplinary review.

Fast Track Designation and Accelerated Approval

FDA is required to facilitate the development, and expedite the review, of drugs that are intended for the treatment of a serious or life-threatening disease or condition for which there is no effective treatment and which demonstrate the potential to address unmet medical needs for the condition. Under the fast track program, the sponsor of a new drug candidate may request that FDA designate the drug candidate for a specific indication as a fast track drug concurrent with, or after, the filing of the IND for the drug candidate. FDA must determine if the drug candidate qualifies for fast track designation within 60 days of receipt of the sponsor's request.

Under the fast track program and FDA's accelerated approval regulations, FDA may approve a drug for a serious or life-threatening illness that provides meaningful therapeutic benefit to patients over existing treatments based upon a surrogate endpoint that is reasonably likely to predict clinical benefit, or 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.

In clinical trials, a surrogate endpoint is a measurement of laboratory or clinical signs of a disease or condition that substitutes for a direct measurement of how a patient feels, functions, or survives. Surrogate endpoints can often be measured more easily or more rapidly than clinical endpoints. A drug candidate approved on this basis is subject to rigorous post-marketing compliance requirements, including the completion of Phase 4 or post-approval clinical trials to confirm the effect on the clinical endpoint. Failure to conduct required post-approval studies, or confirm a clinical benefit during post-marketing studies, will allow FDA to withdraw the drug from the market on an expedited basis. All promotional materials for drug candidates approved under accelerated regulations are subject to prior review by FDA.

In addition to other benefits such as the ability to use surrogate endpoints and engage in more frequent interactions with FDA, FDA may initiate review of sections of a fast track drug's NDA before the application is complete. This rolling review is available if the applicant provides, and FDA approves, a schedule for the submission of the remaining information and the applicant pays applicable user fees. However, FDA's time period goal for reviewing an application does not begin until the last section of the NDA is submitted. Additionally, the fast track designation may be withdrawn by the FDA if the FDA believes that the designation is no longer supported by data emerging in the clinical trial process.

Priority Review

Under FDA policies, a drug candidate is eligible for priority review, or review within a six to eight-month time frame from the time a complete NDA is submitted, if the drug candidate is intended for the treatment, diagnosis, or prevention of a serious or life-threatening condition, demonstrates the potential to address an unmet medical need, or provides a significant improvement compared to marketed drugs.

Disclosure of clinical trial information

Sponsors of clinical trials of FDA-regulated products, including drugs, are required to register and disclose certain clinical trial information. Information related to the product, patient population, phase of investigation, study sites and investigators, and other aspects of the clinical trial is then made public as part of the registration. Sponsors are also obligated to disclose the results of their clinical trials after completion. Disclosure of results of these trials can be delayed in certain circumstances for up to two years after the date of completion of the clinical trial. Competitors may use this publicly-available information to gain knowledge regarding the progress of development programs.

Anti-Kickback, False Claims Laws & the Prescription Drug Marketing Act

In addition to FDA restrictions on marketing of pharmaceutical products, other state and federal laws have been applied to restrict certain marketing practices in the pharmaceutical industry in recent years. These laws include anti-kickback statutes and false claims statutes. The federal healthcare program anti-kickback statute prohibits, among other things, knowingly and willfully offering, paying, soliciting or receiving remuneration to induce or in return for purchasing, leasing, ordering or arranging for the purchase, lease or order of any healthcare item or service reimbursable under Medicare, Medicaid or other federally financed healthcare programs. This statute has been interpreted to apply to arrangements between pharmaceutical manufacturers on the one hand and patients, prescribers, purchasers and formulary managers on the other. Violations of the anti-kickback statute are punishable by imprisonment, criminal fines, civil monetary penalties, and exclusion from participation in federal healthcare programs. Although there are a number of statutory exemptions and regulatory safe harbors protecting certain common activities from prosecution or other regulatory sanctions, the exemptions and safe harbors are drawn narrowly, and practices that involve remuneration intended to induce prescribing, purchases or recommendations may be subject to scrutiny if they do not qualify for an exemption or safe harbor.

Federal false claims laws prohibit any person from knowingly presenting, or causing to be presented, a false claim for payment to the federal government, or knowingly making, or causing to be made, a false statement to have a false claim paid. Recently, several pharmaceutical and other healthcare companies have been prosecuted under these laws for allegedly inflating drug prices they report to pricing services, which in turn were used by the government to set Medicare and Medicaid reimbursement rates, and for allegedly providing free product to customers with the expectation that the customers would bill federal programs for the product. In addition, certain marketing practices, including off-label promotion, may also violate false claims laws. The majority of states also have statutes or regulations similar to the federal anti-kickback law and false claims laws, which apply to items and services reimbursed under Medicaid and other state programs, or, in several states, apply regardless of the payer.

The Centers for Medicare & Medicaid Services (CMS) has issued a final rule that requires manufacturers of approved prescription drugs to collect and report information on payments or transfers of value to physicians and teaching hospitals, as well as investment interests held by physicians and their immediate family members. The information reported each year is made publicly available on a searchable website. Failure to submit required information may result in civil monetary penalties.

In addition, several states now require prescription drug companies to report expenses relating to the marketing and promotion of drug products and to report gifts and payments to individual physicians in these states. Other states prohibit various other marketing-related activities. Still other states require the posting of information relating to clinical studies and their outcomes. In addition, California, Connecticut, Nevada, and Massachusetts require pharmaceutical companies to implement compliance programs and/or marketing codes. Several additional states are considering similar proposals. Compliance with these laws is difficult and time consuming, and companies that do not comply with these state laws face civil penalties.

Prescription drug advertising is subject to federal, state and foreign regulations. In the United States, the FDA regulates prescription drug promotion, including direct-to-consumer advertising. Prescription drug promotional materials must be submitted to the FDA in conjunction with their first use. Any distribution of prescription drug products and pharmaceutical samples must comply with the United States Prescription Drug Marketing Act (PDMA), a part of the FDCA. In addition, Title II of the Federal Drug Quality and Security Act of 2013, known as the Drug Supply Chain Security Act (DSCSA), has imposed new "track and trace" requirements on the distribution of prescription drug products by manufacturers, distributors, and other entities in the drug supply chain. These requirements are being phased in over a ten-year period. The DSCSA ultimately will require product identifiers (i.e., serialization) on prescription drug products in order to establish an electronic interoperable prescription product to system to identify and trace certain prescription drugs distributed in the United States. The DSCSA replaced the prior drug "pedigree" requirements under the PDMA, and preempts existing state drug pedigree laws and regulations. The DSCSA also establishes new requirements for the licensing of wholesale distributors and third party logistic providers. These licensing requirements preempt states from imposing licensing requirements that are inconsistent with, less stringent than, directly related to, or otherwise encompassed by standards established by FDA pursuant to the DSCSA. Until FDA promulgates regulations to address the DSCSA's new national licensing standard, current state licensing requirements typically remain in effect.

Our Employees

As of March 14, 2019 we had 51 employees. We also utilize the services of consultants. None of our employees are covered by a collective bargaining agreement. We believe our relationship with our employees and consultants is good.

We previously had a scientific advisory board. However, we disbanded our scientific advisory board during 2018.

Available Information

We make available free of charge on or through our Internet website our Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and all amendments to those reports as soon as reasonably practicable after such material is electronically filed with or furnished to the Securities and Exchange Commission (SEC). Our Internet address is www.catalystpharma.com. The content on our website is not, nor should it be deemed to be, incorporated by reference into this Form 10-K.

Item 1A. Risk Factors

Our business involves a high degree of risk. You should carefully consider the risks and uncertainties described below, and all of the other information contained in this Form 10-K in assessing the risks relating to ownership of our common stock. The risks described below could cause our business, results of operations, financial condition and prospects to materially suffer and the market price of our stock to decline.

Risks related to the commercialization of Firdapse®

We depend substantially on the commercial success of Firdapse®, and we may not be able to successfully commercialize it.

Until recently, we have focused all of our efforts on obtaining regulatory approval for Firdapse® for the treatment of LEMS, on evaluating Firdapse® for the treatment of other neuromuscular diseases including CMS, MuSK-MG and SMA Type 3, on raising capital, and on recruiting personnel. On November 28, 2018, the FDA approved our first product, Firdapse®, for the treatment of adults with LEMS, which became commercially available in January 2019. We have a history of operating losses, with net losses of $34.0 million in fiscal 2018 and $18.4 million in fiscal 2017. Although we have received FDA approval and commenced commercialization of Firdapse® for the treatment of adults with LEMS in the United States, we may never become profitable.

Our business may require additional capital.

We may need to raise additional capital in the future in order to fund our business and generate significant revenue in order to achieve and maintain profitability. If necessary, we would likely raise additional funds in the future through public or private equity offerings, debt financings, corporate collaborations, or other means. We may also seek governmental grants to support our clinical and pre-clinical trials. However, there is no assurance that any such funding will be available, and, even if it is available, whether it will be available on terms that are favorable to us. We may also seek to raise additional capital to fund additional product development efforts, even if we have sufficient funds for our planned operations.

Any sale by us of additional equity or debt securities convertible into additional equity could result in dilution to our stockholders. Further, to the extent that we raise funds through collaborative arrangements, it may be necessary to relinquish some rights to our technologies or grant sublicenses on terms that are not favorable to us. If we are not able to secure funding when needed, we may have to delay, reduce the scope of or eliminate one or more research and development programs, which could have an adverse effect on our business.

Our success depends on our ability to successfully commercialize Firdapse®. We are primarily a single product company with little or no commercial sales experience, which makes it difficult to evaluate our current business, predict our future prospects and forecast our financial performance and growth.

We have invested a significant portion of our efforts and financial resources into the development and commercialization of our lead product, Firdapse®, which was approved by the FDA as a treatment for adults with LEMS on November 28, 2018. Our success depends on our ability to effectively commercialize Firdapse®, and we expect that the vast majority of our product revenues in the foreseeable future will be from sales of Firdapse®. Successful commercialization of Firdapse® is subject to many risks. We have never launched or commercialized a product, and there is no guarantee that we will be able to do so successfully with Firdapse®. There are numerous examples of unsuccessful product launches and failures to meet high expectations of market potential, including by pharmaceutical companies with more resources and experience than we have. The commercial success of Firdapse® depends on the extent to which patients and physicians accept and adopt Firdapse®. For example, if the expected patient population is smaller than we estimate or if physicians are unwilling to prescribe or patients are unwilling to take Firdapse®, the commercial potential of Firdapse® will be limited. Thus, significant uncertainty remains regarding the commercial potential of Firdapse®.

Moreover, our ability to effectively generate product revenue from Firdapse® will depend on our ability to, among other things:

- achieve and maintain compliance with regulatory requirements, including promotion and advertising requirements;
- increase awareness for and achieve market acceptance of Firdapse® through our sales and marketing activities and other arrangements established for the promotion of Firdapse®;
- train, deploy and support a qualified field sales and marketing force;
- secure formulary approvals for Firdapse® with a substantial number of targeted payors;
- ensure that our third-party manufacturers manufacture Firdapse® in sufficient quantities, in compliance with requirements of the FDA and at acceptable quality and pricing levels, in order to meet commercial demand;
- ensure that our third-party manufacturers develop, validate and maintain commercially viable manufacturing processes that are compliant with current Good Manufacturing Practice, or cGMP, regulations;
- implement and maintain agreements with wholesalers, distributors and group purchasing organizations on commercially reasonable terms;
- ensure that our entire supply chain efficiently and consistently delivers Firdapse® to our customers;
- provide co-pay assistance to help qualified patients with out-of-pocket costs associated with their Firdapse® prescription, and/or other programs to ensure patient access to our products, educate physicians and patients about the benefits, administration and use of Firdapse®, and obtain acceptance of Firdapse® as safe and effective by patients and the medical community;
- receive adequate levels of coverage and reimbursement for Firdapse® from commercial health plans and governmental health programs;
- generate positive experience with our Catalyst Pathways™ program in helping patients obtain access to Firdapse® at an acceptable patient out-of-pocket cost;
- the quality of our relationships with patient advocacy groups;

- influence the nature of publicity related to our product relative to the publicity related to our competitors' products;
- obtain regulatory approvals for additional indications for the use of Firdapse® in treating other rare neuromuscular diseases; and
- maintain and defend our regulatory exclusivity for Firdapse®.

Any disruption in our ability to generate product revenue from the sale of Firdapse® will have a material and adverse impact on our results of operations.

We have limited experience as a company in marketing or distributing pharmaceutical products. If we are unable to expand our marketing capabilities and effectively commercialize Firdapse®, our business, results of operations and financial condition may be materially adversely affected.

Our strategy is to build our sales, marketing and distribution capabilities to successfully commercialize Firdapse® in the United States. While we have established our commercial team and launched our product, we have limited experience commercializing pharmaceutical products as an organization. In order to successfully market Firdapse®, we must continue to build our sales, marketing, managerial, compliance, and related capabilities or make arrangements with third parties to perform these services. If we are unable to establish adequate sales, marketing, and distribution capabilities, whether independently or with third parties, we may not be able to appropriately commercialize Firdapse® and may not become profitable.

Included in our strategy in the United States is a direct sales force to commercialize Firdapse®. These efforts will continue to be expensive and time-consuming, and we cannot be certain that we will be able to successfully develop this capability. Firdapse® is a newly marketed drug and, therefore, while many of our sales force members have promoted other orphan and/or neuromuscular drugs, none of the members of our sales force has ever promoted Firdapse® prior to its commercial launch. In addition, we must train our sales force to ensure that a consistent and appropriate message about Firdapse® is being delivered to our potential customers. If we are unable to effectively train our sales force and equip them with effective materials, including medical and sales literature to help them inform and educate potential customers about the benefits of Firdapse® and its proper administration, all while maintaining compliance with regulatory requirements, our efforts to successfully commercialize Firdapse® could be harmed, which would negatively impact our ability to generate product revenue. Additionally, we will need to maintain and further develop our sales force to achieve commercial success, and we will be competing with other pharmaceutical and biotechnology companies to recruit, hire, train and retain marketing and sales personnel. In the event we are unable to continue to develop and effectively maintain our commercial team, our ability to successfully commercialize Firdapse® would be limited, and we would not be able to generate product revenue successfully.

There are risks involved both with establishing our own sales and marketing capabilities, and with entering into arrangements with third parties to perform these services. For example, any efforts to develop a direct sales and marketing organization are subject to numerous risks, including:

- the expense and time required to recruit, retain, and motivate members of the sales force;
- our inability to recruit, retain or motivate adequate numbers of effective marketing personnel and partner marketing agencies;
- the inability to provide adequate training to sales and marketing personnel;
- the expense and time required to monitor regulatory compliance;
- the inability of sales personnel to obtain access to physicians or convince adequate numbers of physicians to prescribe any product; and
- unforeseen costs and expenses associated with creating an independent sales and marketing organization.

Similarly, if we enter into arrangements with third parties to perform sales, marketing and distribution services, our product revenue or the profitability associated with any product revenue may be lower than if we were to market and sell any products that we develop ourselves. In addition, we may not be successful in entering into arrangements with third parties to sell and market our products or may be unable to do so on terms that are favorable to us. We may have little control over such third parties, and any of them may fail to devote the necessary resources and attention to sell and market our products effectively. Moreover, we may be negatively impacted by other factors outside of our control relating to such third parties, including, but not limited to, their inability to comply with regulatory requirements. If we do not establish sales, marketing and distribution capabilities successfully, either on our own or in collaboration with third parties, we will not be successful in commercializing our products.

Finally, because we are using a very small group of exclusive speciality pharmacies to distribute our product, if the organizations that we work with to deliver our drug do not perform in a lawful manner or have issues unrelated to our business, our business could be adversely affected.

Our business is subject to substantial competition.

The biotechnology and pharmaceutical industries are highly competitive. Many of our competitors have substantially greater financial and other resources, larger research and development staffs and more experience developing products, obtaining FDA and other regulatory approvals of products and manufacturing and marketing products than we have. We compete against pharmaceutical companies that are developing or currently marketing therapies that will compete with us. In addition, we compete against biotechnology companies, universities, government agencies, and other research institutions in the development of pharmaceutical products. Our business could be negatively impacted if our competitors' present or future offerings are more effective, safer or less expensive than ours, or more readily accepted by regulators, healthcare providers or third-party payors. Further, we may also compete with respect to manufacturing efficiency and marketing capabilities.

For example, amifampridine, the active ingredient in Firdapse®, despite not being previously FDA approved, has been available from compounding pharmacies, and from Jacobus Pharmaceutical under compassionate use INDs, for many years. Amifampridine from these sources can be expected to be substantially less expensive than Firdapse®. Even with the FDA approval of Firdapse®, the ingredients in the drug may be used by compounding pharmacies pursuant to Section 503A of the Federal Food, Drug, and Cosmetic Act because pharmacies that compound for individually identified patients under Section 503A may compound using components of approved drug products. In addition, drugs that are not approved by FDA for the treatment of LEMS, such as a related aminopyridine drug, dalfampridine (Ampyra®), may nonetheless be prescribed by physicians for the treatment of LEMS.

For all of these reasons, we may not be able to compete successfully.

We face a risk of product liability claims and may not be able to obtain adequate insurance.

Our business exposes us to potential liability risks that may arise from the clinical testing, manufacture, and/or sale of our pharmaceutical products. Patients have received substantial damage awards in some jurisdictions against pharmaceutical companies based on claims for injuries allegedly caused by the use of pharmaceutical products used in clinical trials or after FDA approval. Liability claims may be expensive to defend and may result in large judgments against us. We currently carry liability insurance that we believe to be adequate. Our insurance may not reimburse us for certain claims or the coverage may not be sufficient to cover claims made against us. We cannot predict all of the possible harms or side effects that may result from the use of our current drug candidates, or any potential future products we may acquire and use in clinical trials or after FDA approval and, therefore, the amount of insurance coverage we currently hold may not be adequate to cover all liabilities we might incur. If we are sued for any injury allegedly caused by our products, our liability could exceed our ability to pay the liability. Whether or not we are ultimately successful in any adverse litigation, such litigation could consume substantial amounts of our financial and managerial resources, all of which could have a material adverse effect on our business, financial condition, results of operations, prospects and stock price.

The obligations incident to being a public company place significant demands on our management.

As a public reporting company, we are required to comply with the Sarbanes-Oxley Act of 2002 and the related rules and regulations of the SEC, including periodic reports, disclosures and more complex accounting rules. As directed by Section 404 of Sarbanes-Oxley, the SEC adopted rules requiring public companies to include a report of management on a company's internal control over financial reporting in their Annual Report on Form 10-K. Based on current rules, we are required to annually report under Section 404(a) of Sarbanes-Oxley regarding our management's assessment as to the effectiveness of our internal control over financial reporting. Further, under Section 404(b) of Sarbanes-Oxley, our auditors are required to report on their assessment as to the effectiveness of our internal control over financial reporting. If we or our auditors are unable to conclude that we have effective internal control over our financial reporting, investors could lose confidence in the reliability of our consolidated financial statements, which could result in a decrease in the value of our common stock.

We are highly dependent on our small number of key personnel and advisors.

We are highly dependent on our officers and key employees and on our Board of Directors. The loss of the services of any of these individuals could significantly impede the achievement of our scientific and business objectives. Other than an employment agreement with Patrick J. McEnany, our Chairman, President and Chief Executive Officer with respect to his services, we have no employment or retention agreements with any of our other officers or key employees. If we lose the services of any of our existing officers or key employees, or if we were unable to recruit qualified replacements on a timely basis for persons who leave our employ, our efforts to develop our drug candidates might be significantly delayed. We do not carry key-man insurance on any of our personnel.

We have relationships with collaborators at academic and other institutions. Such individuals are employed by entities other than us and may have commitments to, or consulting advisory contracts with, such entities that may limit their availability to us. As a result, conflicts may arise from the work in which our collaborators are involved.

Risks Related to the Development of Additional Indications for Firdapse®

Our efforts may fail.

Development of additional indications for Firdapse® is subject to risks of failure. For example:

- Firdapse® may be found to be ineffective or unsafe for the additional indications, or fail to receive necessary regulatory approvals;
- Firdapse® may not be economical to market or take substantially longer to obtain necessary regulatory approvals for additional indications than anticipated; or
- competitors may develop and market equivalent or superior products, including next generation products that act with the same mechanism of action as Firdapse®.

As a result, our drug development activities may not result in any safe, effective and commercially viable additional indications, and we may not be able to commercialize our products successfully. For example, for several years, we evaluated CPP-109 (our formulation of vigabatrin) for the treatment of cocaine addiction. However, CPP-109 failed to meet the primary and two key secondary endpoints in a Phase 2b trial for cocaine addiction, and we are no longer pursuing the evaluation of CPP-109 for addiction.

Our failure to develop safe, effective, and/or commercially viable products would have a material adverse effect on our business, prospects, results of operations and financial condition.

Failure can occur at any stage of our drug development efforts.

We will only obtain regulatory approval to commercialize Firdapse® for additional indications if we can demonstrate to the satisfaction of the FDA (or the equivalent foreign regulatory authorities) in adequate and well-controlled clinical studies and trials that the drug is safe and effective for its intended use, that the clinical and other benefits outweigh the safety risks and that it otherwise meets approval requirements. As we have experienced in the past, a failure of one or more pre-clinical or clinical trials or studies can occur at any stage of drug development. We may experience numerous unforeseen events during, or as a result of, testing that could delay or prevent us from obtaining regulatory approval for, or commercializing our drug candidates, including but not limited to:

- regulators or Institutional Review Boards (IRBs) may not authorize us to commence a clinical trial or conduct a clinical trial at a prospective trial site;
- conditions may be imposed upon us by the FDA regarding the scope or design of our clinical trials, or we may be required to resubmit our clinical trial protocols to IRBs for review due to changes in the regulatory environment;
- the number of subjects required for our clinical trials may be larger, patient enrollment may take longer, or patients may drop out of our clinical trials at a higher rate than we anticipate;
- we may have to suspend or terminate one or more of our clinical trials if we, regulators, or IRBs determine that the participants are being subjected to unreasonable health risks;

- our third-party contractors, clinical investigators or contractual collaborators may fail to comply with regulatory requirements or fail to meet their contractual obligations to us in a timely manner;
- the FDA may not accept clinical data from trials that are conducted at clinical sites in countries where the standard of care is potentially different from the United States;
- our tests may produce negative or inconclusive results, and we may decide, or regulators may require us, to conduct additional testing; and
- the costs of our pre-clinical and/or clinical trials may be greater than we anticipate.

