

Vanda Pharmaceuticals Inc.
Form 10-K
February 19, 2019

Table of Contents

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

Form 10-K

ý ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the fiscal year ended December 31, 2018
..TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF
1934
Commission File No. 001-34186

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

Delaware 03-0491827
(State or other jurisdiction of (I.R.S. Employer
incorporation or organization) Identification No.)
2200 Pennsylvania Avenue NW, Suite 300 E
Washington D.C. 20037
(202) 734-3400

(Address and telephone number, including area code, of registrant's principal executive offices)

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

Title of Each Class	Name of Each Exchange on Which Registered
Common Stock, par value \$0.001	The Nasdaq Stock Market LLC (Nasdaq Global Market)
Rights to Purchase Series A Junior Participating Preferred Stock	The Nasdaq Stock Market LLC (Nasdaq Global Market)

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

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

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Exchange 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 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.

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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

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Securities Exchange Act of 1934). Yes No

As of June 30, 2018, the last business day of the registrant’s last completed second quarter, the aggregate market value of the Common Stock held by non-affiliates of the registrant was approximately \$974.3 million based on the closing price of the registrant’s Common Stock, as reported by The Nasdaq Global Market, on such date. Shares of Common Stock held by each executive officer and director and stockholders known by the registrant to own 10% or more of the outstanding stock based on public filings and other information known to the registrant have been excluded since such persons may be deemed affiliates. This determination of affiliate status is not necessarily a conclusive determination for other purposes.

The number of shares of the registrant’s Common Stock, par value \$0.001 per share, outstanding as of February 12, 2019 was 52,642,754.

The exhibit index as required by Item 601(a) of Regulation S-K is included in Item 15 of Part IV of this report.

DOCUMENTS INCORPORATED BY REFERENCE

Specified portions of the registrant’s proxy statement with respect to the registrant’s 2019 Annual Meeting of Stockholders, which is to be filed pursuant to Regulation 14A within 120 days after the end of the registrant’s fiscal year ended December 31, 2018, are incorporated by reference into Part III of this Form 10-K.

Table of Contents

Vanda Pharmaceuticals Inc.
 Form 10-K
 Table of Contents

	Page
<u>Part I</u>	
<u>Cautionary Note Regarding Forward-Looking Statements</u>	<u>1</u>
Item 1 <u>Business</u>	<u>3</u>
Item 1A <u>Risk Factors</u>	<u>21</u>
Item 1B <u>Unresolved Staff Comments</u>	<u>48</u>
Item 2 <u>Properties</u>	<u>49</u>
Item 3 <u>Legal Proceedings</u>	<u>49</u>
Item 4 <u>Mine Safety Disclosures</u>	<u>51</u>
<u>Part II</u>	
Item 5 <u>Market for Registrant’s Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities</u>	<u>51</u>
Item 6 <u>Selected Consolidated Financial Data</u>	<u>53</u>
Item 7 <u>Management’s Discussion and Analysis of Financial Condition and Results of Operations</u>	<u>55</u>
Item 7A <u>Qualitative and Quantitative Disclosures about Market Risk</u>	<u>66</u>
Item 8 <u>Financial Statements and Supplementary Data</u>	<u>67</u>
Item 9 <u>Changes in and Disagreements with Accountants on Accounting and Financial Disclosure</u>	<u>67</u>
Item 9A <u>Controls and Procedures</u>	<u>67</u>
Item 9B <u>Other Information</u>	<u>68</u>
<u>Part III</u>	
Item 10 <u>Directors, Executive Officers and Corporate Governance</u>	<u>68</u>
Item 11 <u>Executive Compensation</u>	<u>68</u>
Item 12 <u>Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters</u>	<u>68</u>
Item 13 <u>Certain Relationships and Related Transactions, and Director Independence</u>	<u>68</u>
Item 14 <u>Principal Accountant Fees and Services</u>	<u>68</u>
<u>Part IV</u>	
Item 15 <u>Exhibits and Financial Statement Schedules</u>	<u>69</u>
<u>Signatures</u>	<u>70</u>
<u>Exhibits</u>	<u>102</u>

Table of Contents

PART I

CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS

Various statements throughout this report are “forward-looking statements” within the meaning of the Private Securities Litigation Reform Act of 1995. Words such as, but not limited to, “believe,” “expect,” “anticipate,” “estimate,” “intend,” “plan,” “project,” “target,” “goal,” “likely,” “will,” “would,” and “could,” or the negative of these terms and similar expressions or words identify forward-looking statements. Forward-looking statements are based upon current expectations that involve risks, changes in circumstances, assumptions and uncertainties. Important factors that could cause actual results to differ materially from those reflected in our forward-looking statements include, among others:

- the ability of Vanda Pharmaceuticals Inc. (we, our, the Company or Vanda) to continue to commercialize HETLIOZ® (tasimelteon) for the treatment of Non-24-Hour Sleep-Wake Disorder (Non-24) in the United States (U.S.) and Europe;
- uncertainty as to the ability to increase market awareness of Non-24 and the market acceptance of HETLIOZ®;
- our ability to continue to generate U.S. sales of Fanapt® (iloperidone) for the treatment of schizophrenia;
- our dependence on third-party manufacturers to manufacture HETLIOZ® and Fanapt® in sufficient quantities and quality;
- our level of success in commercializing HETLIOZ® and Fanapt® in new markets;
- our ability to prepare, file, prosecute, defend and enforce any patent claims and other intellectual property rights;
- our ability to reach agreement with the U.S. Food and Drug Administration (FDA) regarding our regulatory approval strategy, preclinical animal testing requirements or proposed path to approval for tradipitant;
 - a loss of rights to develop and commercialize our products under our license agreements;
- the ability to obtain and maintain regulatory approval of our products, and the labeling for any approved products;
- the timing and success of preclinical studies and clinical trials;
- a failure of our products to be demonstrably safe and effective;
- the size and growth of the potential markets for our products and the ability to serve those markets;
- our expectations regarding trends with respect to our revenues, costs, expenses, liabilities and cash, cash equivalents and marketable securities;
- the scope, progress, expansion, and costs of developing and commercializing our products;
- our failure to identify or obtain rights to new products;
- a loss of any of our key scientists or management personnel;
- limitations on our ability to utilize some or all of our prior net operating losses and orphan drug and research and development credits;
- the cost and effects of litigation;
- our ability to obtain the capital necessary to fund our research and development or commercial activities;
- losses incurred from product liability claims made against us; and
- use of our existing cash, cash equivalents and marketable securities.

All written and verbal forward-looking statements attributable to us or any person acting on our behalf are expressly qualified in their entirety by the cautionary statements contained or referred to in this section. We caution investors not to rely too heavily on the forward-looking statements we make or that are made on our behalf. We undertake no obligation, and specifically decline any obligation, to update or revise publicly any forward-looking statements, whether as a result of new information, future events or otherwise.

Table of Contents

We encourage you to read Management's Discussion and Analysis of our Financial Condition and Results of Operations and our consolidated financial statements contained in this annual report on Form 10-K. We also encourage you to read Item 1A of Part I of this annual report on Form 10-K, entitled Risk Factors, which contains a more complete discussion of the risks and uncertainties associated with our business. In addition to the risks described above and in Item 1A of this report, other unknown or unpredictable factors also could affect our results. Therefore, the information in this report should be read together with other reports and documents that we file with the Securities and Exchange Commission from time to time, including on Form 10-Q and Form 8-K, which may supplement, modify, supersede or update those risk factors. As a result of these factors, we cannot assure you that the forward-looking statements in this report will prove to be accurate. Furthermore, if our forward-looking statements prove to be inaccurate, the inaccuracy may be material. In light of the significant uncertainties in these forward-looking statements, you should not regard these statements as a representation or warranty by us or any other person that we will achieve our objectives and plans in any specified time frame, or at all.

Table of Contents

ITEM 1. BUSINESS

Overview

Vanda Pharmaceuticals Inc. (we, our, the Company or Vanda) is a global biopharmaceutical company focused on the development and commercialization of innovative therapies to address high unmet medical needs and improve the lives of patients. We commenced operations in 2003 and our product portfolio includes:

HETLIOZ[®] (tasimelteon), a product for the treatment of Non-24-Hour Sleep-Wake Disorder (Non-24), was approved by the U.S. Food and Drug Administration (FDA) in January 2014 and launched commercially in the U.S. in April 2014. In July 2015, the European Commission (EC) granted centralized marketing authorization with unified labeling for HETLIOZ[®] for the treatment of Non-24 in totally blind adults. HETLIOZ[®] was commercially launched in Germany in August 2016. HETLIOZ[®] has potential utility in a number of other circadian rhythm disorders and is presently in clinical development for the treatment of jet lag disorder, Smith-Magenis Syndrome (SMS) and Pediatric Non-24. An assessment of new HETLIOZ[®] clinical opportunities including the treatment of delayed sleep phase disorder and for sleep disorders in patients with neurodevelopmental disorders is ongoing.

Fanapt[®] (iloperidone), a product for the treatment of schizophrenia, the oral formulation of which was approved by the FDA in May 2009 and launched commercially in the U.S. by Novartis Pharma AG (Novartis) in January 2010. Novartis transferred all the U.S. and Canadian commercial rights to the Fanapt[®] franchise to us on December 31, 2014. Additionally, our distribution partners launched Fanapt[®] in Israel in 2014. Fanapt[®] has potential utility in a number of other disorders. Initial clinical work studying a long acting injectable (LAI) formulation of Fanapt[®] began in 2018. An assessment of new Fanapt[®] clinical opportunities including the treatment of bipolar depression is ongoing.

Tradipitant (VLY-686), a small molecule neurokinin-1 receptor (NK-1R) antagonist, which is presently in clinical development for the treatment of chronic pruritus in atopic dermatitis and the treatment of gastroparesis. An assessment of new tradipitant clinical opportunities including the treatment of motion sickness is ongoing.

- VTR-297, a small molecule histone deacetylase (HDAC) inhibitor presently in clinical development for the treatment of hematologic malignancies.

Portfolio of Cystic Fibrosis Transmembrane Conductance Regulator (CFTR) activators and inhibitors. An early stage CFTR activator program is planned for the treatment of dry eye and ocular inflammation. In addition, an early stage CFTR inhibitor program is planned for the treatment of secretory diarrhea disorders, including cholera.

- VQW-765, a Phase II alpha-7 nicotinic acetylcholine receptor partial agonist.

Since we began operations in March 2003, we have devoted substantially all of our resources to the in-licensing, clinical development and commercialization of our products. Our ability to generate meaningful product sales and achieve profitability largely depends on our level of success in commercializing HETLIOZ[®] and Fanapt[®] in the U.S. and Europe, on our ability, alone or with others, to complete the development of our products, including tradipitant, and to obtain the regulatory approvals for and to manufacture, market and sell our products. The results of our operations will vary significantly from year-to-year and quarter-to-quarter and depend on a number of factors, including risks related to our business, risks related to our industry, and other risks which are detailed in Item 1A of Part I entitled Risk Factors and Item 7 of Part II entitled Management's Discussion and Analysis of Financial Condition and Results of Operations of this annual report on Form 10-K.

Our activities will necessitate significant uses of working capital in 2019 and beyond. We are currently concentrating our efforts on selling HETLIOZ[®] and Fanapt[®] in the U.S. and our continued commercialization of HETLIOZ[®] in Europe. Additionally, we continue to pursue market approval of HETLIOZ[®] and Fanapt[®] in other regions. We will continue to work with our distribution partner on the commercialization of Fanapt[®] outside the U.S. We see opportunities to grow our commercial products through life cycle management strategies that include the addition of new indications and formulations. We have built a research and development organization that includes extensive expertise in the scientific disciplines of pharmacogenetics and pharmacogenomics. We operate cross-functionally and are led by an experienced research and development management team. Our pipeline includes novel programs that could address largely unmet medical needs.

Our founder and Chief Executive Officer, Mihael H. Polymeropoulos, M.D., started Vanda's operations in early 2003 after establishing and leading the Pharmacogenetics Department at Novartis. In acquiring and developing our products, we have relied upon our deep expertise in the scientific disciplines of pharmacogenetics and pharmacogenomics. These scientific disciplines examine both genetic variations among people that influence response to a particular drug, and the multiple pathways through which drugs affect people.

Table of Contents

Our Strategy

Our goal is to create a leading global biopharmaceutical company focused on developing and commercializing innovative therapies addressing high unmet medical needs through the application of our drug development expertise and our pharmacogenetics and pharmacogenomics expertise. The key elements of our strategy to accomplish this goal are to:

- Maximize the commercial success of HETLIOZ® and Fanapt®;
- Enter into strategic partnerships to supplement our capabilities and to extend our commercial reach;
- Pursue the clinical development and regulatory approval of our products;
- Apply our pharmacogenetics and pharmacogenomics expertise to differentiate our products; and
- Expand our product portfolio through the identification and acquisition of additional products.

Products

We have the following products on the market:

Product	Indication	Geography	Select Historical Milestones
HETLIOZ® (tasimelteon)	Non-24	United States	FDA approval in January 2014; Commercial launch in April 2014
		Europe	EC approval in July 2015; Commercial launch in Germany in August 2016
Fanapt® (Oral) (iloperidone)	Schizophrenia	United States	FDA approval in May 2009; Commercial launch in January 2010; U.S. and Canada rights sublicensed to Novartis in October 2009 and reacquired by Vanda in December 2014; Long term maintenance supplemental New Drug Application (sNDA) approval in May 2016
Fanaptum® (Oral) (iloperidone)		Israel	Market approval August 2012; Commercial launch in the fourth quarter of 2014 by our local distribution partner

Table of Contents

We have the following products in clinical development or under regulatory review:

Product	Target Indication	Select Historical Milestones
HETLIOZ® (tasimelteon)	Jet Lag Disorder	Completed a Phase III clinical study (JET8) and reported results in the first quarter of 2018; Completed a Phase II clinical study (JET) and reported results in the second quarter of 2018; sNDA PDUFA-VI (as defined below) action target date of August 16, 2019
	SMS	Completed a placebo controlled study and reported results in the fourth quarter of 2018
	Pediatric Non-24	Completed a pharmacokinetic study in the first quarter of 2018
Fanapt® (iloperidone)	Schizophrenia	Initiated a pharmacokinetic study of the LAI formulation in the fourth quarter of 2018
	Other Disorders	Potential indications are under evaluation including bipolar depression, major depressive disorder and post-traumatic stress disorder – nightmares
Tradipitant (VLY-686)	Chronic Pruritus in Atopic Dermatitis	Completed a placebo controlled clinical study and reported results in the third quarter of 2017; Initiated a Phase III study (EPIONE) in the second quarter of 2018
	Gastroparesis	Completed a placebo controlled study and reported results in the fourth quarter of 2018
VTR-297	Oncology	Initiated a clinical study in patients with hematologic malignancies in the fourth quarter of 2018
VQW-765	CNS Disorders	Potential indications are under strategic evaluation including cognitive impairment

For more detailed information regarding our clinical trial results and regulatory activities for our products please refer to our press releases and SEC filings which can be found on the SEC Edgar system and on our website www.vandapharma.com.

HETLIOZ®

Commercial opportunity: Non-24

In January 2014, HETLIOZ® was approved in the U.S. for the treatment of Non-24. Non-24 is a serious, rare and chronic circadian rhythm disorder characterized by the inability to entrain (synchronize) the master body clock with the 24-hour day-night cycle. HETLIOZ® is the first FDA approved treatment for Non-24. HETLIOZ® is a melatonin agonist of the human MT1 and MT2 receptors, with greater specificity for MT2. These receptors are thought to be involved in the control of circadian rhythms. HETLIOZ® is believed to reset the master body clock in the suprachiasmatic nucleus, located in the hypothalamus, resulting in the entrainment and alignment of the body's

melatonin and cortisol rhythms to the 24-hour day-night cycle. HETLIOZ[®] was launched commercially in the U.S. in April 2014. In addition, in July 2015, the EC granted centralized marketing authorization with unified labeling for HETLIOZ[®] for the treatment of Non-24 in totally blind adults and included post-marketing commitments related to a pediatric investigation plan. This authorization is valid in the 28 countries that are members of the European Union (E.U.), as well as European Economic Area members Iceland, Liechtenstein and Norway. HETLIOZ[®] was launched commercially in Germany in August 2016.

In January 2010, the FDA granted orphan drug designation status for HETLIOZ[®] in Non-24 in blind individuals. The FDA grants orphan drug designation to drugs that may provide significant therapeutic advantage over existing treatments and target conditions affecting 200,000 or fewer U.S. patients per year. Orphan drug designation provides potential financial and regulatory incentives, including study design assistance, tax credits, waiver of FDA user fees, and up to seven years of market exclusivity upon marketing approval. In February 2011, the European Medicines Agency (EMA) designated HETLIOZ[®] as an orphan medicinal product for the same indication.

Non-24 affects a majority of totally blind individuals, or approximately 80,000 people in the U.S. Blind individuals who develop Non-24 lack the light sensitivity necessary to synchronize the master body clock in the brain with the 24-hour day-night cycle. Non-24 also affects certain sighted individuals. In these sighted individuals, decreased exposure or sensitivity

Table of Contents

to light and social and physical activity cues may contribute to a free-running circadian rhythm. With the high frequency of mental disorders involving social isolation and cases of Non-24 developing after a change in sleep habits, behavioral factors in combination with physiological tendency may precipitate and perpetuate this disorder in sighted individuals. Hospitalized individuals with neurological and psychiatric disorders can become insensitive to social cues, predisposing them to the development of Non-24.

Most people have a master body clock that naturally runs longer than 24-hours and light is the primary environmental cue that resets it to 24 hours each day. Individuals with Non-24 have a master body clock that is not reset, and continually delays, resulting in prolonged periods of misalignment between their circadian rhythms and the 24-hour day-night cycle, including the timing of melatonin and cortisol secretion. As a result of this misalignment, Non-24 is associated with significant disruption of the sleep-wake cycle and impairments in social and occupational functioning, and marked subjective distress. Individuals with Non-24 cycle in-and out-of phase and suffer from disrupted nighttime sleep patterns and/or excessive daytime sleepiness.

While there are no FDA or EC approved treatments for Non-24 other than HETLIOZ[®], there are a number of drugs approved and prescribed for patients with sleep disorders. The most commonly prescribed drugs are hypnotics. See Competition below for a discussion of commonly prescribed drugs for patients with sleep disorders.

Therapeutic opportunity: Circadian Rhythm Sleep Disorders

Sleep disorders are segmented into three major categories: primary insomnia, secondary insomnia and circadian rhythm sleep disorders (CRSDs). Insomnia is a symptom complex that comprises difficulty falling asleep or staying asleep, or non-refreshing sleep, in combination with daytime dysfunction or distress. The symptom complex can be an independent disorder (primary insomnia) or be a result of another condition such as depression or anxiety (secondary insomnia). CRSDs result from a misalignment of the sleep/wake cycle and an individual's daily activities or lifestyle. The circadian rhythm is the rhythmic output of the human biological clock and is governed by the hormones melatonin and cortisol. Both the timing of behavioral events (activity, sleep, and social interactions) and the environmental light/dark cycle result in a sleep/wake cycle that follows the circadian rhythm. Examples of CRSDs include transient disorders such as jet lag and chronic disorders such as delayed sleep phase disorder, shift work sleep disorder and Non-24.

In March and May 2018, respectively, we announced the results of our JET and JET8 studies for the treatment of jet lag disorder. In the JET8 study, 318 healthy volunteers were admitted to a sleep unit and were subjected to a circadian challenge of an 8 hours advance to their usual bedtime. The JET8 study design induced the circadian challenge experienced by travelers who cross 8 time zones, which leads to jet lag disorder. This clinical design allowed for the study of HETLIOZ[®] without the confounding effects of sleep deprivation and variable light conditions. In the JET8 clinical study, HETLIOZ[®] demonstrated significant and clinically meaningful benefits in nighttime and daytime symptoms of jet lag disorder. The JET study was a two-phase transatlantic travel study, with an observational travel phase (baseline) followed by a treatment phase. Study participants traveled either 5 or 8 time zones from Washington, DC to London and San Francisco or Los Angeles to London, respectively. The JET study showed effectiveness in treating travelers who flew from the U.S. to the United Kingdom. The FDA accepted the filing of our sNDA for HETLIOZ[®] for the treatment of jet lag disorder in December 2018. The FDA determined the action target date under the Prescription Drug User Fee Act Amendments of 2017 (PDUFA-VI) to be August 16, 2019. Jet lag disorder affects millions of individuals annually who cross multiple time zones during their travel. Jet lag disorder symptoms are more severe during eastward travel. U.S. Department of Commerce, International Trade Administration reports state that more than 20 million U.S. residents make trips abroad each year to overseas destinations in Europe, the Middle East and Asia.

We reported results from a SMS placebo controlled study in December 2018, which showed that HETLIOZ[®] improved sleep quality and increased sleep duration in patients with SMS. SMS is a rare genetic disorder caused by a deletion on chromosome 17. The U.S. National Institute of Health estimates that SMS affects approximately one in 15,000 to 25,000 births in the U.S.

We are planning to develop HETLIOZ[®] for the treatment of pediatric Non-24. A pharmacokinetic study of the HETLIOZ[®] pediatric liquid formulation was completed in the first quarter of 2018. Additionally, in September 2018

we announced results from a driving study which demonstrated that tasimelteon did not impair measures of driving performance. An assessment of new HETLIOZ[®] clinical opportunities including the treatment of delayed sleep phase disorder and for sleep disorders in patients with neurodevelopmental disorders is ongoing.

Table of Contents

Fanapt®

Commercial Opportunity: Schizophrenia

Fanapt® is a product for the treatment of schizophrenia. In May 2009, the FDA granted U.S. marketing approval of Fanapt® for the acute treatment of schizophrenia in adults. In October 2009, we entered into an amended and restated sublicense agreement with Novartis. We had originally entered into a sublicense agreement with Novartis in June 2004 pursuant to which we obtained certain worldwide exclusive licenses from Novartis relating to Fanapt®. Pursuant to the amended and restated sublicense agreement, Novartis had exclusive commercialization rights to all formulations of Fanapt® in the U.S. and Canada. In January 2010, Novartis launched Fanapt® in the U.S. On December 31, 2014, Novartis transferred all the U.S. and Canadian commercial rights to the Fanapt® franchise to us as part of a settlement agreement. In May 2016, the FDA approved a sNDA for Fanapt® for the maintenance treatment of schizophrenia in adults.