We rely on third parties to conduct our pre-clinical studies and clinical studies and trials, and if they do not perform their obligations to us we may not be able to obtain approval for additional indications.

We do not currently have the ability to independently conduct pre-clinical studies or clinical studies and trials, and we typically rely on third parties, such as third-party contract research and governmental organizations, medical institutions and clinical investigators (including academic clinical investigators), to conduct studies and trials for us. Our reliance on third parties for development activities reduces our control over these activities. These third parties may not complete activities on schedule or may not conduct our pre-clinical studies and our clinical studies and trials in accordance with regulatory requirements or our study design. If these third parties do not successfully carry out their contractual duties or meet expected deadlines, we may be adversely affected, and our efforts to obtain regulatory approvals for and commercialize Firdapse® for additional indications may be delayed.

If we conduct studies with other parties, we may not have control over all decisions associated with that trial. To the extent that we disagree with the other party on such issues as study design, study timing and the like, it could adversely affect our drug development plans.

Although we also rely on third parties to manage the data from our studies and trials, we are responsible for confirming that each of our studies and trials is conducted in accordance with its general investigational plan and protocol. Moreover, the FDA and foreign regulatory agencies will require us to comply with applicable regulations and standards, including Good Laboratory Practice (GLP) and Good Clinical Practice (GCP), for conducting, recording and reporting the results of such studies and trials to assure that the data and the results are credible and accurate and that the human study and trial participants are adequately protected. Our reliance on third-parties does not relieve us of these obligations and requirements, and we may fail to obtain regulatory approval for any additional indications if these requirements are not met.

We will need to develop distribution and production capabilities or relationships to be successful.

We are licensed in Florida as a virtual drug manufacturer, which means we have no in-house manufacturing capacity and we will be obligated to rely on contract manufacturers and packagers. We cannot be sure that we will successfully manufacture any product, either independently or under manufacturing arrangements, if any, with third party manufacturers. Moreover, if any manufacturer should cease doing business with us or experience delays, shortages of supply or excessive demands on their capacity, we may not be able to obtain adequate quantities of product in a timely manner, or at all. Manufacturers, and in certain situations their suppliers, are required to comply with current NDA commitments and current good manufacturing practices (cGMP) requirements enforced by the FDA, and similar requirements of other countries. The failure by a manufacturer to comply with these requirements could affect its ability to provide us with product. Although we intend to rely on third-party contract manufacturers, we are ultimately responsible for ensuring that our products are manufactured in accordance with cGMP. In addition, if, during a preapproval inspection or other inspection of our third-party manufacturers' facility or facilities, the FDA determines that the facility is not in compliance with cGMP, any of our marketing applications that lists such facility as a manufacturer may not be approved or approval may be delayed until the facility comes into compliance with cGMP and completes a successful re-inspection by the FDA.

Any manufacturing problem, natural disaster affecting manufacturing facilities, or the loss of a contract manufacturer could be disruptive to our operations and result in lost sales. Additionally, we will be reliant on third parties to supply the raw materials needed to manufacture our products. Any reliance on suppliers may involve several risks, including a potential inability to obtain critical materials and reduced control over production costs, delivery schedules, reliability and quality. Any unanticipated disruption to future contract manufacture caused by problems at suppliers could delay shipment of products, increase our cost of goods sold and result in lost sales. If our suppliers were to be unable to supply us with adequate supply of our drugs, it could have a material adverse effect on our ability to successfully commercialize our drug candidates.

If we rely on a sole source of supply to manufacture our products we could be impacted by the viability of our supplier.

We intend to attempt to source our products from more than one supplier. We also intend to enter into contracts with any supplier of our products to contractually obligate them to meet our requirements. However, if we are reliant on a single supplier and that supplier cannot or will not meet our requirements (for whatever reason), our business could be adversely impacted.

We may not be able to sufficiently scale-up manufacturing of our drug candidates.

We may not be able to successfully increase in a sufficient manner the manufacturing capacity for our drug candidates, whether in collaboration with third-party manufacturers or on our own, in a timely or cost-effective manner or at all. If a contract manufacturer makes improvements in the manufacturing process for our drug candidates, we may not own, or may have to share, the intellectual property rights to those improvements.

Significant scale-up of manufacturing may require additional validation studies, which are costly and which the FDA must review and approve. In addition, quality issues may arise during those scale-up activities because of the inherent properties of a drug candidate itself or of a drug candidate in combination with other components added during the manufacturing and packaging process, or during shipping and storage of the finished product or active pharmaceutical ingredients. If we are unable to successfully scale-up manufacture of any of our drug candidates in sufficient quality and quantity, the development of that drug candidate and regulatory approval or commercial launch for any resulting drug products may be delayed or there may be a shortage in supply, which could significantly harm our business.

We may encounter difficulties in managing our growth, which would adversely affect our results of operations.

We have recently hired employees for the commercialization of Firdapse®. To manage future growth, we will need to hire, train, and manage additional employees. Concurrent with expanding our operational and marketing capabilities, we will also need to increase our product development activities. We may not be able to support, financially or otherwise, future growth, or hire, train, motivate, and manage the required personnel. Our failure to manage growth effectively could limit our ability to achieve our goals.

Our success in managing our growth will depend in part on the ability of our executive officers to continue to implement and improve our operational, management, information and financial control systems, and to expand, train and manage our employee base, and particularly to expand, train and manage a specially-trained sales force to market our products. We may not be able to attract and retain personnel on acceptable terms given the intense competition for such personnel among biotechnology, pharmaceutical and healthcare companies, universities and non-profit research institutions. Our inability to manage growth effectively could cause our operating costs to grow at a faster pace than we currently anticipate and could have a material adverse effect on our business, financial condition, results of operations and prospects.

Pressure on drug product third-party payor coverage, reimbursement and pricing may impair our ability to be reimbursed at prices or on terms sufficient to provide a viable financial outcome.

The commercial success of Firdapse® will depend substantially on the extent to which the cost of Firdapse® will be paid by health maintenance, managed care, pharmacy benefit and similar healthcare management organizations, or reimbursed by government health administration authorities (such as Medicare and Medicaid), private health coverage insurers and other third-party payors. If reimbursement is not available, or is available only to limited levels, we may not be able to successfully commercialize Firdapse®. Even if coverage is provided, the approved reimbursement amount may not be high enough to establish and maintain pricing sufficient to realize a meaningful return on our investment.

Our ability to commercialize Firdapse® or any other product candidate will depend in large part on the extent to which coverage and reimbursement for these products and related treatments will be available from government health administration authorities, private health insurers and other organizations. Government authorities and third-party payors, such as private health insurers and health maintenance organizations, decide which medications they will cover and establish reimbursement levels. The healthcare industry is acutely focused on cost containment, both in the United States and elsewhere. Government authorities and third-party payors have attempted to control costs by limiting coverage and the amount of reimbursement for particular medications, which could affect our ability to sell our product candidates profitably. These payors may not view our products as cost-effective, and coverage and reimbursement may not be available to our customers, or may not be sufficient to allow our products, if any, to be marketed on a competitive basis. Cost-control initiatives could cause us to decrease the price we might establish for products, which could result in lower than anticipated product revenues. If the prices for our products decrease or if governmental and other third-party payors do not provide adequate coverage or reimbursement, our prospects for revenue and profitability will suffer.

There may also be delays in obtaining coverage and reimbursement for newly approved drugs, and coverage may be more limited than the indications for which the drug is approved by the FDA. Moreover, eligibility for reimbursement does not imply that any drug will be paid for in all cases or at a rate that covers our costs, including research, development, manufacture, sale and distribution. Reimbursement rates may vary, by way of example, according to the use of the drug and the clinical setting in which it is used. Reimbursement rates may also be based on reimbursement levels already set for lower cost drugs or may be incorporated into existing payments for other services.

In addition, increasingly, third-party payors are requiring higher levels of evidence of the benefits and clinical outcomes of new technologies and are challenging the prices charged. We cannot be sure that coverage will be available for any product candidate that we commercialize and, if available, that the reimbursement rates will be adequate. Further, the net reimbursement for drug products may be subject to additional reductions if there are changes to laws that presently restrict imports of drugs from countries where they may be sold at lower prices than in the United States. An inability to promptly obtain coverage and adequate payment rates from both government funded and private payors for any of our product candidates for which we obtain marketing approval could have a material adverse effect on our operating results, our ability to raise capital needed to commercialize products and our overall financial condition.

The pricing of pharmaceutical products, in general, and of specialty drugs, in particular, has been a topic of concern in the United States Congress, where hearings have been held on the topic, and several bills have been introduced proposing a variety of actions to restrain the prices of drugs. The President of the United States has frequently discussed his intention to reduce drug prices. The Administration has solicited public comment on a variety of regulatory proposals to reduce drug prices, and has also issued several proposed regulations with that objective, such as a proposal to conduct a pilot test that involves tying reimbursement of separately paid drugs under Medicare Part B to an index of average prices of the drug in certain foreign countries, and a proposal to require drug companies to disclose the list price of a drug in direct-to-consumer television advertisements. It is possible that at least some of these legislative proposals will be enacted and some of the proposed regulations will be finalized. We cannot predict how any such laws or regulations, or new laws or regulations that have yet to be proposed, will affect the pricing of our product, of orphan drugs generally, or of pharmaceutical products generally.

We cannot assess the impact on our business of the public concerns expressed by a U.S. Senator and a vocal group of neuromuscular physicians and patients with LEMS about our pricing of our drug product.

In early February 2019, we received a letter from Senator Bernie Sanders asking us to justify our pricing decision for Firdapse®. In the letter, Senator Sanders accuses us of "fleecing" Americans and "immoral exploitation" because of our decision regarding the pricing of Firdapse®. We have responded to Senator Sanders, who has issued a public statement in response asking FDA Commissioner Scott Gottlieb to allow pharmacies and manufacturers who were previously making this drug to be permitted to resume providing it, regardless of the fact that such a decision would violate the exclusivity provisions in the Orphan Drug Act of 1983, since we were the first pharmaceutical company who received an approval for an amifampridine product.

There can be no assurance as to how these matters will affect our business or results of operations.

We are also aware that the vocal group of neuromuscular physicians and some LEMS patients who have raised these issues in the past are continuing to raise concerns with the pricing of our product and with the appropriateness of the provisions in the Orphan Drug Act that grant us exclusivity for Firdapse®. A few of these patients continue to say negative things about us to the media, to the FDA and to politicians. We cannot assess the impact of these activities on our business.

Because the target patient populations for Firdapse® and our other drug candidates are small, we must achieve significant market share and obtain relatively high per-patient prices for our products to achieve meaningful gross margins.

Firdapse® targets diseases with small patient populations. A key component of the successful commercialization of a drug product for these indications includes identification of patients and a targeted prescriber base for the drug product. Due to small patient populations, we believe that we would need to have significant market penetration to achieve meaningful revenues and identifying patients and targeting the prescriber base are key to achieving significant market penetration. Typically, drugs for conditions with small prevalence have higher prices in order to generate a return on investment, and as a result, the per-patient prices at which we anticipate we may sell Firdapse® will need to be relatively high in order for us to generate an appropriate return for the investment in these product development programs and achieve meaningful gross margins, and high per patient prices could drive physicians to seek out compounding pharmacies to provide compounded amifampridine to fill their prescriptions rather than Firdapse®, thereby lowering the Firdapse® market share or penetration in the market. There can be no assurance that we will be successful in achieving a sufficient degree of market penetration and/or obtaining or maintaining high per-patient prices for Firdapse® for diseases with small patient populations. Further, even if we obtain significant market share for Firdapse®, because the potential target populations are very small, we may never achieve profitability despite obtaining such significant market share. Additionally, patients who discontinue therapy or do not fill prescriptions are not easily replaced by new patients, given the limited patient population.

Our internal computer systems, or those of our contract research organizations and other key vendors or consultants, may fail or suffer security breaches, which could result in a material disruption of our product development programs.

Our internal computer systems and those of our contract research organizations and other key vendors and consultants are vulnerable to damage from computer viruses, unauthorized access, natural disasters, terrorism, war and telecommunication and electrical failures. If such an event were to occur and cause interruptions in our operations, it could result in a material disruption of our programs. For example, the loss of clinical trial data from completed or ongoing 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, or inappropriate disclosure of confidential or proprietary information, we could incur liability and the further development of our drug candidates could be delayed.

Our employees and consultants may engage in misconduct or other improper activities, including noncompliance with regulatory standards and requirements.

We are exposed to the risk of employee or consultant fraud or other misconduct. Misconduct by our employees or consultants could include intentional failures to comply with FDA regulations, provide accurate information to the FDA, comply with manufacturing standards, comply with federal and state healthcare fraud and abuse laws and regulations, report financial information or data accurately or disclose unauthorized activities to us. In particular, sales, marketing and business arrangements in the healthcare industry are subject to extensive laws and regulations intended to prevent fraud, kickbacks, self-dealing, and other abusive practices. These laws and regulations may restrict or prohibit a wide range of pricing, discounting, marketing and promotion, sales commission, customer incentive programs, and other business arrangements. Employee and consultant misconduct could also involve the improper use of information obtained in the course of clinical trials, which could result in regulatory sanctions and serious harm to our reputation. It is not always possible to identify and deter such misconduct, and the precautions we take to detect and prevent this activity may not be effective in controlling unknown or unmanaged risks or losses or in protecting us from governmental investigations or other actions or lawsuits stemming from a failure to be in compliance with such laws or regulations. If any such actions are instituted against us, and we are not successful in defending ourselves or asserting our rights, those actions could have a significant impact on our business, including the imposition of significant fines or other sanctions.

Risks Related to Government Regulation

The regulatory approval process is lengthy, and we may not be able to obtain all of the regulatory approvals required to manufacture and commercialize Firdapse® for additional indications.

We will not be able to commercialize our products in other countries or for additional indications until we have obtained the requisite regulatory approvals from applicable governmental authorities. To obtain regulatory approval of a drug candidate for an indication, we must demonstrate to the satisfaction of the applicable regulatory agency that such drug candidate is safe and effective for that indication. The type and magnitude of the testing required for regulatory approval varies depending on the drug candidate and the disease or condition for which it is being developed. In addition, in the United States we must show that the facilities used to manufacture our drug candidate are in compliance with cGMP requirements. We will also have to meet similar regulations in any foreign country where we may seek to commercialize our drug candidates. In general, these requirements mandate that manufacturers follow elaborate design, testing, control, documentation, and other quality assurance procedures throughout the entire manufacturing process. The process of obtaining regulatory approvals typically takes several years and requires the expenditure of substantial capital and other resources. Despite the time, expense and resources invested by us in the approval process, we may not be able to demonstrate that our drug candidate is safe and effective in specific indications, in which event we would not receive the regulatory approval required to market it.

The FDA and other regulatory authorities generally approve products for particular indications. Our drug candidates may not be approved for any or all of the indications that we request, which would limit the indications for which we can promote it and adversely impact our ability to generate revenues. We may also be required to conduct costly, post-marketing follow-up studies if FDA requests additional information.

If our pre-clinical studies or our clinical studies and trials are unsuccessful or significantly delayed, our ability to commercialize our products will be impaired.

Before we can obtain future regulatory approval for the sale of our drug candidate for an indication, we may have to conduct, at our own expense, pre-clinical tests in animals in order to support the safety of our drug candidates. Pre-clinical testing is expensive, difficult to design and implement, can take several years to complete, and is uncertain as to outcome. Our pre-clinical tests may produce negative or inconclusive results, and on the basis of such results, we may decide, or regulators may require us, to halt ongoing clinical trials or conduct additional pre-clinical testing.

Additionally, future clinical trials for our drug candidates may not be successfully completed or may take longer than anticipated because of any number of factors, including potential delays in the start of the trial, an inability to recruit clinical trial participants at the expected rate, failure to demonstrate safety and efficacy, unforeseen safety issues, or unforeseen governmental or regulatory delays. Further, our drug candidate may not be found to be safe and effective in particular indications and may not be approved by regulatory authorities for the proposed indication. Further, regulatory authorities and IRBs that must approve and monitor the safety of each clinical study may suspend a clinical study at any time if the patients participating in such study are deemed to be exposed to any unacceptable health risk. We may also choose to suspend human clinical studies and trials if we become aware of any such risks. We might encounter problems in our clinical trials, including our expanded access program, such as seizures, weakness or other side effects that will cause us, regulatory authorities, or IRBs to delay or suspend such trial or study. Moreover, FDA will consider the data, including safety data, from patients enrolled in our expanded access program in the evaluation of any NDA we may submit for Firdapse®.

In other countries where Firdapse®, or any other product we develop or license may be marketed, we will also be subject to regulatory requirements governing human clinical studies, trials and marketing approval for drugs. The requirements governing the conduct of clinical studies, trials, product licensing, pricing and reimbursement varies widely from country to country.

We may face significant delays in our clinical studies and trials due to an inability to recruit patients for our clinical studies and trials or to retain patients in the clinical studies and trials we may perform.

We may encounter difficulties in our current and future clinical studies and trials recruiting patients, particularly since the conditions we are studying are rare, orphan conditions. We compete for study and trial subjects with others conducting clinical trials testing other treatments for the indications we are studying for our drug candidates. Further, unrelated third parties and investigators in the academic community have in the past and we expect will continue in the future to test our drug candidates, including Firdapse®. If these third-party tests are unsuccessful, or if they show significant health risk to the test subjects, our development efforts may also be adversely affected.

Clinical trials in orphan diseases are often difficult to enroll given the small number of patients with these diseases. Completion of orphan clinical trials may take considerable more time than other trials, sometimes years, depending on factors such as type, complexity, novelty and intended use of a product candidate. As a result of the uncertainties described above, there can be no assurance that we will meet timelines that we establish for any of our clinical trials.

If our third-party suppliers or contract manufacturers do not maintain appropriate standards of manufacturing in accordance with cGMP and other manufacturing regulations, our development and commercialization activities could suffer significant interruptions or delays.

We rely, and intend to continue to rely, on third-party suppliers and contract manufacturers to provide us with materials for our clinical trials and commercial-scale production of our products. These suppliers and manufacturers must continuously adhere to cGMP as well as any applicable corresponding manufacturing regulations outside of the United States. In complying with these regulations, we and our third-party suppliers and contract manufacturers must expend significant time, money and effort in the areas of design and development, testing, production, record-keeping, and quality control to assure that our products meet applicable specifications and other regulatory requirements. Failure to comply with these requirements could result in an enforcement action against us, including warning letters, the seizure of products, suspension or withdrawal of approvals, shutting down of production, and criminal prosecution. Any of these third-party suppliers or contract manufacturers will also be subject to inspections by the FDA and other regulatory agencies. If any of our third-party suppliers or contract manufacturers fail to comply with cGMP or other applicable manufacturing regulations, our ability to develop and commercialize our products could suffer significant interruptions and delays.

Reliance on third-party manufacturers entails risks to which we would not be subject if we manufactured the product ourselves, including:

- reliance on the third party for regulatory compliance and quality assurance;
- reliance on the continued financial viability of the third parties;
- limitations on supply availability resulting from capacity and scheduling constraints of the third parties;
- impact on our reputation in the marketplace if manufacturers of our products fail to meet the demands of our customers;
- the possible breach of the manufacturing agreement by the third party because of factors beyond our control; and
- the possible termination or nonrenewal of the agreement by the third party, based on its own business priorities, at a time that is costly or inconvenient for us.

If any of our contract manufacturers fail to achieve and maintain appropriate manufacturing standards, patients using our products could be injured or die, resulting in product liability claims. Even absent patient injury, we may be subject to product recalls, product seizures or withdrawals, delays or failures in testing or delivery, cost overruns, or other problems that could seriously harm our business or profitability.

Firdapse® is subject to ongoing regulatory review. If we fail to comply with continuing United States and applicable foreign regulations, we could lose those approvals, and our business would be severely harmed.

We are and will continue to be subject to continuing regulatory review for our approved products, including the review of clinical results which are reported after our drug candidates become commercially available approved drugs. As greater numbers of patients use a drug following its approval, side effects and other problems may be observed after approval that were not seen or anticipated during preapproval clinical studies and trials. In addition, the manufacturer, and the manufacturing facilities we use to make any approved drugs, will also be subject to periodic review and inspection by the FDA. The subsequent discovery of previously unknown problems with the drug, manufacturer or facility may result in restrictions on the drug, manufacturer or facility, including withdrawal of the drug from the market. If we fail to comply with applicable continuing regulatory requirements, we may be subject to fines, suspension, or withdrawal of regulatory approval, product recalls and seizures, operating restrictions, and criminal prosecutions.

Our product promotion and advertising is also subject to regulatory requirements and continuing regulatory review. In particular, the marketing claims we will be permitted to make in labeling or advertising regarding our marketed products will be limited by the terms and conditions of the FDA-approved labeling and available scientific data. We must submit copies of our advertisements and promotional labeling to the FDA at the time of initial publication or dissemination. If the FDA believes these materials or statements promote our products for unapproved indications, or with unsubstantiated claims, or if we fail to provide appropriate safety related information, the FDA could allege that our promotional activities misbrand our products. Specifically, the FDA could issue an untitled letter or warning letter, which may demand, among other things, that we cease such promotional activities and issue corrective advertisements and labeling to all recipients of the misbranded materials. The FDA also could take enforcement action including seizure of allegedly misbranded product, injunction, or criminal prosecution against us and our officers or employees. If we repeatedly or deliberately fail to submit such advertisements and labeling to the agency, the FDA could withdraw our approvals. Moreover, the Department of Justice can bring civil or criminal actions against companies and executives that promote drugs or biologics for unapproved uses, based on the Federal Food, Drug, and Cosmetic Act, the False Claims Act, and other federal laws governing the marketing and reimbursement for such products under federally supported healthcare programs such as Medicare and Medicaid. Monetary penalties in such cases have often been substantial, and civil penalties can include costly mandatory compliance programs and potential exclusion of a company's products from federal healthcare programs.

Enacted and future legislation or judicial action may increase the difficulty and cost for us to commercialize Firdapse® or any other drug candidate we develop, and affect the prices we may obtain.

In the United States, there have been a number of court cases, legislative and regulatory changes, and other potential changes relating to the healthcare system that restrict or regulate post-approval activities, which may affect our ability to profitably sell Firdapse® or any other drug candidate for which we obtain marketing approval.

The Medicare Prescription Drug Improvement and Modernization Act of 2003, or MMA, changed the way Medicare covers and pays for pharmaceutical products. The legislation expanded Medicare coverage for outpatient drug purchases by those covered by Medicare under a new Part D and introduced a reimbursement methodology based on average sales prices for Medicare Part B physician-administered drugs. In addition, this legislation authorized Medicare Part D prescription drug plans to use formularies whereby they can limit the number of drugs that will be covered in any therapeutic class. As a result of this legislation and the expansion of federal coverage of drug products, there is additional pressure to contain and reduce costs. While the MMA applies only to drug benefits for Medicare beneficiaries, private payors often follow Medicare coverage policy and payment limitations in setting their own reimbursement rates, and any reduction in reimbursement that results from the MMA may result in a similar reduction in payments from private payors. These cost reduction initiatives and other provisions of the MMA could decrease the coverage and reimbursement that we receive for any approved products, and could seriously harm our business. Manufacturers' contributions to this area, including donut hole coverage (as described below) or potential excise taxes, are increasing and are subject to additional changes in the future.

In 2010, President Obama signed into law the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act of 2010 (together, the "Health Care Reform Law"), a sweeping law intended to broaden access to health insurance, reduce or constrain the growth of healthcare spending, enhance remedies against fraud and abuse, add new transparency requirements for healthcare and health insurance industries, impose new taxes and fees on the health industry, and impose additional health policy reforms. The Health Care Reform Law, among other things, revised the definition of Average Manufacturer Price used by the Medicaid Drug Rebate Program for reporting purposes, which could increase the amount of Medicaid drug rebates to states and extended the rebate program to beneficiaries enrolled in Medicaid managed care organizations. The Health Care Reform Law also imposed a significant annual fee on companies that manufacture or import branded prescription drug products and established an annual non-deductible fee on entities that sell branded prescription drugs or biologics to specified government programs in the United States. The Health Care Reform Law also expanded the 340B drug discount program (excluding orphan drugs), including the creation of new penalties for non-compliance and included a 50% discount on brand name drugs for Medicare Part D participants in the coverage gap, or "donut hole." The Health Care Reform Law increased the Medicaid rebates for line extensions or reformulated drugs, which could substantially increase our Medicaid rebate rate (in effect limiting reimbursement for these patients).

Both President Trump and the Republican leadership in Congress have expressed their intention to eliminate the Health Care Reform Law and replace it with a still unknown new law. While proposals have been introduced in Congress, and efforts made to repeal the Health Care Reform Law, it is still unknown what form any such modifications or any law passed to replace the Health Care Reform Law would take, and how or any such new law may affect our business in the future.

Additionally, in response to controversies regarding pricing of pharmaceutical products, there has been a recent push to propose legislation, both on state and federal levels, that would require greater disclosure as to the reasoning behind drug prices and, in some cases, could give state or federal-level commissions the right to impose cost controls on certain drugs. These and other new provisions are likely to continue the pressure on pharmaceutical pricing, may require us to modify our business practices with healthcare practitioners, and may also increase our regulatory burdens and operating costs. In that regard, President Trump and members of Congress in both parties have expressed concerns about high drug prices. However, whether and to what extent any such positions will result in changes of the law, and how any such changes could impact our business, cannot be determined at this time.

Legislative and regulatory proposals also have been made to expand post-approval requirements and restrict sales and promotional activities for pharmaceutical products. In addition, increased scrutiny by the United States Congress of the FDA's approval process may subject us to more stringent product labeling and post-marketing testing and other requirements. Delays in feedback from the FDA may affect our ability to quickly update or adjust our label in the interest of patient adherence and tolerability. We cannot predict whether other legislative changes will be adopted or how such changes would affect the pharmaceutical industry generally and specifically the commercialization of Firdapse®.

If we fail to obtain or subsequently maintain orphan drug exclusivity or regulatory exclusivity for Firdapse® and our other orphan drug candidates, our competitors may sell products to treat the same conditions at greatly reduced prices, and our revenues would be significantly adversely affected.

In the United States, orphan drug designation entitles a party to financial incentives such as opportunities for grant funding towards clinical trial costs, tax advantages, and user-fee waivers. The company that first obtains FDA approval for a designated orphan drug for a given rare disease receives marketing exclusivity for use of that drug for the stated condition for a period of seven years, with an additional six months of exclusivity if the product also qualifies for pediatric exclusivity. Orphan drug exclusive marketing rights may be lost if the FDA later determines that the request for designation was materially defective, a subsequent product is deemed clinically superior, or if the manufacturer is unable to deliver sufficient quantity of the drug.

Because the extent and scope of patent protection for some of our drug products may be particularly limited, orphan drug designation is especially important for our products that are eligible for orphan drug designation. For eligible drugs, we plan to rely on the orphan exclusivity period to maintain a competitive position. However, if we do not obtain orphan drug exclusivity for our drug candidates or we cannot maintain orphan exclusivity for our drug candidates, our competitors may then sell the same drug to treat the same condition and our revenues will be reduced. Also, without strong patent protection, competitors may sell a generic version upon the expiration of orphan exclusivity if our patent position is not upheld.

Even if we obtain orphan drug designation for our future drug candidates, we may not fulfill the criteria for exclusivity or we may not be the first to obtain marketing approval for any orphan indication. Further, even if we obtain orphan drug exclusivity for a particular product, that exclusivity may not effectively protect the product from competition because different drugs can be approved for the same condition. Even after an orphan drug is approved, the FDA can subsequently approve a drug for the same condition if the FDA concludes that the later drug is safer, more effective or makes a major contribution to patient care. The FDA can discontinue orphan drug exclusivity after it has been granted if the orphan drug cannot be manufactured in sufficient quantities to meet demand.

Finally, there can be no assurance that the exclusivity provisions currently in the law may not be changed in the future and the impact of any such changes (if made) on us. The orphan drug exclusivity contained in the Orphan Drug Act has been the subject of recent scrutiny from the press, from some members of Congress and from some in the medical community. There can be no assurance that the exclusivity granted in the Orphan Drug Act to orphan drugs approved by the FDA will not be modified in the future, and as to how any such change might affect our products, if approved.

Even though our MuSK-MG trial is being conducted under a Special Protocol Assessment (SPA) agreed to with the FDA, we cannot guarantee that the design of, or data collected from, that trial or any of our clinical trials will be sufficient to support filing or approval of an NDA.

In the context of a Phase 3 clinical trial, the purpose of a SPA is to reach agreement with the FDA on the protocol design and analysis that will form the primary basis of an efficacy claim: in other words, if the agreed-upon clinical trial protocol is followed, the clinical trial endpoints are achieved, and there is a favorable risk-benefit profile, the data may serve as the primary basis for an efficacy claim in support of an NDA. However, FDA may rescind a SPA if the director of the FDA reviewing division determines that a substantial scientific issue essential to determining the safety or efficacy of the drug was identified after the trial began. Thus, a SPA is not binding on the FDA if, for example, the Agency identifies a safety concern related to the product or its pharmacological class, if FDA or the scientific community recognizes a paradigm shift in disease diagnosis or management, if the relevant data or assumptions provided by the sponsor in the SPA submission are found to be false or misstated, or if the sponsor fails to follow the protocol that was agreed upon with FDA. In addition, a SPA may be modified with the written agreement of the FDA and the trial sponsor. The FDA retains significant latitude and discretion in interpreting the terms of a SPA agreement and the data and results from the applicable clinical trial. Moreover, even if a clinical trial is conducted pursuant to a SPA, that does not mean that the NDA will meet the standard for approval.

Further, there can be no assurance that the FDA will not require an additional adequate and well controlled clinical trial to approve Firdapse® for CMS or MuSK-MG, even if the clinical trials we are currently undertaking are successful.

Our operations and relationships with healthcare providers, healthcare organizations, customers and third-party payors are subject to applicable anti-bribery, anti-kickback, fraud and abuse, transparency and other healthcare laws and regulations, which could expose us to, among other things, enforcement actions, criminal sanctions, civil penalties, contractual damages, reputational harm, administrative burdens and diminished profits and future earnings.

Our current and future arrangements with healthcare providers, healthcare organizations, third-party payors, customers , and patients expose us to broadly applicable anti-bribery, fraud and abuse and other healthcare laws and regulations that may constrain the business or financial arrangements and relationships through which we research, market, sell and distribute our product candidates. In addition, we may be subject to patient data privacy and security regulation by the U.S. federal government and the states and the foreign governments in which we conduct our business. Restrictions under applicable federal and state anti-bribery and healthcare laws and regulations include the following:

- the Federal health care program Anti-Kickback Statute, which prohibits individuals and entities from, among other things, knowingly and willfully soliciting, offering, receiving or providing remuneration, directly or indirectly, in cash or in kind, to induce or reward, or in return for, either the referral of an individual for, or the purchase, order or recommendation of, any good or service, for which payment may be made under a federal and state healthcare program such as Medicare and Medicaid. A person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation;

- the federal criminal and civil false claims and civil monetary penalties laws, including the federal False Claims Act, which can be imposed through civil whistleblower or qui tam actions against individuals or entities, prohibits, among other things, knowingly presenting, or causing to be presented, to the federal government, claims for payment that are false or fraudulent, knowingly making, using or causing to be made or used, a false record or statement material to a false or fraudulent claim, or from knowingly making a false statement to avoid, decrease or conceal an obligation to pay money to the federal government. In addition, certain marketing practices, including off-label promotion, may also violate false claims laws. Moreover, the government may assert that a claim including items and services resulting from a violation of the federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the federal False Claims Act;
- HIPAA, which imposes criminal and civil liability, prohibits, among other things, knowingly and willfully executing, or attempting to execute a scheme to defraud any healthcare benefit program, or knowingly and willfully falsifying, concealing or covering up a material fact or making any materially false statement in connection with the delivery of or payment for healthcare benefits, items or services; similar to the federal Anti-Kickback Statute, a person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation;
- HIPAA, as amended by HITECH, which impose obligations on certain healthcare providers, health plans, and healthcare clearinghouses, known as covered entities, as well as their business associates that perform certain services involving the storage, use or disclosure of individually identifiable health information, including mandatory contractual terms, with respect to safeguarding the privacy, security, and transmission of individually identifiable health information, and require notification to affected individuals and regulatory authorities of certain breaches of security of individually identifiable health information;
- the federal legislation commonly referred to as the Physician Payments Sunshine Act, enacted as part of the ACA, and its implementing regulations, which requires certain manufacturers of covered drugs, devices, biologics and medical supplies that are reimbursable under Medicare, Medicaid, or the Children's Health Insurance Program, with certain exceptions, to report annually to CMS information related to certain payments and other transfers of value to physicians (defined to include doctors, dentists, optometrists, podiatrists and chiropractors) and teaching hospitals, as well as ownership and investment interests held by the physicians described above and their immediate family members, with the information made publicly available on a searchable website; effective January 1, 2022, transfers of value to physician assistants, nurse practitioners or clinical nurse specialists, certified registered nurse anesthetists, and certified nurse-midwives must also be reported;
- the U.S. Foreign Corrupt Practices Act of 1977, as amended, which prohibits, among other things, U.S. companies and their employees and agents from authorizing, promising, offering, or providing, directly or indirectly, corrupt or improper payments or anything else of value to foreign government officials, employees of public international organizations and foreign government owned or affiliated entities, candidates for foreign political office, and foreign political parties or officials thereof;
- analogous state and foreign laws and regulations, such as state anti-kickback and false claims laws, that may apply to sales or marketing arrangements and claims involving healthcare items or services reimbursed by non-governmental third-party payors, including private insurers; and
- certain state laws that require pharmaceutical companies to comply with the pharmaceutical industry's voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government in addition to requiring drug and therapeutic biologics manufacturers to report information related to payments to physicians and other healthcare providers or marketing expenditures and pricing information, state and local laws that require the registration of pharmaceutical sales representatives, and state laws governing the privacy and security of health information in certain circumstances, many of which differ from each other in significant ways and often are not preempted by HIPAA, thus complicating compliance efforts.

If we or our collaborators, manufacturers or service providers fail to comply with applicable federal, state or foreign laws or regulations, we could be subject to enforcement actions, which could affect our ability to develop, market and sell our products successfully and could harm our reputation and lead to reduced acceptance of our products by the market. These enforcement actions include, not only civil and criminal penalties, but also exclusion from participation in government-funded healthcare programs, and exclusion from eligibility for the award of government contracts for our products.

Efforts to ensure that our current and future business arrangements with third parties comply with applicable healthcare laws and regulations could involve substantial costs. It is possible that governmental authorities will conclude that our business practices do not comply with current or future statutes, regulations, agency guidance or case law involving applicable fraud and abuse or other healthcare laws and regulations. If our operations are found to be in violation of any such requirements, we may be subject to significant penalties, including civil, criminal and administrative penalties, damages, fines, disgorgement, imprisonment, the curtailment or restructuring of our operations, loss of eligibility to obtain approvals from the FDA, exclusion from participation in government contracting, healthcare reimbursement or other government programs, including Medicare and Medicaid, integrity oversight and reporting obligations, or reputational harm, any of which could adversely affect our financial results. Although effective compliance programs can mitigate the risk of investigation and prosecution for violations of these laws, these risks cannot be entirely eliminated. Any action against us for an alleged or suspected violation could cause us to incur significant legal expenses and could divert our management's attention from the operation of our business, even if our defense is successful. In addition, achieving and sustaining compliance with applicable laws and regulations may be costly to us in terms of money, time and resources.

Risks Related to Our Intellectual Property

We are dependent on our relationships and license agreements, and we rely upon the patent rights granted to us pursuant to the license agreements.

All of our patent rights for Firdapse® are derived from our license agreement with BioMarin. Under the BioMarin License Agreement, we licensed two pending patents and certain trademarks for Firdapse®. One of the licensed patents is a pending composition of matter patent that, if issued, will protect Firdapse® until February 2027, which includes five years of patent term extension that is expected under the Patent Term Restoration Act. This application was initially rejected following an appeal to the Patent Trial and Appeal Board. The application was refiled with new claims. The new claims were the subject of an office action in which the claims were rejected. A response to the rejection was filed and a final rejection was issued. The application was refiled and we are awaiting an office action. There can be no assurance that this patent will be issued. The second patent claims methods of administering Firdapse®. Substantive examination has begun on this patent application and a final rejection was issued and the application was refiled. We are awaiting the next office action. We may also pursue other patents in order to seek to protect the exclusivity of the drug, dosage forms and methods of administration.

We may lose our rights to these patents and patent applications if we breach our obligations under the license agreement, including, without limitation, our financial obligations to BioMarin. If we violate or fail to perform any term or covenant of the license agreement, BioMarin may terminate the license agreement upon satisfaction of any applicable notice requirements and expiration of any applicable cure periods. Additionally, any termination of the license agreement, whether by us or by BioMarin, will not relieve us of our obligation to pay any license fees owing at the time of such termination. If we fail to retain our rights under the license agreement, we would not be able to commercialize Firdapse®, and our business, results of operations, financial condition and prospects would be materially adversely affected.

Our commercial success will depend in large part on our ability to use patents and regulatory exclusivity to exclude others from competing with our products. The patent position of emerging pharmaceutical companies like us can be highly uncertain and involve complex legal and technical issues. Until our licensed patents are interpreted by a court, either because we have sought to enforce them against a competitor or because a competitor has preemptively challenged them, we will not know the breadth of protection that they will afford us. Our patents may not contain claims sufficiently broad to prevent others from practicing our technologies or marketing competing products. Third parties may intentionally attempt to design around our patents or design around our patents so as to compete with us without infringing our patents. Moreover, the issuance of a patent is not conclusive as to its validity or enforceability, and so our patents may be invalidated or rendered unenforceable if challenged by others.

As a result of the foregoing factors, we cannot be certain how much protection from competition patent rights will provide us.

Our success will depend significantly on our ability to operate without infringing the patents and other proprietary rights of third parties.

While we are not currently aware of any third-party patents which we may infringe, there can be no assurance that we do not or will not infringe on patents held by third parties or that third parties will not claim that we have infringed on their patents. In the event that our technologies infringe or violate the patent or other proprietary rights of third parties, we may be prevented from pursuing product development, manufacturing or commercialization of our products that utilize such technologies. There may be patents held by others of which we are unaware that contain claims that our products or operations infringe. In addition, given the complexities and uncertainties of patent laws, there may be patents of which we are aware that we may ultimately be held to infringe, particularly if the claims of the patent are determined to be broader than we believe them to be. Adding to this uncertainty, in the United States, patent applications filed in recent years are confidential for 18 months, while older applications are not publicly available until the patent issues. As a result, avoiding patent infringement may be difficult.

If a third-party claims that we infringe its patents, any of the following may occur:

- we may be required to pay substantial financial damages if a court decides that our technologies infringe a competitor's patent, which can be tripled if the infringement is deemed willful, or be required to discontinue or significantly delay development, marketing, selling and licensing of the affected products and intellectual property rights;
- a court may prohibit us from selling or licensing our product without a license from the patent holder, which may not be available on commercially acceptable terms or at all, or which may require us to pay substantial royalties or grant cross-licenses to our patents; and
- we may have to redesign our product so that it does not infringe others' patent rights, which may not be possible or could require substantial funds or time and require additional studies.

In addition, employees, consultants, contractors and others may use the proprietary information of others in their work for us or disclose our proprietary information to others. If our employees, consultants, contractors or others disclose our data to others or use data belonging to others in connection with our business, it could lead to disputes over the ownership of inventions derived from that information or expose us to potential damages or other penalties.

The occurrence of any of these events could have a material adverse effect on our business, financial condition, results of operations or prospects.

We may incur substantial costs as a result of litigation or other proceedings relating to patent and other intellectual property rights.

There is substantial history of litigation and other proceedings regarding patent and intellectual property rights in the pharmaceutical industry. We may be forced to defend claims of infringement brought by our competitors and others, and we may institute litigation against others who we believe are infringing our intellectual property rights. The outcome of intellectual property litigation is subject to substantial uncertainties and may, for example, turn on the interpretation of claim language by the court, which may not be to our advantage, or on the testimony of experts as to technical facts upon which experts may reasonably disagree.

Under our license agreements, we have the right to bring legal action against any alleged infringers of the patents we license. However, we are responsible for all costs relating to such potential litigation. We have the right to any proceeds received as a result of such litigation, but, even if we are successful in such litigation, there is no assurance we would be awarded any monetary damages.

Our involvement in intellectual property litigation could result in significant expense to us. Some of our competitors have considerable resources available to them and a strong economic incentive to undertake substantial efforts to stop or delay us from commercializing products. Moreover, regardless of the outcome, intellectual property litigation against or by us could significantly disrupt our development and commercialization efforts, divert our management's attention and quickly consume our financial resources.

In addition, if third parties file patent applications or issue patents claiming technology that is also claimed by us in pending applications, we may be required to participate in interference proceedings with the United States Patent Office or in other proceedings outside the United States, including oppositions, to determine priority of invention or patentability. Even if we are successful in these proceedings, we may incur substantial costs, and the time and attention of our management and scientific personnel will be diverted from product development or other more productive matters.

Risks Related to Our Common Stock

The trading price of the shares of our common stock has been and could in the future be highly volatile.

The market price of our common stock has fluctuated in the past and is likely to fluctuate in the future. Market prices for biopharmaceutical companies have historically been particularly volatile. Some of the factors that may cause the market price of our common stock to fluctuate include:

- developments concerning our clinical studies and trials and our pre-clinical studies;
- status of regulatory requirements for approval of our drug candidates;
- adverse publicity regarding the pricing of Firdapse®;
- announcements of product development successes and failures by us or our competitors;
- new products introduced or announced by us or our competitors;
- adverse changes in the abilities of our third-party manufacturers to provide drug or product in a timely manner or to meet FDA requirements;
- changes in reimbursement levels;
- changes in financial estimates by securities analysts;
- actual or unanticipated variations in operating results;
- expiration or termination of licenses (particularly our license from BioMarin), research contracts, or other collaboration agreements;
- conditions or trends in the regulatory climate and the biotechnology and pharmaceutical industries;
- intellectual property, product liability or other litigation against us;
- changes in the market valuations of similar companies;
- changes in pharmaceutical company regulations or reimbursements for pharmaceutical products as a result of healthcare reform or other legislation;
- changes in economic conditions; and
- sales of shares of our common stock, particularly sales by our officers, directors and significant stockholders, or the perception that such sales may occur.

In addition, equity markets in general, and the market for emerging pharmaceutical and life sciences companies in particular, have experienced substantial price and volume fluctuations that have often been unrelated or disproportionate to the operating performance of companies traded in those markets. Further, changes in economic conditions in the United States, Europe, or globally could impact our ability to grow profitably. Adverse economic changes are outside our control and may result in material adverse impacts on our business or financial results. These broad market and industry factors may materially affect the market price of our shares, regardless of our own development and operating performance. In the past, following periods of volatility in the market price of a company's securities, securities class-action litigation has often been instituted against that company. Any such litigation that we become involved in could cause us to incur substantial costs and divert our management's attention and resources, which could have a material adverse effect on our business, financial condition, and results of operations.