In July 2017, the EMA's Committee for Medicinal Products for Human Use (CHMP) issued a negative opinion recommending against approval of Fanaptum® (oral iloperidone tablets) for the treatment of schizophrenia in adult patients in the E.U. The CHMP was of the opinion that the benefits of Fanaptum® did not outweigh its risks and recommended against marketing authorization. The negative opinion was upheld upon appeal in November 2017. Schizophrenia is a chronic, debilitating mental disorder characterized by hallucinations, delusions, racing thoughts and other psychotic symptoms (collectively referred to as "positive symptoms"), as well as moodiness, anhedonia (inability to feel pleasure), loss of interest, eating disturbances and withdrawal (collectively referred to as "negative symptoms"), and attention and memory deficits (collectively referred to as "cognitive symptoms"). Schizophrenia develops in late adolescence or early adulthood in approximately 1% of the world's population. Most schizophrenia patients today are treated with drugs known as "atypical" antipsychotics, which were first approved in the U.S. in the late 1980s. These antipsychotics have been named "atypical" for their ability to treat a broader range of negative symptoms than the first-generation "typical" antipsychotics, which were introduced in the 1950s and are now generic. Atypical antipsychotics are generally regarded as having improved side effect profiles and efficacy relative to typical antipsychotics. See Competition below for a discussion of commonly prescribed atypical antipsychotics in addition to Fanapt®.

Therapeutic opportunity: Other

In October 2018, we enrolled our first patient in a pharmacokinetic study of the LAI formulation of Fanapt®. An assessment of new Fanapt® clinical opportunities including the treatment of bipolar depression, major depressive disorder and post-traumatic stress disorder-nightmares is ongoing.

Tradipitant (VLY-686)

Tradipitant is a small molecule NK-1R antagonist that we licensed from Eli Lilly and Company (Lilly) in April 2012. NK-1R antagonists have been evaluated in a number of indications including chemotherapy-induced nausea and vomiting, post-operative nausea and vomiting, alcohol dependence, anxiety, depression, gastroparesis and chronic pruritus in atopic dermatitis, psoriasis and prurigo nodularis.

We announced results in September 2017 from a randomized Phase II clinical study of tradipitant as a monotherapy in the treatment of chronic pruritus in patients with atopic dermatitis. Tradipitant was shown to improve the intensity of the worst itch patients experienced, as well as atopic dermatitis disease severity. On the pre-specified primary endpoint of Average Itch Visual Analog Scale (VAS), tradipitant showed improvement over placebo, but this improvement was not significant due to high placebo effect and the lack of sensitivity of this measure. In June 2018, we initiated EPIONE, a Phase III study of tradipitant for chronic pruritus in atopic dermatitis.

Atopic dermatitis is a chronic, relapsing inflammatory skin disorder characterized by the symptom of intense and persistent pruritus or itch. Other clinical features include erythema, excoriation, edema, lichenification, oozing and xerosis. Atopic dermatitis is a common skin disorder affecting millions of people worldwide. Currently there are very few safe systemic treatments available for atopic dermatitis, representing a significant unmet medical need in this population. A 2015 Decision Resources Group report estimated that 9.8 million individuals were diagnosed with atopic dermatitis in the U.S. of which approximately 6.4 million were drug-treated atopic dermatitis patients.

We announced results in December 2018 from a randomized clinical study (2301) of tradipitant as a monotherapy in the treatment of gastroparesis. Several symptom severity scales were used to assess gastroparesis symptoms, including the Gastroparesis Symptom Index (GCSI), Patients Assessment of Upper Gastrointestinal Disorders-Symptoms (PAGI- SYM), and

7

Table of Contents

Patient Global Impression of Change (PGI-C) as well as a Clinician Global Impression of Severity (CGI-S). Tradipitant met the primary endpoint of the study of change in nausea score as measured by patient daily diaries and also met the related endpoint of improvement in the number of nausea free days. Tradipitant also showed significant improvement in most of the secondary endpoints studied, including the several key scales reflecting overall gastroparesis symptoms, specifically GCSI, PAGI-SYM, CGI-S, and PGI-C.

Gastroparesis is a serious medical condition characterized by delayed gastric emptying associated with the symptoms of nausea, vomiting, bloating, fullness after meals and abdominal pain, along with significant impairment of social and occupational functioning. A paper by Rey et al published in the January 2012 Journal of Neurogastroenterology and Motility estimated the prevalence of gastroparesis in the U.S. to be over 5 million patients, many of whom remain undiagnosed.

An assessment of new tradipitant clinical opportunities including the treatment of motion sickness is ongoing. In April 2018, we submitted a protocol amendment to the FDA, proposing a 52-week open-label extension (OLE) period for patients who had completed the tradipitant Phase II clinical study (2301) in gastroparesis. In May 2018, based on feedback from the FDA, we amended the protocol limiting the duration of treatment in the 2301 study to a total of three months, while continuing to seek further dialogue with the FDA on extending the study duration to 52-weeks. As a part of this negotiation process, in September 2018, we submitted a new follow-on 52-week OLE protocol to the FDA (2302) for patients who had completed the 2301 study. While waiting for further feedback, no patients were ever enrolled in any study beyond 12 weeks. On December 19, 2018, the FDA imposed a partial clinical hold (PCH) on the two proposed studies, stating that we are required first to conduct additional chronic toxicity studies in canines, monkeys or minipigs before allowing patients access in any clinical protocol beyond 12 weeks. The PCH was not based on any safety or efficacy data related to tradipitant. Rather, the FDA informed us that these additional toxicity studies are required by a guidance document. We do not expect the PCH to have any material impact on our ongoing clinical studies in atopic dermatitis and motion sickness or the planned Phase III study in gastroparesis. At present, the PCH has not had any impact on the potential timing of an NDA filing or approval for these indications. We will continually reassess this situation as events unfold.

On February 5, 2019, we filed a lawsuit against the FDA in the United States District Court for the District of Columbia, challenging the FDA's legal authority to issue the PCH, and seeking an order to set it aside. On February 14, 2019, the FDA filed a Motion for Voluntary Remand to the Agency and for a Stay of the Case. We intend to continue vigorously pursuing our interests in the matter (see Part I, Item 3, Legal Proceedings of this annual report on Form 10-K for additional information).

VTR-297

VTR-297 is a small molecule HDAC inhibitor with potential use as a treatment for several oncology indications. The FDA accepted an Investigational New Drug (IND) application for VTR-297 in 2017 and provided authorization to proceed with the treatment of patients with relapsed and/or refractory hematologic malignancies. We initiated a clinical study in patients with hematologic malignancies in the fourth quarter of 2018.

VQW-765

VQW-765 is a Phase II alpha-7 nicotinic acetylcholine receptor partial agonist that we licensed from Novartis on December 31, 2014 pursuant to a settlement agreement. We are evaluating potential indications, including cognitive impairment.

License Agreements

Our rights to develop and commercialize our products are subject to the terms and conditions of licenses granted to us by other pharmaceutical companies.

HETLIOZ®

In February 2004, we entered into a license agreement with Bristol-Myers Squibb (BMS) under which we received an exclusive worldwide license under certain patents and patent applications, and other licenses to intellectual property, to develop and commercialize HETLIOZ®. As a result of the FDA's approval of the HETLIOZ® New Drug Application (NDA) in January 2014, we made an \$8.0 million milestone payment to BMS in the first quarter of 2014 under the license agreement that was capitalized as an intangible asset and is being amortized over the estimated

economic useful life of the related product patents for HETLIOZ® in the U.S. In April 2018, we met another milestone under our license agreement when cumulative worldwide

8

Table of Contents

sales of HETLIOZ[®] reached \$250.0 million. As a result of the achievement of this milestone, we made a payment to BMS of \$25.0 million in June 2018. We have no remaining milestone obligations to BMS. Additionally, we are obligated to make royalty payments on HETLIOZ[®] net sales to BMS in any territory where we commercialize HETLIOZ[®] for a period equal to the greater of 10 years following the first commercial sale in the territory or the expiry of the new chemical entity (NCE) patent in that territory. During the period prior to the expiry of the NCE patent in a territory, we are obligated to pay a 10% royalty on net sales in that territory. The royalty rate is decreased by half for countries in which no NCE patent existed or for the remainder of the 10 years after the expiry of the NCE patent. We are also obligated under the license agreement to pay BMS a percentage of any sublicense fees, upfront payments and milestone and other payments (excluding royalties) that we receive from a third-party in connection with any sublicensing arrangement, at a rate which is in the mid-twenties. We have agreed with BMS in the license agreement for HETLIOZ[®] to use commercially reasonable efforts to develop and commercialize HETLIOZ[®]. Either party may terminate the HETLIOZ[®] license agreement under certain circumstances, including a material breach of the agreement by the other. In the event we terminate our license, or if BMS terminates our license due to our breach, all rights licensed and developed by us under this agreement will revert or otherwise be licensed back to BMS on an exclusive basis.

Fanapt[®]

Pursuant to the terms of a settlement agreement with Novartis, Novartis transferred all U.S. and Canadian rights in the Fanapt[®] franchise to us on December 31, 2014. We were obligated to make royalty payments to Sanofi S.A. (Sanofi) and Titan Pharmaceuticals Inc. (Titan) at a percentage rate equal to 23% on annual U.S. net sales of Fanapt[®] up to \$200.0 million, and at a percentage rate in the mid-twenties on sales over \$200.0 million through November 2016. In February 2016, we amended the agreement with Sanofi and Titan to remove Titan as the entity through which royalty payments from Vanda are directed to Sanofi following the expiration of the NCE patent for Fanapt[®] in the U.S. on November 15, 2016. Under the amended agreement, we pay directly to Sanofi a fixed royalty of 3% of net sales from November 16, 2016 through December 31, 2019 related to manufacturing know-how. We made a \$2.0 million pre-payment during the year ended December 31, 2016 that applied to this 3% manufacturing know-how royalty. No further royalties on manufacturing know-how are payable by us after December 31, 2019. This amended agreement did not alter Titan's obligation under the license agreement to make royalty payments to Sanofi prior to November 16, 2016 or our obligation to pay Sanofi a fixed royalty on Fanapt[®] net sales equal up to 6% on Sanofi know-how not related to manufacturing under certain conditions for a period of up to 10 years in markets where the NCE patent has expired or was not issued. We may lose our rights to develop and commercialize Fanapt[®] if we fail to comply with certain requirements in the Titan license agreement regarding our financial condition, or if we fail to comply with certain diligence obligations regarding our development or commercialization activities.

Tradipitant (VLY-686)

In April 2012, we entered into a license agreement with Lilly pursuant to which we acquired an exclusive worldwide license under certain patents and patent applications, and other licenses to intellectual property, to develop and commercialize an NK-1R antagonist, tradipitant, for all human indications. The patent describing tradipitant as a NCE expires in April 2023, except in the U.S., where it expires in June 2024 absent any applicable patent term adjustments. Lilly is eligible to receive future payments based upon achievement of specified development and commercialization milestones as well as tiered-royalties on net sales at percentage rates up to the low double digits. These milestones include \$4.0 million for pre-NDA approval milestones, \$10.0 million and \$5.0 million for the first approval of a marketing authorization for tradipitant in the U.S. and E.U., respectively, and up to \$80.0 million for sales milestones. The \$4.0 million of pre-NDA approval milestones includes \$2.0 million due upon enrollment of the first subject into a Phase III study for tradipitant and \$2.0 million due upon the filing of the first marketing authorization for tradipitant in either the U.S. or the E.U. As a result of enrolling the first subject into a Phase III study for tradipitant in July 2018, we made a \$2.0 million milestone payment to Lilly. We are obligated to use commercially reasonable efforts to develop and commercialize tradipitant. Either party may terminate the agreement under certain circumstances, including a material breach of the agreement by the other. In the event that we terminate the agreement, or if Lilly terminates the agreement due to our breach or for certain other reasons set forth in the agreement, all rights licensed

and developed by us under the agreement will revert or otherwise be licensed back to Lilly on an exclusive basis, subject to payment by Lilly to us of a royalty on net sales of products that contain tradipitant.

VQW-765

In connection with the settlement agreement with Novartis relating to Fanapt[®], we received an exclusive worldwide license under certain patents and patent applications, and other licenses to intellectual property, to develop and commercialize VQW-765, a Phase II alpha-7 nicotinic acetylcholine receptor partial agonist. Pursuant to the license agreement, we are obligated to use commercially reasonable efforts to develop and commercialize VQW-765 and are responsible for all

Table of Contents

development costs. We have no milestone obligations, but Novartis is eligible to receive tiered-royalties on net sales at percentage rates up to the mid-teens.

Either party may terminate the agreement under certain circumstances, including a material breach of the agreement by the other. In the event that we terminate the agreement, or if Novartis terminates the agreement due to our breach or for certain other reasons set forth in the agreement, all rights licensed and developed by us under the agreement will revert or otherwise be licensed back to Novartis on an exclusive basis, subject to payment by Novartis to us of a royalty on net sales of products that contain VQW-765.

Portfolio of CFTR activators and inhibitors

In March 2017, we entered into a license agreement with the University of California San Francisco (UCSF), under which we acquired an exclusive worldwide license to develop and commercialize a portfolio of CFTR activators and inhibitors. Pursuant to the license agreement, we will develop and commercialize the CFTR activators and inhibitors and are responsible for all development costs under the license agreement, including current pre-investigational new drug development work. UCSF is eligible to receive future payments based upon achievement of specified development and commercialization milestones as well as single-digit tiered-royalties on net sales. These milestones include an initial license fee of \$1.0 million, which was paid by us in the first quarter of 2017, annual maintenance fees, \$12.4 million for pre-NDA approval milestones and \$33.0 million for future regulatory approval and sales milestones. Included in the \$12.4 million in pre-NDA approval milestones is a \$350,000 milestone due upon the conclusion of a Phase I study for each licensed product but not to exceed \$1.1 million in total for the CFTR portfolio. In the fourth quarter of 2018, we determined the first pre-NDA approval milestone to be probable and accrued a current liability of \$0.2 million as of December 31, 2018.

Either party may terminate the agreement under certain circumstances. In the event that we terminate the agreement, or if UCSF terminates the agreement due to our breach or for certain other reasons set forth in the agreement, all rights licensed and developed by us under the agreement will revert or otherwise be licensed back to UCSF. Termination will not relieve us of our obligation to pay royalties or other payments owed, if any, to UCSF under the terms of the agreement.

Patents and proprietary rights; Hatch-Waxman protection

We will be able to protect our products from unauthorized use by others only to the extent that our products are covered through regulatory protections or by valid and enforceable patents, either licensed to us by others or generated through our activities internally, that give us sufficient proprietary rights. Accordingly, securing patents, regulatory data package protection, and other proprietary rights is an essential element of our business strategies.

HETLIOZ[®], traidipitant and VQW-765 are covered by NCE and other patents and patent applications related to their respective medicinal uses. In addition, NCE patent protection has been sought for VTR-297 and CFTR. Patent applications for these active ingredients remain pending. While the NCE patents protecting Fanapt[®] have expired, Fanapt[®] remains protected by medicinal patents. For more on the license and sublicense arrangements related to these active ingredients, see License Agreements above. In addition, we have filed for patents based on our own discoveries that seek to provide additional protection for HETLIOZ[®] and Fanapt[®].

Table of Contents

The table below is a summary of Orange Book listed patents for our commercial products. Members of these patent families are also issued or pending in a number of major market territories, such as Europe and Japan.

	Number	Type
HETLIOZ®	US 5,856,529	New chemical entity
	US 9,060,995	Method of treatment
	US 9,539,234	Method of treatment
	US 9,549,913	Method of treatment
	US 9,730,910	Method of treatment
	US 9,855,241	Method of treatment
	US RE46604	Method of treatment
	US 10,071,977	Drug substance
	US 10,149,829	Method of treatment
	Fanapt®	US 8,586,610
US 8,652,776		Method of treatment
US 8,999,638		Method of treatment
US 9,072,742		Method of treatment
US 9,074,254		Method of treatment
US 9,074,255		Method of treatment
US 9,074,256		Method of treatment
US 9,138,432		Method of treatment
US 9,157,121		Method of treatment

HETLIOZ®

Our rights to the NCE patent covering HETLIOZ® and related intellectual property have been acquired through a license with BMS. HETLIOZ® and its formulations, genetic markers and uses are the subject of numerous patent filings for which protection has been sought in selected countries worldwide. The NCE patent covering HETLIOZ® expires in December 2022 in the U.S., which is inclusive of a five-year extension granted under the Hatch-Waxman Act in October 2018. Corresponding NCE patent protection has expired in most other markets. The U.S. Patent and Trademark Office has issued seven method of use patents for HETLIOZ® that will expire during 2033 and 2034 and one drug substance patent that will expire in 2035.

In Europe, the law provides for ten years of data exclusivity (with the potential for an additional year if the drug is developed for a significant new indication). As such, in Europe, data exclusivity will protect HETLIOZ® for at least ten years from approval. A completed Pediatric Investigation Plan could further extend this exclusivity for two years in an orphan indication, for a total of 12 years of exclusivity. It is also possible that the term of the new chemical entity patent in Europe could be extended by issuance of a supplementary protection certificate (SPC). The European Patent Office has granted our patent application directed to the 20 mg/day dose. This patent will expire normally in 2027. Other pending patent applications in Europe, if granted, may offer additional protection for HETLIOZ®.

Outside the U.S. and Europe, data exclusivity will protect HETLIOZ® from generic competition for varying numbers of years depending on the country.

Additional patent applications directed to specific sleep disorders and to methods of treating patients with HETLIOZ®, if issued, would provide exclusivity for such indications and methods of treatment, potentially extending the effective patent protection period in the U.S., Europe, and other major markets.

Fanapt®

The NCE patent for Fanapt®, which expired in 2016 in the U.S. and in 2010 in other major market countries, was owned by Sanofi. Other patents and patent applications relating to Fanapt® previously owned by Novartis are now owned by Vanda. We originally obtained exclusive worldwide rights to develop and commercialize the products covered by these patents

Table of Contents

through license and sublicense arrangements. Then, pursuant to an amended sublicense agreement with Novartis, Novartis retained exclusive commercialization rights to all formulations of Fanapt® in the U.S. and Canada. However, as of December 2014, pursuant to an asset transfer agreement, we acquired all rights in Fanapt®, including in the U.S. and Canada.

Fanapt® metabolites, formulations, genetic markers and uses are the subject of numerous patent filings in which protection has been sought in the U.S., Europe, and other markets. In November 2013, a U.S. patent directed to a method of treating patients with Fanapt® based on genotype was issued to us by the U.S. Patent and Trademark Office. This patent, which was listed in the Orange Book in January 2015, is set to expire in 2027, potentially further extending the U.S. marketing exclusivity for Fanapt®. Additional method of treatment patents have been issued in the U.S. and listed in the Orange Book, with the latest expiration date in December 2031. See Note 16, Legal Matters, to the consolidated financial statements included in Part II of this annual report on Form 10-K for additional information. In Europe, the law provides for ten years of regulatory exclusivity (with the potential for an additional year if the drug is developed for a significant new indication). No generic versions of Fanapt® would be permitted to be marketed or sold during the applicable regulatory exclusivity period in most European countries. Outside the U.S. and Europe, similar regulatory package protection periods may be available and could protect Fanapt® from generic competition for varying numbers of years depending upon the country. Several other patent applications covering metabolites, uses, formulations and genetic markers relating to Fanapt® could provide protection extending beyond 2020. Patents sought for the microsphere LAI formulation of Fanapt® expire in 2024 in the U.S. and 2022 in most of the major markets in Europe. Patents sought for the aqueous microcrystals LAI formulation of Fanapt® expire in 2023 in the U.S. and in most of the major markets in Europe.

Tradipitant

Lilly owns an NCE patent as well as patent applications directed to polymorphic forms of, and methods of making tradipitant. This patent protection was sought in the U.S. and in other countries worldwide. These patents and patent applications have been licensed to us. The NCE patent covering tradipitant expires in 2023, except in the U.S., where it expires normally in 2024, subject to any extension that may be received under Hatch-Waxman. We have filed additional patent applications based on discoveries made during recent studies with tradipitant.

VQW-765

Novartis owns a NCE patent as well as patent applications directed to methods of using VQW-765, VQW-765 formulations, and combinations of VQW-765 with other active pharmaceutical ingredients. In connection with the settlement agreement with Novartis relating to Fanapt®, we received an exclusive worldwide license under certain patents and patent applications, and other licenses to intellectual property, to develop and commercialize VQW-765, a Phase II alpha-7 nicotinic acetylcholine receptor partial agonist. The NCE patent expires normally in 2023 in the U.S., Europe, and other markets.

VTR-297

VTR-297 is a small molecule HDAC inhibitor with potential use as a treatment for several oncology indications. We have pending patent applications covering the use of VTR-297 and plan on filing additional applications based on discoveries made throughout the development plan of this molecule.

Portfolio of CFTR activators and inhibitors

Our portfolio of CFTR activators and inhibitors may have broad applicability in addressing a number of high unmet medical needs, including chronic dry eye, constipation, polycystic kidney disease, cholestasis and secretory diarrheas. We plan on filing applications based on discoveries made throughout the development plan of these compounds.

Other Patents

Aside from the NCE patents and other in-licensed patents relating to Fanapt®, HETLIOZ®, tradipitant and VQW-765, we have obtained or filed numerous patent and patent applications, most of which have been filed in key markets including the U.S., relating to our products and development compounds. In addition, we have filed numerous other patent applications relating to drugs not presently in clinical studies. The claims in these various patents and patent applications are directed to compositions of matter, including claims covering other products, pharmaceutical

compositions and methods of use.

12

Table of Contents

Proprietary Know-how

For proprietary know-how that is not appropriate for patent protection, processes for which patents are difficult to enforce and any other elements of our discovery process that involve proprietary know-how and technology that are not covered by patent applications, we generally rely on trade secret protection and confidentiality agreements to protect our interests. We require all of our employees, relevant consultants and advisors to enter into confidentiality agreements. Where it is necessary to share our proprietary information or data with outside parties, our policy is to make available only that information and data required to accomplish the desired purpose and only pursuant to a duty of confidentiality on the part of those parties.

Marketing and Sales

HETLIOZ[®] was approved in the U.S. for the treatment of Non-24 in January 2014 and commercially launched in the U.S. in April 2014. Additionally, HETLIOZ[®] was approved in the E.U. for the treatment of Non-24 in totally blind adults in July 2015. We commercially launched HETLIOZ[®] in Germany in August 2016.

Given the range of potential indications for HETLIOZ[®], we may pursue one or more partnerships for the development and commercialization of HETLIOZ[®] worldwide.

Fanapt[®] was approved in the U.S. for the treatment of schizophrenia in May 2009 and commercially launched in the U.S. in January 2010. In October 2009, we entered into an amended and restated sublicense agreement with Novartis pursuant to which Novartis has exclusive commercialization rights to all formulations of Fanapt[®] in the U.S. and Canada. Novartis began selling Fanapt[®] in the U.S. during the first quarter of 2010. Pursuant to the terms of a settlement agreement with Novartis, Novartis transferred all U.S. and Canadian rights in the Fanapt[®] franchise to us on December 31, 2014. We continue to explore the regulatory path and commercial opportunity for Fanapt[®] oral formulation in other regions.