Delaware law and our certificate of incorporation and by-laws contain provisions that could delay and discourage takeover attempts that stockholders may consider favorable.

Certain provisions of our certificate of incorporation and by-laws, and applicable provisions of Delaware corporate law, may make it more difficult for or prevent a third party from acquiring control of us or changing our Board of Directors and management. These provisions include:

- the ability of our Board of Directors to issue preferred stock with voting or other rights or preferences;
- limitations on the ability of stockholders to amend our charter documents, including stockholder supermajority voting requirements;

- the inability of stockholders to act by written consent or to call special meetings;
- requirements that special meetings of our stockholders may only be called by the Board of Directors; and
- advance notice procedures our stockholders must comply with in order to nominate candidates for election to our Board of Directors or to place stockholders' proposals on the agenda for consideration at meetings of stockholders.

On September 20, 2011, the board of directors approved the adoption of a stockholder rights plan ("Rights Plan"), which was amended on September 19, 2016. Further, at the 2018 annual meeting of stockholders, the stockholders approved the Rights Plan.

The Rights Plan was implemented through our entry into a rights agreement with Continental Stock Transfer & Trust Company, as rights agent, and the declaration of a non-taxable dividend distribution of one preferred stock purchase right (each, a Right) for each outstanding share of our common stock. The dividend was paid on October 7, 2011 to holders of record as of that date. Each right is attached to and trades with the associated share of common stock. The rights will become exercisable only if a person acquires beneficial ownership of 17.5% or more of our common stock (or, in the case of a person who beneficially owned 17.5% or more of our common stock on the date the rights plan was adopted, such person acquires beneficial ownership of any additional shares of our common stock) or after the date of the Rights Agreement, commences a tender offer that, if consummated, would result in beneficial ownership by a person of 17.5% or more of our common stock. The rights will expire on September 20, 2019, unless the rights are earlier redeemed or exchanged.

The intent of the Rights Plan is to protect our stockholders' interests by encouraging anyone seeking control of our company to negotiate with our Board of Directors. However, our Rights Plan could make it more difficult for a third party to acquire us without the consent of our Board of Directors, even if doing so may be beneficial to our stockholders. This plan may discourage, delay or prevent a tender offer or takeover attempt, including offers or attempts that could result in a premium over the market price of our common stock. This plan could reduce the price that stockholders might be willing to pay for shares of our common stock in the future. Furthermore, the anti-takeover provisions of our Rights Plan may entrench management and make it more difficult to replace management even if the stockholders consider it beneficial to do so.

In addition, Section 203 of the Delaware General Corporation Law generally prohibits us from engaging in a business combination with any person who owns 15% or more of our common stock for a period of three years from the date such person acquired such common stock, unless Board or stockholder approval is obtained. These provisions could make it difficult for a third party to acquire us, or for members of our Board of Directors to be replaced, even if doing so would be beneficial to our stockholders.

Any delay or prevention of a change of control transaction or changes in our Board of Directors or management could deter potential acquirers or prevent the completion of a transaction in which our stockholders could receive a substantial premium over the then current market price for their shares.

Future sales of our common stock may cause our stock price to decline.

As of March 14, 2019, we had 102,739,257 shares of our common stock outstanding, of which 7,084,164 shares were held by our officers and directors. We also had outstanding: (i) stock options to purchase an aggregate of 10,649,500 shares at exercise prices ranging from $0.79 to $4.64 per share (5,334,163 of which are currently exercisable). Sales of restricted shares or shares underlying stock options, or the perception in the market that the holders of a large number of shares intend to sell shares, could reduce the market price of our common stock.

We do not intend to pay cash dividends on our common stock in the foreseeable future.

We have never declared or paid any cash dividends on our common stock or other securities, and we currently do not anticipate paying any cash dividends in the foreseeable future. Accordingly, investors should not invest in our common stock if they require dividend income. Our stockholders will not realize a return on their investment unless the trading price of our common stock appreciates, which is uncertain and unpredictable.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

We currently operate our business in leased office space in Coral Gables, Florida. We currently lease approximately 7,800 square feet of space for which we pay annual rent of approximately $330,000.

Item 3. Legal Proceedings

In 2018, we became aware that certain patents granted to Northwestern in 2018 (which patents have been licensed by Northwestern to a third-party) for a new GABA aminotransferase inhibitor were derived from CPP-115. As a result, it is our position that Northwestern has violated the license agreement based on its failure to transfer these new patent rights to us as part of the existing license agreement. It is also our position that Northwestern's publication of information about the new patents in violation of the license agreement has damaged us. On October 26, 2018, we notified Northwestern that we were terminating the license agreement for CPP-115 and seeking damages for Northwestern's breach of the license agreement. Further, on the same date, we filed a claim for damages in arbitration against Northwestern for Northwestern's breaches of the license agreement.

On November 5, 2018, Northwestern advised us that in its view, Northwestern has a right to terminate the license agreement with us because we allegedly breached the license agreement by failing to pay certain milestones and by allegedly failing to use commercially reasonable efforts to develop and commercialize any products. Northwestern has also advised us that, in its view, we have engaged in wrongful conduct and communications with the unrelated pharmaceutical company that licensed the new patents from Northwestern, and that such communications have damaged Northwestern's relationship with that party. We dispute Northwestern's allegations and intend to vigorously defend ourselves against claims that Northwestern has brought against us in the arbitration proceedings.

The arbitration is currently pending and there can be no assurance as to the outcome of this matter.

Additionally, from time to time we may become involved in legal proceedings arising in the ordinary course of business. We believe that there is no litigation pending at this time that could have, individually or in the aggregate, a material adverse effect on our results of operations, financial condition or cash flows.

Item 4. Mine Safety Disclosure

Not applicable.

PART II

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

Market Information

Our common stock trades on the Nasdaq Capital Market under the symbol "CPRX."

The closing sale price for the common stock on March 14, 2019 was $2.99. As of March 14, 2019, there were 39 holders of record of our common stock, which includes custodians who hold our securities for the benefit of others. We estimate that there are approximately 11,500 beneficial holders of our common stock.

Dividend Policy

We have never declared or paid any cash dividends on our capital stock. We currently intend to retain all available funds and any future earnings to support operations and finance the growth and development of our business and do not intend to pay cash dividends on our common stock for the foreseeable future. Any future determination related to our dividend policy will be made at the discretion of our Board of Directors.

Performance Graph

Not applicable.

Item 6. Selected Financial Data

The selected statement of operations data for the years ended December 31, 2018 and 2017, and the balance sheet data as of December 31, 2018 and 2017, have been derived from our audited consolidated financial statements included elsewhere in this Form 10-K. The selected statement of operations data for the years ended December 31, 2016, 2015 and 2014 and the selected balance sheet data at December 31, 2016, 2015 and 2014 have been derived from financial statements that are not included in this Form 10-K. Historical results are not necessarily indicative of future results. This selected financial data should be read in conjunction with "Management's Discussion and Analysis of Financial Condition and Results of Operations" and our consolidated financial statements and related notes included elsewhere in this Form 10-K.

	Year Ended December 31,				
Statement of Operations Data:	**2018**	**2017**	**2016**	**2015**	**2014**
Revenues from collaborative arrangement	$ 500,000	$ —	$ —	$ —	$ —
Operating costs and expenses:					
Research and development	19,919,204	11,375,237	11,369,941	11,801,342	10,117,774
General and administrative	15,875,961	7,304,399	7,910,260	8,597,010	4,473,654
Total operating cost and expenses	35,795,165	18,679,636	19,280,201	20,398,352	14,591,428
Loss from operations	(35,295,165)	(18,679,636)	(19,280,201)	(20,398,352)	(14,591,428)
Other income, net	1,291,651	454,163	321,612	100,389	76,233
Change in fair value of warrants liability	—	(186,904)	886,137	65,005	(993,866)
Loss before income taxes	(34,003,514)	(18,412,377)	(18,072,452)	(20,232,958)	(15,509,061)
Provision for income taxes	—	—	—	—	—
Net loss	$ (34,003,514)	$(18,412,377)	$(18,072,452)	$(20,232,958)	$(15,509,061)
Net loss per share – basic and diluted	$ (0.33)	$ (0.21)	$ (0.22)	$ (0.25)	$ (0.24)
Weighted average shares outstanding – basic and diluted	102,633,884	85,802,487	82,875,281	80,858,393	64,142,534

	As of December 31,				
Balance Sheet Data:	**2018**	**2017**	**2016**	**2015**	**2014**
Cash and cash equivalents, certificates of deposit and investments	$ 58,489,856	$ 84,013,413	$ 40,405,817	$ 58,396,395	$ 39,275,123
Working capital	45,676,052	80,920,995	39,359,226	56,460,530	37,972,795
Total assets	60,449,962	85,387,430	41,706,853	60,101,570	43,908,086
Warrants liability, at fair value	—	—	122,226	1,008,363	2,794,891
Total liabilities	9,666,153	4,423,618	2,397,923	4,625,259	8,665,756
Stockholders' equity	50,783,809	80,963,812	39,308,930	55,476,311	35,242,330

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

The following discussion and analysis of our financial condition and results of operations should be read in conjunction with "Selected Financial Data" and our consolidated financial statements and related notes appearing elsewhere in this Form 10-K. In addition to historical information, this discussion and analysis contains forward-looking statements that involve risks, uncertainties, and assumptions. Our actual results may differ materially from those anticipated in these forward-looking statements as a result of certain factors, including but not limited to those set forth under the caption "Risk Factors" in Item 1A of this Form 10-K.

Introduction

Management's Discussion and Analysis of Financial Condition and Results of Operations (MD&A) is intended to provide an understanding of our financial condition, changes in financial condition and results of operations. The discussion and analysis is organized as follows:

- *Overview*. This section provides a general description of our business and information about our business that we believe is important in understanding our financial condition and results of operations.
- *Basis of Presentation*. This section provides information about key accounting estimates and policies that we followed in preparing our consolidated financial statements for the 2018 fiscal year.
- *Critical Accounting Policies and Estimates*. This section discusses those accounting policies that are both considered important to our financial condition and results of operations, and require significant judgment and estimates on the part of management in their application. All of our significant accounting policies, including the critical accounting policies, are also summarized in the notes to our accompanying consolidated financial statements.
- *Results of Operations*. This section provides an analysis of our results of operations for the two fiscal years presented in the accompanying consolidated statements of operations.
- *Liquidity and Capital Resources*. This section provides an analysis of our cash flows, capital resources, off-balance sheet arrangements and our outstanding commitments, if any.
- *Caution Concerning Forward-Looking Statements*. This section discusses how certain forward-looking statements made throughout this MD&A and in other sections of this report are based on management's present expectations about future events and are inherently susceptible to uncertainty and changes in circumstance.

Overview

We are a biopharmaceutical company focused on developing and commercializing innovative therapies for people with rare, debilitating, chronic neuromuscular and neurological diseases. We are dedicated to making a meaningful impact on the lives of those suffering from rare diseases, and we believe in putting patients first in everything we do.

Firdapse®

In October 2012, we licensed the North American rights to Firdapse®, a proprietary form of amifampridine phosphate, or chemically known as 3,4-diaminopyridine phosphate, from BioMarin Pharmaceutical Inc. (BioMarin). When we acquired the rights to the product, it had already been granted orphan drug designation by the FDA for the treatment of patients with Lambert-Eaton Myasthenic Syndrome (LEMS), a rare and sometimes fatal autoimmune disease characterized by muscle weakness. Further, in August 2013, we were granted "breakthrough therapy designation" by the United States Food & Drug Administration (FDA), for Firdapse® for the treatment of LEMS. Finally, the FDA has granted Orphan Drug Designation for Firdapse® for the treatment of patients with Congenital Myasthenic Syndromes (CMS) and Myasthenia Gravis (MG).

On November 28, 2018, we received approval from the FDA for Firdapse® 10 mg tablets for the treatment of adults with LEMS. Prior to that approval, the chemical entity, amifampridine (3,4-diaminopyridine, or 3,4-DAP), had never been approved by the FDA for any indication. Because amifampridine phosphate (Firdapse®) had previously been granted Orphan Drug designation for the treatment of LEMS, we have received seven years of marketing exclusivity for this indication. Further, since we were the first pharmaceutical company to obtain approval for a product containing amifampridine, we have also received five years of marketing exclusivity with respect to the use of this product for all indications, running concurrently with the seven years of orphan marketing exclusivity described above.

In January 2019, we launched Firdapse® in the United States, selling through a field force experienced in neurologic, central nervous system or rare disease products consisting of approximately 20 field personnel, including sales (Regional Account Managers), patient assistance and insurance navigation support (Patient Access Liaisons), and payer reimbursement (National Account Managers) personnel. We also have a field-based force of six medical science liaisons who are helping educate the medical communities and patients about LEMS and about our ongoing clinical trial activities evaluating Firdapse® for other ultra-orphan, neuromuscular diseases. Finally, we are working with several rare disease advocacy organizations (including Global Genes, the National Organization for Rare Disorders (NORD), and the Myasthenia Gravis Foundation of America) to help increase awareness and level of support for patients living with LEMS, CMS and MuSK antibody positive myasthenia gravis, or MuSK-MG, and to provide education for the physicians who treat these rare diseases and the patients they treat.

We are supporting the distribution of Firdapse® through "Catalyst Pathways™," our personalized treatment support program. "Catalyst Pathways" is a single source for personalized treatment support, education and guidance through the challenging dosing and titration regimen to an effective therapeutic dose. It also includes distributing the drug through a very small group of exclusive specialty pharmacies (primarily AnovoRx), which is consistent with the way that most pharmaceutical products for ultra-orphan diseases are distributed and dispensed to patients. We believe that by using specialty pharmacies in this way, the difficult task of navigating the health care system is far better for the patient needing treatment for their rare disease and the health care community in general.

In order to help patients afford their medication, we, like other pharmaceutical companies which are marketing drugs for ultra-orphan conditions, have developed an array of financial assistance programs that are available to reduce patient co-pays and deductibles to a nominal affordable amount. For eligible patients with commercial coverage, a co-pay assistance program designed to keep out-of-pocket costs to $10 or less per month is available for all LEMS patients prescribed Firdapse®. We are also donating, and committing to continue to donate, money to qualified, independent charitable foundations dedicated to providing assistance to LEMS patients in financial need. Our goal is to ensure that no LEMS patient is ever denied access to Firdapse® for financial reasons.

We are currently conducting a Phase 3 clinical trial evaluating Firdapse® for the treatment of certain types of CMS. This trial, which will include approximately 23 adult and pediatric subjects, is being conducted at trial sites around the United States and Canada. Details of this trial are available on www.clinicaltrials.gov (NCT02562066). Based on currently available information, we expect to report top-line results from this trial in the second half of 2019.

We are currently conducting a Phase 3 clinical trial evaluating Firdapse® for the treatment of MuSK-MG under a Special Protocol Assessment (SPA) with the FDA. The trial is a multi-site, international (United States and Italy), double-blind, placebo-controlled, clinical trial that is targeted to enroll approximately 60 subjects diagnosed with MuSK-MG. The trial will also enroll up to 10 generalized myasthenia gravis patients who will be assessed with the same clinical endpoints but achieving statistical significance in this subgroup of patients is not required and only summary statistics will be provided. We initiated this trial in January 2018 and are currently enrolling subjects. We currently expect to report top-line results from this trial in the second half of 2019. Details of this trial are available on www.clinicaltrials.gov (NCT03304054).

Because the FDA has granted Orphan Drug Designation for Firdapse® for the treatment of patients with CMS and MG, if we are the first to receive approvals in the future for Firdapse® for the treatment of CMS or MuSK-MG, we would be eligible to receive seven years of marketing exclusivity for those indications added to our Firdapse® label, of which there can be no assurance.

We are conducting a proof-of-concept clinical study evaluating Firdapse® as a symptomatic treatment for patients with Spinal Muscular Atrophy (SMA) Type 3, ambulatory. The study is designed as a randomized (1:1), double-blind, 2-period, 2-treatment, crossover, outpatient proof-of-concept study to evaluate the safety, tolerability and potential efficacy of amifampridine in ambulatory patients diagnosed with SMA Type 3. The study is planned to include approximately 12 patients, and we currently expect to report top-line results from this study in the first half of 2020. Details of this trial are available on www.clinicaltrials.gov (NCT03781479).

There can be no assurance that our currently ongoing trials evaluating Firdapse® for the treatment of CMS, MuSK-MG or SMA Type 3, or any trials we may undertake in the future to evaluate Firdapse® for the treatment of other rare neuromuscular diseases, will be successful. Further, there can be no assurance that we will ever be granted the right to commercialize Firdapse® for any of these indications.

Finally, we intend to take steps to seek approval for Firdapse® in Canada. We also intend as a longer term strategy to seek to develop a sustained release formulation for Firdapse®. There can be no assurance that we will be successful in these efforts.

Generic Sabril®

In September 2015, we announced the initiation of a project to develop generic versions of Sabril® (vigabatrin). Sabril® is marketed by Lundbeck Inc. in the United States in two dosage forms (powder sachets and tablets) for the treatment of infantile spasms and refractory complex partial seizures. Par Pharmaceutical brought the first generic version of the powder sachet to market, and, to date, several generic versions of the powder sachets have been approved. However, at this time, there is only one approved generic version of the tablets.

On December 18, 2018, we announced that we had signed a definitive agreement with Endo International PLC's subsidiary, Endo Ventures Limited ("Endo"), for the further development and commercialization of generic Sabril® tablets through Endo's United States Generic Pharmaceuticals segment, Par Pharmaceutical. Pursuant to the agreement, we have received an up-front payment, and we will receive milestone payments based on achievement of regulatory approvals, and a sharing of defined net profits upon commercialization and certain expenses for development.

There can be no assurance that our collaboration with Endo for the development of generic Sabril® (vigabatrin) tablets will be successful and that if an Abbreviated New Drug Application (ANDA) is approved for vigabatrin tablets in the future, that it will be profitable to us.

Basis of Presentation

Revenues

In 2018 we were a development stage company, as we had no revenues from product sales. We expect to have product sales in 2019 as we commercialize Firdapse®. In 2018, we generated revenues of $500,000 from up-front license fees received under a collaborative agreement with Endo. We expect these revenues to fluctuate in future periods based on our collaborators' abilities to meet various regulatory milestones set forth in such agreements.

Research and Development Expenses

Our research and development expenses consist of costs incurred for company-sponsored research and development activities, as well as support for selected investigator-sponsored research. The major components of research and development costs include preclinical study costs, clinical manufacturing costs, clinical study and trial expenses, insurance coverage for clinical trials, consulting, scientific advisors, and other third-party costs, salaries and employee benefits, stock-based compensation expense, supplies and materials, and allocations of various overhead costs related to our product development efforts. To date, all of our research and development resources have been devoted to the development of Firdapse®, CPP-109 (our version of vigabatrin), and formerly CPP-115, and we expect that our future development costs will be attributable principally to the continued development of Firdapse®.

Our cost accruals for clinical studies and trials are based on estimates of the services received and efforts expended pursuant to contracts with numerous clinical study and trial sites and clinical research organizations (CROs). In the normal course of our business we contract with third parties to perform various clinical study and trial activities in the on-going development of potential products. The financial terms of these agreements are subject to negotiation and vary from contract to contract and may result in uneven payment flows. Payments under the contracts depend on factors such as the achievement of certain events or milestones, the successful enrollment of patients, the allocation of responsibilities among the parties to the agreement, and the completion of portions of the clinical study or trial or similar conditions. The objective of our accrual policy is to match the recording of expenses in our consolidated financial statements to the actual services received and efforts expended. As such, expense accruals related to preclinical and clinical studies or trials are recognized based on our estimate of the degree of completion of the event or events specified in the specific study or trial contract. We monitor service provider activities to the extent possible; however, if we underestimate activity levels associated with various studies or trials at a given point in time, we could be required to record significant additional research and development expenses in future periods. Preclinical and clinical study and trial activities require significant up-front expenditures. We anticipate paying significant portions of a study or trial's cost before such begins, and incurring additional expenditures as the study or trial progresses and reaches certain milestones.

Selling and Marketing Expenses

We had no selling expenses in 2018. During the fourth quarter of 2018, as Firdapse® was approved by the FDA as a treatment for adults with LEMS, we actively committed funds to developing our commercialization program for Firdapse® so that we would be in a position to launch the product in early 2019. Pre-commercialization costs are included in general and administrative expenses.

General and Administrative Expenses

Our general and administrative expenses consist primarily of salaries and personnel expenses for accounting, corporate, compliance, and administrative functions. Other costs include administrative facility costs, regulatory fees, insurance, pre-commercialization costs, and professional fees for legal, information technology, accounting, and consulting services.

Stock-Based Compensation

We recognize expense for the fair value of all stock-based awards to employees, directors, and consultants in accordance with U.S. GAAP. For stock options, we use the Black-Scholes option valuation model in calculating the fair value of the awards.

Warrants Liability

We issued warrants to purchase shares of our common stock as part of an equity financing that we completed in October 2011. In accordance with U.S. GAAP, we recorded the fair value of those warrants as a liability in the consolidated balance sheet using a Black-Scholes option-pricing model. We re-measured the fair value of this warrants liability at each reporting date until the warrants were exercised or until the unexercised warrants expired on May 2, 2017. Changes in the fair value of the warrants liability were reported in the consolidated statements of operations as income or expense. The fair value of the warrants liability was subject to significant fluctuation based on changes in the inputs to the Black-Scholes option-pricing model, including our common stock price, expected volatility, expected term, the risk-free interest rate and dividend yield.