Manufacturing

We currently utilize a virtual supply manufacturing and distribution chain in which we do not have our own facilities to manufacture commercial or clinical trial supplies of drugs and we do not have our own distribution facilities. Additionally, we do not intend to develop such facilities for any product in the near future. Instead, we contract with third parties for the manufacture, warehousing, order management, billing and collection and distribution of our products and product candidates.

We expect to continue to rely solely on third-party manufacturers to manufacture drug substance and final drug products for both clinical development and commercial sale. However, there are numerous factors that could cause interruptions in the supply of our products, including regulatory reviews, changes in our sources for manufacturing, disputes with a manufacturer, or financial instability of manufacturers, all of which could negatively impact our operation and our financial results.

We have agreements in place with Patheon Pharmaceuticals Inc. and Patheon Inc. (collectively, Patheon), subsidiaries of Thermo Fisher Scientific, for the manufacture of HETLIOZ[®] and Fanapt[®].

In January 2014, we entered into a manufacturing agreement with Patheon for the manufacture of commercial supplies of HETLIOZ[®] 20 mg capsules at Patheon's Cincinnati, Ohio manufacturing site. Under the HETLIOZ[®] manufacturing agreement, we are responsible for supplying the active pharmaceutical ingredient (tasimelteon) for HETLIOZ[®] to Patheon and have agreed to certain minimum yearly order requirements. Patheon is responsible for manufacturing the HETLIOZ[®] 20 mg capsules, conducting quality control and stability testing, and packaging the HETLIOZ[®] capsules. The HETLIOZ[®] manufacturing agreement has an initial term of five years and will automatically renew after the initial term for successive terms of one year each, unless either party gives notice of its intention to terminate the agreement at least twelve months prior to the end of the then current term. Either party may terminate the HETLIOZ[®] manufacturing agreement under certain circumstances upon specified written notice to the other party.

As part of a settlement agreement, we assumed Novartis' manufacturing agreement with Patheon for the manufacture of commercial supplies of Fanapt[®]. In May 2016, we entered into a new manufacturing agreement with Patheon for the manufacture of commercial supplies of Fanapt[®] 1, 2, 4, 6, 8, 10 and 12 mg tablets at Patheon's Mississauga, Ontario, Canada manufacturing site. Under the Fanapt[®] manufacturing agreement, we are responsible for sourcing the supply of the active pharmaceutical ingredient (iloperidone), and have agreed to order from Patheon at least 70% of

the total yearly requirement of new units of Fanapt® tablets for the U.S. and other specified countries each year for the term of the agreement. The Fanapt® manufacturing agreement has an initial term of five years and will automatically renew after the initial term for successive

Table of Contents

terms of one year each, unless either party gives notice of its intention to terminate the agreement at least twelve months prior to the end of the then current term. Either party may terminate the Fanapt[®] manufacturing agreement under certain circumstances upon specified written notice to the other party.

Research and Development

We have built a research and development organization that includes extensive expertise in the scientific disciplines of pharmacogenetics and pharmacogenomics. We operate cross-functionally and are led by an experienced research and development management team. We use rigorous project management techniques to assist us in making disciplined strategic research and development program decisions and to help limit the risk profile of our product pipeline. We also access relevant market information and key opinion leaders in creating target product profiles and, when appropriate, as we advance our programs towards commercialization. We engage third parties to conduct portions of our preclinical research. In addition, we utilize multiple clinical sites to conduct our clinical trials; however, we are not substantially dependent upon any one of these sites for our clinical trials nor do any of them conduct a major portion of our clinical trials.

Major Customers

Our revenues are generated from product sales and are concentrated with specialty pharmacies, including Diplomat Pharmacy, Inc. and Accredo (a subsidiary of Express Scripts), and wholesalers, including Cardinal Health, Inc., AmerisourceBergen Drug Corporation, and McKesson Corporation. These 5 major customers each accounted for more than 10% of total revenues and, as a group, represented 92% of total revenues for the year ended December 31, 2018.

Competition

The pharmaceutical industry, in particular, is highly competitive and includes a number of established large and mid-sized companies with greater financial, technical and personnel resources than we have and significantly greater commercial infrastructures than we have. Our market segment also includes several smaller emerging companies whose activities are directly focused on our target markets and areas of expertise. Our products, once approved for commercial use, will compete with numerous therapeutic treatments offered by these competitors. While we believe that our products will have certain favorable features, existing and new treatments may also possess advantages. Additionally, the development of other drug technologies and methods of disease prevention are occurring at a rapid pace. These developments may render our products or technologies obsolete or noncompetitive.

We believe the primary competitors for HETLIOZ[®] and Fanapt[®] are as follows:

For HETLIOZ[®] in the treatment of Non-24, there are no FDA approved direct competitors. Sedative-Hypnotic treatments for certain sleep related disorders include, Ambien[®] (zolpidem) by Sanofi (including Ambien CR[®]), Lunesta[®] (eszopiclone) by Sunovion Pharmaceuticals Inc., Sonata[®] (zaleplon) by Pfizer Inc., Rozerem[®] (ramelteon) by Takeda Pharmaceuticals Company Limited, Silenor[®] (doxepin) by Pernix Therapeutics, Belsomra[®] (suvorexant) by Merck & Co., Inc., generic products such as zolpidem, trazodone and doxepin, and over-the-counter remedies such as Benadryl[®] and Tylenol PM[®]. The class of melatonin agonists includes Rozerem[®] (ramelteon) by Takeda Pharmaceuticals Company Limited, Valdoxan[®] (agomelatine) by Servier, Circadin[®] (long-acting melatonin) by Neurim Pharmaceuticals Ltd. and the food supplement melatonin. Shift work and excessive sleepiness disorder treatments include Nuvigil[®] (armodafinil) and Provigil[®] (modafinil) both by Teva Pharmaceutical Industries Ltd. For Fanapt[®] in the treatment of schizophrenia, the atypical antipsychotics competitors are Risperdal[®] (risperidone), including the LAI formulation Risperdal Consta[®] and Invega[®] (paliperidone), including the LAI formulation Invega[®] Sustenna[®], each by Ortho-McNeil-Janssen Pharmaceuticals, Inc., Zyprexa[®] (olanzapine), including the LAI formulation Zyprexa[®] Relprevv[™], each by Eli Lilly and Company, Seroquel[®] and Seroquel XR[®] (quetiapine) by AstraZeneca PLC, Abilify[®] (aripiprazole) by Otsuka America Pharmaceutical Inc., Abilify Maintena[®] (the LAI formulation of Abilify[®]) by Lundbeck/Otsuka America Pharmaceutical Inc., Geodon[®] (ziprasidone) by Pfizer Inc., Saphris[®] (asenapine) by Allergan plc, Latuda[®] (lurasidone) by Sunovion Pharmaceuticals Inc., Rexulti[®] (brexpiprazole) by Lundbeck/Otsuka America Pharmaceutical, Inc., Aristada[™] (aripiprazole lauroxil)

extended-release injectable suspension by Alkermes, Inc., Vraylar™ (cariprazine) by Teva Pharmaceutical Industries Ltd., and generic clozapine, as well as the typical antipsychotics haloperidol, chlorpromazine, thioridazine, and sulpiride (all of which are generic).

Our ability to compete successfully will depend in part on our ability to utilize our pharmacogenetics and pharmacogenomics and drug development expertise to identify, develop, secure rights to and obtain regulatory approvals for

Table of Contents

promising pharmaceutical products before others are able to develop competitive products. Our ability to compete successfully will also depend on our ability to attract and retain skilled and experienced personnel. Additionally, our ability to compete may be affected because insurers and other third-party payors in some cases seek to encourage the use of cheaper, generic products, which could make our products less attractive.

Government Regulation

Government authorities in the U.S., at the federal, state and local level, as well as foreign countries and local foreign governments, regulate the research, development, testing, manufacture, labeling, promotion, advertising, distribution, sampling, marketing, import and export of our products. Other than HETLIOZ® in the U.S. and the E.U. and Fanapt® in the U.S., Israel and Mexico, all of our products will require regulatory approval by government agencies prior to commercialization. In particular, human pharmaceutical products are subject to rigorous preclinical and clinical trials and other approval procedures of the FDA and similar regulatory authorities in foreign countries. The process of obtaining these approvals and the subsequent compliance with appropriate domestic and foreign laws, rules and regulations require the expenditure of significant time and human and financial resources.

United States government regulation

FDA approval process

In the U.S., the FDA regulates drugs under the Federal Food, Drug and Cosmetic Act (FDCA), as amended, and implements regulations. If we fail to comply with the applicable requirements at any time during the product development process, approval process, or after approval, we may become subject to administrative or judicial sanctions. These sanctions could include the FDA's refusal to approve pending applications, withdrawals of approvals, clinical holds, warning letters, product recalls, product seizures, total or partial suspension of our operations, injunctions, fines, civil penalties or criminal prosecution. Any such sanction could have a material adverse effect on our business.

The steps required before a drug may be marketed in the U.S. include:

- preclinical laboratory tests, animal studies and formulation studies under Current Good Laboratory Practices (cGMP);
- submission to the FDA of an IND, which must become effective before human clinical trials may begin;
- execution of adequate and well-controlled clinical trials to establish the safety and efficacy of the drug for each indication for which approval is sought;
- submission to 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 Practices (cGMP); and
- FDA review and approval of the NDA.

Preclinical studies generally are conducted in laboratory animals to evaluate the potential safety and activity of a drug. Violation of the FDA's cGMP regulations can, in some cases, lead to invalidation of the studies, requiring these studies to be replicated. In the U.S., drug developers submit the results of preclinical trials, together with manufacturing information and analytical and stability data, to the FDA as part of the IND, which must become effective before clinical trials can begin in the U.S. An IND becomes effective 30 days after receipt by the FDA unless before that time the FDA raises concerns or questions about issues such as the proposed clinical trials outlined in the IND. In that case, the IND sponsor and the FDA must resolve any outstanding FDA concerns or questions before clinical trials can proceed. If these concerns or questions are unresolved, the FDA may not allow the clinical trials to commence.

Pilot studies generally are conducted in a limited patient population, approximately three to 25 subjects, to determine whether the drug warrants further clinical trials based on preliminary indications of efficacy. These pilot studies may be performed in the U.S. after an IND has become effective or outside of the U.S. prior to the filing of an IND in the U.S. in accordance with applicable government regulations and institutional procedures.

Clinical trials involve the administration of the investigational new drug to human subjects under the supervision of qualified investigators. Clinical trials are conducted under protocols detailing, among other things, the objectives of the study, the parameters to be used in assessing the safety and the effectiveness of the drug. Each protocol must be

submitted to the FDA as part of the IND prior to beginning the trial.

15

Table of Contents

Typically, clinical evaluation involves a time-consuming and costly three-Phase sequential process, but the phases may overlap. Each trial must be reviewed, approved and conducted under the auspices of an independent Institutional Review Board, and each trial must include the patient's informed consent.

Phase I: refers typically to closely-monitored clinical trials and includes the initial introduction of an investigational new drug into human patients or healthy volunteer subjects. Phase I trials are designed to determine the safety, metabolism and pharmacologic actions of a drug in humans, the potential side effects associated with increasing drug doses and, if possible, to gain early evidence of the drug's effectiveness. Phase I trials also include the study of structure-activity relationships and mechanism of action in humans, as well as studies in which investigational new drugs are used as research tools to explore biological phenomena or disease processes. During Phase I trials, sufficient information about a drug's pharmacokinetics and pharmacological effects should be obtained to permit the design of well-controlled, scientifically valid Phase II studies. The total number of subjects and patients included in Phase I trials varies, but is generally in the range of 20 to 80 people.

Phase II: refers to controlled clinical trials conducted to evaluate appropriate dosage and the effectiveness of a drug for a particular indication or indications in patients with a disease or condition under study and to determine the common short-term side effects and risks associated with the drug. These trials are typically well-controlled, closely monitored and conducted in a relatively small number of patients, usually involving no more than several hundred subjects.

Phase III: refers to expanded controlled and uncontrolled clinical trials. These trials are performed after preliminary evidence suggesting effectiveness of a drug has been obtained. Phase III trials are intended to gather additional information about the effectiveness and safety that is needed to evaluate the overall benefit-risk relationship of the drug and to provide an adequate basis for physician labeling. Phase III trials usually include several hundred to several thousand subjects.

Phase IV: refers to post-approval studies, when applicable, are conducted following initial approval, typically to gain additional experience and data from treatment of patients in the intended therapeutic indication.

Phase I, II and III testing may not be completed successfully within any specified time period, if at all. The FDA closely monitors the progress of each of the three phases of clinical trials that are conducted in the U.S. and may, at its discretion, reevaluate, alter, suspend or terminate the testing based upon the data accumulated to that point and the FDA's assessment of the risk/benefit ratio to the patient. A clinical program is designed after assessing the causes of the disease, the mechanism of action of the active pharmaceutical ingredient of the drug and all clinical and preclinical data of previous trials performed. Typically, the trial design protocols and efficacy endpoints are established in consultation with the FDA. Upon request through a special protocol assessment, the FDA can also provide specific guidance on the acceptability of protocol design for clinical trials. The FDA or we may suspend or terminate clinical trials at any time for various reasons, including a finding that the subjects or patients are being exposed to an unacceptable health risk. The FDA can also request additional clinical trials be conducted as a condition to drug approval. During all clinical trials, physicians monitor the patients to determine effectiveness and to observe and report any reactions or other safety risks that may result from use of the drug.

Assuming successful completion of the required clinical trials, drug developers submit the results of preclinical studies and clinical trials, together with other detailed information including information on the manufacture and composition of the drug, to the FDA, in the form of an NDA, requesting approval to market the drug for one or more indications. In most cases, the NDA must be accompanied by a substantial user fee. Under PDUFA-VI, the submission of most NDAs is additionally subject to a significant human drug application fee, which is collected at the time of submission. PDUFA-VI eliminated user fees for supplements and establishments. In addition, the sponsor of an approved NDA is also subject to annual program fee. For federal fiscal year 2019, the submission of an NDA for which clinical data (other than bioavailability or bioequivalence studies) with respect to safety or effectiveness are required for approval is subject to an application user fee of \$2,588,478. The annual program user fee for fiscal year 2019 is \$309,915. The FDA reviews an NDA to determine, among other things, whether a drug is safe and effective for its intended use.

The FDA conducts a preliminary review of an NDA generally within 60 calendar days of its receipt and strives to inform the sponsor by the 74th day after the FDA's receipt of the submission to determine whether the application is sufficiently complete before the agency accepts it for filing and conducts substantive review.

Before approving an NDA, the FDA will inspect the facility or facilities where the drug is manufactured. The FDA will not approve the application unless cGMP compliance is satisfactory. The FDA will issue an approval letter if it determines that the application, manufacturing process and manufacturing facilities are acceptable. If the FDA determines that the NDA, manufacturing process or manufacturing facilities are not acceptable, it will issue a complete response letter (CRL), in which it

Table of Contents

will outline the deficiencies in the submission and will often request additional testing or information.

Notwithstanding the submission of any requested additional information, the FDA may ultimately decide that the NDA does not satisfy the regulatory criteria for approval and refuse to approve the NDA.

The testing and approval process requires substantial time, effort and financial resources, and each may take several years to complete. The FDA may not grant approval on a timely basis, or at all. We may encounter difficulties or unanticipated costs in our efforts to secure necessary governmental approvals, which could delay or preclude us from marketing our products. Furthermore, the FDA may prevent a drug developer from marketing a drug under a label for its desired indications or place other conditions on distribution as a condition of any approvals, which may impair commercialization of the drug. After approval, some types of changes to the approved drug, such as adding new indications, manufacturing changes and additional labeling claims, are subject to further FDA review and approval. Similar regulatory procedures must also be followed within countries outside the U.S.

If the FDA approves the NDA, the drug becomes available for physicians to prescribe in the U.S. After approval of our products, we have to comply with a number of post-approval requirements, including delivering periodic reports to the FDA, submitting descriptions of any adverse reactions reported, and complying with drug sampling and distribution requirements. We also are required to provide updated safety and efficacy information and to comply with requirements concerning advertising and promotional labeling. Also, our quality control and manufacturing procedures must continue to conform to cGMP after approval. Drug manufacturers and their subcontractors are required to register their facilities and are subject to periodic unannounced inspections by the FDA to assess compliance with cGMP which imposes certain procedural and documentation requirements relating to quality assurance and quality control. Accordingly, manufacturers must continue to expend time, money and effort in the area of production and quality control to maintain compliance with cGMP and other aspects of regulatory compliance. The FDA may require post market testing and surveillance to monitor the drug's safety or efficacy, including additional studies, known as Phase IV trials, to evaluate long-term effects.

In addition to studies requested by the FDA after approval, we may have to conduct other trials and studies to explore use of the approved product for treatment of new indications, which require FDA approval. The purpose of these trials and studies is to broaden the application and use of the product and its acceptance in the medical community.

We use, and will continue to use, third-party manufacturers to produce our products in clinical and commercial quantities. Future FDA inspections may identify compliance issues at our facilities or at the facilities of our contract manufacturers that may disrupt production or distribution, or require substantial resources to correct. In addition, discovery of problems with a product or the failure to comply with requirements may result in restrictions on a product, manufacturer or holder of an approved NDA, including withdrawal or recall of the product from the market or other voluntary or FDA-initiated action that could delay further marketing. Newly discovered or developed safety or effectiveness data may require changes to a product's approved labeling, including the addition of new warnings and contraindications.

In September 2007, the Food and Drug Administration Amendments Act (FDAAA), was enacted into law, amending the FDCA and the Public Health Service Act. The FDAAA made a number of substantive and incremental changes to the review and approval processes in ways that could make it more difficult or costly to obtain approval for new pharmaceutical products, or to produce, market and distribute existing pharmaceutical products. Most significantly, the law changed the FDA's handling of postmarket drug product safety issues by giving the FDA authority to require post approval studies or clinical trials, to request that safety information be provided in labeling, or to require an NDA applicant to submit and execute a Risk Evaluation and Mitigation Strategy (REMS).

The FDAAA made certain changes to the user fee provisions to permit the use of user fee revenue to fund the FDA's drug product safety activities and the review of Direct-to-Consumer advertisements. The Food and Drug Administration Safety and Innovation Act of 2012, which became effective in October 2012, reauthorized the authority of the FDA to collect user fees to fund the FDA's review activities.

In addition, new government requirements may be established that could delay or prevent regulatory approval of our products under development.

The Hatch-Waxman Act

In seeking approval for a drug through an NDA, applicants are required to list with the FDA each patent with claims that cover the applicant's drug. Upon approval of a drug, each of the patents listed in the application for the drug is 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 competitors in support of approval of an abbreviated

Table of Contents

new drug application (ANDA). An ANDA provides for marketing of a drug that has the same active ingredients in the same strengths and dosage form as the listed drug and has been shown through bioequivalence testing to be therapeutically equivalent to the listed drug. ANDA applicants are not required to conduct or submit results of preclinical or clinical tests to prove the safety or effectiveness of their drug, other than the requirement for bioequivalence testing. 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 drug in the 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 drug. A certification that the new drug will not infringe the already approved drug’s listed patents or that such patents are invalid is called a Paragraph IV certification. If the applicant does not challenge the listed patents, the ANDA application will not be approved until all the listed patents claiming the referenced drug have expired.

If the ANDA applicant has provided a Paragraph IV certification to the FDA, the applicant must also send notice of the Paragraph IV certification to the NDA and patent holders once the ANDA has been accepted for filing by the FDA. The NDA and patent holders may then initiate a patent infringement lawsuit in response to the notice of the Paragraph IV certification. The filing of a patent infringement lawsuit within 45 days 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 non-patent exclusivity, such as exclusivity for obtaining approval of a NCE, listed in the Orange Book for the referenced drug has expired. The U.S. Drug Price Competition and Patent Term Restoration Act of 1984, more commonly known as the “Hatch-Waxman Act,” provides a period of five years following approval of a drug containing no previously approved active ingredients, during which ANDAs for generic versions of those drugs cannot be submitted unless the submission contains a Paragraph IV challenge to a listed patent, in which case the submission may be made four years following the original drug approval. Federal law provides for a period of three years of exclusivity following approval of a listed drug that contains previously approved active ingredients but is approved in a new dosage form, route of administration or combination, or for a new use, the approval of which was required to be supported by new clinical trials conducted by or for the sponsor, during which FDA cannot grant effective approval of an ANDA based on that listed drug.

Foreign regulation

Whether or not we obtain FDA approval for a product, we must obtain approval by the comparable regulatory authorities of foreign countries before we can commence clinical trials or marketing of the product in those countries. The approval process varies from country to country, and the time may be longer or shorter than that required for FDA approval. The requirements governing the conduct of clinical trials, product licensing, pricing and reimbursement also vary greatly from country to country. Although governed by the applicable country, clinical trials conducted outside of the U.S. typically are administered with the three-Phase sequential process that is discussed above under “United States government regulation.” However, the foreign equivalent of an IND is not a prerequisite to performing pilot studies or Phase I clinical trials.

Under E.U. regulatory systems, we may submit Marketing Authorization Applications (MAAs) either under a centralized or decentralized procedure. The centralized procedure, which is available for drugs produced by biotechnology or which are highly innovative, provides for the grant of a single marketing authorization that is valid for all E.U. member states. This authorization is a marketing authorization approval. The decentralized procedure provides for mutual recognition of national approval decisions. Under this procedure, the holder of a national marketing authorization may submit an application to the remaining member states. Within 90 days of receiving the applications and assessment report, each member state must decide whether to recognize approval. This procedure is referred to as the mutual recognition procedure.

In addition, regulatory approval of prices is required in most countries other than the U.S. We face the risk that the resulting prices would be insufficient to generate an acceptable return to us.

Pharmaceutical Coverage, Pricing and Reimbursement

Significant uncertainty exists as to the coverage and reimbursement status of products approved by the FDA and other government authorities. Sales of products will depend, in part, on the extent to which the costs of the products will be covered by third-party payors, including government health programs in the United States such as Medicare and Medicaid, commercial

Table of Contents

health insurers and managed care organizations. The process for determining whether a payor will provide coverage for a product may be separate from the process for setting the price or reimbursement rate that the payor will pay for the product once coverage is approved. Third-party payors are increasingly challenging the prices charged, examining the medical necessity, and reviewing the cost-effectiveness of medical products and services and imposing controls to manage costs. Third-party payors may also limit coverage to specific products on an approved list, or formulary, which might not include all of the approved products for a particular indication.

In order to secure coverage and reimbursement for any product that might be approved for sale, a company may need to conduct expensive pharmacoeconomic studies in order to demonstrate the medical necessity and cost-effectiveness of the product, in addition to the costs required to obtain FDA or other comparable regulatory approvals. A payor's decision to provide coverage for a drug product does not imply that an adequate reimbursement rate will be approved. Third-party reimbursement may not be sufficient to maintain price levels high enough to realize an appropriate return on investment in product development.

The containment of healthcare costs also has become a priority of federal, state and foreign governments and the prices of drugs have been a focus in this effort. Governments have shown significant interest in implementing cost-containment programs, including price controls, restrictions on reimbursement and requirements for substitution of generic products. Adoption of price controls and cost-containment measures, and adoption of more restrictive policies in jurisdictions with existing controls and measures, could further limit a company's revenue generated from the sale of any approved products. Coverage policies and third-party reimbursement rates may change at any time. Even if favorable coverage and reimbursement status is attained for one or more products for which a company or its collaborators receive marketing approval, less favorable coverage policies and reimbursement rates may be implemented in the future. In the E.U., pricing and reimbursement schemes vary widely from country to country. Some countries provide that drug products may be marketed only after a reimbursement price has been agreed. Some countries may require the completion of additional studies that compare the cost-effectiveness of a particular drug candidate to currently available therapies, or so called health technology assessments, in order to obtain reimbursement or pricing approval. For example, the E.U. provides options for its member states to restrict the range of drug products for which their national health insurance systems provide reimbursement and to control the prices of medicinal products for human use. E.U. member states may approve a specific price for a drug product or may instead adopt a system of direct or indirect controls on the profitability of the company placing the drug product on the market. Other member states allow companies to fix their own prices for drug products, but monitor and control company profits. The downward pressure on health care costs in general, particularly prescription drugs, has become intense. As a result, increasingly high barriers are being erected to the entry of new products. In addition, in some countries, cross-border imports from low-priced markets exert competitive pressure that may reduce pricing within a country. Any country that has price controls or reimbursement limitations for drug products may not allow favorable reimbursement and pricing arrangements.

A primary trend in the U.S. healthcare industry and elsewhere is cost containment. There have been a number of federal and state proposals during the last several years regarding the pricing of pharmaceutical and biopharmaceutical products, limiting coverage and reimbursement for drugs and other medical products, government control and other changes to the healthcare system in the U.S.

By way of example, the U.S. and state governments continue to propose and pass legislation designed to reduce the cost of healthcare. In March 2010, the U.S. Congress enacted the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Affordability Reconciliation Act of 2010 (together, PPACA), which, among other things, includes changes to the coverage and payment for products under government health care programs. Among the provisions of the PPACA of importance to potential drug candidates are:

- an annual, nondeductible fee on any entity that manufactures or imports specified branded prescription drugs and biologic agents, apportioned among these entities according to their market share in certain government healthcare programs, although this fee would not apply to sales of certain products approved exclusively for orphan indications;
-

expansion of eligibility criteria for Medicaid programs by, among other things, allowing states to offer Medicaid coverage to certain individuals with income at or below 133% of the federal poverty level, thereby potentially increasing a manufacturer's Medicaid rebate liability;

expanded manufacturers' rebate liability under the Medicaid Drug Rebate Program by increasing the minimum rebate for both branded and generic drugs and revising the definition of "average manufacturer price," or AMP, for calculating and reporting Medicaid drug rebates on outpatient prescription drug prices and extending rebate liability to prescriptions for individuals enrolled in Medicare Advantage plans;

Table of Contents

addressed a new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for drugs that are inhaled, infused, instilled, implanted or injected;

expanded the types of entities eligible for the 340B drug discount program;

established the Medicare Part D coverage gap discount program by requiring manufacturers to provide a 50% point of sale discount off the negotiated price of applicable brand drugs to eligible beneficiaries during their coverage gap period as a condition for the manufacturers' outpatient drugs to be covered under Medicare Part D. Public Law No. 115-123, also known as the Bipartisan Budget Act of 2018 enacted on February 9, 2018 increased the manufacturer discount from 50% to 70% effective in 2019 for applicable drugs;

established a new Patient Centered Outcomes Research Institute to oversee, identify priorities in, and conduct comparative clinical effectiveness research, along with funding for such research;

established the Independent Payment Advisory Board, or IPAB, which has authority to recommend certain changes to the Medicare program to reduce expenditures by the program that could result in reduced payments for prescription drugs. However, the IPAB implementation has been not been clearly defined. The PPACA provided that under certain circumstances, IPAB recommendations will become law unless Congress enacts legislation that will achieve the same or greater Medicare cost savings; and

established the Center for Medicare and Medicaid Innovation within CMS to test innovative payment and service delivery models to lower Medicare and Medicaid spending, potentially including prescription drug spending. Funding has been allocated to support the mission of the Center for Medicare and Medicaid Innovation from 2011 to 2019. Other legislative changes have been proposed and adopted since the PPACA was enacted. These changes include the Budget Control Act of 2011, which, among other things, led to aggregate reductions to Medicare payments to providers of up to 2% per fiscal year that started in 2013 and will stay in effect through 2024 unless additional congressional action is taken, and the American Taxpayer Relief Act of 2012, which, among other things, reduced Medicare payments to several types of providers and increased the statute of limitations period for the government to recover overpayments to providers from three to five years. These new laws may result in additional reductions in Medicare and other healthcare funding and otherwise affect the prices we may obtain for any of our product candidates for which we may obtain regulatory approval or the frequency with which any such product candidate is prescribed or used. Further, there have been several recent U.S. congressional inquiries and proposed state and federal legislation designed to, among other things, bring more transparency to drug pricing, review the relationship between pricing and manufacturer patient programs, reduce the costs of drugs under Medicare and reform government program reimbursement methodologies for drug products.

These healthcare reforms, as well as other healthcare reform measures that may be adopted in the future, may result in additional reductions in Medicare and other healthcare funding, more rigorous coverage criteria, new payment methodologies and additional downward pressure on the price for any approved product and/or the level of reimbursement physicians receive for administering any approved product. Reductions in reimbursement levels may negatively impact the prices or the frequency with which products are prescribed or administered. Any reduction in reimbursement from Medicare or other government programs may result in a similar reduction in payments from private payors. Since enactment of the PPACA, there have been numerous legal challenges and congressional actions to repeal and replace provisions of the law. Various pieces of legislation have been proposed and/or passed by each of the chambers of Congress to achieve those objectives, but to date, few of these measures have been implemented. The current presidential administration has also taken executive actions to undermine or delay implementation of the PPACA. In January 2017, the President signed an Executive Order directing federal agencies with authorities and responsibilities under the PPACA to waive, defer, grant exemptions from, or delay the implementation of any provision of the PPACA that would impose a fiscal or regulatory burden on states, individuals, healthcare providers, health insurers, or manufacturers of pharmaceuticals or medical devices. In October 2017, the President signed a second Executive Order allowing for the use of association health plans and short-term health insurance, which may provide fewer health benefits than the plans sold through the PPACA exchanges. At the same time, the Administration announced that it will discontinue the payment of cost-sharing reduction (CSR) payments to insurance companies until Congress approves the appropriation of funds for such CSR payments. The loss of the CSR payments

is expected to increase premiums on certain policies issued by qualified health plans under the PPACA. More recently, with enactment of the Tax Cuts and Jobs Act of 2017 (TCJA), which was signed by the President on December 22, 2017, Congress repealed the “individual mandate.” The repeal of this provision, which requires most Americans to carry a minimal level of health insurance, became effective on January 1, 2019. According to the Congressional Budget Office, the repeal of the individual mandate will cause 13 million fewer Americans to be insured in 2027 and premiums in

Table of Contents

insurance markets may rise. Additionally, on January 22, 2018, the President signed a continuing resolution on appropriations for fiscal year 2018 that delayed the implementation of certain PPACA-mandated fees, including the so-called “Cadillac” tax on certain high cost employer-sponsored insurance plans, the annual fee imposed on certain health insurance providers based on market share, and the medical device excise tax on non-exempt medical devices. Further, there have been several recent U.S. congressional inquiries and proposed federal and proposed and enacted state legislation designed to, among other things, bring more transparency to drug pricing, review the relationship between pricing and manufacturer patient programs, reduce the costs of drugs under Medicare and reform government program reimbursement methodologies for drug products. At the federal level, Congress and the current presidential administration have each indicated that it will continue to seek new legislative and/or administrative measures to control drug costs. At the state level, individual states are increasingly aggressive in passing legislation and implementing regulations designed to control pharmaceutical and biological product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing. In addition, regional health care authorities and individual hospitals are increasingly using bidding procedures to determine what pharmaceutical products and which suppliers will be included in their prescription drug and other health care programs. These measures could reduce the ultimate demand for our products, once approved, or put pressure on our product pricing.

Employees

We had 270 full-time employees as of December 31, 2018, compared with 273 employees as of December 31, 2017. None of our employees are represented by a labor union. We have not experienced any work stoppages and consider our employee relations to be good.

Corporate Information

We were incorporated in Delaware in 2002. Our principal executive offices are located at 2200 Pennsylvania Avenue NW, Suite 300E, Washington D.C. 20037, and our telephone number is (202) 734-3400. Our website address is www.vandapharma.com and the information contained in, or that can be accessed through, our website is not part of this annual report and should not be considered part of this annual report.

Available Information

We file annual, quarterly, and current reports, proxy statements, and other documents with the Securities and Exchange Commission (SEC) under the Securities Exchange Act of 1934 (Exchange Act). The SEC maintains a website at www.sec.gov that contains reports, proxy and information statements, and other information regarding issuers, including us, that file electronically with the SEC.

We also make available free of charge on our Internet website at www.vandapharma.com our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, and, if applicable, amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Exchange Act as soon as reasonably practicable after we electronically file such material with, or furnish it to, the SEC.

Our code of ethics, other corporate policies and procedures, and the charters of our Audit Committee, Compensation Committee and Nominating/Corporate Governance Committee are available through our Internet website at www.vandapharma.com.

ITEM 1A. RISK FACTORS

Our business, financial condition and operating results can be affected by a number of factors, whether currently known or unknown, including but not limited to those described below, any one or more of which could, directly or indirectly, cause our actual operating results and financial condition to vary materially from past, or anticipated future, operating results and financial condition. Any of these factors, in whole or in part, could materially and adversely affect our business, financial condition, operating results and the price of our common stock.

The following discussion of risk factors contains forward-looking statements. These risk factors may be important to understanding any statement in this annual report on Form 10-K or elsewhere. The following information should be read in

Table of Contents

conjunction with the consolidated financial statements and related notes in Part I, Item 1, Financial Statements and Part I, Item 2, Management's, Discussion and Analysis of Financial Condition and Results of Operations.

Because of the following factors, as well as other factors affecting our financial condition and operating results, past financial performance should not be considered to be a reliable indicator of future performance, and investors should not use historical trends to anticipate results or trends in future periods.

Risks related to our business and industry

We are dependent on the commercial success of HETLIOZ[®] and Fanapt[®].

Our future success is currently substantially dependent upon the commercial success of HETLIOZ[®] for the treatment of Non-24-Hour Sleep-Wake Disorder (Non-24) and Fanapt[®] for the treatment of schizophrenia.

In January 2014, the U.S. Food and Drug Administration (FDA) approved our New Drug Application (NDA) for HETLIOZ[®] for the treatment of Non-24 and in April 2014, we commenced the U.S. commercial launch of HETLIOZ[®]. In July 2015, the European Commission (EC) granted centralized marketing authorization with unified labeling for HETLIOZ[®] for the treatment of Non-24 in totally blind adults, and in August 2016 we commenced the commercial launch of HETLIOZ[®] in Germany. This authorization is valid in the 28 countries that are members of the European Union (E.U.), as well as European Economic Area members Iceland, Liechtenstein and Norway.

In the fourth quarter of 2014, we acquired the U.S. commercial rights to Fanapt[®], and began selling, marketing and distributing Fanapt[®] in the U.S.

Our ability to generate significant product revenue from sales of HETLIOZ[®] and Fanapt[®], both in the U.S. and abroad, in the near term will depend on, among other things, our ability to:

- defend our patents and intellectual property from generic competition;
- maintain commercial manufacturing arrangements with third-party manufacturers;
- produce, through a validated process, sufficiently large quantities of inventory of our products to meet demand;
- continue to maintain and grow a wide variety of internal sales, distribution and marketing capabilities sufficient to sustain growth in sales of our products;
- gain broad acceptance of our products from physicians, health care payors, patients, pharmacists and the medical community;
- properly price and obtain adequate coverage and reimbursement of these products by governmental authorities, private health insurers, managed care organizations and other third-party payors;
- maintain compliance with ongoing labeling, packaging, storage, advertising, promotion, recordkeeping, safety and other post-market requirements;
- obtain regulatory approval to expand the labeling of our approved products for additional indications;
- obtain regulatory approval for HETLIOZ[®] or Fanapt[®] in additional countries;
- adequately protect against and effectively respond to any claims by holders of patents and other intellectual property rights that our products infringe their rights; and
- adequately protect against and effectively respond to any unanticipated adverse effects or unfavorable publicity that develops in respect to our products, as well as the emergence of new or existing competitive products, which may be proven to be more clinically effective and cost-effective.

We expect to continue to incur significant expenses and to utilize a substantial portion of our cash resources as we continue the commercialization of HETLIOZ[®] and Fanapt[®], evaluate foreign market opportunities for HETLIOZ[®] and Fanapt[®] and continue to grow our operational capabilities, both domestically and abroad. This activity represents a significant investment in the commercial success of HETLIOZ[®] and Fanapt[®], which is uncertain.

If our continued commercial efforts are not successful with respect to HETLIOZ[®] and Fanapt[®] in the U.S., Europe or other jurisdictions in which these products may be approved for sale, our ability to generate increased product sales revenue may be jeopardized and, consequently, our business may be seriously harmed.

Table of Contents

The cost of growing and maintaining a sales, marketing and distribution organization may exceed its cost effectiveness. If we fail to continue to develop sales, marketing and distribution capabilities, if sales efforts are not effective or if costs of developing sales, marketing and distribution capabilities exceed their cost effectiveness, our business, results of operations and financial condition could be materially adversely affected.

Growth of HETLIOZ[®] and Fanapt[®] may be slow or limited for a variety of reasons including competing products or unanticipated safety issues. If either HETLIOZ[®] or Fanapt[®] is not successful in gaining broad commercial acceptance, our business would be harmed.

Any increase in sales of HETLIOZ[®] and Fanapt[®] will be dependent on several factors, including our ability to educate physicians and to increase physician awareness of the benefits of our products relative to competing products. The degree of further market acceptance of any of our products or market acceptance of approved product candidates among physicians, patients, health care payors and the medical community will depend on a number of factors, including but not limited to:

- acceptable evidence of safety and efficacy;
- relative convenience and ease of administration;
- the prevalence and severity of any adverse side effects;
- availability of alternative treatments; and
- pricing and cost effectiveness.

In addition, HETLIOZ[®] and Fanapt[®] are subject to continual review by the FDA, and we cannot assure that newly discovered or reported safety issues will not arise. With the use of any newly marketed drug by a wider patient population, serious adverse events may occur from time to time that initially do not appear to relate to the drug itself. Any safety issues could cause us to suspend or cease marketing of our approved products, cause us to modify how we market our approved products, subject us to substantial liabilities and adversely affect our revenues and financial condition. In the event of a withdrawal of either HETLIOZ[®] or Fanapt[®] from the market, our revenues would decline significantly and our business would be seriously harmed.

If the FDA does not accept for filing the NDAs that we may submit for tradipitant for the treatment of chronic pruritus in atopic dermatitis and the treatment of gastroparesis, regulatory authorities determine that our clinical trial results for tradipitant for the treatment of chronic pruritus in atopic dermatitis or the treatment of gastroparesis do not demonstrate adequate safety and efficacy, or the FDA does not approve an applicable PDUFA-VI date, continued development of tradipitant will be significantly delayed or terminated, our business will be significantly harmed, and the market price of our stock could decline.

We announced the results in September 2017 from a randomized Phase II clinical study of tradipitant as a monotherapy in the treatment of chronic pruritus in patients with atopic dermatitis. Tradipitant was shown to improve the intensity of the worst itch patients experienced, as well as atopic dermatitis disease severity.

We announced results in December 2018 from a randomized clinical study (2301) of tradipitant as a monotherapy in the treatment of gastroparesis. Tradipitant met the primary endpoint of the study of change in nausea score as measured by patient daily diaries and also met the related endpoint of improvement in the number of nausea free days. Tradipitant also showed significant improvement in most of the secondary endpoints studied, including the several key scales reflecting overall gastroparesis symptoms, specifically GCSI; PGI-SYM; CGI-S; PGI-C.

If the results of our ongoing Phase III clinical study of tradipitant for the treatment of chronic pruritus in atopic dermatitis and/or our planned Phase III clinical study of tradipitant for the treatment of gastroparesis are positive, we will likely submit an NDA with the FDA for these indications. Any adverse developments or results or perceived adverse developments or results with respect to our pre-NDA meeting with the FDA, our regulatory submission or the tradipitant clinical programs in either or both indications will significantly harm our business and could cause the market price of our stock to decline. Examples of such adverse developments include, but are not limited to:

- the FDA determining that additional clinical studies are required with respect to the tradipitant for the treatment of chronic pruritus in atopic dermatitis and/or the treatment of gastroparesis;
- safety, efficacy or other concerns arising from clinical or non-clinical studies in these programs; or

the FDA determining that the tradipitant clinical trial programs raise safety concerns or do not demonstrate adequate efficacy.

Table of Contents

In April 2018, we submitted a protocol amendment to the FDA, proposing a 52-week open-label extension (OLE) period for patients who had completed the tradipitant Phase II clinical study (2301) in gastroparesis. In May 2018, based on feedback from the FDA, we amended the protocol limiting the duration of treatment in the 2301 study to a total of three months, while continuing to seek further dialogue with the FDA on extending the study duration to 52-weeks. As a part of this negotiation process, in September 2018, we submitted a new follow-on 52-week OLE protocol to the FDA (2302) for patients who had completed the 2301 study. While waiting for further feedback, no patients were ever enrolled in any study beyond 12 weeks. On December 19, 2018, the FDA imposed a partial clinical hold (PCH) on the two proposed studies, stating that we are required first to conduct additional chronic toxicity studies in canines, monkeys or minipigs before allowing patients access in any clinical protocol beyond 12 weeks. The PCH was not based on any safety or efficacy data related to tradipitant. Rather, the FDA informed us that these additional toxicity studies are required by a guidance document. We do not expect the PCH to have any material impact on our ongoing clinical studies in atopic dermatitis and motion sickness or the planned Phase III study in gastroparesis. At present, the PCH has not had any impact on the potential timing of an NDA filing or approval for these indications. We will continually reassess this situation as events unfold.

On February 5, 2019, we filed a lawsuit against the FDA in the United States District Court for the District of Columbia, challenging the FDA’s legal authority to issue the PCH, and seeking an order to set it aside. On February 14, 2019, the FDA filed a Motion for Voluntary Remand to the Agency and for a Stay of the Case. We intend to continue vigorously pursuing our interests in the matter (see Part I, Item 3, Legal Proceedings of this annual report on Form 10-K for additional information).

Even if our lawsuit challenging the FDA’s authority to issue the PCH is successful, there can be no assurances that the FDA will not attempt to impose a clinical hold or PCH on other grounds. While we believe we have a strong legal basis, this litigation is subject to uncertainties and we may not prevail. Because the PCH could, however, impede our ability to conduct longer term studies of tradipitant, whether the PCH impacts the timing or approvability of NDA filings with the FDA for any indication will depend on a number of factors, including whether the PCH is resolved through the lawsuit described above, whether we resolve the PCH out of court through discussions with the FDA, and, in addition to the non-clinical animal studies, whether the FDA considers the clinical trials that we conduct to be sufficient. A delay in filing, or FDA delay or denial of approval, of NDA filings for tradipitant for the treatment of chronic pruritus in atopic dermatitis, gastroparesis or motion sickness could materially adversely impact our business. If the FDA does not approve our supplemental New Drug Application (sNDA) for tasimelteon for the treatment jet lag disorder, or does not agree to an acceptable regulatory path forward for tasimelteon for the treatment of Smith-Magenis Syndrome (SMS) or continued development of tasimelteon for the treatment of either jet lag disorder or SMS is significantly delayed or terminated, our business will be significantly harmed, and the market price of our stock could decline.

In December 2018, we announced that the FDA had accepted the HETLIOZ® sNDA for the treatment of jet lag disorder with a PDUFA-VI target action date of August 16, 2019. We expect to meet with the FDA by mid-2019 to confirm the regulatory path forward for HETLIOZ® in the treatment of SMS and discuss the further development of HETLIOZ® for the treatment of sleep disorders in patients with neurodevelopmental disorders. Any adverse developments or results or perceived adverse developments or results with respect to our regulatory submission for jet lag disorder or our meeting with the FDA to determine the regulatory path forward for HETLIOZ® in the treatment of SMS will significantly harm our business and could cause the market price of our stock to decline. Examples of such adverse developments include, but are not limited to:

- the FDA determining that additional clinical studies are required with respect to either the SMS or jet lag disorder program;
- safety, efficacy or other concerns arising from clinical or non-clinical studies in either the SMS or jet lag disorder program, or the manufacturing processes or facilities used for either the SMS or jet lag disorder programs; or
- the FDA determining that either the SMS or jet lag disorder program raises safety concerns or does not demonstrate adequate efficacy.

We may enter into third party collaborations from time to time in order to develop and commercialize our products. If we are unable to identify or enter into an agreement with any material third-party collaborator, if our collaborations with any such third-party are not commercially successful or if our agreement with any such third-party is terminated or allowed to expire, we could be adversely affected financially or our business reputation could be harmed. Our business strategy includes entering into collaborations with corporate collaborators for the commercialization of HETLIOZ[®], Fanapt[®] and our other products. While we are not currently party to any material commercial collaborative arrangements, areas in which we may potentially enter into third-party collaboration arrangements include joint sales and marketing arrangements for sales and marketing in certain E.U. countries and elsewhere outside of the U.S., and future product

Table of Contents

development arrangements. If we are unable to identify or enter into an agreement with any material third-party collaborator, this could result in an adverse effect on our business, results of operations or financial condition. Any arrangements we do enter into may not be scientifically or commercially successful. The termination of any of these arrangements might adversely affect our ability to develop, commercialize and market our products.

The success of our collaboration arrangements will depend heavily on the efforts and activities of our collaborators. Our collaborators will have significant discretion in determining the efforts and resources that they will apply to these collaborations. We expect that the risks which we face in connection with these future collaborations will include the following:

- our collaboration agreements are expected to be for fixed terms and subject to termination under various circumstances, including, in many cases, on short notice without cause;
- our collaborators may develop and commercialize, either alone or with others, products and services that are similar to or competitive with our products which are the subject of their collaboration with us; and
- our collaborators may change the focus of their commercialization efforts.

In recent years there have been a significant number of mergers and consolidations in the pharmaceutical and biotechnology industries, some of which have resulted in the participant companies reevaluating and shifting the focus of their business following the completion of these transactions. The ability of our products to reach their potential could be limited if any of our future collaborators decreases or fails to increase spending relating to such products. Collaborations with pharmaceutical companies and other third-parties often are terminated or allowed to expire by the other party. With respect to our future collaborations, any such termination or expiration could adversely affect us financially as well as harm our business reputation.