Income Taxes

We have incurred operating losses since inception. As of December 31, 2018 and 2017, we had net operating loss carryforwards of approximately $78,956,000 and $62,584,000, respectively. Our net deferred tax asset has a 100% valuation allowance as of December 31, 2018 and 2017, as we believe it is more likely than not that the deferred tax asset will not be realized. The net operating loss carry-forwards will expire at various dates beginning 2023 through 2037. If an ownership change, as defined under Internal Revenue Code 382, occurs, the use of these carry-forwards may be subject to limitations.

As required by ASC 740, *Income Taxes*, we recognize the financial statement benefit of a tax position only after determining that the relevant tax authority would more likely than not sustain the position following an audit. For tax positions meeting the more-likely-than-not threshold, the amount recognized in the financial statements is the largest benefit that has a greater than 50 percent likelihood of being realized upon ultimate settlement with the relevant tax authority.

Recently Issued Accounting Standards

For discussion of recently issued accounting standards, please see Note 2, “Basis of Presentation and Significant Accounting Policies,” in the consolidated financial statements included in this report.

Non-GAAP Financial Measures

We prepare our consolidated financial statements and notes thereto which accompany this report in accordance with U.S. GAAP. To supplement our financial results presented on a U.S. GAAP basis, we may use non-GAAP financial measures in our reports filed with the Commission and/or our communications with investors. Non-GAAP measures are provided as additional information and not as an alternative to our consolidated financial statements presented in accordance with GAAP. Our non-GAAP financial measures are intended to enhance an overall understanding of our current financial performance. We believe that the non-GAAP financial measures we present provide investors and prospective investors with an alternative method for assessing our operating results in a manner that we believe is focused on the performance of ongoing operations and provide a more consistent basis for comparison between periods.

The non-GAAP financial measures that we typically present exclude from the calculation of net loss the expense (or the income) associated with the change in fair value of the liability-classified warrants. Further, we often report non-GAAP net loss per share, which is calculated by dividing non-GAAP net loss by the weighted average common shares outstanding.

Any non-GAAP financial measures that we report should not be considered in isolation or as a substitute for comparable U.S. GAAP accounting, and investors should read them in conjunction with our financial statements and notes thereto prepared in accordance with U.S. GAAP. Finally, the non-GAAP measures of net loss we may use may be different from, and not directly comparable to, similarly titled measures used by other companies.

Critical Accounting Policies and Estimates

Our discussion and analysis of our financial condition and results of operations are based on our consolidated financial statements, which have been prepared in accordance with U.S. GAAP. The preparation of these consolidated financial statements requires us to make judgments, 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 consolidated financial statements, as well as the reported revenue and expenses during the reporting periods. We continually evaluate our judgments, estimates and assumptions. We base our estimates on the terms of underlying agreements, our expected course of development, historical experience and other factors we believe are reasonable based on the circumstances, the results of which form our management's 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.

The accounting policies described below are not intended to be a comprehensive list of all of our accounting policies. In many cases, the accounting treatment of a particular transaction is specifically dictated by GAAP. There are also areas in which our management's judgment in selecting any available alternative would not produce a materially different result. Our consolidated financial statements and the notes thereto included elsewhere in this report contain accounting policies and other disclosures as required by GAAP.

Preclinical Study and Clinical Trial Expenses

Research and development expenditures are charged to operations as incurred. Our expenses related to preclinical and clinical trials are based on actual and estimated costs of the services received and efforts expended pursuant to contracts with multiple research institutions and any CRO that conducts and manages our clinical trials. The financial terms of these agreements are subject to negotiation and will vary from contract to contract and may result in uneven payment flows. Generally, these agreements will set forth the scope of the work to be performed at a fixed fee or unit price. Payments under these contracts will depend on factors such as the successful enrollment of patients or the completion of clinical trial milestones. Expenses related to clinical trials generally are accrued based on contracted amounts applied to the level of patient enrollment and activity according to the protocol. If timelines or contracts are modified based upon changes in the clinical trial protocol or scope of work to be performed, we would be required to modify estimates accordingly on a prospective basis.

Stock-Based Compensation

We recognize stock-based compensation for the fair value of all share-based payments, including grants of stock options and restricted stock units. For stock options, we use the Black-Scholes option valuation model to determine the fair value of stock options on the date of grant. This model derives the fair value of stock options based on certain assumptions related to expected stock price volatility, expected option life, risk-free interest rate and dividend yield. Expected volatility is based on reviews of historical volatility of our common stock. The estimated expected option life is based upon the simplified method. Under this method, the expected option life is presumed to be the mid-point between the vesting date and the end of the contractual term. We will continue to use the simplified method until we have sufficient historical exercise data to estimate the expected life of the options. The risk-free interest rate assumption is based upon the U.S. Treasury yield curve appropriate for the expected life of our stock options awards. For the years ended December 31, 2018 and 2017, the assumptions used were an estimated annual volatility of 82% and 104%, expected holding periods of zero to seven years and four to seven years, and risk-free interest rates of 2.09% to 2.88% and 1.66% to 2.25%, respectively.

Results of Operations

Years Ended December 31, 2018 and 2017

Revenues

We had no revenues from product sales for the years ended December 31, 2018 or 2017. We had revenues in 2018 in the amount of $500,000 relating to the up-front payment from Endo in connection with the collaboration for vigabatrin tablets.

Research and Development Expenses

Year	Amount	Change from Prior Year	Percentage of Total Operating Costs and Expenses
2018	$19,919,204	75.1%	55.6%
2017	$11,375,237	0.0%	61.0%

Our expenses, including stock-based compensation, for research and development for the year ended December 31, 2018 increased compared to amounts expended during the 2017 fiscal year. Research and development expenses, in the aggregate, represented approximately 55.6% of total operating costs and expenses for the 2018 fiscal year, compared to 61.0% for the 2017 fiscal year, respectively. The stock-based compensation is non-cash and relates to the expense of stock options awards to certain employees.

Research and development expenses in the 2018 fiscal year primarily included consulting expenses as we prepared to submit our NDA for Firdapse® during the first quarter of 2018, milestone expenses relating to the acceptance and approval of our NDA submission, expenses from our medical affairs program, compensation and related personnel costs as we expanded our headcount to support our ongoing trials evaluating Firdapse® for the treatment of CMS, MuSK-MG and SMA Type 3, costs of operating our Expanded Access Program, and costs incurred to build up inventory to launch Firdapse® in early 2019. Research and development expenses in the 2017 fiscal year primarily included, among other items, costs associated with our ongoing second Phase 3 trial evaluating Firdapse® for the treatment of LEMS, our ongoing clinical trial evaluating Firdapse® for the treatment of CMS, and our Expanded Access Program for Firdapse®.

We expect that research and development costs will continue to be substantial in 2019 as we continue our clinical trials evaluating Firdapse® for the treatment of CMS and MuSK-MG, continue our Expanded Access Programs, conduct our proof-of-concept trial evaluating Firdapse® for the treatment of SMA Type 3, take steps to develop a sustained release formulation of Firdapse®, and potentially prepare an NDA for Firdapse® for the treatment of CMS and/or MuSK-MG.

Our research and development expenses for 2018 and 2017, include stock-based compensation relating to the value of stock options granted to certain employees and consultants. The amount of stock-based compensation recorded in 2018 and 2017 relating to our research and development activities was $1,079,230 and $785,899, respectively. The weighted-average grant-date fair value of the stock options granted in 2018 and 2017 was $1.99 and $0.84, respectively.

Selling and Marketing Expenses

We had no selling expenses during 2018 and 2017. As we moved closer to the approval of Firdapse® for the treatment of LEMS, we actively committed funds to building a commercial team and developing our commercialization program for Firdapse® so that we would be in a position to launch the product in early 2019, including our marketing efforts. Pre-commercialization costs are included in general and administrative expenses.

General and Administrative Expenses

Year	Amount	Change from Prior Year	Percentage of Total Operating Costs and Expenses
2018	$15,875,961	117.3%	44.4%
2017	$ 7,304,399	(7.7)%	39.0%

General and administrative expenses include, among other expenses, corporate and office expenses, legal, accounting and consulting fees, pre-commercialization costs, and travel expenses for our administrative employees, consultants and members of our Board of Directors. Included in general and administrative expenses in the years 2018 and 2017 was (i) stock-based compensation of $2,471,414 and $1,622,062, respectively, and (ii) pre-commercialization costs of $6,897,483 and $809,584, respectively.

The 117.3% increase in general and administrative expenses for the year ended December 31, 2018 when compared to the same period in 2017 was primarily due to our efforts to expand our operations and headcount in order to prepare for the commercialization of Firdapse®. We expect that general and administrative costs, excluding pre-commercialization costs (which, going forward, will be included in sales and marketing expenses), will increase in 2019 compared with the general and administrative costs incurred in 2018, as we expand our operations and headcount to support the commercialization of Firdapse®.

Stock-Based Compensation

We issued stock options and other share-based payments to several of our employees, directors, and consultants in 2018 and 2017. Total stock-based compensation expense for the years ended December 31, 2018 and 2017 was $3,550,644 and $2,407,961, respectively. We regularly grant non-cash stock-based compensation to employees and directors as part of their compensation packages. The 2018 increase in expense from the prior year is primarily due to the expense of options granted to employees and directors during the first quarter of 2018 in connection with 2017 year-end grants and the effect of grants to new employees as we increase our headcount to build up our infrastructure and commercial programs to support the launch of Firdapse® in 2019.

Change in Fair Value of Warrants Liability

In connection with the October 2011 equity offering, we issued warrants to purchase an aggregate of 1,523,370 shares of common stock. As of May 2, 2017, all of the 2011 warrants were either exercised or had expired. During the period that the 2011 warrants were outstanding, the fair value of the warrants liability was determined at the end of each reporting period with the resulting gains or losses recorded as the change in fair value of warrants liability in the consolidated statements of operations.

No gain or loss was recognized for the year ended December 31, 2018, as all 2011 warrants that were not exercised expired on May 2, 2017. For the year ended December 31, 2017, we recognized a loss of $186,904 in connection with the change in the fair value of the warrants liability. The loss during 2017 was principally a result of fluctuations in our common stock price and the warrants liability expiration date on May 2, 2017.

Other Income, Net

We reported other income, net in all periods relating to our investment of funds received from offerings of our securities. Other income, net consists of interest income, dividend income and unrealized and realized gain (loss) on trading securities and realized gain (loss) on available-for-sale securities, if any. The $837,488 increase in other income, net for the year ended December 31, 2018 as compared to the year ended December 31, 2017 was principally due to higher yields on investment balances from the proceeds of our offerings. These proceeds were used to fund our drug development activities and our operations. Substantially all such funds were invested in short-term interest-bearing obligations, a short-term bond fund and U.S. Treasuries.

Income Taxes

We have incurred net operating losses since inception. Consequently, we have applied a 100% valuation allowance against our deferred tax asset as we believe that it is more likely than not that the deferred tax asset will not be realized.

Net Loss

Our net loss was $34,003,514 in the year ended December 31, 2018 ($0.33 per basic and diluted share) as compared to $18,412,377 in the year ended December 31, 2017 ($0.21 per basic and diluted share).

Non-GAAP Net Loss

Our non-GAAP net loss for the year ended December 31, 2018 was the same as our GAAP net loss, as there were no non-GAAP adjustments. Our non-GAAP net loss, which excludes for 2017 a $186,904 loss associated with the change in the fair value of liability classified warrants was $18,225,473 ($0.21 per basic and diluted share).

Liquidity and Capital Resources

Since our inception, we have financed our operations primarily with the net proceeds of public and private offerings of our securities. At December 31, 2018, we had cash and investments aggregating $58.5 million and working capital of $45.7 million as compared to cash and investments of $84.0 million and working capital of $80.9 million at December 31, 2017. At December 31, 2018, substantially all of our cash and cash equivalents were deposited with one financial institution, and such balances were in excess of federally insured limits.

We have to date incurred operating losses, and we may never become profitable. Further, we expect to continue to spend substantial dollars on our current and future drug development programs.

Based on forecasts of available cash, we believe that we have sufficient resources to support our currently anticipated operations for at least the next 12 months. There can be no assurance that we will ever become profitable or that we will obtain any additional funding that we may require in the future.

We may also require additional working capital to support our operations beyond that time, depending on our success in launching Firdapse® and whether the results are cash flow positive. There can be no assurance as to the amount of any such funding that will be required for these purposes or whether any such funding will be available to us when it is required.

In that regard, our future funding requirements will depend on many factors, including:

- the scope, rate of progress and cost of our clinical trials and other product development activities;
- future clinical trial results;
- the terms and timing of any collaborative, licensing and other arrangements that we may establish;
- the cost and timing of regulatory approvals;
- the cost and delays in product development as a result of any changes in regulatory oversight applicable to our products;
- the cost and timing of establishing sales, marketing and distribution capabilities;
- the level of revenues that we report from sales of Firdapse®;
- the effect of competition and market developments;
- the cost of filing and potentially prosecuting, defending and enforcing any patent claims and other intellectual property rights; and
- the extent to which we acquire or invest in other products.

We plan to raise additional funds that we may require in the future, through public or private equity offerings, debt financings, corporate collaborations or other means. We also may seek governmental grants for a portion of the required funding for our clinical trials and preclinical trials. We may also seek to raise capital to fund additional product development efforts or product acquisitions, even if we have sufficient funds for our planned operations. Any sale by us of additional equity or convertible debt securities could result in dilution to our stockholders. There can be no assurance that any such required additional funding will be available to us at all or available on terms acceptable to us. Further, to the extent that we raise additional funds through collaborative arrangements, it may be necessary to relinquish some rights to our technologies or grant sublicenses on terms that are not favorable to us. If we are not able to secure additional funding when needed, we may have to delay, reduce the scope of or eliminate one or more research and development programs, which could have an adverse effect on our business.

On July 12, 2017, we filed a shelf registration statement with the SEC to sell up to $150 million of common stock, preferred stock, warrants to purchase common stock, debt securities and units consisting of one or more of such securities (the "2017 Shelf Registration Statement"). The 2017 Shelf Registration Statement (file no. 333-219259) was declared effective by the SEC on July 26, 2017. We have completed one offering under the 2017 Shelf Registration Statement, raising net proceeds of approximately $53.8 million from the sale of 16,428,572 shares of our common stock on November 28, 2017.

On December 23, 2016, we filed a shelf registration statement with the SEC to sell up to $33.8 million of common stock (the "2016 Shelf Registration Statement"). This shelf registration statement was declared effective by the SEC on January 9, 2017. We have made no sales under the 2016 Shelf Registration Statement.

As of the date of this Form 10-K, the full amount of our 2016 Shelf Registration Statement and $92.5 million of our 2017 Shelf Registration Statement remains available for future sales.

Contractual Obligations and Arrangements

We have entered into the following contractual arrangements:

- *Payments to BioMarin and others under our license agreement with BioMarin.* We have agreed to pay certain payments under our license agreement with BioMarin:
  - *Royalties:* We have agreed to pay (i) royalties to BioMarin for seven years from the first commercial sale of Firdapse® equal to 7% of net sales (as defined in the license agreement) in North America for any calendar year for sales up to $100 million, and 10% of net sales in North America in any calendar year in excess of $100 million; and (ii) royalties to the third-party licensor of the rights sublicensed to us for seven years from the first commercial sale of Firdapse® equal to 7% of net sales (as defined in the license agreement between BioMarin and the third-party licensor) in any calendar year.

- *Milestone Payments:* Under our license agreement with BioMarin, we agreed to pay certain milestone payments that BioMarin was obligated to pay to both a third-party licensor of the rights that have been sublicensed to us and to the former stockholders of Huxley Pharmaceuticals ("Huxley") under an earlier stock purchase agreement between BioMarin and the former Huxley stockholders. In full satisfaction of these obligations, we have paid (i) $3,150,000 in milestone payments to the third party licensor of the rights that have been sublicensed to us ($150,000 of which was paid in 2018 and $3.0 million of which was paid in February 2019), and (ii) $2.0 million in milestone payments to the former Huxley Stockholders (all of which was paid in 2018).
- *Cost Sharing Payments:* In the BioMarin License Agreement, we agreed to share in the cost of certain post-marketing studies of Firdapse® that were being conducted by BioMarin, and, we fulfilled our commitment to BioMarin in that regard several years ago.

- *Employment agreements*. We have entered into an employment agreement with our Chief Executive Officer that requires us to make base salary payments of approximately $546,000 in 2019. The agreement expires in November 2020.
- *Lease for office space*. We operate our business in leased office space in Coral Gables, Florida. We currently lease approximately 7,800 square feet of office space for which we pay annual rent of approximately $330,000.

Off-Balance Sheet Arrangements

We currently have no debt or capital leases. We have operating leases for our office facilities. We do not have any off-balance sheet arrangements as such term is defined in rules promulgated by the SEC.

Cash Flows

Net cash used in operating activities was $25,704,406 and $13,742,572, respectively, for the years ended December 31, 2018 and 2017.

During the year ended December 31, 2018, net cash used in operating activities was primarily attributable to our net loss of $34,003,514 and increases of $476,037 in prepaid expenses and other current assets and deposits and $56,012 in inventory, which was partially offset by increases of $391,792 in accounts payable and $4,850,743 in accrued expenses. The loss included an additional $3,588,622 of non-cash expenses, consisting of stock-based compensation expense and depreciation.

During the year ended December 31, 2017, net cash used in operating activities was primarily attributable to our net loss of $18,412,377 and an increase of $125,800 in prepaid expenses and other current assets and deposits, which was partially offset by increases of $1,012,399 in accounts payable and $1,142,652 in accrued expenses, and a loss of $186,904 of non-cash change in fair value of warrants liability. The loss included an additional $2,453,650 of non-cash expenses, consisting of stock-based compensation expense and depreciation.

Net cash used in investing activities was $15,526,011 and $3,958, respectively, for 2018 and 2017. During 2018, net cash used in investing activities was primarily attributable to purchases of investments of $36,802,418. This was partially offset by $21,368,425 proceeds from maturities of investments. During 2017, net cash used in investing activities consisted of purchases of investments.

Net cash provided by financing activities was $293,115 and $57,350,168, respectively, for 2018 and 2017. During 2018, net cash from financing activities consisted primarily of proceeds from the exercise of stock options. During 2017, net cash from financing activities consisted of the net proceeds from the sale of shares of common stock in an underwritten direct public offering under the 2017 Shelf Registration Statement, as well as proceeds from exercise of stock options and warrants. Such funds are being used to fund our research and development costs, our general and administrative costs, and our commercialization costs associated with the launch of Firdapse®.

Caution Concerning Forward-Looking Statements

Some of the statements in this Form 10-K are "forward-looking statements", as that term is defined in the Private Securities Litigation Reform Act of 1995. These include statements regarding our expectations, beliefs, plans or objectives for future operations and anticipated results of operations. For this purpose, any statements contained herein that are not statements of historical fact may be deemed to be forward-looking statements. Without limiting the foregoing, "believes", "anticipates", "proposes", "plans", "expects", "intends", "may", and other similar expressions are intended to identify forward-looking statements. Such statements 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 such forward-looking statements. The forward-looking statements made in this Form 10-K are based on current expectations that involve numerous risks and uncertainties.

The successful development of our product candidates is highly uncertain. We cannot reasonably estimate or know the nature, timing, or estimated expenses of the efforts necessary to complete the development of, or the period in which material net cash inflows are expected to commence due to the numerous risks and uncertainties associated with developing such products, including the uncertainty of:

- our estimates regarding anticipated capital requirements and our future needs for additional financing;
- the impact on Firdapse® of adverse changes in potential reimbursement and coverage policies from government and private payors such as Medicare, Medicaid, insurance companies, health maintenance organizations and other plan administrators, or the impact of pricing pressures enacted by industry organizations, the federal government or the government of any state, including as a result of increased scrutiny over pharmaceutical pricing or otherwise;
- the impact on our business and results of operations of recent public statements by Senator Bernie Sanders and a vocal group of LEMS patients who object to our pricing of Firdapse®;
- whether we will be able to successfully market Firdapse® while maintaining full compliance with applicable federal and state laws, rules and regulations;
- whether our estimates of the size of the market for our drug candidates will turn out to be accurate;
- whether we will be able to locate LEMS patients who are undiagnosed or are misdiagnosed with other diseases;
- whether our efforts to commercialize Firdapse® will be successful and, even if they are successful, whether we can become profitable;
- whether payors will reimburse for our product;
- changes in the healthcare industry and the effect of political pressure from President Trump, Congress and/or medical professionals seeking to reduce prescription drug costs;
- changes to the healthcare industry occasioned by any future repeal and replacement of the Affordable Care Act, in laws relating to the pricing of drug products, or changes in the healthcare industry generally;
- the scope, rate of progress and expense of our clinical trials and studies, pre-clinical studies, proof-of-concept studies, and our other drug development activities, and whether our trials and studies will be successful;
- our ability to complete our trials and studies on a timely basis and within the budgets we establish for such trials and studies;
- whether the trials that we are currently undertaking to evaluate Firdapse® for the treatment of Congenital Myasthenic Syndromes (CMS), Anti-MuSK antibody positive myasthenia gravis (MuSK-MG) and Spinal Muscular Atrophy (SMA) Type 3, or any other trials that we undertake in the future, will be successful;
- whether Firdapse® will ever be approved for the treatment of CMS, MuSK-MG, SMA Type 3, or any other neuromuscular disease;
- the result of our currently ongoing arbitration action with Northwestern University regarding our license for CPP-115;
- whether our version of generic vigabatrin tablets will ever be approved by the United States Food and Drug Administration (FDA);
- even if vigabatrin tablets are approved for commercialization, whether Endo Ventures/Par Pharmaceutical will be successful in marketing the product;

- whether Catalyst will earn milestone payments on approval of an Abbreviated New Drug Application (ANDA) for generic vigabatrin tablets and royalties on sales of generic vigabatrin tablets; and
- the ability of our third-party suppliers and contract manufacturers to maintain compliance with current Good Manufacturing Practices (cGMP).