Even after we obtain regulatory approvals of a product, acceptance of the product in the marketplace is uncertain and failure to achieve commercial acceptance will prevent or delay our ability to generate significant revenue from such product.

Even after obtaining regulatory approvals for the sale of our products, the commercial success of these products will depend, among other things, on their acceptance by physicians, patients, third-party payors and other members of the medical community as therapeutic and cost-effective alternatives to competing products and treatments. The degree of market acceptance of any product will depend on a number of factors, including the demonstration of its safety and efficacy, its cost-effectiveness, its potential advantages over other therapies, the reimbursement policies of government and third-party payors with respect to such product, our ability to attract and maintain corporate partners, including pharmaceutical companies, to assist in commercializing our products, receipt of regulatory clearance of marketing claims for the uses that we are developing and the effectiveness of our marketing and distribution capabilities. If our approved products fail to gain market acceptance or do not become widely accepted by physicians, patients, third-party payors and other members of the medical community, it is unlikely that we will ever become profitable on a sustained basis or achieve significant revenues.

We rely and will continue to rely on outsourcing arrangements for many of our activities, including clinical development and supply of HETLIOZ[®], Fanapt[®] and our other products.

As of December 31, 2018, we had 270 full-time employees. We rely on outsourcing arrangements for a significant portion of our activities, including distribution, clinical research and development, data collection and analysis and manufacturing, as well as for certain functions as a public company. We have limited control over these third parties and we cannot guarantee that they will perform their obligations in an effective and timely manner.

Disruptions to our HETLIOZ[®] or Fanapt[®] supply chains could materially affect our level of success in commercializing HETLIOZ[®] or Fanapt[®], thereby reducing our future earnings and prospects.

A loss or disruption with any one of our manufacturers or suppliers could disrupt the supply of HETLIOZ[®] or Fanapt[®], possibly for a significant time period, and we may not have sufficient inventories to maintain supply before the manufacturer or supplier could be replaced or the disruption is resolved. In addition, marketed drugs and their contract manufacturing organizations are subject to continual review, including review and approval by regulatory authorities of their manufacturing facilities and the manufacturing processes, which can result in delays in the regulatory approval process and/or commercialization. Introducing a replacement or backup manufacturer or supplier

for HETLIOZ® or Fanapt® requires a lengthy regulatory and commercial process and there can be no guarantee that we could obtain necessary regulatory approvals in a timely fashion or at all. In addition, it is difficult to identify and select qualified suppliers and manufacturers with the necessary

Table of Contents

technical capabilities, and establishing new supply and manufacturing sources involves a lengthy and technical engineering process.

Failure to comply with government regulations regarding the sale and marketing of our products could harm our business.

Pharmaceutical companies are subject to extensive government regulation and oversight by government authorities in countries in which they do business. As a result, we may become subject to governmental actions which could materially and adversely affect our business, results of operations and financial condition, certain of which are described below.

Pharmaceutical Pricing and Reimbursement

In U.S. markets, our ability to commercialize our products successfully, and to attract commercialization partners for our products, should we choose to do so, depends in significant part on the availability of adequate financial coverage and reimbursement from third-party payors, including, in the U.S., governmental payors such as the Medicare and Medicaid programs, managed care organizations, and private health insurers.

We participate in the Medicaid Drug Rebate Program for both HETLIOZ[®] and Fanapt[®]. Under the Medicaid Drug Rebate Program, we are required to pay a rebate to each state Medicaid program for our covered outpatient drugs that are dispensed to Medicaid beneficiaries and paid for by a state Medicaid program as a condition of having our drugs eligible for coverage under Medicaid and Medicare Part B. Those rebates are based on pricing data that are reported by us on a monthly and quarterly basis to the Centers for Medicare & Medicaid Services (CMS). Federal law requires that any company that participates in the Medicaid Drug Rebate Program also participate in the Public Health Service's 340B drug pricing discount program (340B program), in order for the manufacturer's drugs to be eligible for coverage under Medicaid and Medicare Part B. The 340B program requires participating manufacturers to agree to charge statutorily-defined covered entities no more than the 340B "ceiling price" for the manufacturer's covered outpatient drugs. The ceiling price can represent a significant discount and is based on the pricing data reporting to the Medicaid Drug Rebate Program.

The Patient Protection and Affordable Care Act, as amended by the Health Care and Education Affordability Reconciliation Act of 2010 (together, PPACA) expanded the 340B program to include additional entity types: certain free-standing cancer hospitals, critical access hospitals, rural referral centers and sole community hospitals, each as defined by PPACA. PPACA exempts drugs designated under section 526 of the FDC Act as "orphan drugs" from the ceiling price requirements for these newly-eligible entities.

PPACA also obligates the Health Resources and Services Administration (HRSA) to create regulations and processes to improve the integrity of the 340B program and to update the agreement that manufacturers must sign to participate in the 340B program. HRSA issued a final regulation in January of 2017 regarding the calculation of the 340B ceiling price and the imposition of civil monetary penalties on manufacturers that knowingly and intentionally overcharge covered entities, although that regulation has been withdrawn and is not currently applicable. The withdrawn final regulation regarding the 340B program included a requirement that a manufacturer calculate the 340B ceiling price on a quarterly basis, the requirement that a manufacturer charge \$0.01 per unit of measure if the 340B ceiling price calculation results in a ceiling price that equals zero (penny pricing), the methodology manufacturers must use when estimating the ceiling price for a new covered outpatient drug, an explanation of how a civil monetary penalty (CMP) would be imposed on a manufacturer that knowingly and intentionally overcharges a covered entity; and an explanation of what would constitute an instance of overcharging to trigger a CMP. HRSA recently issued a proposed regulation regarding an administrative dispute resolution process for the 340B program. Any final regulations and guidance could affect our obligations under the 340B program in ways we cannot anticipate. In addition, legislation may be introduced that, if passed, would further expand the 340B program to additional covered entities or otherwise expand the 340B program.

Federal law also requires that for a drug manufacturer's products to be eligible for coverage under the Medicaid and Medicare Part B programs and to be purchased by certain federal agencies and grantees, the manufacturer must participate in the Department of Veterans Affairs Federal Supply Schedule (FSS), pricing program, established by Section 603 of the Veterans Health Care Act of 1992. Manufacturers that participate in the FSS pricing program must

list their covered (innovator and authorized generic) drugs on an FSS contract and charge no more than Federal Ceiling Price (FCP), to the Department of Veterans Affairs, Department of Defense, Public Health Service, and Coast Guard when those agencies purchase from the FSS contract or a depot contract. FCP is calculated based on non-federal average manufacturer price data, which manufacturers must submit quarterly and annually. In addition, because our products are available in the retail and specialty pharmacy setting, we are required to provide rebates to the Department of Defense for prescriptions dispensed to Tricare beneficiaries from Tricare retail network pharmacies under the Tricare Retail Refund Program. To the extent we choose to participate in these

Table of Contents

government healthcare programs for our current and future products, these and other requirements may affect our ability to profitably sell any product for which we obtain marketing approval.

Pricing and rebate calculations vary among products and programs. The calculations are complex and will often be subject to interpretation by us, governmental or regulatory agencies and the courts. If we become aware that our reporting of pricing data for a prior quarter was incorrect, we will be obligated to resubmit the corrected data. For the Medicaid Drug Rebate Program, corrected data must be submitted for a period not to exceed 12 quarters from the quarter in which the data originally were due. Such restatements and recalculations increase our costs for complying with the laws and regulations governing the Medicaid Drug Rebate Program and other governmental pricing programs.

We may be liable for errors associated with our submission of pricing data. If we are found to have knowingly submitted false pricing data to the Medicaid program or the FSS pricing program, we may be liable for civil monetary penalties in the amount of up to \$100,000 per item of false information. Our failure to submit pricing data to the Medicaid program or the FSS pricing program on a timely basis could result in a civil monetary penalty of \$10,000 per day for each day the information is late. Such failure also could be grounds for CMS to terminate our Medicaid drug rebate agreement, which is the agreement under which we would participate in the Medicaid Drug Rebate Program. In the event that CMS terminates our rebate agreement, our products may no longer be eligible for coverage under Medicaid or Medicare Part B. There can be no assurance that our submissions will not be found to be incomplete or incorrect.

Third-party payors decide which drugs they will cover and establish reimbursement and co-pay levels. Third-party payors are increasingly challenging the prices charged for medical products and services and examining their cost effectiveness, in addition to their safety and efficacy. We may need to conduct expensive pharmacoeconomic studies in order to demonstrate the cost effectiveness of our products. Even with such studies, any of our products that are commercialized may be considered less cost-effective than other products, and third-party payors may not provide coverage and reimbursement, in whole or in part, for our products.

Political, economic and regulatory influences are subjecting the healthcare industry in the U.S. to fundamental changes. There have been, and we expect there will continue to be, legislative and regulatory proposals to change the healthcare system and reimbursement systems in ways that could impact our ability to profitably sell commercialized products.

Payors also are increasingly considering new metrics as the basis for reimbursement rates. It is difficult to project the impact of these evolving reimbursement mechanics on the willingness of payors to cover any of our commercialized products.

In addition, we anticipate that a significant portion of our revenue from sales of commercialized products will be obtained through government payors, including Medicare and Medicaid. Any failure to obtain eligibility for coverage under those programs for products we are able to commercialize would have a material adverse effect on revenues and royalties from sales of such products.

Interactions with Healthcare Providers

Physicians and other healthcare providers often play a primary role in the recommendation and prescription of pharmaceutical products. Manufacturers of branded prescription drugs are subject to broadly applicable fraud and abuse and other healthcare laws and regulations that may constrain the business or financial arrangements and relationships through which manufacturers market, sell and distribute the products for which they obtain marketing approval. Some of the laws and regulations that may affect our ability to operate are described below.

Anti-Kickback Laws

The federal Anti-Kickback Statute prohibits, among other things, knowingly and willfully offering, paying, soliciting, or receiving remuneration, directly or indirectly, in cash or in kind, to induce or reward the purchasing, leasing, ordering or arranging for or recommending the purchase, lease, or order of any health care item or service reimbursable under federal healthcare programs such as Medicare and Medicaid. The term "remuneration" has been broadly interpreted to include anything of value, and the government can establish a violation of the Anti-Kickback Statute without proving that a person or entity had actual knowledge of the law or specific intent to violate it. This

statute has been interpreted to apply to arrangements between pharmaceutical manufacturers on the one hand and prescribers, purchasers, patients, and formulary managers on the other. There are a number of statutory exceptions and regulatory safe harbors protecting certain common activities from prosecution or other regulatory sanctions, however, the exceptions and safe harbors are drawn narrowly. Failure to meet all of the requirements of a particular statutory exception or regulatory safe harbor does not make the conduct per se illegal under the Anti-Kickback Statute, but the legality of the arrangement will be evaluated on a case-by-case basis based on the totality of the facts and circumstances. A number of states also have anti-kickback laws that establish similar prohibitions that may apply to

Table of Contents

items or services reimbursed by government programs, as well as any third-party payors, including commercial payors. Violations of the Anti-Kickback Statute are punishable by imprisonment, criminal fines, civil monetary penalties and exclusion from the participation in federal healthcare programs, such as Medicare and Medicaid. Federal Food Drug and Cosmetic Act

The Federal Food, Drug, and Cosmetic Act and its implementing regulations (FDCA) apply to drug product advertising and labeling. These laws prohibit drug manufacturers and third parties acting on their behalf from marketing drug products for off-label uses. Violations of the FDCA can result in criminal and civil penalties, including imprisonment and civil monetary penalties. The U.S. Criminal Code may also apply and permit greater fines than those enumerated in the FDCA.

Prescription Drug Marketing Act

As part of the sales and marketing process, pharmaceutical companies frequently provide healthcare providers with samples of approved drugs. The Prescription Drug Marketing Act (PDMA) imposes requirements and limitations upon the distribution of drugs and drug samples, and prohibits states from licensing distributors of prescription drugs unless the state licensing program meets certain federal guidelines that include minimum standards for storage and handling, as well as record keeping and other requirements. Violations of the PDMA may result in criminal and civil penalties. In addition, the PPACA imposes annual reporting requirements related to sample distribution.

False Claims Act

The federal False Claims Act prohibits, among other things, knowingly presenting, or causing to be presented false or fraudulent claims for payment of government funds and knowingly making, or causing to be made or used, a false record or statement to get a false claim paid. Certain marketing practices may implicate the False Claims Act, including promotion of pharmaceutical products for unapproved uses, providing free product to customers with the expectation that customers would bill federal programs for the product, or inflating prices reported to private price publication services used to set drug reimbursement rates under federal healthcare programs. In addition, PPACA amended the Social Security Act to provide that a claim including items or services resulting from a violation of the Anti-Kickback Statute constitutes a false claim for purposes of the False Claims Act. Actions under the False Claims Act may be brought by the government or as a qui tam action by private individuals who may receive financial awards if their claims are successful. False Claims Act liability is potentially significant in the healthcare industry because the statute provides for treble damages and mandatory penalties of \$5,500 to \$11,000 per false claim or statement, which increased to a range of \$11,181 to \$22,363 in January 2018. Violations of the False Claims Act are also punishable by exclusion from participation in federal healthcare programs, such as Medicare and Medicaid. Pharmaceutical and other life sciences companies often resolve allegations without admissions of liability for significant and sometimes material amounts to avoid the uncertainty of treble damages and per claim penalties that may be awarded in litigation. These companies may be required, however, to enter into corporate integrity agreements with the government, which may impose substantial costs on companies to ensure compliance.

Health Insurance Portability and Accountability Act and Health Information Technology for Economic and Clinical Health Act

The federal Health Insurance Portability and Accountability Act of 1996 (HIPAA), includes federal criminal statutory provisions that prohibit among other actions, knowingly and willfully executing, or attempting to execute, a scheme to defraud any healthcare benefit program, including private third-party payors, knowingly and willfully embezzling or stealing from a healthcare benefit program, willfully obstructing a criminal investigation of a healthcare offense, and knowingly and willfully falsifying, concealing or covering up a material fact or making any materially false, fictitious or fraudulent statement in connection with the delivery of or payment for healthcare benefits, items or services. HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act (HITECH) and their implementing regulations, impose certain requirements and restrictions on certain types of individuals and entities relating to the privacy and security of individually identifiable health information. Among other things, HITECH makes HIPAA's security standards directly applicable not only to covered entities (e.g. health care providers and health plans), but also to business associates, i.e., independent contractors or agents of covered entities that receive or obtain protected health information in connection with providing a service for or on behalf of a covered

entity. HITECH also created four new tiers of civil monetary penalties, amended HIPAA to make civil and criminal penalties directly applicable to business associates, and gave state attorneys general new authority to file civil actions for damages or injunctions in federal courts to enforce the federal HIPAA laws and seek attorneys' fees and costs associated with pursuing federal civil actions.

Table of Contents

Physician Payment Sunshine Act

The federal Physician Payment Sunshine Act requires manufacturers of drugs, devices, biologics and medical supplies for which payment is available under Medicare, Medicaid or the Children's Health Insurance Program to report annually (with certain exceptions) to CMS, information related to payments or other "transfers of value" made to physicians and teaching hospitals, and requires applicable manufacturers and group purchasing organizations to report annually to CMS ownership and investment interests held by physicians and their immediate family members and payments or other "transfers of value" to such physician owners. Failure to report relevant data may result in civil fines and/or penalties.

Foreign Corrupt Practices Act

The U.S. Foreign Corrupt Practices Act (FCPA), prohibits U.S. corporations and their representatives and intermediaries from offering, promising, authorizing or making payments to any foreign government official, government staff member, political party or political candidate in an attempt to obtain or retain business abroad. The scope of the FCPA includes interactions with certain healthcare professionals in many countries. Other countries have enacted similar anti-corruption laws and/or regulations.

Analogous State and Foreign Laws

Analogous state and foreign fraud and abuse laws and regulations, such as state anti-kickback and false claims laws, can apply to our business practices, including but not limited to research, distribution, sales or marketing arrangements and claims involving healthcare items or services reimbursed by non-governmental third party payors and are generally broad and are enforced by many different federal and state agencies as well as through private actions. In addition to requiring reporting transfers of value, some states have imposed price reporting requirements, and an increasing number of countries worldwide have either adopted or are considering similar laws requiring disclosure of various interactions with healthcare professionals. These state laws apply to items and services reimbursed under Medicaid and other state programs, or, in several states, apply regardless of the payor. In addition, a number of states require pharmaceutical companies to report expenses relating to the marketing and promotion of pharmaceutical products and to report gifts and payments to individual physicians in the states. Other states restrict when pharmaceutical companies may provide meals to prescribers or engage in other marketing related activities, or require pharmaceutical companies to implement compliance programs or marketing codes of conduct, and file periodic reports or disclosures with states. Compliance with these laws requires significant resources and companies that do not comply may face civil penalties or other consequences.

Outside the U.S., we are subject to similar regulations in those countries where we market and sell products, including with respect to transparency, bribery and other laws mentioned above. In some foreign countries, including major markets in the E.U. and Japan, the pricing of prescription pharmaceuticals is subject to governmental control. In these countries, pricing negotiations with governmental authorities can take nine to twelve months or longer after the receipt of regulatory marketing approval for a product. To obtain reimbursement or pricing approval in some countries, we may be required to conduct a clinical trial that compares the cost-effectiveness of our product to other available therapies. Our business could be materially harmed if reimbursement of our products is unavailable or limited in scope or amount or if pricing is set at unsatisfactory levels.

The collection and processing of personal data in the E.U. is governed by the General Data Protection Regulation (GDPR), which became applicable in May 2018. The GDPR implements stringent operational requirements for processors and controllers of personal data, including expanded disclosures about how personal information is to be used, limitations on retention of information, requirements pertaining to health data and pseudonymised (i.e., key-coded) data, mandatory data breach notification requirements and standards for controllers to demonstrate that they have obtained valid consent for certain data processing activities. The GDPR provides that members of the E.U. may make their own additional laws and regulations in relation to the processing of genetic, biometric or health data, which could result in differences between Member States, limit our ability to use and share personal data or could cause our costs to increase, and harm our business and financial condition. We are also subject to evolving and strict rules on the transfer of personal data out of the E.U. Failure to comply with E.U. data protection laws may result in fines and other administrative penalties, which may be onerous and adversely affect our business, financial condition,

results of operations and prospects.

Efforts to ensure that our business arrangements with third parties, and our business generally, will comply with applicable healthcare laws and regulations may involve substantial costs. It is possible that governmental authorities will conclude that our business practices may 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 of these laws or any other governmental regulations that may apply to us, we may be subject to significant civil, criminal

Table of Contents

and administrative penalties, damages, fines, imprisonment, exclusion from government funded healthcare programs, such as Medicare and Medicaid, and the curtailment or restructuring of our operations.

Additionally, drug prices are under significant scrutiny, and along with other health care costs, continue to be subject to intense political and societal pressures, which we anticipate will continue and escalate, including on a global basis. As a result, our business and reputation may be harmed, our stock price may be adversely impacted and experience periods of volatility, and our results of operations may be adversely impacted.

Other Laws and Regulations

There are evolving legal requirements and other statutory and regulatory regimes that will continue to affect our business.

Efforts to ensure that business activities and business arrangements comply with applicable healthcare laws and regulations can be costly for manufacturers of branded prescription products. If a manufacturer's operations, including activities conducted by its sales or marketing teams, are found to be in violation of any of these laws or any other governmental regulations that apply to the company, the company may be subject to significant civil, criminal and administrative sanctions, including imprisonment, monetary penalties, damages, fines, exclusion from participation in federal healthcare programs, such as Medicare and Medicaid, and the curtailment or restructuring of operations.

We intend to seek regulatory approvals for our products in additional foreign jurisdictions, but we may not obtain any such approvals.

We intend to market our products, alone or with others, in foreign jurisdictions. In order to market our products in foreign jurisdictions, we may be required to obtain separate regulatory approvals and to comply with numerous and varying regulatory requirements. The approval procedure varies among countries and jurisdictions and can involve additional trials, and the time required to obtain approval may differ from that required to obtain FDA approval. Additionally, the foreign regulatory approval process may include all of the risks associated with obtaining FDA approval. For all of these reasons, we may not obtain foreign regulatory approvals on a timely basis, if at all. Approval by the FDA does not ensure approval by regulatory authorities in other countries or jurisdictions, and approval by one foreign regulatory authority does not ensure approval by regulatory authorities in other foreign countries or jurisdictions or by the FDA. We may not be able to file for regulatory approvals and may not receive necessary approvals to commercialize our products in any market. The failure to obtain these approvals could harm our business materially.

We rely on a limited number of specialty pharmacies for distribution of HETLIOZ[®] in the U.S., and the loss of one or more of these specialty pharmacies or their failure to distribute HETLIOZ[®] effectively would materially harm our business.

HETLIOZ[®] is only available for distribution through a limited number of specialty pharmacies in the U.S. A specialty pharmacy is a pharmacy that specializes in the dispensing of medications for complex or chronic conditions, which often require a high level of patient education and ongoing management. The use of specialty pharmacies involves certain risks, including, but not limited to, risks that these specialty pharmacies will:

- not provide us accurate or timely information regarding their inventories, the number of patients who are using HETLIOZ[®] or complaints about HETLIOZ[®];
- reduce their efforts or discontinue to sell or support or otherwise not effectively sell or support HETLIOZ[®];
- not devote the resources necessary to sell HETLIOZ[®] in the volumes and within the time frames that we expect;
- be unable to satisfy financial obligations to us or others; or
- cease operations.

In addition, if one or more of our specialty pharmacies do not fulfill their contractual obligations to us, or refuse or fail to adequately serve patients, or their agreements are terminated without adequate notice, shipments of HETLIOZ[®], and associated revenues, would be adversely affected. We expect that it would take a significant amount of time if we were required to replace one or more of our specialty pharmacies.

Table of Contents

Our revenues from Fanapt® are substantially dependent on sales through a limited number of wholesalers, and such revenues may fluctuate from quarter to quarter.

We sell Fanapt® primarily through a limited number of pharmaceutical wholesalers in the U.S. The use of pharmaceutical wholesalers involves certain risks, including, but not limited to, risks that these pharmaceutical wholesalers will:

- not provide us accurate or timely information regarding their inventories, demand from wholesaler customers buying Fanapt® or complaints about Fanapt®;
- reduce their efforts or discontinue to sell or support or otherwise not effectively sell or support Fanapt®;
- not devote the resources necessary to sell Fanapt® in the volumes and within the time frames that we expect;
- be unable to satisfy financial obligations to us or others; or
- cease operations.

Additionally, our reliance on a small number of wholesalers could cause revenues to fluctuate from quarter to quarter based on the buying patterns of these wholesalers. In addition, if any of these wholesalers fails to pay on a timely basis or at all, our business, financial condition and results of operations could be materially adversely affected.

We face substantial competition, which may result in others developing or commercializing products before or more successfully than we do.