Our current plans and objectives are based on assumptions relating to the development of our current drug candidates, and particularly the development of additional indications for Firdapse®. Although we believe that our assumptions are reasonable, any of our assumptions could prove inaccurate. In light of the significant uncertainties inherent in the forward-looking statements we have made herein, which reflect our views only as of the date of this report, you should not place undue reliance upon such statements. We undertake no obligation to update or revise publicly any forward-looking statements, whether as a result of new information, future events or otherwise.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

Not applicable.

Item 8. Financial Statements and Supplementary Data

See the list of financial statements filed with this report under Item 15 below.

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

None.

Item 9A. Controls and Procedures

Disclosure Controls and Procedures

We have carried out an evaluation, under the supervision and with the participation of our management, including our principal executive officer and principal financial officer, of the effectiveness of the design and operation of our disclosure controls and procedures. The term "disclosure controls and procedures", as defined in Rules 13a-15(e) and 15(d)-15(e) under the Securities Exchange Act of 1934 (the "Exchange Act"), means controls and other procedures of a company that are designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is processed, summarized and reported, within the time periods specified in the Securities and Exchange Commission's rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is accumulated and communicated to the company's management, including its principal executive and principal financial officers, as appropriate to allow timely decisions regarding required disclosure.

Based on such evaluation, our principal executive officer and principal financial officer have concluded that as of December 31, 2018, our disclosure controls and procedures were effective to ensure that the information required to be disclosed by us in the reports filed or submitted by us under the Securities Exchange Act of 1934, as amended, was recorded, processed, summarized or reported within the time periods specified in the rules and regulations of the SEC, and include controls and procedures designed to ensure that information required to be disclosed by us in such reports was accumulated and communicated to management, including our principal executive officer and principal financial officer, as appropriate to allow timely decisions regarding required disclosures.

Management's Annual Assessment of Internal Control Over Financial Reporting

Management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Exchange Act Rule 13a-15(f). Our internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of our assets; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that our receipts and expenditures are being made only in accordance with authorizations of our management and directors; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of our assets that could have a material effect on our consolidated financial statements.

Internal control over financial reporting is designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements prepared for external purposes in accordance with generally accepted accounting principles. 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.

Under the supervision and with the participation of our principal executive officer and our principal financial officer, management conducted an evaluation of the effectiveness of our internal control over financial reporting as of December 31, 2018 based on the 2013 framework in Internal Control – Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission and in accordance with the interpretive guidance issued by the SEC in Release No. 34-55929. Based on that evaluation, management concluded that our internal control over financial reporting was effective as of December 31, 2018.

During the fourth quarter of 2018, there were no changes in our internal control over financial reporting, as defined in Rule 13a-15(f) under the Securities and Exchange Act of 1934 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Our independent registered public accounting firm, Grant Thornton LLP, has issued a report on our internal control over financial reporting, which is included in Item 15 of this Annual Report on Form 10-K.

Item 9B. Other Information

Not applicable.

PART III

Item 10. Directors and Executive Officers of the Registrant

The information required by this item will be contained in our definitive proxy statement, or Proxy Statement, to be filed with the SEC in connection with our 2019 Annual Meeting of Stockholders. Our Proxy Statement for the 2019 Annual Meeting of Stockholders is expected to be filed not later than 120 days after the end of our fiscal year ended December 31, 2018 and is incorporated into this report by this reference.

We have adopted a code of ethics that applies to our chief executive officer, chief financial officer, and to all of our other officers, directors, employees and agents. The code of ethics is available on our website at www.catalystpharma.com. We intend to disclose future amendments to, or waivers from, certain provisions of our code of ethics on the above website within five business days following the date of such amendment or waiver.

Item 11. Executive Compensation

The information required by this item will be set forth in the Proxy Statement and is incorporated into this report by this reference.

Item 12. Security Ownership of Certain Beneficial Owners and Management

The information required by this item will be set forth in the Proxy Statement and is incorporated into this report by this reference.

Item 13. Certain Relationships and Related Transactions

The information required by this item will be set forth in the Proxy Statement and is incorporated into this report by this reference.

Item 14. Principal Accounting Fees and Services

The information required by this item will be set forth in the Proxy Statement and is incorporated into this report by this reference.

PART IV

Item 15. Exhibits and Financial Statement Schedules

(a) Documents filed as part of this report.

1. The following financial statements of Catalyst Pharmaceuticals, Inc. and Reports of Grant Thornton LLP, independent registered public accounting firm, are included in this report:

- Reports of Grant Thornton LLP, Independent Registered Public Accounting Firm
- Consolidated Balance Sheets as of December 31, 2018 and 2017
- Consolidated Statements of Operations for the years ended December 31, 2018 and 2017
- Consolidated Statements of Changes in Stockholders' Equity for the years ended December 31, 2018 and 2017
- Consolidated Statements of Cash Flows for the years ended December 31, 2018 and 2017
- Notes to Consolidated Financial Statements

2. List of financial statement schedules. All schedules are omitted because they are not applicable or the required information is shown in the financial statements or notes thereto.

3. List of exhibits required by Item 601 of Regulation S-K. See part (b) below.

(b) Exhibits.

Exhibit No.	Description of Exhibit
2.1	Agreement and Plan of Merger, dated August 14, 2006, between the Company and Catalyst Pharmaceutical Partners, Inc., a Florida corporation
3.1	Certificate of Incorporation
3.2	Amendment to Certificate of Incorporation
3.3	Amendment to Certificate of Incorporation
3.4	Amendment to Certificate of Incorporation
3.5	By-laws
4.1	Specimen stock certificate for common stock
4.2	Rights Agreement between the Company and Continental Stock Transfer and Trust Company
4.3	Amendment to Rights Agreement between the Company and Continental Stock Transfer and Trust Company
10.1+	Employment Agreement between the Company and Patrick J. McEnany
10.2+	First Amendment to Employment Agreement between the Company and Patrick J. McEnany
10.3+	Second Amendment to Employment Agreement between the Company and Patrick J. McEnany
10.4+	Third Amendment to Employment Agreement between the Company and Patrick J. McEnany
10.5+	Fourth Amendment to Employment Agreement between the Company and Patrick J. McEnany
10.6+	Fifth Amendment to Employment Agreement between the Company and Patrick J. McEnany
10.7+	Sixth Amendment to Employment Agreement between the Company and Patrick J. McEnany
10.8+	2014 Stock Incentive Plan
10.9+	Amendment No. 1 to 2014 Stock Incentive Plan
10.10+	Amendment No. 2 to 2014 Stock Incentive Plan
10.11	2018 Stock Incentive Plan
10.12	License Agreement between the Company and Northwestern University
10.13	Lease Agreement between the Company and 355 Alhambra Plaza, Ltd.
10.14	First Amendment to Lease Agreement between the Company and 355 Alhambra Plaza, Ltd.
10.15	Second Amendment to Lease, dated as of February 4, 2014, between the Company and 355 Alhambra Circle LLC

Exhibit No.	Description of Exhibit
10.16	Third Amendment to Lease, dated effective as of March 16, 2015, between the Company and 355 Alhambra Circle LLC
10.17	Fourth Amendment to Lease, dated effective as of August 13, 2018 among the Company and PRII 355 Alhambra Circle, LLC
10.18	License Agreement among the Company, New York University, and The Feinstein Institute for Medical Research
10.19	Convertible Promissory Note and Note Purchase Agreement, dated as of October 26, 2012, between the Company and BioMarin Pharmaceutical, Inc.
10.20	License Agreement, dated as of October 26, 2012, between the Company and BioMarin Pharmaceutical, Inc.
10.21	Amendment No. 1 to License Agreement, dated April 8, 2014, between the Company and BioMarin Pharmaceutical, Inc.
10.22	Settlement Agreement, dated effective as of July 26, 2018, by and among (i) Aceras BioMedical LLC, in its capacity as Stockholder Representative for the former stockholders of Huxley Pharmaceuticals, Inc., (ii) BioMarin Pharmaceutical, Inc., and (iii) the Company
10.23	Development, License and Commercialization Agreement, dated effective as of December 18, 2018, by and between Endo Ventures Limited and the Company
21.1	Subsidiaries of the registrant*
23.1	Consent of Independent Registered Public Accounting Firm*
31.1	Section 302 CEO Certification*
31.2	Section 302 CFO Certification*
32.1	Section 906 CEO Certification*
32.2	Section 906 CFO Certification*
101.INS	XBRL Instance Document
101.SCH	XBRL Taxonomy Extension Schema
101.CAL	XBRL Taxonomy Extension Calculation Linkbase
101.DEF	XBRL Taxonomy Extension Definition Linkbase
101.LAB	XBRL Taxonomy Extension Label Linkbase
101.PRE	XBRL Taxonomy Extension Presentation Linkbase

+ Management contract or compensatory plan
* Filed herewith

SIGNATURES

Pursuant to the requirements of Section 13 and 15(d) of the Securities Exchange Act of 1934, the Registrant has caused this Annual Report on Form 10-K to be signed by the undersigned, thereunto duly authorized, this 18th day of March, 2019.

CATALYST PHARMACEUTICALS, INC.

By: /s/ Patrick J. McEnany
Patrick J. McEnany, Chairman,
President and CEO

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

Signature	Title	Date
/s/ Patrick J. McEnany Patrick J. McEnany	Chairman of the Board of Directors, President and Chief Executive Officer (Principal Executive Officer)	March 18, 2019
/s/ Alicia Grande Alicia Grande	Vice President, Treasurer, Chief Financial Officer (Principal Financial Officer and Principal Accounting Officer)	March 18, 2019
/s/ Charles B. O'Keeffe Charles B. O'Keeffe	Director	March 18, 2019
/s/ Philip H. Coelho Philip H. Coelho	Director	March 18, 2019
/s/ David S. Tierney, M.D. David S. Tierney, M.D.	Director	March 18, 2019
/s/ Donald A. Denkhaus Donald A. Denkhaus	Director	March 18, 2019
/s/ Richard Daly Richard Daly	Director	March 18, 2019

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Years ended December 31, 2018 and 2017

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

Board of Directors and Shareholders
Catalyst Pharmaceuticals, Inc.

Opinion on internal control over financial reporting

We have audited the internal control over financial reporting of Catalyst Pharmaceuticals, Inc. (a Delaware corporation) and subsidiary (the "Company") as of December 31, 2018, based on criteria established in the 2013 *Internal Control – Integrated Framework* issued by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO"). In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2018, based on criteria established in the 2013 *Internal Control – Integrated Framework* issued by COSO.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) ("PCAOB"), the consolidated financial statements of the Company as of and for the year ended December 31, 2018, and our report dated March 18, 2019 expressed an unqualified opinion on those financial statements.

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 Assessment of 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/ GRANT THORNTON LLP

Miami, Florida
March 18, 2019

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

Board of Directors and Shareholders
Catalyst Pharmaceuticals, Inc.

Opinion on the financial statements

We have audited the accompanying consolidated balance sheets of Catalyst Pharmaceuticals, Inc. (a Delaware corporation) and subsidiary (the "Company") as of December 31, 2018 and 2017, the related consolidated statements of operations and comprehensive loss, changes in stockholders' equity, and cash flows for the two years in the period ended December 31, 2018, 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, 2018 and 2017, and the results of its operations and its cash flows for each of the two years in the period ended December 31, 2018, in conformity with accounting principles generally accepted in the United States of America.

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, 2018, based on criteria established in the 2013 *Internal Control – Integrated Framework* issued by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO"), and our report dated March 18, 2019 expressed an unqualified opinion.

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 U.S. 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 included examining, on a test basis, evidence supporting 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/ GRANT THORNTON LLP

We have served as the Company's auditor since 2006.

Miami, Florida
March 18, 2019

CATALYST PHARMACEUTICALS, INC.
CONSOLIDATED BALANCE SHEETS

	December 31, 2018	December 31, 2017
ASSETS		
Current Assets:		
Cash and cash equivalents	$ 16,559,400	$ 57,496,702
Short-term investments	36,922,213	26,516,711
Inventory	56,012	—
Prepaid expenses and other current assets	1,649,781	1,173,744
Total current assets	55,187,406	85,187,157
Investments	5,008,243	—
Property and equipment, net	245,425	191,385
Deposits	8,888	8,888
Total assets	$ 60,449,962	$ 85,387,430
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current Liabilities:		
Accounts payable	$ 2,337,367	$ 1,945,575
Accrued expenses and other liabilities	7,173,987	2,320,587
Total current liabilities	9,511,354	4,266,162
Accrued expenses and other liabilities, non-current	154,799	157,456
Total liabilities	9,666,153	4,423,618
Commitments and contingencies		
Stockholders' equity:		
Preferred stock, $0.001 par value, 5,000,000 shares authorized: none issued and outstanding at December 31, 2018 and 2017	—	—
Common stock, $0.001 par value, 150,000,000 shares authorized; 102,739,257 shares and 102,549,498 shares issued and outstanding at December 31, 2018 and 2017, respectively	102,739	102,549
Additional paid-in capital	211,265,279	207,421,710
Accumulated deficit	(160,563,961)	(126,560,447)
Accumulated other comprehensive loss	(20,248)	—
Total stockholders' equity	50,783,809	80,963,812
Total liabilities and stockholders' equity	$ 60,449,962	$ 85,387,430

The accompanying notes are an integral part of these consolidated financial statements.

CATALYST PHARMACEUTICALS, INC.
CONSOLIDATED STATEMENTS OF OPERATIONS AND COMPREHENSIVE LOSS

	Year Ended December 31,	
	2018	2017
Revenues from collaborative arrangement	$ 500,000	$ —
Operating costs and expenses:		
Research and development	19,919,204	11,375,237
General and administrative	15,875,961	7,304,399
Total operating costs and expenses	35,795,165	18,679,636
Loss from operations	(35,295,165)	(18,679,636)
Other income, net	1,291,651	454,163
Change in fair value of warrants liability	—	(186,904)
Loss before income taxes	(34,003,514)	(18,412,377)
Provision for income taxes	—	—
Net loss	$ (34,003,514)	$(18,412,377)
Net loss per share – basic and diluted	$ (0.33)	$ (0.21)
Weighted average shares outstanding – basic and diluted	102,633,884	85,802,487
Net loss	$ (34,003,514)	$(18,412,377)
Other comprehensive loss:		
Unrealized gain (loss) on available-for-sale securities	(20,248)	—
Comprehensive loss	$ (34,023,762)	$(18,412,377)

The accompanying notes are an integral part of these consolidated financial statements.

CATALYST PHARMACEUTICALS, INC.
CONSOLIDATED STATEMENTS OF CHANGES IN STOCKHOLDERS' EQUITY
For the years ended December 31, 2018 and 2017

	Preferred Stock	Common Stock	Additional Paid-in Capital	Accumulated Deficit	Accumulated Other Comprehensive Loss	Total
Balance at December 31, 2016	$ —	$ 82,972	$147,374,028	$(108,148,070)	$ —	$ 39,308,930
Issuance of common stock, net	—	16,455	53,756,105	—	—	53,772,560
Issuance of stock options for services	—	—	2,342,625	—	—	2,342,625
Amortization of restricted stock for services	—	—	65,336	—	—	65,336
Exercise of warrants for common stock	—	2,258	3,516,295	—	—	3,518,553
Exercise of stock options for common stock	—	864	367,321	—	—	368,185
Net loss	—	—	—	(18,412,377)	—	(18,412,377)
Balance at December 31, 2017	—	102,549	207,421,710	(126,560,447)	—	80,963,812
Issuance of common stock, net	—	3	10,546	—	—	10,549
Issuance of stock options for services	—	—	3,535,647	—	—	3,535,647
Exercise of stock options for common stock	—	187	297,376	—	—	297,563
Other comprehensive loss	—	—	—	—	(20,248)	(20,248)
Net loss	—	—	—	(34,003,514)	—	(34,003,514)
Balance at December 31, 2018	$ —	$102,739	$211,265,279	$(160,563,961)	$ (20,248)	$ 50,783,809

The accompanying notes are an integral part of these consolidated financial statements.

CATALYST PHARMACEUTICALS, INC.
CONSOLIDATED STATEMENTS OF CASH FLOWS

	Year Ended December 31,	
	2018	2017
Operating Activities:		
Net loss	$(34,003,514)	$(18,412,377)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation	37,978	45,689
Stock-based compensation	3,550,644	2,407,961
Change in fair value of warrants liability	—	186,904
(Increase) decrease in:		
Inventory	(56,012)	—
Prepaid expenses and other current assets and deposits	(476,037)	(125,800)
Increase (decrease) in:		
Accounts payable	391,792	1,012,399
Accrued expenses and other liabilities	4,850,743	1,142,652
Net cash used in operating activities	(25,704,406)	(13,742,572)
Investing Activities:		
Purchases of property and equipment	(92,018)	—
Purchases of investments	(36,802,418)	(3,958)
Proceeds from maturities of investments	21,368,425	—
Net cash provided by (used in) investing activities	(15,526,011)	(3,958)
Financing Activities:		
Proceeds from issuance of common stock, net	—	53,772,560
Payment of employee withholding tax related to stock-based compensation	(4,448)	—
Proceeds from exercise of warrants	—	3,209,423
Proceeds from exercise of stock options	297,563	368,185
Net cash provided by (used in) financing activities	293,115	57,350,168
Net increase (decrease) in cash and cash equivalents	(40,937,302)	43,603,638
Cash and cash equivalents – beginning of period	57,496,702	13,893,064
Cash and cash equivalents – end of period	$ 16,559,400	$ 57,496,702
Non-cash investing and financing activities:		
Unrealized gain (loss) on available-for-sale securities	$ (20,248)	$ —
Exercise of liability classified warrants for common stock	$ —	$ 309,130

The accompanying notes are an integral part of these consolidated financial statements.

CATALYST PHARMACEUTICALS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

1. Organization and Description of Business.

Catalyst Pharmaceuticals, Inc. and subsidiary (collectively, the "Company"), is a development-stage biopharmaceutical company focused on developing and commercializing innovating therapies for people with rare debilitating, chronic neuromuscular and neurological diseases, including Lambert-Eaton Myasthenic Syndrome (LEMS), Congenital Myasthenic Syndromes (CMS), and MuSK antibody positive myasthenia gravis (MuSK-MG). The Company (f/k/a Catalyst Pharmaceutical Partners, Inc.) was incorporated in Delaware in July 2006. It is the successor by merger to Catalyst Pharmaceutical Partners, Inc., a Florida corporation, which commenced operations in January 2002.

On November 28, 2018, the U.S. Food and Drug Administration, or FDA, granted approval of Firdapse® for the treatment of adults with LEMS.

Since inception, the Company has devoted substantially all of its efforts to business planning, research and development, recruiting management and technical staff, acquiring operating assets and raising capital. The Company's primary focus is on the development and commercialization of its drug candidates. The Company has incurred operating losses in each period from inception through December 31, 2018. The Company has been able to fund its cash needs to date primarily through public and private offerings of its securities. See Note 11.

Capital Resources

While there can be no assurance, based on currently available information, the Company estimates that it currently has sufficient resources to support its operations for at least the next 12 months from the issuance date of this Form 10-K.

The Company may raise required funds in the future through public or private equity offerings, debt financings, corporate collaborations, governmental research grants or other means. The Company may also seek to raise new capital to fund additional product development efforts, even if it has sufficient funds for its planned operations. Any sale by the Company of additional equity or convertible debt securities could result in dilution to the Company's current stockholders. There can be no assurance that any such required additional funding will be available to the Company at all or available on terms acceptable to the Company. Further, to the extent that the Company raises additional funds through collaborative arrangements, it may be necessary to relinquish some rights to the Company's drug candidates or grant sublicenses on terms that are not favorable to the Company. If the Company is not able to secure additional funding when needed, the Company may have to delay, reduce the scope of, or eliminate one or more research and development programs, which could have an adverse effect on the Company's business.

2. Basis of Presentation and Significant Accounting Policies.

a. **PRINCIPLES OF CONSOLIDATION**. The consolidated financial statements include the Company's accounts and those of its wholly-owned subsidiary Catalyst Pharmaceuticals Ireland, Ltd. ("Catalyst Ireland"). All intercompany accounts and transactions have been eliminated in consolidation. Catalyst Ireland was organized in 2017.

b. **USE OF ESTIMATES.** The preparation of financial statements in conformity with U.S. generally accepted accounting principles (U.S. GAAP) requires management to make estimates and assumptions that affect the amounts reported in the consolidated financial statements and accompanying notes. Actual results could differ from those estimates.

c. **CASH AND CASH EQUIVALENTS.** The Company considers all highly liquid instruments, purchased with an original maturity of three months or less, to be cash equivalents. Cash equivalents consist mainly of money market funds. The Company has substantially all of its cash and cash equivalents deposited with one financial institution. These amounts at times may exceed federally insured limits.

d. **INVESTMENTS.** The Company invests in high credit-quality funds in order to obtain higher yields on its cash and investments pending the use of those funds in its business. At December 31, 2018, investments consisted of a short-term bond fund and U.S. Treasuries. At December 31, 2017, investments consisted of a short-term bond fund. Such investments are not insured by the Federal Deposit Insurance Corporation.

2. Basis of Presentation and Significant Accounting Policies (continued).

Short-term bond fund

The short-term bond fund is classified as trading securities. Trading securities are recorded at fair value based on the closing market price of the security. For trading securities, the Company recognizes realized gains and losses and unrealized gains and losses to earnings. At December 31, 2018 and 2017, the only investment classified as trading securities was the short-term bond fund. Unrealized gain (loss) on trading securities was ($29,430) and $29,430, respectively, for the years ended December 31, 2018, and 2017 and is included in other income, net in the accompanying consolidated statements of operations.

U.S. Treasuries

U.S. Treasuries are classified as available-for-sale securities. The Company classifies available-for-sale securities with stated maturities of greater than three months and less than one year from the date of purchase as short-term investments. Available-for-sale securities with stated maturities greater than one year are classified as non-current investments in the accompanying consolidated balance sheets. The Company records available-for-sale securities at fair value with unrealized gains and losses in accumulated other comprehensive income (loss) in stockholders' equity. Realized gains and losses are included in other income, net in the consolidated statements of operations and are derived using the specific identification method for determining the cost of securities sold. Interest income is recognized when earned and is included in other income, net in the consolidated statements of operations. The Company recognizes a charge when the declines in the fair value below the amortized cost basis of its available-for-sale securities are judged to be other-than-temporary. The Company considers various factors in determining whether to recognize an other-than-temporary charge, including whether the Company intends to sell the security or whether it is more likely than not that the Company would be required to sell the security before recovery of the amortized cost basis. The Company has not recorded any other-than-temporary impairment charges on its available-for-sale securities. See Note 3.

e. INVENTORY. Inventories are stated at the lower of cost or net realizable value with cost determined under the first-in-first-out (FIFO) cost method. Inventories consist of raw materials and supplies, work in process and finished goods. Costs to be capitalized as inventories include third party manufacturing costs, associated compensation related costs of personnel indirectly involved in the manufacturing process and other overhead costs such as ancillary supplies. The Company began capitalizing inventories post FDA approval of Firdapse® on November 28, 2018 as the related costs were expected to be recoverable through the commercialization of the product. Costs incurred prior to the FDA approval of Firdapse® have been recorded as research and development expenses in the consolidated statements of operations. If information becomes available that suggests that inventories may not be realizable, the Company may be required to expense a portion or all of the previously capitalized inventories. The costs of inventories during the year ended December 31, 2018 consists mainly of packaging and labeling costs, indirect costs including compensation cost of personnel and supplies. As of December 31, 2018, inventory was approximately $56,000. As of December 31, 2017, the Company did not have any inventory.

Products that have been approved by the FDA or other regulatory authorities, such as Firdapse®, are also used in clinical programs to assess the safety and efficacy of the products for usage in treating diseases that have not been approved by the FDA or other regulatory authorities. The form of Firdapse® utilized for both commercial and clinical programs is identical and, as a result, the inventory has an "alternative future use" as defined in authoritative guidance. Raw materials and purchased drug product associated with clinical development programs are included in inventory and charged to research and development expense when the product enters the research and development process and no longer can be used for commercial purposes and, therefore, does not have an "alternative future use".

The Company evaluates for potential excess inventory by analyzing current and future product demand relative to the remaining product shelf life. The Company builds demand forecasts by considering factors such as, but not limited to, overall market potential, market share, market acceptance, and patient usage.

f. PREPAID EXPENSES AND OTHER CURRENT ASSETS. Prepaid expenses and other current assets consist primarily of prepaid research fees, prepaid insurance, prepaid pre-commercialization fees, and prepaid subscription fees. Prepaid research fees consist of advances for the Company's product development activities, including drug manufacturing, contracts for preclinical studies, clinical trials and studies, regulatory affairs, and consulting. Such advances are recorded as expense as the related goods are received or the related services are performed.

2. Basis of Presentation and Significant Accounting Policies (continued).

g. **PROPERTY AND EQUIPMENT.** Property and equipment are recorded at cost. Depreciation is calculated to amortize the depreciable assets over their useful lives using the straight-line method and commences when the asset is placed in service. Leasehold improvements are amortized on a straight-line basis over the term of the lease or the estimated life of the improvement, whichever is shorter. Useful lives generally range from three to five years for computer equipment to five years for furniture and equipment, and from four to seven years for leasehold improvements. Expenditures for repairs and maintenance are charged to expenses as incurred.

h. **OPERATING LEASES.** The Company recognizes lease expense on a straight-line basis over the lease term. For leases that contain rent holidays, escalation clauses or tenant improvement allowances, the Company recognizes rent expense on a straight-line basis and records the difference between the rent expense and rental amount payable as deferred rent. As of December 31, 2018, and 2017, the Company had $188,207 and $181,467, respectively, of deferred rent and lease incentive in accrued expenses and other liabilities in the consolidated balance sheet.

i. **FAIR VALUE OF FINANCIAL INSTRUMENTS.** The Company's financial instruments consist of cash and cash equivalents, investments, accounts payable, and accrued expenses and other liabilities. At December 31, 2018 and 2017, the fair value of these instruments approximated their carrying value.

j. **FAIR VALUE MEASUREMENTS.** Current Financial Accounting Standards Board (FASB) fair value guidance emphasizes that fair value is a market-based measurement, not an entity-specific measurement. Therefore, a fair value measurement should be determined based on the assumptions that market participants would use in pricing the asset or liability. As a basis for considering market participant assumptions in fair value measurements, current FASB guidance establishes a fair value hierarchy that distinguishes between market participant assumptions based on market data obtained from sources independent of the reporting entity (observable inputs that are classified within Levels 1 and 2 of the hierarchy) and the reporting entity's own assumptions that it believes market participants would use in pricing assets or liabilities (unobservable inputs classified within Level 3 of the hierarchy).

Level 1 inputs utilize quoted prices (unadjusted) in active markets for identical assets or liabilities that the Company has the ability to access at the measurement date. Level 2 inputs are inputs other than quoted prices included in Level 1 that are observable for the asset or liability, either directly or indirectly. Level 2 inputs may include quoted prices for similar assets and liabilities in active markets, as well as inputs that are observable for the asset or liability (other than quoted prices), such as interest rates, foreign exchange rates, and yield curves that are observable at commonly quoted intervals. Level 3 inputs are unobservable inputs for the asset or liability, which are typically based on an entity's own assumptions, as there is little, if any, related market activity. In instances where the determination of the fair value measurement is based on inputs from different levels of the fair value hierarchy, the level in the fair value hierarchy within which the entire fair value measurement falls is based on the lowest level input that is significant to the fair value measurement in its entirety. The Company's assessment of the significance of a particular input to the fair value measurement in its entirety requires judgment, and considers factors specific to the asset or liability.

2. Basis of Presentation and Significant Accounting Policies (continued).

	Fair Value Measurements at Reporting Date Using			
	Balances as of December 31, 2018	Quoted Prices in Active Markets for Identical Assets/Liabilities (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Cash and cash equivalents:				
Money market funds	$14,462,087	$ 14,462,087	$ —	$ —
Short-term investments:				
Short-term bond fund	$26,541,349	$ 26,541,349	$ —	$ —
U.S. Treasuries	$10,380,864	$ —	$10,380,864	$ —
Investments:				
U.S. Treasuries	$ 5,008,243	$ —	$ 5,008,243	$ —

	Balances as of December 31, 2017	Quoted Prices in Active Markets for Identical Assets/Liabilities (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Cash and cash equivalents:				
Money market funds	$56,820,688	$ 56,820,688	$ —	$ —
Short-term investments:				
Short-term bond fund	$26,516,711	$ 26,516,711	$ —	$ —

k. WARRANTS LIABILITY. In October 2011, the Company issued 1,523,370 warrants (the 2011 warrants) to purchase shares of the Company's common stock in connection with a registered direct offering. During the period that the 2011 warrants were outstanding, the Company accounted for these warrants as a liability measured at fair value due to a provision included in the warrants agreement that provided the warrants holders with an option to require the Company (or its successor) to purchase their warrants for cash in an amount equal to their Black-Scholes Option Pricing Model (the Black-Scholes Model) value in the event that certain fundamental transactions, as defined, occurred. The fair value of the warrants liability was estimated using the Black-Scholes Model which required inputs such as the expected term of the warrants, share price volatility and risk-free interest rate. These assumptions were reviewed on a quarterly basis and changes in the estimated fair value of the outstanding warrants were recognized each reporting period in the "Change in fair value of warrants liability" line in the consolidated statements of operations. All unexercised 2011 warrants expired on May 2, 2017.

The following table rolls forward the fair value of the Company's warrants liability activity for the year ended December 31, 2017. On May 2, 2017, all outstanding and unexercised 2011 warrants expired.

	2017
Fair value, beginning of period	$ 122,226
Issuance of warrants	—
Exercise of warrants	(309,130)
Change in fair value	186,904
Fair value, end of period	$ —

During the year ended December 31, 2017, 613,913 of the 2011 warrants were exercised, with proceeds of $798,087 to the Company.

2. Basis of Presentation and Significant Accounting Policies (continued).

l. REVENUES FROM COLLABORATIVE ARRANGEMENT. The Company has entered into a collaboration agreement for the further development and commercialization of generic Sabril® (vigabatrin) tablets. Pursuant to the terms of this agreement, collaborators could be required to make various payments to the Company, including upfront license fees, milestone payments based on achievement of regulatory approvals, and royalties on sales of products resulting from collaborative agreement.

Nonrefundable upfront license fees are recognized upon receipt as persuasive evidence of an arrangement exists, the price to the collaborator is fixed or determinable and collectability is reasonably assured. An upfront license fee of $500,000 was recognized in the year ended December 31, 2018 when it was paid following execution of the collaborative arrangement for vigabatrin tablets.

Refer to Note 7, Collaborative Arrangement, for further discussion on the Company's collaborative arrangement.

m. RESEARCH AND DEVELOPMENT. Costs incurred in connection with research and development activities are expensed as incurred. These costs consist of direct and indirect costs associated with specific projects as well as fees paid to various entities that perform research related services for the Company.

n. STOCK-BASED COMPENSATION. The Company recognizes expense in the consolidated statements of operations for the fair value of all stock-based payments to employees, directors, scientific advisors and consultants, including grants of stock options and other share-based awards. For stock options, the Company uses the Black-Scholes option valuation model, the single-option award approach, and the straight-line attribution method. Using this approach, compensation cost is amortized on a straight-line basis over the vesting period of each respective stock option, generally one to five years. Forfeitures are recognized as a reduction of stock-based compensation expense as they occur.

o. CONCENTRATION OF CREDIT RISK. The financial instruments that potentially subject the Company to concentration of credit risk are cash equivalents (i.e. money market funds) and investments. The Company places its cash equivalents with high-credit quality financial institutions. These amounts at times may exceed federally insured limits. The Company has not experienced any credit losses in these accounts.

2. Basis of Presentation and Significant Accounting Policies (continued).

p. INCOME TAXES. The Company utilizes the asset and liability method of accounting for income taxes. Under this method, deferred tax assets and liabilities are determined based on differences between the financial reporting and tax basis of assets and liabilities and are measured using enacted tax rates and laws that will be in effect when the differences are expected to reverse. 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.

The Company recognizes the financial statement benefit of a tax position only after determining that the relevant tax authority would more likely than not sustain the position following an audit. For tax positions meeting the more-likely-than-not threshold, the amount recognized in the financial statements is the largest benefit that has a greater than 50 percent likelihood of being realized upon ultimate settlement with the relevant tax authority. The Company is subject to income taxes in the U.S. federal jurisdiction and various state jurisdictions. Tax regulations within each jurisdiction are subject to the interpretation of the related tax laws and regulations and require significant judgment to apply. The Company is not subject to U.S. federal, state and local tax examinations by tax authorities for years before 2015. If the Company were to subsequently record an unrecognized tax benefit, associated penalties and tax related interest expense would be reported as a component of income tax expense.

On December 22, 2017, the U.S. government enacted comprehensive tax legislation commonly referred to as the Tax Cuts and Jobs Act (the "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 percent; (2) requiring companies to pay a one-time transition tax on certain repatriated 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 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.

q. COMPREHENSIVE INCOME (LOSS). U.S. GAAP requires that all components of comprehensive income (loss) be reported in the financial statements in the period in which they are recognized. Comprehensive income (loss) is net income (loss), plus certain other items that are recorded directly into stockholders' equity. The Company's comprehensive loss is shown on the Consolidated Statements of Operations and Comprehensive Loss for the year ended December 31, 2018 and is comprised of net unrealized losses on the Company's available-for-sale securities. For December 31, 2017 and all prior periods, the Company's net loss equaled comprehensive loss, since the Company had no items which were considered other comprehensive income (loss).

r. NET LOSS PER SHARE. Basic net loss per share is computed by dividing net loss for the period by the weighted average number of common shares outstanding during the period. The calculation of basic and diluted net loss per share is the same for all periods presented, as the effect of potential common stock equivalents is anti-dilutive due to the Company's net loss position for all periods presented. The potential shares, which are excluded from the determination of basic and diluted net loss per share as their effect is anti-dilutive, are as follows:

	2018	2017
Options to purchase common stock	10,532,500	5,191,666
Potential equivalent common stock excluded	10,532,500	5,191,666

Potentially dilutive stock options to purchase common stock as of December 31, 2018, had exercise prices ranging from $0.79 to $4.64. Potentially dilutive stock options to purchase common stock as of December 31, 2017 had exercise prices ranging from $0.47 to $4.64.

s. SEGMENT INFORMATION. Management has determined that the Company operates in one reportable segment, which is the development and commercialization of pharmaceutical products.

t. RECLASSIFICATIONS. Certain prior year amounts in the consolidated financial statements have been reclassified to conform to the current year presentation.

2. Basis of Presentation and Significant Accounting Policies (continued).

u. RECENTLY ISSUED ACCOUNTING STANDARDS. In February 2016, the FASB issued ASU No. 2016-02, *Leases (Topic 842),* which requires an entity to recognize assets and liabilities arising from a lease for both financing and operating leases. The ASU will also require new qualitative and quantitative disclosures to help investors and other financial statement users better understand the amount, timing, and uncertainty of cash flows arising from leases. ASU 2016-02 is effective for fiscal years beginning after December 15, 2018, with early adoption permitted. The Company adopted the standard as of January 1, 2019, the beginning of fiscal 2019, using the modified retrospective approach in which prior comparative periods are not adjusted. The Company elected the package of practical expedients permitted under the transition guidance within the new standard, which among other things, allows the Company to carry forward historical lease classification. The Company has operating leases for its office facilities, which expire on November 30, 2022. As of January 1, 2019, the Company will recognize an additional asset and corresponding liability related to its facility lease on the consolidated balance sheet of approximately $1.0M to $1.5M. The difference between the additional lease assets and lease liabilities, net of the deferred tax impact, was recorded as an adjustment to accumulated deficit. The standard did not materially impact the Company's consolidated statement of operations and had no impact on cash flows.

In May 2017, the FASB issued ASU No. 2017-09, *Compensation – Stock Compensation (Topic 718): Scope of Modification Accounting* to clarify when to account for a change to the terms or conditions of a share-based payment award as a modification. Under this new guidance, modification accounting is required if the fair value, vesting conditions, or classification of the award changes as a result of the change in terms or conditions. ASU 2017-09 is effective for all entities for annual reporting periods beginning after December 15, 2017, including interim reporting periods within each annual reporting period, applied prospectively on or after the effective date. The Company adopted this standard in the first quarter of 2018. The adoption of this standard did not have a material impact on the Company's consolidated financial statements.

In June 2018, the FASB issued ASU No. 2018-07, *Compensation – Stock Compensation (Topic 718): Improvements to Nonemployee Share-Based Payment Accounting* that largely aligns the accounting for share-based payment awards issued to employees and nonemployees. Under this ASU, most of the guidance on such payments to nonemployees would be aligned with the requirements for share-based payments granted to employees. ASU 2018-07 is effective for all entities for annual reporting periods beginning after December 15, 2018, including interim reporting periods within each annual reporting period, with early adoption permitted. The Company has adopted this standard in the first quarter of 2019. The adoption of this standard will not have a material impact on the Company's consolidated financial statements.

In June 2016, the FASB issued ASU No. 2016-13, *Financial Instruments — Credit Losses (Topic 326), Measurement of Credit Losses on Financial Instruments*. The standard amends the impairment model by requiring entities to use a forward-looking approach based on expected losses to estimate credit losses for most financial assets and certain other instruments that aren't measured at fair value through net income. For available-for-sale debt securities, entities will be required to recognize an allowance for credit losses rather than a reduction in carrying value of the asset. Entities will no longer be permitted to consider the length of time that fair value has been less than amortized cost when evaluating when credit losses should be recognized. The Company plans to adopt the new guidance on January 1, 2020. The Company does not anticipate the adoption will have a material impact on its consolidated financial position or results of operations.

3. Investments.

Available-for-sale investments by security type were as follows:

	Amortized cost	Gross Unrealized Gains	Gross Unrealized Losses	Estimated Fair Value
At December 31, 2018:				
U.S. Treasuries – ST	$10,382,699	$ —	$ (1,835)	$10,380,864
U.S. Treasuries – LT	5,026,656	—	(18,413)	5,008,243
Total	$15,409,355	$ —	$ (20,248)	$15,389,107

At December 31, 2017, the Company did not have any available-for-sale securities.

3. Investments (continued).

In accordance with FASB ASC *Topic 320, "Investments – Debt and Equity Securities"*, or ASC 320, the Company has classified its U.S. Treasuries as available-for-sale securities with secondary or resale markets, and, as such, they are reported at fair value with unrealized gains and losses included in comprehensive loss in stockholders' equity and realized gain and losses, included in other income, net. There were no realized gains or losses from sales of available-for-sale securities for the years ended December 31, 2018 or 2017.

Certain U.S. Treasuries at December 31, 2018 had fair values less than their amortized costs and, therefore, contained unrealized losses. Given that the Company has no intent to sell the U.S. Treasuries until a recovery of the fair value, which may be at maturity, and there are no current requirements to sell any of these securities, as of December 31, 2018, the Company did not consider these investments to be other-than-temporarily impaired. The Company anticipates full recovery of amortized costs with respect to these investments at maturity. The duration of time the U.S. Treasuries have been in a continuous unrealized loss position as of December 31, 2018 was less than 12 months.

The estimated fair values of available-for-sale securities at December 31, 2018, by contractual maturity, are summarized as follows:

	2018
Due in one year or less	$10,380,864
Due after one year but within two years	5,008,243
	$15,389,107

4. Prepaid Expenses and Other Current Assets.

Prepaid expenses and other current assets consist of the following as of December 31:

	2018	2017
Prepaid research fees	$ 358,209	$ 388,977
Prepaid insurance	800,261	638,139
Prepaid pre-commercialization fees	17,030	65,000
Prepaid subscriptions fees	170,552	23,347
Prepaid rent	31,561	—
Other	272,168	58,281
Total prepaid expenses and other current assets	$1,649,781	$1,173,744

5. Property and Equipment, net.

Property and equipment, net consists of the following as of December 31:

	2018	2017
Computer equipment	$ 52,704	$ 27,915
Furniture and equipment	212,451	169,931
Leasehold improvements	177,417	152,708
	442,572	350,554
Less: Accumulated depreciation	(197,147)	(159,169)
Total property and equipment, net	$ 245,425	$ 191,385

Depreciation expense was $37,978 and $45,689, respectively, for the years ended December 31, 2018 and 2017.

6. Accrued Expenses and Other Liabilities.

Accrued expenses and other liabilities consist of the following as of December 31:

	2018	2017
Accrued preclinical and clinical trial expenses	$ 821,633	$ 970,649
Accrued professional fees	1,311,061	227,457
Accrued compensation and benefits	1,941,449	821,935
Accrued license fees	3,000,000	252,500
Deferred rent and lease incentive	33,408	24,011
Other	66,436	24,035
Current accrued expenses and other liabilities	7,173,987	2,320,587
Deferred rent and lease incentive – non-current	154,799	157,456
Non-current accrued expenses and other liabilities	154,799	157,456
Total accrued expenses and other liabilities	$7,328,786	$2,478,043

7. Collaborative Arrangement.

In December 2018, the Company entered into a collaboration and license agreement with Endo International plsc's subsidiary, Endo Ventures Limited (EVL), for the further development and commercialization of generic Sabril® (vigabatrin) tablets through Endo's U.S. Generic Pharmaceuticals segment, doing business as Par Pharmaceutical.

EVL assumes all development, manufacturing, clinical, regulatory, sales and marketing costs under the collaboration, while the Company is responsible for exercising commercially reasonable efforts to develop, or cause the development of, a final finished, stable dosage form of generic Sabril® tablets.

Under the terms of the Collaboration, the Company has received an up-front payment, and will receive milestone payments based on achievement of regulatory approvals, and a sharing of defined net profits upon commercialization from EVL consisting of a mid-double digit percent of net sales of generic Sabril®. Unless terminated earlier in accordance with its terms, the collaboration continues in effect until the date that is ten years following the commercial launch. As of December 31, 2018, a $500,000 upfront license fee was recognized.

8. Commitments and Contingencies.

The Company has contracted with drug manufacturers and other vendors, including clinical research organizations (CRO) overseeing one or more of the clinical trials of the Company's drug candidates, to assist in the execution of the Company's preclinical and clinical trials, analysis, and the preparation of material necessary for the submission of new drug applications (NDAs) and abbreviated new drug applications (ANDAs) with the U.S. FDA. The contracts are cancelable at any time, but obligate the Company to reimburse the providers for any time or costs incurred through the date of termination.

The Company has executed operating lease agreements for its corporate office. The leases have free and escalating rent payment provisions. The Company recognizes rent expense under such leases on a straight-line basis over the term of the lease. As of December 31, 2018, future minimum lease payments under the operating lease agreements are as follows:

2019	$ 329,725
2020	339,612
2021	349,792
2022	329,662
	$1,348,791

In August 2018, the Company entered into a fourth amendment to the lease to its corporate offices to obtain additional space for its operations. The Company now leases approximately 7,800 square feet and the lease term expires in November 2022. In connection with the expansion, approximately $13,000 of tenant build-out costs were funded and paid by the landlord through lease incentives. The lease incentives are being amortized over the term of the lease as a reduction of rent expense. The lease provides for fixed increases in minimum annual rent payments, as well as rent free periods. The total amount of rental payments due over the lease term is being charged to rent expense on the straight-line method over the term of the lease. The differences between rent expense recorded and the amount paid is credited or charged to accrued expenses and other liabilities in the accompanying consolidated balance sheets. Rent expense was $242,155 and $204,170 respectively, for the years ended December 31, 2018 and 2017.

8. Commitments and Contingencies (continued).

There are no obligations under capital leases.