Our future success will depend on our ability to demonstrate and maintain a competitive advantage with respect to our products and our ability to identify and develop additional products. Large, fully integrated pharmaceutical companies, either alone or together with collaborative partners, have substantially greater financial resources and have significantly greater experience than we do in:

- developing products;
- undertaking preclinical testing and clinical trials;
- obtaining FDA and other regulatory approvals of products; and
- manufacturing, marketing and selling products.

These companies may invest heavily and quickly to discover and develop novel products that could make our products obsolete. Accordingly, our competitors may succeed in obtaining patent protection, receiving FDA or foreign regulatory approval or commercializing superior products or other competing products before we do. Technological developments or the FDA or foreign regulatory approval of new therapeutic indications for existing products may make our products obsolete or may make them more difficult to market successfully, any of which could have a material adverse effect on our business, results of operations and financial condition.

Our products, if successfully developed and approved for commercial sale, will compete with a number of drugs and therapies currently manufactured and marketed by major pharmaceutical and other biotechnology companies. Our products may also compete with new products currently under development by others or with products which may cost less than our products. Physicians, patients, third party payors and the medical community may not accept or utilize any of our products that may be approved. If HETLIOZ®, Fanapt® and our other products, if and when approved, do not achieve significant market acceptance, our business, results of operations and financial condition would be materially adversely affected. We believe the primary competitors for HETLIOZ® and Fanapt® are as follows:

For HETLIOZ® in the treatment of Non-24, there are no FDA approved direct competitors. Sedative-Hypnotic treatments for certain sleep related disorders include, Ambien® (zolpidem) by Sanofi (including Ambien CR®), Lunesta® (eszopiclone) by Sunovion Pharmaceuticals Inc., Sonata® (zaleplon) by Pfizer Inc., Rozerem® (ramelteon) by Takeda Pharmaceuticals Company Limited, Silenor® (doxepin) by Pernix Therapeutics, Belsomra® (suvorexant) by Merck & Co., Inc., generic products such as zolpidem, trazodone and doxepin, and over-the-counter remedies such as Benadryl® and Tylenol PM®. The class of melatonin agonists includes Rozerem® (ramelteon) by Takeda

Pharmaceuticals Company Limited, Valdoxan[®] (agomelatine) by Servier, Circadin[®] (long-acting melatonin) by Neurim Pharmaceuticals Ltd. and the food supplement melatonin. Shift work and excessive sleepiness disorder treatments include Nuvigil[®] (armodafinil) and Provigil[®] (modafinil) both by Teva Pharmaceutical Industries Ltd.

Table of Contents

For Fanapt® in the treatment of schizophrenia, the atypical antipsychotics competitors are Risperdal® (risperidone), including the long acting injectable (LAI) formulation Risperdal Consta® and Invega® (paliperidone), including the LAI formulation Invega® Sustenna®, each by Ortho-McNeil-Janssen Pharmaceuticals, Inc., Zyprexa® (olanzapine), including the LAI formulation Zyprexa® Relprevv™, each by Eli Lilly and Company, Seroquel® and Seroquel XR® (quetiapine) by AstraZeneca PLC, Abilify® (aripiprazole) by Otsuka America Pharmaceutical Inc., Abilify Maintena® (the LAI formulation of Abilify®) by Lundbeck/Otsuka America Pharmaceutical Inc., Geodon® (ziprasidone) by Pfizer Inc., Saphris® (asenapine) by Allergan plc, Latuda® (lurasidone) by Sunovion Pharmaceuticals Inc., Rexulti® (brexpiprazole) by Lundbeck/Otsuka America Pharmaceutical, Inc., Aristada™ (aripiprazole lauroxil) extended-release injectable suspension by Alkermes, Inc., Vraylar™ (cariprazine) by Teva Pharmaceutical Industries Ltd., and generic clozapine, as well as the typical antipsychotics haloperidol, chlorpromazine, thioridazine, and sulpiride (all of which are generic).

Additionally, we may face competition from newly developed generic products. Under the Hatch-Waxman Act newly approved drugs and indications may benefit from a statutory period of non-patent marketing exclusivity. The Hatch-Waxman Act seeks to stimulate competition by providing incentives to generic pharmaceutical manufacturers to introduce non-infringing forms of patented pharmaceutical products and to challenge patents on branded pharmaceutical products. If we are unsuccessful at challenging an Abbreviated New Drug Application (ANDA), filed pursuant to the Hatch-Waxman Act, cheaper generic versions of our products, which may be favored by insurers and third-party payors, may be launched commercially, which would significantly harm our business.

FDA and foreign regulatory approval of our products is uncertain.

The research, testing, manufacturing and marketing of products such as those that we have developed or that we are developing are subject to extensive regulation by federal, state and local government authorities, including the FDA, as well as foreign regulatory authorities in jurisdictions in which we seek approval. To obtain regulatory approval of such products, we must demonstrate to the satisfaction of the applicable regulatory agency that, among other things, the product is safe and effective for its intended use. In addition, we must show that the manufacturing facilities used to produce such products are in compliance with current Good Manufacturing Practices regulations (cGMP).

The process of obtaining FDA and other required regulatory approvals and clearances can take many years and will require us to expend substantial time and capital. Despite the time and expense expended, regulatory approval is never guaranteed. The number of preclinical and clinical trials that will be required for FDA or foreign regulatory approval varies depending on the product, the disease or condition that the product is in development for, and the requirements applicable to that particular product. The FDA or applicable foreign regulatory agency can delay, limit or deny approval of a product for many reasons, including that:

- a product may not be shown to be safe or effective;
- the FDA or foreign agency may interpret data from preclinical and clinical trials in different ways than we do;
- the FDA or foreign agency may not approve our or our partners' manufacturing processes or facilities;
- a product may not be approved for all the indications we request;
- the FDA or foreign agency may change its approval policies or adopt new regulations;
- the FDA or foreign agency may not meet, or may extend, the Prescription Drug User Fee Act Amendments of 2017 (PDUFA-VI) date or its foreign equivalent with respect to a particular NDA or foreign application; and
- the FDA or foreign agency may not agree with our regulatory approval strategies or components of the regulatory filings, such as clinical trial designs.

For example, if certain of our methods for analyzing trial data are not accepted by the FDA or the applicable foreign agency, we may fail to obtain regulatory approval for our products.

Any delay or failure to obtain regulatory approvals for our products will result in increased costs, could diminish competitive advantages that we may attain and would adversely affect the marketing and sale of our products. Other than HETLIOZ® in the U.S. and the 31 countries in Europe covered by the centralized marketing authorization by the EC, and Fanapt® in the U.S., Mexico and Israel, we have not received, and may never receive, regulatory approval to market any of our products in any jurisdiction.

Table of Contents

Even following regulatory approval of our products, the FDA or the applicable foreign agency may impose limitations on the indicated uses for which such products may be marketed, subsequently withdraw approval or take other actions against us, or such products that are adverse to our business. The FDA and foreign agencies generally approve drugs for particular indications. An approval for a more limited indication reduces the size of the potential market for the product. Product approvals, once granted, may be withdrawn or modified if problems occur after initial marketing.

We and our partners also are subject to numerous federal, state, local and foreign laws, regulations and recommendations relating to safe working conditions, laboratory and manufacturing practices, the environment and the use and disposal of hazardous substances used in connection with discovery, research and development work. In addition, we cannot predict the extent to which new governmental regulations might significantly impede the discovery, development, production and marketing of our products. We or our partners may be required to incur significant costs to comply with current or future laws or regulations, and we may be adversely affected by the cost of such compliance or the inability to comply with such laws or regulations.

If our products are determined to be unsafe or ineffective in humans, whether commercially or in clinical trials, our business will be materially harmed.

Despite the FDA's approval of the NDA for HETLIOZ[®] in January 2014 and the NDA for Fanapt[®] in May 2009, the EC's grant of the centralized marketing authorization for HETLIOZ[®] in July 2015, and the positive results of our completed trials for HETLIOZ[®] and Fanapt[®], we are uncertain whether either of these products will ultimately prove to be effective and safe in humans long term and in all uses. Frequently, products that have shown promising results in clinical trials have suffered significant setbacks in later clinical trials or even after they are approved for commercial sale. Future uses of our products, whether in clinical trials or commercially, may reveal that the product is ineffective, unacceptably toxic, has other undesirable side effects, is difficult to manufacture on a large scale, is uneconomical, infringes on proprietary rights of another party or is otherwise not fit for further use. If our products are determined to be unsafe or ineffective in humans, our business will be materially harmed.

Clinical trials for our products are expensive and their outcomes are uncertain. Any failure or delay in completing clinical trials for our products could severely harm our business.

Preclinical studies and clinical trials required to demonstrate the safety and efficacy of our products are time-consuming and expensive and together take several years to complete. Before obtaining regulatory approvals for the commercial sale of any of our products, we must demonstrate through preclinical testing and clinical trials that such product is safe and effective for use in humans. We have incurred, and we will continue to incur, substantial expense for, and devote a significant amount of time to, preclinical testing and clinical trials.

Historically, the results from preclinical testing and early clinical trials often have not predicted results of later clinical trials. A number of new drugs have shown promising results in clinical trials, but subsequently failed to establish sufficient safety and efficacy data to obtain necessary regulatory approvals. Clinical trials conducted by us or by third parties on our behalf may not demonstrate sufficient safety and efficacy to obtain the requisite regulatory approvals for our products. Regulatory authorities may not permit us to undertake any additional clinical trials for our products, may force us to stop any ongoing clinical trials and it may be difficult to design efficacy studies for our products in new indications.

Clinical development efforts performed by us may not be successfully completed, or completed in a timely manner. Completion of clinical trials may take several years or more. The length of time can vary substantially with the type, complexity, novelty and intended use of the products and the size of the prospective patient population. Our ability to enroll patients in, and the commencement and rate of completion of, clinical trials for our products may be affected by many factors, including:

- the size and nature of the patient population;
- the design of the trial protocol for our clinical trials;
- the eligibility and exclusion criteria for the trial in question;
- the availability of competing therapies and competing clinical trials, and physician and patient perception of our product candidates and our other product candidates being studied in relation to these other potential options;

the availability of raw materials and the possibility of raw materials expiring prior to their use;
difficulty in maintaining contact with patients after treatment, resulting in incomplete data;

Table of Contents

poor effectiveness of our products during clinical trials;
unforeseen safety issues or side effects;
the number and location of clinical sites in our clinical trials;
the proximity and availability of clinical trial sites for prospective patients;
the availability of time and resources at the institutions where clinical trials are and will be conducted;
the availability of adequate financing to fund ongoing clinical trial expenses;
the study endpoints that rely on subjective patient reported outcomes; and
governmental or regulatory delays and changes in regulatory requirements and guidelines.

If we fail to complete successfully, or have difficulty enrolling a sufficient number of patients for, our clinical trials, we or they may not receive the regulatory approvals needed to market that product. Any such failure or difficulty could have a material adverse effect on our business.

Our products may cause undesirable side effects or have other properties that could delay, prevent or result in the revocation of their regulatory approval or limit their marketability.

Undesirable side effects caused by our products could interrupt, delay or halt clinical trials and could result in the denial of regulatory approval by the FDA or other regulatory authorities for any or all targeted indications, and in turn prevent us from commercializing or continuing the commercialization of such products and generating revenues from their sale. We will continue to assess the side effect profile of our products in ongoing clinical development programs. However, we cannot predict whether the commercial use of our approved products (or our products in development, if and when they are approved for commercial use) will produce undesirable or unintended side effects that have not been evident in the use of, or in clinical trials conducted for, such products to date. Additionally, incidents of product misuse may occur. These events, among others, could result in product recalls, product liability actions or withdrawals or additional regulatory controls, all of which could have a material adverse effect on our business, results of operations and financial condition.

In addition, if after receiving marketing approval of a product, we or others identify undesirable side effects caused by such product, we could face one or more of the following:

regulatory authorities may require the addition of labeling statements, such as a “black box” warning or a contraindication;
regulatory authorities may withdraw their approval of the product;
we may be required to change the way the product is administered, conduct additional clinical trials or change the labeling of the product; and
our or the product’s reputation may suffer.

Any of these events could prevent us from achieving or maintaining market acceptance of the affected product or could substantially increase the costs and expenses of commercializing the product, which in turn could delay or prevent us from generating significant revenues from its sale.

We have a history of operating losses, anticipate future losses and may never become profitable on a sustained basis. We have been engaged in identifying and developing products since March 2003, which has required, and will continue to require, significant research and development expenditures. The continued commercialization of HETLIOZ® and Fanapt® will require substantial additional expenditures.

As of December 31, 2018, we had an accumulated deficit of \$336.2 million and we cannot estimate with precision the extent of our future losses. We may not succeed in gaining additional market acceptance of HETLIOZ® and Fanapt® in the U.S. and we may not succeed in commercializing HETLIOZ® or Fanapt® outside of the U.S. We may not be profitable even if our products are successfully commercialized. We may be unable to fully develop, obtain regulatory approval for, commercialize, manufacture, market, sell and derive revenue from our products in the timeframes we project, if at all, and our inability to do so would materially and adversely impact the market price of our common stock and our ability to raise capital and continue operations.

Table of Contents

There can be no assurance that we will achieve sustained profitability. Our ability to achieve sustained profitability in the future depends, in part, upon:

- our ability to obtain and maintain regulatory approval for our products both in the U.S. and in foreign countries;
- our level of success in commercializing HETLIOZ® in the U.S., Europe and other jurisdictions in which HETLIOZ® may receive regulatory approval, if any;
- our level of success in raising awareness regarding Non-24 in the medical and patient communities;
- our level of success in marketing and selling Fanapt® in the U.S. and our or our partners' level of success in marketing and selling Fanapt® in Israel and other jurisdictions in which we may receive regulatory approval, if any;
- our ability to enter into and maintain agreements to develop and commercialize our products;
- our ability to develop, have manufactured and market our products;
- our ability to obtain adequate reimbursement coverage for our products from insurance companies, government programs and other third party payors; and
- our ability to obtain additional research and development funding from collaborative partners or funding for our products.

In addition, the amount we spend will impact our profitability. Our spending will depend, in part, upon:

- the costs of our marketing or awareness campaigns;
- the progress of our research and development programs for our products, including clinical trials;
- the time and expense that will be required to pursue FDA and/or foreign regulatory approvals for our products and whether such approvals are obtained on a timely basis, if at all;
- the time and expense required to prosecute, enforce and/or challenge patent and other intellectual property rights;
- the cost of third party manufacturers;
- the number of additional products we pursue;
- how competing technological and market developments affect our products;
- the cost of possible acquisitions of technologies, products, product rights or companies;
- the cost of obtaining licenses to use technology owned by others for proprietary products and otherwise;
- the costs and effects of potential litigation; and
- the costs associated with recruiting and compensating a highly skilled workforce in an environment where competition for such employees may be intense.

We may not achieve all or any of these goals and, thus, we cannot provide assurances that we will ever be profitable on a sustained basis or achieve significant revenues. Even if we do achieve some or all of these goals, we may not achieve significant or sustained commercial success.

Our ability to use net operating loss carryforwards and tax credit carryforwards to offset future taxable income may be limited as a result of transactions involving our common stock.

In general, under Section 382 of the Internal Revenue Code of 1986, as amended (IRC), a corporation that undergoes an "ownership change" is subject to limitations on its ability to utilize its pre-change net operating losses (NOLs) and certain other tax assets (tax attributes) to offset future taxable income. In general, an ownership change occurs if the aggregate stock ownership of certain stockholders increases by more than 50 percentage points over such stockholders' lowest percentage ownership during the testing period (generally three years). Transactions involving our common stock, even those outside our control, such as purchases or sales by investors, within the testing period could result in an ownership change. A limitation on our ability to utilize some or all of our NOLs or credits could have a material adverse effect on our results of operations and cash flows. Ownership changes occurred in the years ending December 31, 2014 and 2008. We believe that the ownership changes in 2014 and 2008 will not impact our ability to utilize NOL and credit carryforwards; however, future ownership changes may cause our existing tax attributes to have additional limitations.

Table of Contents

If we fail to obtain the capital necessary to fund our research and development activities and commercialization efforts, we may be unable to continue operations or we may be forced to share our rights to commercialize our products with third parties on terms that may not be attractive to us.

Our activities will necessitate significant uses of working capital throughout 2019 and beyond. It is uncertain whether our existing funds will be sufficient to meet our operating needs. As of December 31, 2018, our total cash and cash equivalents and marketable securities were \$257.4 million. Our long term capital requirements are expected to depend on many factors, including, among others:

- our level of success in commercializing HETLIOZ® and Fanapt® globally;
- outcomes of ongoing and potential patent litigation;
- costs of developing and maintaining sales, marketing and distribution channels and our ability to sell our products;
- market acceptance of our products;
- costs involved in establishing and maintaining manufacturing capabilities for commercial quantities of our products;
- the number of potential formulations and products in development;
- progress with preclinical studies and clinical trials;
- time and costs involved in obtaining regulatory (including FDA) approval;
- costs involved in preparing, filing, prosecuting, maintaining and enforcing patent, trademark and other intellectual property claims;
- competing technological and market developments;
- costs for recruiting and retaining employees and consultants;
- costs for training physicians; and
- legal, accounting, insurance and other professional and business related costs.

As a result, we may need to raise additional capital to fund our anticipated operating expenses and execute on our business plans. In our capital-raising efforts, we may seek to sell debt securities or additional equity securities, obtain a bank credit facility, or enter into partnerships or other collaboration agreements. The sale of additional equity or debt securities, if convertible, could result in dilution to our stockholders and may also result in a lower price for our common stock. The incurrence of indebtedness would result in increased fixed obligations and could also result in covenants that could restrict our operations. However, we may not be able to raise additional funds on acceptable terms, or at all. If we are unable to secure sufficient capital to fund our planned activities, we may not be able to continue operations, or we may have to enter into partnerships or other collaboration agreements that could require us to share commercial rights to our products to a greater extent or at earlier stages in the drug development process than is currently intended. These partnerships or collaborations, if consummated prior to proof-of-efficacy or safety of a given product, could impair our ability to realize value from that product. If additional financing is not available when required or is not available on acceptable terms, we may be unable to fund our operations and planned growth, develop or enhance our technologies or products, take advantage of business opportunities or respond to competitive market pressures, any of which would materially harm our business, financial condition and results of operations. If our contract research organizations (CROs) do not successfully carry out their duties or if we lose our relationships with contract research organizations, our drug development efforts could be delayed.

Our arrangements with CROs are critical to our success in bringing our products to the market and promoting such marketed products profitably. We are dependent on CROs, third-party vendors and investigators for preclinical testing and clinical trials related to our drug discovery and development efforts and we will likely continue to depend on them to assist in our future discovery and development efforts. These parties are not our employees and we cannot control the amount or timing of resources that they devote to our programs. As such, they may not complete activities on schedule or may not conduct our clinical trials in accordance with regulatory requirements or our stated protocols. The parties with which we contract for execution of our clinical trials play a significant role in the conduct of the trials and the subsequent collection and analysis of data. If they fail to devote sufficient time and resources to our drug development programs or if their performance is substandard, it will delay the development, approval and commercialization of our products. Moreover, these parties may also

Table of Contents

have relationships with other commercial entities, some of which may compete with us. If they assist our competitors, it could harm our competitive position.

Our CROs could merge with or be acquired by other companies or experience financial or other setbacks unrelated to our collaboration that could, nevertheless, materially adversely affect our business, results of operations and financial condition.

If we lose our relationship with any one or more of these parties, we could experience a significant delay in both identifying another comparable provider and then contracting for its services. We may be unable to retain an alternative provider on reasonable terms, if at all. Even if we locate an alternative provider, it is likely that this provider may need additional time to respond to our needs and may not provide the same type or level of service as the original provider. In addition, any provider that we retain will be subject to current Good Laboratory Practices, and similar foreign standards and we do not have control over compliance with these regulations by these providers. Consequently, if these practices and standards are not adhered to by these providers, the development and commercialization of our products could be delayed.

We rely on a limited number of third party manufacturers to formulate and manufacture our products and our business will be seriously harmed if these manufacturers are not able to satisfy our demand and alternative sources are not available.

Our expertise is primarily in the research and development and preclinical and clinical trial phases of product development. We do not have an in-house manufacturing capability and depend completely on a small number of third-party manufacturers and active pharmaceutical ingredient formulators for the manufacture of our products. Therefore, we are dependent on third parties for our formulation development and manufacturing of our products. This may expose us to the risk of not being able to directly oversee the production and quality of the manufacturing process and provide ample commercial supplies to successfully launch and maintain the marketing of our products.

Furthermore, these third party contractors, whether foreign or domestic, may experience regulatory compliance difficulty, mechanical shut downs, employee strikes, or other unforeseeable events that may delay or limit production. Our inability to adequately establish, supervise and conduct (either ourselves or through third parties) all aspects of the formulation and manufacturing processes would have a material adverse effect on our ability to develop and commercialize our products.

We have agreements in place with Patheon Pharmaceuticals Inc. and Patheon Inc. (collectively, Patheon), subsidiaries of Thermo Fisher Scientific, for the manufacture of HETLIOZ[®] and Fanapt[®].

In January 2014, we entered into a manufacturing agreement with Patheon for the manufacture of commercial supplies of HETLIOZ[®] 20 mg capsules at Patheon's Cincinnati, Ohio manufacturing site. In May 2016, we entered into a manufacturing agreement with Patheon for the manufacture of commercial supplies of Fanapt[®] tablets at Patheon's Mississauga, Ontario, Canada manufacturing site. We do not have exclusive long-term agreements with any other third party manufacturers of our products. If our current manufacturers, or any other third party manufacturer, is unable or unwilling to perform its obligations under our manufacturing agreements for any reason, we may not be able to locate alternative acceptable manufacturers or formulators or enter into favorable agreements with them. Any inability to acquire sufficient quantities of our products in a timely manner from these third parties could adversely affect sales of our products, delay clinical trials and prevent us from developing our products in a cost-effective manner or on a timely basis. In addition, manufacturers of our products are subject to cGMP and similar foreign standards and we do not have control over compliance with these regulations by our manufacturers. If one of our contract manufacturers fails to maintain compliance, the production of our products could be interrupted, resulting in delays and additional costs. In addition, if the facilities of such manufacturers do not pass a pre-approval or post-approval plant inspection, the FDA will not grant approval and may institute restrictions on the marketing or sale of our products.

Our manufacturing strategy presents the following additional risks:

because most of our third-party manufacturers and formulators are located outside of the U.S., there may be difficulties in importing our products or their components into the U.S. as a result of, among other things, FDA import

inspections, incomplete or inaccurate import documentation or defective packaging; and because of the complex nature of our products, our manufacturers may not be able to successfully manufacture our products in a cost-effective and/or timely manner.

37

Table of Contents

Materials necessary to manufacture our products may not be available on commercially reasonable terms, or at all, which may delay the development, regulatory approval and commercialization of our products.

We rely on manufacturers to purchase from third-party suppliers the materials necessary to produce our products for clinical trials and commercialization. Suppliers may not sell these materials to such manufacturers at the times we need them or on commercially reasonable terms. We do not have any control over the process or timing of the acquisition of these materials by these manufacturers. Moreover, we currently do not have any agreements for the commercial production of these materials. If the manufacturers are unable to obtain these materials for our clinical trials, product testing, potential regulatory approval of our products and commercial scale manufacturing could be delayed, significantly affecting our ability to further develop and commercialize our products. If we, our manufacturers are unable to purchase these materials for our products, there would be a shortage in supply or the commercial launch of such products would be delayed, which would materially and adversely affect our ability to generate revenues from the sale of such products.

If we cannot identify, or enter into licensing arrangements for, new products, our ability to develop a diverse product portfolio will be limited.

A component of our business strategy is acquiring rights to develop and commercialize products discovered or developed by other pharmaceutical and biotechnology companies for which we may find effective uses and markets through our unique pharmacogenetics and pharmacogenomics expertise for the treatment of central nervous system disorders. Competition for the acquisition of these products is intense. If we are not able to identify opportunities to acquire rights to commercialize additional products, we may not be able to develop a diverse portfolio of products and our business may be harmed. Additionally, it may take substantial human and financial resources to secure commercial rights to promising products. Moreover, if other firms develop pharmacogenetics and pharmacogenomics capabilities, we may face increased competition in identifying and acquiring additional products.

If we lose key scientists or management personnel, or if we fail to recruit additional highly skilled personnel, it will impair our ability to identify, develop and commercialize products.

We are highly dependent on principal members of our management team and scientific staff, including our Chief Executive Officer, Mihael H. Polymeropoulos, M.D. These executives each have significant pharmaceutical industry experience. The loss of any such executives, including Dr. Polymeropoulos, or any other principal member of our management team or scientific staff, would impair our ability to identify, develop and market new products. Our management and other employees may voluntarily terminate their employment with us at any time. The loss of the services of these or other key personnel, or the inability to attract and retain additional qualified personnel, could result in delays to development or approval, loss of sales and diversion of management resources. In addition, we depend on our ability to attract and retain other highly skilled personnel, including research scientists. Competition for qualified personnel is intense, and the process of hiring and integrating such qualified personnel is often lengthy. We may be unable to recruit such personnel on a timely basis, if at all, which would negatively impact our development and commercialization programs.

Additionally, we do not currently maintain “key person” life insurance on the lives of our executives or any of our employees. This lack of insurance means that we may not have adequate compensation for the loss of the services of these individuals.

Product liability lawsuits could divert our resources, result in substantial liabilities and reduce the commercial potential of our products.

The risk that we may be sued on product liability claims is inherent in the development and sale of pharmaceutical products. For example, we face a risk of product liability exposure related to the testing of our products in clinical trials and will face even greater risks upon commercialization of our products. We believe that we may be at a greater risk of product liability claims relative to other pharmaceutical companies because certain of our products are intended to treat central nervous system disorders, among others, and it is possible that we may be held liable for the behavior and actions of patients who use our products. These lawsuits may divert our management from pursuing our business strategy and may be costly to defend. In addition, if we are held liable in any of these lawsuits, we may incur substantial liabilities and we may be forced to limit or forego further commercialization of one or more of our

products. Although we maintain product liability insurance, our aggregate coverage limit under this insurance is \$30.0 million, and while we believe this amount of insurance is sufficient to cover our product liability exposure, these limits may not be high enough to fully cover potential liabilities. As our development activities and commercialization efforts progress and we sell our products, this coverage may be inadequate, we may be unable to obtain adequate coverage at an acceptable cost or we may be unable to get adequate coverage at all or our insurer may disclaim coverage as to a future claim. This could prevent the commercialization or limit the commercial potential

Table of Contents

of our products. Even if we are able to maintain insurance that we believe is adequate, our results of operations and financial condition may be materially adversely affected by a product liability claim. Uncertainties resulting from the initiation and continuation of products liability litigation or other proceedings could have a material adverse effect on our ability to compete in the marketplace. Product liability litigation and other related proceedings may also require significant management time.

E.U. Member States tend to impose strict price controls, which may delay or prevent the further commercial launch or impede the commercial success of HETLIOZ® in Europe and adversely affect our future results of operations.

In the E.U., prescription drug pricing and reimbursement are subject to governmental control and reimbursement mechanisms used by private and public health insurers in the E.U. vary by Member State. For the public systems, reimbursement is determined by guidelines established by the legislature or responsible national authority. As elsewhere, inclusion in reimbursement catalogues focuses on the medical usefulness, need, quality and economic benefits to patients and the health care system. Acceptance for reimbursement comes with cost, use and often volume restrictions, which can vary by Member State. Although we have received marketing authorization for HETLIOZ® from the EC, pricing negotiations with governmental authorities may take a considerable amount of time in those Member States that impose price controls. For example, we launched HETLIOZ® commercially in Germany in August 2016, and concluded our pricing negotiations with German authorities in October 2017. In addition, to obtain reimbursement or pricing approval for HETLIOZ® in some Member States, we may be required to conduct a clinical trial that compares the cost-effectiveness of HETLIOZ®, to other available therapies.

Some Member States require approval of the sale price of a drug before it can be marketed. In many countries, the pricing review period begins after marketing or product licensing approval is granted. In some Member States, prescription pharmaceutical pricing remains subject to continuing governmental control even after initial approval is granted. As a result, we may be subject to lengthy price regulations that delay or prevent the commercial launch of HETLIOZ® in a particular Member State and negatively impact the revenues that are generated from the sale of HETLIOZ® in that country. If reimbursement of HETLIOZ® is unavailable or limited in scope or amount, or if pricing for HETLIOZ® is set at unsatisfactory levels or takes too long to establish, or if there is competition from lower priced cross-border sales, our results of operations will be negatively affected.

We may not be able to effectively market and sell our future products, if approved, in the U.S.

We plan to continue to build our sales and marketing capabilities in the U.S. to commercialize future products, if approved. Our current sales and marketing capabilities in the U.S. may not be adequate to support the commercialization of future products and we would expect to build such capabilities by investing significant amounts of financial and management resources. Furthermore, the cost of establishing and maintaining marketing and sales capabilities may not be justifiable in light of the revenues generated by any future products.

If we are unable to establish and maintain adequate sales and marketing capabilities for future products or are unable to do so in a timely manner, we may not be able to generate product revenues from these products which may prevent us from reaching or maintaining profitability.

Legislative or regulatory reform of the healthcare system in the U.S. may affect our ability to sell our products profitably.

PPACA substantially changes the way healthcare is financed by both governmental and private insurers, and significantly impacts the pharmaceutical industry. PPACA contains a number of provisions that are expected to impact our business and operations, in some cases in ways we cannot currently predict. Changes that may affect our business if we commercialize our products in the future include those governing enrollment in federal healthcare programs, reimbursement changes, rules regarding prescription drug benefits under the health insurance exchanges, and fraud and abuse and enforcement. In addition, continued implementation of PPACA may result in the expansion of new programs such as Medicare payment for performance initiatives, and may impact existing government healthcare programs, such as by improving the physician quality reporting system and feedback program.

Additional provisions of PPACA may negatively affect our revenues from products that we commercialize in the future. For example, as part of PPACA's provisions closing a coverage gap that currently exists in the Medicare Part D prescription drug program, manufacturers of branded prescription drugs are required to provide a 50% discount on

branded prescription drugs dispensed to beneficiaries within this coverage gap. Public Law No. 115-123, also known as the Bipartisan Budget Act of 2018 enacted on February 9, 2018 increased the manufacturer discount from 50% to 70% effective in 2019 for applicable drugs. Medicare Part D is a prescription drug benefit available to all Medicare beneficiaries. It is a voluntary benefit

Table of Contents

that is implemented through private plans under contractual arrangements with the federal government. Similar to pharmaceutical coverage through private health insurance, Part D plans negotiate discounts from drug manufacturers and pass on some of those savings to Medicare beneficiaries. PPACA also makes changes to the Medicaid Drug Rebate Program, discussed in more detail below, including increasing the minimum rebate from 15.1% to 23.1% of the average manufacturer price for most innovator products. On February 1, 2016, CMS, the federal agency that administers the Medicare and Medicaid programs, issued final regulations to implement the changes to the Medicaid Drug Rebate Program under PPACA. These regulations became effective on April 1, 2016.

Many of PPACA's most significant reforms did not take effect until 2014 or thereafter, and the resulting new programs and requirements will continue to evolve in the next few years. Some states have chosen not to expand their Medicaid programs by raising the income limit to 133% of the federal poverty level. In part because not all states have expanded their Medicaid programs, it is unclear whether there will be more uninsured patients than anticipated when Congress passed PPACA. For each state that has opted not to expand its Medicaid program, there will be fewer insured patients overall. An increase in the proportion of uninsured patients who are prescribed products resulting from our proprietary or partnered programs could impact the future sales of any products that are commercialized in the future and our business and results of operations.

Further, in September 2007, the Food and Drug Administration Amendments Act of 2007 was enacted giving the FDA enhanced post-marketing authority including the authority to require post-marketing studies and clinical trials, labeling changes based on new safety information and compliance with Risk Evaluation and Mitigation Strategy (REMS) approved by the FDA. The FDA's exercise of this authority could result in delays or increased costs during product development, clinical trials and regulatory review, increased costs to ensure compliance with post-approval regulatory requirements and potential restrictions on the sale and/or distribution of approved products.

In addition, other legislative changes have been proposed and adopted in the U.S. since PPACA was enacted. On August 2, 2011, the Budget Control Act of 2011 among other things, created measures for spending reductions by Congress. A Joint Select Committee on Deficit Reduction, tasked with recommending a targeted deficit reduction of at least \$1.2 trillion for the years 2013 through 2021, was unable to reach required goals, thereby triggering the legislation's automatic reduction to several government programs. This includes aggregate reductions to Medicare payments to providers of up to 2% per fiscal year, starting in 2013, which will remain in effect until 2024 unless additional congressional action is taken. On January 2, 2013, the American Taxpayer Relief Act of 2012 was signed into law, which, among other things, increased the statute of limitations period for the government to recover overpayments to providers from three to five years. We expect that additional federal healthcare reform measures will be adopted in the future, any of which could limit the amounts that federal and state governments will pay for healthcare products and services, and in turn could significantly reduce the projected value of certain development projects and reduce our profitability.

More recently, the current presidential administration and many members of the U.S. Congress have attempted to repeal and replace PPACA, but they have been unsuccessful in doing so as of the date of the filing of this report. We cannot predict the ultimate form or timing of any repeal or replacement of PPACA or the effect such repeal or replacement would have on our business. Regardless of the impact of repeal or replacement of PPACA on us, the government has shown significant interest in pursuing healthcare reform and reducing healthcare costs.

We expect that additional state and federal healthcare reform measures will be adopted in the future, any of which could limit the amounts that federal and state governments will pay for healthcare products and services, which could result in reduced demand for our products once approved or additional pricing pressures, and may adversely affect our operating results.

Significant developments arising from changes in the political climate could have a material adverse effect on us. Changes in U.S. social, political, regulatory and economic conditions or in laws and policies governing foreign trade, manufacturing, development and investment, and any negative sentiments towards the U.S. as a result of such changes, could adversely affect our business.

Additionally, in June 2016, the United Kingdom (U.K.) held a referendum and voted in favor of leaving the E.U. In February 2017, the U.K. parliament voted to allow the U.K. to exit the E.U. by passing a bill that gives the prime

minister of the U.K. the authority to invoke Article 50 of the Lisbon Treaty. The prime minister of the U.K. has negotiated with the E.U. to provide an orderly transition as the U.K. exits the E.U., but has been unsuccessful in having the U.K. assembly approve the agreement, which has created additional uncertainty. This referendum has created political and economic uncertainty, particularly in the U.K. and the E.U., and this uncertainty may last for years. There are many ways in which our business could be affected, only some of which we can identify.

40

Table of Contents

The referendum, and the likely withdrawal of the U.K. from the E.U. it triggers, has caused and, along with events that could occur in the future as a consequence of the U.K.'s withdrawal, including the possible breakup of the U.K., may continue to cause significant volatility in global financial markets, including in global currency and debt markets. This volatility could cause a slowdown in economic activity in the U.K., Europe or globally, which could adversely affect our operating results and growth prospects. In addition, our business could be negatively affected by new trade agreements between the U.K. and other countries, including the U.S., and by the possible imposition of trade or other regulatory barriers in the U.K., especially if the U.K. withdraws from the E.U. These possible negative impacts, and others resulting from the U.K.'s actual or threatened withdrawal from the E.U., may adversely affect our operating results and growth prospects as well as the manner in which we conduct our business operations in Europe.

U.S. federal income tax reform could adversely affect us.

In December 2017, U.S. federal tax legislation, commonly referred to as the Tax Cuts and Jobs Act (TCJA), was signed into law, significantly reforming the Internal Revenue Code of 1986, as amended (IRC). The TCJA, among other things, includes changes to U.S. federal tax rates, imposes significant additional limitations on the deductibility of interest, allows for the expensing of capital expenditures, puts into effect the migration from a "worldwide" system of taxation to a territorial system and modifies or repeals many business deductions and credits.

We completed our accounting analysis of the impact of the TCJA in the fourth quarter of 2018. However, we continue to examine the impact the TCJA may have on our business. The TCJA is a far-reaching and complex revision to the U.S. federal income tax laws with disparate and, in some cases, countervailing impacts on different categories of taxpayers and industries. The long-term impact of the TCJA on the overall economy, the industries in which we operate and our business cannot be reliably predicted at this early stage of the new law's implementation. There can be no assurance that the TCJA will not negatively impact our operating results, financial condition, and future business operations. The impact of the TCJA is based on our management's current knowledge and assumptions, following consultation with our tax advisors. Because of our valuation allowance in the U.S., ongoing tax effects of the TCJA are not expected to materially change our effective tax rate in future periods. The impact of the TCJA on holders of common stock is uncertain and could be materially adverse. This Annual Report does not discuss any such tax legislation or the manner in which it might affect investors in common stock. Investors should consult with their own tax advisors with respect to such legislation and the potential tax consequences of investing in common stock. New legislation or regulation which could affect our tax burden could be enacted by any governmental authority. We cannot predict the timing or extent of such tax-related developments which could have a negative impact on our financial results. Additionally, we use our best judgment in attempting to quantify and reserve for these tax obligations. However, a challenge by a taxing authority, our ability to utilize tax benefits such as carryforwards or tax credits, or a deviation from other tax-related assumptions may cause actual financial results to deviate from previous estimates.

Future transactions may harm our business or the market price of our stock.

We regularly review potential transactions related to technologies, products or product rights and businesses complementary to our business. These transactions could include:

- mergers;
- acquisitions;
- strategic alliances;
- licensing agreements; and
- co-promotion and similar agreements.

We may choose to enter into one or more of these transactions at any time, which may cause substantial fluctuations in the market price of our stock. Moreover, depending upon the nature of any transaction, we may experience a charge to earnings, which could also materially adversely affect our results of operations and could harm the market price of our stock.

We may undertake strategic acquisitions in the future, and difficulties integrating such acquisitions could damage our ability to achieve or sustain profitability.

Although we have no experience in acquiring businesses, we may acquire businesses or assets that complement or augment our existing business. If we acquire businesses with promising products or technologies, we may not be able to realize

41

Table of Contents

the benefit of acquiring such businesses if we are unable to move one or more products through preclinical and/or clinical development to regulatory approval and commercialization. Integrating any newly acquired businesses or technologies could be expensive and time-consuming, resulting in the diversion of resources from our current business. We may not be able to integrate any acquired business successfully. We cannot assure you that, following an acquisition, we will achieve revenues, specific net income or loss levels that justify the acquisition or that the acquisition will result in increased earnings, or reduced losses, for the combined company in any future period. Moreover, we may need to raise additional funds through public or private debt or equity financing to acquire any businesses, which would result in dilution for stockholders or the incurrence of indebtedness and may not be available on terms which would otherwise be acceptable to us. We may not be able to operate acquired businesses profitably or otherwise implement our growth strategy successfully.

Our operating results may fluctuate significantly due to a number of factors which make our future results difficult to predict and could cause our operating results to fall below expectations or our guidance.

Our operating results will continue to be subject to fluctuations. The revenues we generate and our operating results will be affected by numerous factors, including:

- product sales;
- cost of product sales;
- marketing and other expenses;
- manufacturing or supply issues;
- the timing and amount of royalties or milestone payments;
- our addition or termination of development programs;
- variations in the level of expenses related to our products or future development programs;
- regulatory developments affecting our products or those of our competitors;
- our execution of collaborative, licensing or other arrangements, and the timing of payments we may make or receive under these arrangements;
- any intellectual property infringement or other lawsuit in which we may become involved; and
- the timing and recognition of stock-based compensation expense.

If our operating results fall below the expectations of investors or securities analysts or below any guidance we may provide, the price of our common stock could decline substantially. Furthermore, any fluctuations in our operating results may, in turn, cause the price of our stock to fluctuate substantially. We believe that comparisons of our financial results are not necessarily meaningful and should not be relied upon as an indication of our future performance.

We are increasingly dependent on information technology systems, infrastructure and data. Cybersecurity breaches could expose us to liability, damage our reputation, compromise our confidential information or otherwise adversely affect our business.

We are increasingly dependent upon information technology systems, infrastructure and data. Our computer systems may be vulnerable to service interruption or destruction, malicious intrusion and random attack. Security breaches pose a risk that sensitive data, including intellectual property, trade secrets or personal information may be exposed to unauthorized persons or to the public. Cyber-attacks are increasing in their frequency, sophistication and intensity, and have become increasingly difficult to detect. Cyber-attacks could include the deployment of harmful malware, denial-of service, social engineering and other means to affect service reliability and threaten data confidentiality, integrity and availability. Our key business partners face similar risks, and a security breach of their systems could adversely affect our security posture. While we continue to invest in data protection and information technology, there can be no assurance that our efforts will prevent service interruptions, or identify breaches in our systems, that could adversely affect our business and operations and/or result in the loss of critical or sensitive information, which could result in financial, legal, business or reputational harm.

Our internal computer systems, or those of our collaborator, CROs or other contractors or consultants, may fail or suffer security breaches, which could result in a material disruption of development programs for our product

candidates.

Despite the implementation of security measures, our internal computer systems and those of our collaborators, CROs, and other contractors and consultants are vulnerable to damage from computer viruses, unauthorized access, natural disasters,

42

Table of Contents

terrorism, war and telecommunication and electrical failures. Information security risks have significantly increased in recent years in part due to the proliferation of new technologies and the increased sophistication and activities of organized crime, hackers, terrorists and other external parties, including foreign state actors. As cyber threats continue to evolve, we may be required to expend significant additional resources to continue to modify or enhance our protective measures or to investigate and remediate any information security breaches.

While we have not experienced any such system failure, accident or security breach to date, if such an event were to occur and cause interruptions in our operations, it could result in a material disruption of our independent drug development programs. For example, the loss of clinical trial data from ongoing or future clinical trials for any of our product candidates could result in delays in regulatory approval efforts and significantly increase costs to recover or reproduce the data. Our information security systems are also subject to laws and regulations requiring that we take measures to protect the privacy and security of certain information we gather and use in our business. For example, HIPAA and its implementing regulations impose, among other requirements, certain regulatory and contractual requirements regarding the privacy and security of personal health information. In addition to HIPAA, numerous other federal and state laws, including, without limitation, state security breach notification laws, state health information privacy laws and federal and state consumer protection laws, govern the collection, use, disclosure and storage of personal information. To the extent that any disruption or security breach were to result in a loss of or damage to data or applications, or inappropriate disclosure of confidential or proprietary information or personal health information, we could incur substantial liability, our reputation would be damaged, and the further development of our product candidates could be delayed.

Risks related to intellectual property and other legal matters

Our rights to develop and commercialize our products are subject in part to the terms and conditions of licenses or sublicenses granted to us by other pharmaceutical companies.

Our rights to our product portfolio are based in part on patents and other intellectual property licensed from third-parties. These third parties may generally terminate the license agreements under certain circumstances, including a material breach of the agreement by the other. In the event we terminate our license, or if the third-party terminates our license due to our breach, rights to the intellectual property revert back to the licensor. Any termination or reversion of our rights to develop or commercialize our products would have a material adverse effect on our business.

If our efforts to protect the proprietary nature of the intellectual property related to our products are not adequate, we may not be able to compete effectively in our markets.

Method of treatment patents protect the use of a product for the method specified in the patent claims. This type of patent does not prevent a competitor from making and marketing a product that is identical to our product for a use that is outside the scope of the patented method. Moreover, even if competitors do not actively promote their product for our patented methods, physicians may prescribe these products “off-label.” Although off-label prescriptions may infringe or contribute to the infringement of method of treatment patents, such infringement may be difficult to prevent.

Our patents and patent applications may be challenged or fail to result in issued patents and our existing or future patents may be too narrow to prevent third parties from developing or designing around these patents. In addition, we generally rely on trade secret protection and confidentiality agreements to protect certain proprietary know-how that is not patentable, for processes for which patents are difficult to enforce and for any other elements of our drug development processes that involve proprietary know-how, information and technology that is not covered by patent applications. While we require all of our employees, consultants, advisors and any third parties who have access to our proprietary know-how, information and technology to enter into confidentiality agreements, we cannot be certain that this know-how, information and technology will not be disclosed or that competitors will not otherwise gain access to our trade secrets or independently develop substantially equivalent information and techniques. Further, the laws of some foreign countries do not protect proprietary rights to the same extent as the laws of the U.S. As a result, we may encounter significant problems in protecting and defending our intellectual property both in the U.S. and abroad. If we are unable to protect or defend the intellectual property related to our technologies, we will not be able to establish or

maintain a competitive advantage in our market.

Even if our patent applications issue as patents, they may not issue in a form that will provide us with any meaningful protection, prevent competitors from competing with us or otherwise provide us with any competitive advantage. Our competitors may be able to circumvent our owned or licensed patents by developing similar or alternative technologies or products in a non-infringing manner. Our competitors may seek to market generic versions of any approved products by submitting ANDAs to the FDA in which they claim that patents owned or licensed by us are invalid, unenforceable and/or not infringed. Alternatively, our competitors may seek approval to market their own products similar to or otherwise competitive with our products. In these circumstances, we may need to defend and/or assert our patents, including by filing lawsuits

Table of Contents

alleging patent infringement. In any of these types of proceedings, a court or other agency with jurisdiction may find our patents invalid and/or unenforceable. Even if we have valid and enforceable patents, these patents still may not provide protection against competing products or processes sufficient to achieve our business objectives.

The issuance of a patent is not conclusive as to its inventorship, scope, validity or enforceability, and our owned and licensed patents may be challenged in the courts or patent offices in the U.S. and abroad. Such challenges may result in loss of exclusivity or freedom to operate or in patent claims being narrowed, invalidated or held unenforceable, in whole or in part, which could limit our ability to stop others from using or commercializing similar or identical technology and products, or limit the duration of the patent protection of our technology and products. In addition, given the amount of time required for the development, testing and regulatory review of new product candidates, patents protecting such candidates might expire before or shortly after such candidates are commercialized.