On August 27, 2009, the Company entered into a license agreement with Northwestern University (Northwestern), under which it acquired worldwide rights to CPP-115. As of December 31, 2018, the Company had paid $424,885 in connection with the license and had accrued license fees of $0 in the accompanying December 31, 2018 consolidated balance sheet for expenses, maintenance fees and milestones.

In 2018, the Company became aware that certain patents granted to Northwestern in 2018 (which patents have been licensed by Northwestern to a third-party) for a new GABA aminotransferase inhibitor were derived from CPP-115. As a result, the Company terminated the license agreement, based on the Company's position that Northwestern has violated the license agreement because of its failure to transfer these new patent rights to the Company as part of the existing license agreement. It is also the Company's position that Northwestern's publication of information about the new patents in violation of the license agreement has damaged the Company. On October 26, 2018, the Company filed a claim for damages in arbitration against Northwestern for Northwestern's breaches of the license agreement.

On November 5, 2018, Northwestern advised the Company that in its view, Northwestern has a right to terminate the license agreement with the Company because the Company has allegedly breached the license agreement by failing to pay certain milestones and by allegedly failing to use commercially reasonable efforts to develop and commercialize any products. Northwestern has also advised the Company that, in its view, the Company has engaged in wrongful conduct and communications with the third party that licensed the new patents from Northwestern, and that such communications have damaged Northwestern's relationship with that third party. The Company disputes Northwestern's allegations and is vigorously defending itself against claims that Northwestern has brought against it in the arbitration proceeding.

There can be no assurance as to the outcome of this matter.

The Company has an employment agreement with its Chief Executive Officer. Under this agreement, the CEO received an annual base salary of approximately $525,000 in 2018. This agreement expires in November 2020.

9. Agreements.

a. LICENSE AGREEMENT WITH BIOMARIN (FIRDAPSE®). On October 26, 2012, the Company entered into a license agreement with BioMarin Pharmaceutical, Inc. (BioMarin) for the North American rights to Firdapse®.

Under the License Agreement, the Company has agreed to pay: (i) royalties to BioMarin for seven years from the first commercial sale of Firdapse® equal to 7% of net sales (as defined in the license agreement) in North America for any calendar year for sales up to $100 million, and 10% of net sales in North America in any calendar year in excess of $100 million; and (ii) royalties to the third-party licensor of the rights sublicensed to the Company for seven years from the first commercial sale of Firdapse® equal to 7% of net sales (as defined in the license agreement between BioMarin and the third-party licensor) in any calendar year.

Under the Company's license agreement with BioMarin, the Company agreed to pay certain milestone payments that BioMarin was obligated to pay to both a third-party licensor of the rights that have been sublicensed to us and to the former stockholders of Huxley Pharmaceuticals ("Huxley") under an earlier stock purchase agreement between BioMarin and the former Huxley stockholders.

In full satisfaction of the milestone obligations, the Company has paid (i) $3,150,000 in milestone payments to the third party licensor of the rights that have been sublicensed to the Company ($3.0 million of which was paid in February 2019 and the balance of which was paid in 2018) and (ii) $2.0 million in milestone payments to the former Huxley Stockholders (all of which was paid in 2018).

In the BioMarin License Agreement, the Company agreed to share in the cost of certain post-marketing studies of Firdapse® that were being conducted by BioMarin, and the Company fulfilled its commitment to BioMarin regarding all such payments several years ago.

9. Agreements (continued).

b. AGREEMENTS FOR DRUG DEVELOPMENT, PRECLINICAL AND CLINICAL STUDIES. The Company has entered into agreements with contract manufacturers for the manufacture of drug and study placebo for the Company's trials and studies, with contract research organizations (CRO) to conduct and monitor the Company's trials and studies and with various entities for laboratories and other testing related to the Company's trials and studies. The contractual terms of the agreements vary, but most require certain advances as well as payments based on the achievement of milestones. Further, these agreements are cancellable at any time, but obligate the Company to reimburse the providers for any time or costs incurred through the date of termination.

10. Income Taxes.

Due to the ongoing operating losses and the inability to recognize any income tax benefit, there is no provision for income taxes in any period presented in these financial statements. Since inception, the Company has only generated pretax losses.

The reconciliation of income tax expense (benefit) computed at the statutory federal income tax rate of 21% to amounts included in the statements of operations is as follows:

	2018	2017
Statutory rate	21.0%	34.0%
State tax	4.2%	3.5%
Valuation allowance	(25.9)%	26.5%
Federal rate change	0.0%	(73.2)%
Tax credit	1.4%	6.8%
Other	(0.7)%	2.4%
	0.0%	0.0%

Deferred tax assets and liabilities reflect the net tax effects of net operating loss and tax credit carryovers and the temporary differences between the carrying amounts of assets and liabilities for financial reporting and the amounts used for income tax purposes. Significant components of the Company's deferred tax assets as of December 31, 2018 and 2017 are as follows:

	2018	2017
Net operating loss	$ 19,867,591	$ 15,718,570
Start-up cost	13,861,147	10,508,487
Tax credits	12,625,275	11,582,134
Deferred compensation	1,919,434	1,326,189
Other	109,779	72,395
Gross deferred tax asset	48,383,226	39,207,775
Valuation allowance	(48,383,226)	(39,207,775)
Net deferred tax assets	$ —	$ —

The Company's deferred tax assets have been fully offset by a valuation allowance at December 31, 2018 and 2017 because the Company believes that it is more likely than not that the deferred tax asset will not be realized. The increase and decrease in the valuation allowance on the deferred tax assets was $9,175,451 and $3,388,951 for the years ended December 31, 2018 and 2017, respectively.

At December 31, 2018 and 2017, respectively, the Company had net operating loss carryforwards of approximately $79.0 million and $62.6 million available to reduce future taxable income, if any. The net operating loss carryforwards will expire at various dates beginning in 2023 and ending in 2037, the amount of net operating loss generated in 2018 will have an infinite life, but will be limited to utilization per year of 80% of taxable income. If an ownership change, as defined under Internal Revenue Code Section 382, occurs, the use of these carry-forwards may be subject to limitation. The effective tax rate of 0% in all periods presented differs from the statutory rate of 21% due to the valuation allowance and because the Company had no taxable income.

Beginning in 2010, the Company has received several orphan drug designations by the FDA for products currently under development. The orphan drug designations allow the Company to claim increased federal tax credits for certain research and development activities.

10. Income Taxes (continued).

No interest or penalties were accrued through December 31, 2018. The Company's policy is to recognize any related interest or penalties in income tax expense. The Company is not subject to U.S. federal, state and local tax examinations by tax authorities for any years before 2015. The Company is not currently under income tax examinations by any tax authorities.

11. Stockholders' Equity.

Preferred Stock

The Company has 5,000,000 shares of authorized preferred stock, $0.001 par value per share at December 31, 2018 and 2017. No shares of preferred stock were outstanding at December 31, 2018 and 2017.

Common Stock

The Company has 150,000,000 shares of authorized common stock, par value $0.001 per share. At December 31, 2018 and 2017, 102,739,257 and 102,549,498 shares, respectively, of common stock were issued and outstanding. Each holder of common stock is entitled to one vote of each share of common stock held of record on all matters on which stockholders generally are entitled to vote.

2016 Shelf Registration Statement

On December 23, 2016, the Company filed a shelf Registration Statement on Form S-3 (the 2016 Shelf Registration Statement) with the SEC to sell up to approximately $33.8 million of common stock. The 2016 Shelf Registration Statement (file No. 333-215315) was declared effective by the SEC on January 9, 2017. No sales have been conducted to date under the 2016 Shelf Registration Statement.

2017 Shelf Registration Statement

On July 12, 2017, the Company filed a universal shelf Registration Statement on Form S-3 (the 2017 Shelf Registration Statement) with the SEC to sell up to $150 million of common stock, preferred stock, warrants to purchase common stock, or debt securities (including debt securities that may be convertible or exchangeable for common stock or other securities), which securities may be offered separately or together in units or multiple series. The 2017 Shelf Registration Statement (file No. 333-219259) was declared effective by the SEC on July 26, 2017.

On November 28, 2017, the Company filed a prospectus supplement and offered for sale 16,428,572 shares of its common stock at a price of $3.50 per share in an underwritten public offering under the 2017 Shelf Registration. The Company received gross proceeds in the public offering of approximately $57.5 million before underwriting commission and incurred expenses of approximately $3.7 million.

At December 31, 2018, there is approximately $92.5 million available for future sale under the 2017 Shelf Registration Statement.

Warrant Exercises

All unexercised warrants expired in 2017. For the year ended December 31, 2017, the Company issued 2,257,663 shares of its authorized but unissued common stock upon the exercise of previously issued common stock purchase warrants, with net proceeds to the Company of $3,209,423.

Stockholder Rights Plan

On September 20, 2011, the Board of Directors approved the Company's adoption of a Stockholder Rights Plan. Under the Plan, a dividend of one preferred share purchase right (a Right) was declared for each share of common stock of the Company that was outstanding on October 7, 2011. Each Right entitles the holder to purchase from the Company one one-hundredth of a share of Series A Junior Preferred Stock at a purchase price of $7.80, subject to adjustment.

11. Stockholders' Equity (continued).

The Rights trade automatically with the common stock and will not be exercisable until a person or group has become an "acquiring person" by acquiring 17.5% or more of the Company's outstanding common stock, or a person or group commences, or publicly announces a tender offer that will result in such a person or group owning 17.5% or more of the Company's outstanding common stock. Upon announcement that any person or group has become an acquiring person, each Right will entitle all rightholders (other than the acquiring person) to purchase, for the exercise price of $7.80, a number of shares of the Company's common stock having a market value equal to twice the exercise price. Rightholders would also be entitled to purchase common stock of the acquiring person having a value of twice the exercise price if, after a person had become an acquiring person, the Company were to enter into certain mergers or other transactions. If any person becomes an acquiring person, the Board of Directors may, at its option and subject to certain limitations, exchange one share of common stock for each Right.

The Rights have certain anti-takeover effects, in that they would cause substantial dilution to a person or group that attempts to acquire a significant interest in the Company on terms not approved by the Board of Directors. In the event that the Board of Directors determines a transaction to be in the best interests of the Company and its stockholders, the Board of Directors may redeem the Rights for $0.001 per share at any time prior to a person or group becoming an acquiring person.

On September 19, 2016, the Board of Directors unanimously approved, and on the same date the Company entered into Amendment No. 1 to the Stockholders Rights Plan (the "Amendment"). Under the terms of the Amendment, the outside expiration date of the rights plan has been extended from September 20, 2016 to September 20, 2019. Additionally, as part of the Amendment, the Board adopted a Certificate of Designation, Preferences and Rights of Series A Junior Participating Preferred Stock of the Company to increase the number of shares of Series A Junior Participating Preferred Stock of the Company available for issuance under the Rights Plan from 500,000 shares to 1.5 million shares.

12. Stock Compensation Plans.

For the years ended December 31, 2018 and 2017, the Company recorded stock-based compensation expense as follows:

	2018	2017
Research and development	$1,079,230	$ 785,899
General and administrative	2,471,414	1,622,062
Total stock-based compensation	$3,550,644	$2,407,961

The Company may issue stock options, restricted stock, stock appreciation rights and restricted stock units (collectively, the "Awards") to employees, directors, and consultants of the Company under the 2014 and 2018 Stock Incentive Plans (the 2014 Plan and the 2018 Plan or collectively, the Plans). At December 31, 2018, no shares remain available for future issuance under the 2014 Plan. Under the 2018 Plan, 7,500,000 shares were reserved for issuance and as of December 31, 2018, 3,620,603 shares remain available for future issuance.

Stock Options

The Company has granted stock options to employees, officers, directors, and consultants generally at exercise prices equal to the market price of the common stock at grant date. Option awards generally vest over a period of 1 to 5 years of continuous service and have contractual terms from 5 to 7 years. Certain awards provide for accelerated vesting if there is a change in control. The Company issues new shares as shares are required to be delivered upon exercise of outstanding stock options.

During the years ended December 31, 2018 and 2017, options to purchase 186,665 and 780,000 shares of the Company's common stock were exercised with gross proceeds to the Company of $297,563 and $368,185, respectively. Further, during the year ended December 31, 2018, no options to purchase shares of the Company's common stock were exercised on a "cashless" basis. During the year ended December 31, 2017, options to purchase 100,000 shares of the Company's common stock were exercised on a "cashless" basis, resulting in the issuance of an aggregate of 84,280 shares of the Company's common stock, respectively.

During the years ended December 31, 2018 and 2017 the Company recorded non-cash stock-based compensation expense related to stock options totaling $3,535,647 and $2,342,625, respectively.

During the years ended December 31, 2018 and 2017, the Company granted seven-year options to purchase an aggregate of 5,822,500 and 1,550,000 shares, respectively, of the Company's common stock to certain of the Company's officers, employees, directors, and consultants.

12. Stock Compensation Plans (continued).

Stock option activity under the Company's Plans for the year ended December 31, 2018 is summarized as follows:

	Number of Options	Weighted Average Exercise Price	Weighted Average Remaining Contractual Term (in years)	Aggregate Intrinsic Value
Outstanding at beginning of year	5,191,666	$ 1.96		
Granted	5,822,500	3.04		
Exercised or released	(186,665)	1.59		
Forfeited or cancelled	(270,001)	2.94		
Expired	(25,000)	0.47		
Outstanding at end of year	10,532,500	$ 2.54	5.39	$ 2,239,500
Exercisable at end of year	4,349,996	$ 2.16	4.00	$ 1,679,297

Other information pertaining to stock option activity during the years ended December 31, 2018 and 2017 was as follows:

	2018	2017
Weighted–average fair value of granted stock options	$ 1.93	$ 0.91
Total fair value of vested stock options	$2,193,294	$2,016,992
Total intrinsic value of exercised stock options	$ 274,864	$2,296,100

The following table summarizes information about the Company's options outstanding at December 31, 2018:

	Options Outstanding			Options Exercisable		
Range of Exercise Prices	Number Outstanding	Weighted Average Remaining Contractual Life (Years)	Weighted Average Exercise Price	Number Exercisable	Weighted Average Remaining Contractual Life (Years)	Weighted Average Exercise Price
$0.79 to $1.13	2,385,000	4.78	$ 0.99	1,686,664	4.69	$ 0.93
$1.14 to $2.28	2,440,000	6.87	$ 2.22	209,999	6.22	$ 2.07
$2.29 to $3.07	1,765,000	4.84	$ 2.60	1,098,333	3.72	$ 2.53
$3.08 to $3.75	2,005,000	4.59	$ 3.30	995,000	2.71	$ 3.14
$3.76 to $4.64	1,937,500	5.62	$ 4.03	360,000	3.92	$ 4.11
	10,532,500	5.39	$ 2.54	4,349,996	4.00	$ 2.16

As of December 31, 2018, there was approximately $8.8 million of unrecognized compensation expense related to non-vested stock option awards granted under the Plans. That cost is expected to be recognized over a weighted average period of approximately 2.58 years.

The Company utilizes the Black-Scholes option-pricing model to determine the fair value of stock options on the date of grant. This model derives the fair value of stock options based on certain assumptions related to the expected stock price volatility, expected option life, risk-free interest rate and dividend yield. Expected volatility is based on reviews of historical volatility of the Company's common stock. The estimated expected option life is based upon estimated employee exercise patterns and considers whether and the extent to which the options are in-the-money. The Company estimates the expected option life for options granted to employees and directors based upon the simplified method. Under this method, the expected life is presumed to be the mid-point between the vesting date and the end of the contractual term. The Company will continue to use the simplified method until it has sufficient historical exercise data to estimate the expected life of the options. The risk-free interest rate assumption is based upon the U.S. Treasury yield curve appropriate for the estimated life of the stock options awards. The expected dividend rate is zero. Forfeitures are recognized as a reduction of stock-based compensation expense as they occur.

12. Stock Compensation Plans (continued).

Assumptions used during the years were as follows:

	December 31, 2018	December 31, 2017
Risk free interest rate	2.09% to 2.88%	1.66% to 2.25%
Expected term	0 to 7 years	4 to 7 years
Expected volatility	82%	104%
Expected dividend yield	— %	— %
Expected forfeiture rate	— %	— %

Restricted Stock Units

Under the 2018 Plan, participants may be granted restricted stock units, each of which represents a conditional right to receive shares of common stock in the future. The restricted stock units granted under this plan generally vest ratably over a four-year period. Upon vesting, the restricted stock units will convert into an equivalent number of shares of common stock. The amount of expense relating to the restricted stock units is based on the closing market price of the Company's common stock on the date of grant and is amortized on a straight-line basis over the requisite service period. No restricted stock units were granted during 2018. Restricted stock unit activity during 2017 was as follows:

	2017	
	Number of Restricted Stock Units	Weighted Average Grant Date Fair Value
Nonvested balance at beginning of year	26,667	$ 2.83
Granted	—	—
Vested	(26,667)	2.83
Forfeited	—	—
Nonvested balance at end of year	—	$ —

No stock-based compensation related to restricted stocks was recorded during 2018. During the year ended December 31, 2017, the Company recorded non-cash stock-based compensation expense related to restricted stock units totaling $65,336. All restricted stock units were vested as of December 31, 2017.

Common Stock

During the year ended December 31, 2018, the Company granted 3,094 net shares of common stock to an employee as compensation. The Company recorded stock-based compensation related to common stock issued to an employee totaling approximately $15,000, during the year ended December 31, 2018. No shares of common stock were granted during the year ended December 31, 2017.

13. Benefit Plan.

The Company maintains an employee savings plan pursuant to Section 401(k) of the Internal Revenue Code covering all eligible employees. Subject to certain dollar limits, eligible employees may contribute up to 15% of their pre-tax annual compensation to the plan. The Company has elected to make discretionary matching contributions of employee contributions up to 4% of an employee's gross salary. For the years ended December 31, 2018 and 2017, the Company's matching contributions were approximately $123,000 and $84,000, respectively.

14. Quarterly Financial Information (unaudited).

The following table presents unaudited supplemental quarterly financial information for the years ended December 31, 2018 and 2017:

	Quarter Ended			
	March 31, 2018	June 30, 2018	September 30, 2018	December 31, 2018
Revenues	$ —	$ —	$ —	$ 500,000
Loss from operations	$ (5,933,440)	$(6,335,855)	$ (8,182,603)	$ (14,843,267)
Net loss	$ (5,699,892)	$(5,965,140)	$ (7,838,873)	$ (14,499,609)
Net loss per share – basic and diluted	$ (0.06)	$ (0.06)	$ (0.08)	$ (0.14)

	Quarter Ended			
	March 31, 2017	June 30, 2017	September 30, 2017	December 31, 2017
Revenues	$ —	$ —	$ —	$ —
Loss from operations	$ (4,679,871)	$(4,181,271)	$ (4,306,708)	$ (5,511,786)
Change in fair value of warrants liability	$ (397,235)	$ 210,331	$ —	$ —
Net loss	$ (4,967,129)	$(3,879,901)	$ (4,177,649)	$ (5,387,698)
Net loss per share – basic and diluted	$ (0.06)	$ (0.05)	$ (0.05)	$ (0.06)

Quarterly basic and diluted net loss per common share were computed independently for each quarter and do not necessarily total to the full year basic and diluted net loss per common share.

15. Subsequent Events.

On January 15, 2019, the Company launched its first product, Firdapse®, in the United States for the treatment of adults with LEMS.

Exhibit 21.1

CATALYST PHARMACEUTICALS, INC.

LISTING OF SUBSIDIARIES

CATALYST PHARMACEUTICALS, INC. SUBSIDIARIES	JURISDICTION
Catalyst Pharmaceuticals Ireland, Ltd.	Ireland

Exhibit 23.1

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We have issued our reports dated March 18, 2019, with respect to the consolidated financial statements and internal control over financial reporting included in the Annual Report of Catalyst Pharmaceuticals, Inc. on Form 10-K for the year ended December 31, 2018. We consent to the incorporation by reference of said reports in the Registration Statements of Catalyst Pharmaceuticals, Inc. on Forms S-3 (File No. 333-215315 and File No. 333-219259) and Forms S-8 (File No. 333-226008 and File No. 333-198119).

/s/ GRANT THORNTON LLP

Miami, Florida
March 18, 2019

Exhibit 31.1

Certification of Principal Executive Officer

I, Patrick J. McEnany, certify that:

1. I have reviewed this annual report on Form 10-K of Catalyst Pharmaceuticals, 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) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting.

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.

Date: March 18, 2019

/s/ Patrick J. McEnany
Patrick J. McEnany
Chief Executive Officer
(Principal Executive Officer)

Exhibit 31.2

Certification of Principal Financial Officer

I, Alicia Grande, certify that:

1. I have reviewed this annual report on Form 10-K of Catalyst Pharmaceuticals, 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) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting.

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.

Date: March 18, 2019

/s/ Alicia Grande
Alicia Grande
Chief Financial Officer
(Principal Financial Officer)

Exhibit 32.1

Certification Required by 18 U.S.C. Section 1350
(as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002)

I, Patrick J. McEnany, as Principal Executive Officer of Catalyst Pharmaceuticals, Inc. (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 to my knowledge:

1. the accompanying Annual Report on Form 10-K of the Company for the year ended December 31, 2018 (the "Report"), filed with the U.S. Securities and Exchange Commission, fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended; and

2. the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: March 18, 2019

/s/ Patrick J. McEnany
Patrick J. McEnany
Chief Executive Officer
(Principal Executive Officer)

Exhibit 32.2

Certification Required by 18 U.S.C. Section 1350
(as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002)

I, Alicia Grande, as Principal Financial Officer of Catalyst Pharmaceuticals, Inc. (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 to my knowledge:

1. the accompanying Annual Report on Form 10-K of the Company for the year ended December 31, 2018 (the "Report"), filed with the U.S. Securities and Exchange Commission, fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended; and

2. the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: March 18, 2019

/s/ Alicia Grande
Alicia Grande
Chief Financial Officer
(Principal Financial Officer)