We are, have been, and may continue to be, involved in lawsuits to protect or enforce our patents, which could be expensive, time-consuming and unsuccessful, and third parties may challenge the validity or enforceability of our patents and they may be successful.

Even where laws provide protection or we are able to obtain patents, costly and time-consuming litigation may be necessary to enforce and determine the scope of our proprietary rights, and the outcome of such litigation would be uncertain. Moreover, any actions we may bring to enforce our intellectual property against our competitors could provoke them to bring counterclaims against us, and some of our competitors have substantially greater intellectual property portfolios than we have. To counter infringement or unauthorized use of any patents we may obtain, we may be required to file infringement claims, which can be expensive and time-consuming to litigate. In addition, if we or one of our future collaborators were to initiate legal proceedings against a third party to enforce a patent covering one of our products, current product candidates, or one of our future products, the defendant could counterclaim that the patent is invalid or unenforceable. In patent litigation in the U.S., defendant counterclaims alleging invalidity or unenforceability are commonplace and challenges to validity of patents in certain foreign jurisdictions are common as well. Grounds for a validity challenge could be an alleged failure to meet any of several statutory requirements, including lack of novelty, obviousness, non-enablement or lack of statutory subject matter. Grounds for an unenforceability assertion could be an allegation that someone connected with prosecution of the patent withheld relevant material information from the U.S. Patent and Trademark Office, or made a materially misleading statement, during prosecution. We may assert the patents in Hatch-Waxman litigation against the party filing the ANDA to keep the competing product off of the market until the patents expire but there is a risk that we will not succeed. The party filing the ANDA may also counterclaim in the litigation that our patents are not valid or unenforceable, and the court may find one or more claims of our patents invalid or unenforceable. If this occurs, a competing generic product could be marketed prior to expiration of our patents listed in the FDA's Approved Drug Products with Therapeutic Equivalence Evaluations, commonly known as the "Orange Book," which would harm our business.

We have been and continue to be involved in number of lawsuits with a variety of generic drug manufacturers who have filed ANDAs relating to certain of our patents. We have been successful in asserting that these third parties have infringed certain of our patents, but we may not be successful in such lawsuits in the future. Please see Part I, Item 3, Legal Proceedings, of this annual report on Form 10-K for additional information.

If we do not obtain protection under the Hatch-Waxman Act and similar foreign legislation to extend our patents and to obtain market exclusivity for our products, our business will be harmed.

The Hatch-Waxman Act provides for an extension of patent term for drugs for a period of up to five years to compensate for time spent in development. The HETLIOZ® U.S. new chemical entity (NCE) patent (the primary patent covering the product as a new composition of matter) received the full five-year patent term extension under the Hatch-Waxman Act and so, assuming that we continue to have rights under our license agreement with respect to this product, this patent in the U.S. expires in December 2022. We also own HETLIOZ® U.S. method of treatment patents (directed to the approved method of treatment as described in the HETLIOZ® label approved by the FDA), which expire normally in 2033 and 2034, and a drug substance patent which expires in 2035. The Fanapt® U.S. NCE patent received the full five-year patent term extension under the Hatch-Waxman Act and so this patent in the U.S. expired in November 2016. In November 2013, a patent directed to a method of treating patients with Fanapt® based on

genotype was issued to us by the U.S. Patent and Trademark Office. This patent, which was listed in the Orange Book in January 2015, is set to expire in 2027. Please see the risk factor entitled “We have been, and may be, involved in lawsuits to protect or enforce our patents, which could be expensive, time-consuming and unsuccessful, and third parties may challenge the validity or enforceability of our patents and they may be successful,” and Part I, Item 3, Legal Proceedings, of this annual report on Form 10-K for additional information. See also Note 16, Legal Matters, to the consolidated financial statements included in Part II of this annual report on Form 10-K for

Table of Contents

additional information. Eight additional U.S. patents directed to methods of treating patients with Fanapt[®], which are set to expire between 2025 and 2031, were issued to us in 2015.

A directive in the E.U. provides that companies that receive regulatory approval for a new medicinal product will have a 10-year period of market exclusivity for that product (with the possibility of a further one-year extension), beginning on the date of such European regulatory approval, regardless of when the European NCE patent covering such product expires. A generic version of the approved drug may not be marketed or sold in Europe during such market exclusivity period. This directive is of material importance with respect to Fanapt[®], since the European NCE patent for Fanapt[®] has expired.

Assuming we gain a five-year patent term restoration for tradipitant, and that we continue to have rights under our license agreement with respect to this product, we would have exclusive rights to tradipitant's U.S. NCE patent until 2029. Assuming we gain a five-year patent term restoration for VQW-765, and that we continue to have rights under our license agreement with respect to this product, we would have exclusive rights to VQW-765's U.S. NCE patent until 2028.

However, there is no assurance that we will receive the extensions of our patents or other exclusive rights available under the Hatch-Waxman Act or similar foreign legislation. If we fail to receive such extensions or exclusive rights, our ability to prevent competitors from manufacturing, marketing and selling generic versions of our products will be materially impaired.

We may not be successful in the development of products for our own account.

In addition to our business strategy of acquiring rights to develop and commercialize products, we may develop products for our own account by applying our technologies to off-patent drugs as well as developing our own proprietary molecules. Because we will be funding the development of such programs, there is a risk that we may not be able to continue to fund all such programs to completion or to provide the support necessary to perform the clinical trials, obtain regulatory approvals or market any approved products. We expect the development of products for our own account to consume substantial resources. If we are able to develop commercial products on our own, the risks associated with these programs may be greater than those associated with our programs with collaborative partners. Litigation or third-party claims of intellectual property infringement could require us to divert resources and may prevent or delay our drug discovery and development efforts.

Our commercial success depends in part on our not infringing the patents and proprietary rights of third parties. Third parties may assert that we are employing their proprietary technology without authorization. In addition, third parties may obtain patents in the future and claim that use of our technologies infringes upon these patents.

Furthermore, parties making claims against us may obtain injunctive or other equitable relief, which could effectively block our ability to develop and commercialize one or more of our products. Defense of these claims, regardless of their merit, would divert substantial financial and employee resources from our business. In the event of a successful claim of infringement against us, we may have to pay substantial damages, obtain one or more licenses from third parties or pay royalties. In addition, even in the absence of litigation, we may need to obtain additional licenses from third parties to advance our research or allow commercialization of our products. We may fail to obtain any of these licenses at a reasonable cost or on reasonable terms, if at all. In that event, we would be unable to develop and commercialize further one or more of our products.

In addition, in the future we could be required to initiate litigation to enforce our proprietary rights against infringement by third parties. Prosecution of these claims to enforce our rights against others could divert substantial financial and employee resources from our business. If we fail to enforce our proprietary rights against others, our business will be harmed.

As described elsewhere in these risk factors and in Part I, Item 3, Legal Proceedings, of this annual report on Form 10-K, we have initiated lawsuits to enforce our patent rights against certain generic pharmaceutical companies.

Risks related to our common stock

Our stock price has been highly volatile and may be volatile in the future, and purchasers of our common stock could incur substantial losses.

The realization of any of the risks described in these risk factors or other unforeseen risks could have a dramatic and adverse effect on the market price of our common stock. Between January 1, 2018 and December 31, 2018, the high and low sale prices of our common stock as reported on The Nasdaq Global Market varied between \$13.75 and \$33.44. Additionally, market prices for securities of biotechnology and pharmaceutical companies, including ours, have historically been very

45

Table of Contents

volatile. The market for these securities has from time to time experienced significant price and volume fluctuations for reasons that were unrelated to the operating performance of any one company.

The following factors, in addition to the other risk factors described in this section, may also have a significant impact on the market price of our common stock:

- our level of success in commercializing our products;
- our level of success in executing our commercialization strategies;
- publicity regarding actual or potential testing or trial results relating to products under development by us or our competitors;
- the outcome of regulatory review relating to products under development by us or our competitors;
- regulatory developments in the U.S. and foreign countries;
- developments concerning any collaboration or other strategic transaction we may undertake;
- publicity regarding actual or potential litigation involving us;
- announcements of patent issuances or denials, technological innovations or new commercial products by us or our competitors;
- safety issues with our products or those of our competitors;
- announcements of technological innovations or new therapeutic products or methods by us or others;
- actual or anticipated variations in our quarterly operating results;
- changes in estimates of our financial results or recommendations by securities analysts or failure to meet such financial expectations;
- changes in government regulations or policies;
- changes in patent legislation or patent decisions or adverse changes to patent law;
- additions or departures of key personnel or members of our board of directors;
- the publication of negative research or articles about our company, our business or our products by industry analysts or others;
- market rumors or press reports;
- publicity regarding actual or potential transactions involving us; and
- economic, political and other external factors beyond our control.

We have been and may in the future be subject to litigation, which could harm our stock price, business, results of operations and financial condition.

We have been the subject of litigation in the past and may be subject to litigation in the future. In the past, following periods of volatility in the market price of their stock, many companies, including us, have been the subjects of securities class action litigation. Any such litigation can result in substantial costs and diversion of management's attention and resources and could harm our stock price, business results of operations and financial condition. As a result of these factors, holders of our common stock might be unable to sell their shares at or above the price they paid for such shares.

If there are substantial sales of our common stock, our stock price could decline.

A small number of institutional investors and private equity funds hold a significant number of shares of our common stock. Sales by these stockholders of a substantial number of shares, or the expectation of such sales, could cause a significant reduction in the market price of our common stock.

In addition to our outstanding common stock, as of December 31, 2018 there were a total of 5,682,618 shares of our common stock that we have registered and that we are obligated to issue upon the exercise of currently outstanding options and settlement of restricted stock unit awards granted under our 2006 and 2016 Equity Incentive Plans. Upon the exercise of these options or settlement of the shares underlying these restricted stock units, as the case may be, in accordance with their respective terms, these shares may be resold freely, subject to restrictions imposed on our affiliates under Rule 144. If

Table of Contents

significant sales of these shares occur in short periods of time, these sales could reduce the market price of our common stock. Any reduction in the trading price of our common stock could impede our ability to raise capital on attractive terms, if at all.

If we fail to maintain the requirements for continued listing on The Nasdaq Global Market, our common stock could be delisted from trading, which would adversely affect the liquidity of our common stock and our ability to raise additional capital.

Our common stock is currently listed for quotation on The Nasdaq Global Market. We are required to meet specified listing criteria in order to maintain our listing on The Nasdaq Global Market. If we fail to satisfy The Nasdaq Global Market's continued listing requirements, our common stock could be delisted from The Nasdaq Global Market, in which case we may transfer to The Nasdaq Capital Market, which generally has lower financial requirements for initial listing or, if we fail to meet its listing requirements, the over-the-counter bulletin board. Any potential delisting of our common stock from The Nasdaq Global Market would make it more difficult for our stockholders to sell our stock in the public market and would likely result in decreased liquidity and increased volatility for our common stock.

If securities or industry analysts do not publish research or reports or publish unfavorable research about our business, our stock price and trading volume could decline.

The trading market for our common stock will depend in part on the research and reports that securities or industry analysts publish about us or our business. We currently have research coverage by securities and industry analysts. If one or more of the analysts who covers us downgrades our stock, our stock price would likely decline. If one or more of these analysts ceases coverage of our Company or fails to regularly publish reports on us, interest in the purchase of our stock could decrease, which could cause our stock price or trading volume to decline.

Our common stock may experience future dilution as a result of future equity offerings.

In order to raise additional capital, we may in the future offer additional shares of our common stock or other securities convertible into or exchangeable for our common stock at prices that may not be the same as the price per share in previous offerings. We may sell shares or other securities in any other offering at a price per share that is less than the price per share paid by investors in previous offerings, and investors purchasing shares or other securities in the future could have rights superior to existing stockholders. The price per share at which we sell additional shares of our common stock, or securities convertible or exchangeable into common stock, in future transactions may be higher or lower than the price per share paid by investors.

Our business could be negatively affected as a result of the actions of activist stockholders.

Proxy contests have been waged against many companies in the biopharmaceutical industry, including us, over the last several years. If faced with a proxy contest or other type of shareholder activism, we may not be able to respond successfully to the contest or dispute, which would be disruptive to our business. Even if we are successful, our business could be adversely affected by a proxy contest or shareholder dispute involving us because:

- responding to proxy contests and other actions by activist stockholders can be costly and time-consuming, disrupting operations and diverting the attention of management and employees;
- perceived uncertainties as to future direction may result in the loss of potential acquisitions, collaborations or in-licensing opportunities, and may make it more difficult to attract and retain qualified personnel and business partners; and
- if individuals are elected to a board of directors with a specific agenda, it may adversely affect our ability to effectively and timely implement our strategic plan and create additional value for our stockholders.

These actions could cause our stock price to experience periods of volatility.

Anti-takeover provisions in our charter and bylaws and under Delaware law, and the adoption of a rights plan, could prevent or delay a change in control of our company.

We are a Delaware corporation and the anti-takeover provisions of Section 203 of the Delaware General Corporation Law may discourage, delay or prevent a change in control by prohibiting us from engaging in a business combination with an interested stockholder for a period of three years after the person becomes an interested stockholder, even if a

change of control would be beneficial to our existing stockholders. In addition, our amended and restated certificate of incorporation and bylaws

47

Table of Contents

may discourage, delay or prevent a change in our management or control over us that stockholders may consider favorable. Our amended and restated certificate of incorporation and bylaws:

- authorize the issuance of “blank check” preferred stock that could be issued by our board of directors to thwart a takeover attempt;
- do not provide for cumulative voting in the election of directors, which would allow holders of less than a majority of the stock to elect some directors;
- establish a classified board of directors, as a result of which the successors to the directors whose terms have expired will be elected to serve from the time of election and qualification until the third annual meeting following their election;
- require that directors only be removed from office for cause;
- provide that vacancies on the board of directors, including newly-created directorships, may be filled only by a majority vote of directors then in office;
- limit who may call special meetings of stockholders;
- prohibit stockholder action by written consent, requiring all actions to be taken at a meeting of the stockholders; and
- establish advance notice requirements for nominating candidates for election to the board of directors or for proposing matters that can be acted upon by stockholders at stockholder meetings.

Our board of directors previously adopted a rights agreement, the provisions of which could have had the effect of discouraging, delaying or preventing a change in or management or control over us. While there is no plan to do so at this time, our board of directors may choose to adopt a new rights plan in the future.

Global economic conditions may have an adverse effect on our business.

Financial instability or a general decline in economic conditions in the U.S. and other countries where we sell our product could adversely affect our operations. Economic conditions, and uncertainty as to the general direction of the macroeconomic environment, are beyond our control and may make any necessary debt or equity financing more difficult, more costly, and more dilutive. While we believe we have adequate capital resources to meet current working capital and capital expenditure requirements, an economic downturn or significant increase in our expenses could require additional financing on less than attractive rates or on terms that are excessively dilutive to existing stockholders. Failure to secure any necessary financing in a timely manner and on favorable terms could have a material adverse effect on our stock price and could require us to delay or abandon clinical development plans. Sales of our products will be dependent, in large part, on reimbursement from government health administration authorities, private health insurers, distribution partners and other organizations. In the event of economic decline, these organizations may be unable to satisfy their reimbursement obligations or may delay payment. In addition, federal and state health authorities may reduce Medicare and Medicaid reimbursements, and private insurers may increase their scrutiny of claims. A reduction in the availability or extent of reimbursement could negatively affect our product sales and revenue.

In addition, we rely on third parties for several important aspects of our business. For example, we use third parties for sales, distribution, medical affairs and clinical research, and we rely upon several single source providers of raw materials and contract manufacturers for the manufacture of our products. During challenging and uncertain economic times and in tight credit markets, there may be a disruption or delay in the performance of our third party contractors, suppliers or partners. If such third parties are unable to satisfy their commitments to us, our business and results of operations would be adversely affected.

ITEM 1B. UNRESOLVED STAFF COMMENTS

Not applicable.

Table of Contents

ITEM 2. PROPERTIES

Our headquarters office consists of a total of 43,462 square feet of office space located at 2200 Pennsylvania Avenue, N.W. in Washington, D.C. under operating leases and subleases that expire between 2026 and 2028 and are subject to renewal options. In addition, we have 2,880 square feet of office space for our European headquarters in London under an operating lease that has a lease term ending in 2021 and is subject to a renewal option, and 1,249 square feet of office space in Berlin under a short-term operating lease. We believe that these facilities are suitable and adequate to meet our anticipated near-term needs. We anticipate that following the expiration of the leases, additional or alternative space will be available at commercially reasonable terms.

ITEM 3. LEGAL PROCEEDINGS

Fanapt[®]. In June 2014, we filed suit against Roxane Laboratories, Inc. (Roxane) in the U.S. District Court for the District of Delaware (Delaware District Court). The suit sought an adjudication that Roxane has infringed one or more claims of our U.S. Patent No. 8,586,610 ('610 Patent) by submitting to the U.S. Food and Drug Administration (FDA) an Abbreviated New Drug Application (ANDA) for a generic version of Fanapt[®] prior to the expiration of the '610 Patent in November 2027. In addition, pursuant to a settlement agreement with Novartis Pharma AG (Novartis), we assumed Novartis' patent infringement action against Roxane in the Delaware District Court. That suit alleges that Roxane has infringed one or more claims of U.S. Patent RE39198 ('198 Patent), which is licensed exclusively to us, by filing an ANDA for a generic version of Fanapt[®] prior to the expiration of the '198 Patent in November 2016. These two cases against Roxane were consolidated by agreement of the parties and were tried together in a five-day bench trial that concluded in March 2016. In August 2016, the Delaware District Court ruled that we are entitled to a permanent injunction against Roxane enjoining Roxane from infringing the '610 Patent, including the manufacture, use, sale, offer to sell, sale, distribution or importation of any generic iloperidone product described in the '610 Patent ANDA until the expiration of the '610 Patent in November 2027. If we obtain pediatric exclusivity, the injunction against Roxane would be extended until May 2028 under the Delaware District Court's order. In September 2016, Roxane filed a notice of appeal with the Federal Circuit Court of Appeals (Federal Circuit). In July 2017, Roxane, now a subsidiary of Hikma Pharmaceuticals PLC (Hikma), petitioned the Federal Circuit to substitute Roxane with new defendants West-Ward Pharmaceuticals International Limited and West-Ward Pharmaceuticals Corp. (each of which is a subsidiary of Hikma and both of which are referred to collectively herein as West-Ward). In April 2018, the Federal Circuit affirmed the Delaware District Court's decision that West-Ward infringed the '610 Patent. In June 2018, West-Ward filed with the Federal Circuit a petition seeking rehearing en banc. The Federal Circuit invited us to respond to West-Ward's petition; our response was filed in July 2018. In August 2018, the Federal Circuit denied West-Ward's petition for rehearing. In January 2019, West-Ward filed a petition in the United States Supreme Court for a writ of certiorari seeking reversal of the Federal Circuit's decision. We submitted a response to that petition on February 12, 2019.

In 2015, we filed six separate patent infringement lawsuits in the Delaware District Court against Roxane, Inventia Healthcare Pvt. Ltd. (Inventia), Lupin Ltd. and Lupin Pharmaceuticals, Inc. (Lupin), Taro Pharmaceuticals USA, Inc. and Taro Pharmaceutical Industries, Ltd. (Taro), and Apotex Inc. and Apotex Corp. (Apotex, and collectively with Roxane, Inventia, Lupin and Taro, the Defendants). The lawsuits each seek an adjudication that the respective Defendants infringed one or more claims of the '610 Patent and/or our U.S. Patent No. 9,138,432 ('432 Patent) by submitting to the FDA an ANDA for a generic version of Fanapt[®] prior to the expiration of the '610 Patent in November 2027 or the '432 Patent in September 2025. The Defendants denied infringement and counterclaimed for declaratory judgment of invalidity and noninfringement of the '610 Patent and the '432 Patent. Certain Defendants have since entered into agreements resolving these lawsuits, as discussed below. The remaining matters have been stayed until the later of November 30, 2018 or 14 days after final disposition by the U.S. Supreme Court of any petition for a writ of certiorari filed by West-Ward. We entered into a confidential stipulation with each of Inventia and Lupin regarding any potential launch of Inventia's and Lupin's generic ANDA products.

Lupin filed counter claims for declaratory judgment of invalidity and noninfringement of seven of our method of treatment patents that are listed in the Approved Drug Products with Therapeutic Equivalence Evaluations (Orange Book) related to Fanapt[®] (such seven patents, the Method of Treatment Patents). We have not sued Lupin for

infringing the Method of Treatment Patents. In October 2016, we, along with Lupin, filed a Stipulation of Dismissal in the Delaware District Court pursuant to which Lupin's counterclaims relating to the Method of Treatment Patents were dismissed without prejudice in recognition of an agreement reached between the parties by which we would not assert those patents against Lupin absent certain changes in Lupin's proposed prescribing information for its iloperidone tablets.

Taro and Apotex each entered into separate License Agreements (together, the License Agreements) resolving these lawsuits in October 2016 and December 2016, respectively. The License Agreements grant Taro and Apotex non-exclusive

Table of Contents

licenses to manufacture and commercialize a version of Fanapt® in the U.S. effective November 2027, unless prior to that date we obtain pediatric exclusivity for Fanapt®, in which case, the license will be effective May 2028. Taro and Apotex each may enter the market earlier under certain limited circumstances. The License Agreements, which are subject to review by the U.S. Federal Trade Commission (FTC) and the U.S. Department of Justice (DOJ), provide for a full settlement and release of all claims that are the subject of the respective litigation with Taro and Apotex.

In February 2016, Roxane filed suit against us in the U.S. District Court for the Southern District of Ohio (Ohio District Court). The suit sought a declaratory judgment of invalidity and noninfringement of the Method of Treatment Patents. In December 2016, the Ohio District Court dismissed Roxane's suit without prejudice for lack of personal jurisdiction.

In February 2016, Roxane filed a Petition for Inter Partes Review (IPR) of the '432 Patent with the Patent Trials and Appeals Board (PTAB) of the U.S. Patent and Trademark Office. In August 2016, the PTAB denied the request by Roxane to institute an IPR of the '432 Patent. In September 2016, Roxane filed a Petition for Rehearing with the PTAB. In November 2016, the PTAB denied Roxane's Petition for Rehearing.

HETLIOZ®. In March 2018, we received a Paragraph IV certification notice letter from Teva Pharmaceuticals USA, Inc. (Teva) notifying us that Teva had submitted an ANDA for HETLIOZ® to the FDA requesting approval to market, sell and use a generic version of the 20mg HETLIOZ® capsules for Non-24-Hour-Sleep-Wake Disorder. In its notice letter, Teva alleges that our Orange Book listed U.S. Patent No. RE46,604, U.S. Patent No. 9,060,995, U.S. Patent 9,539,234, U.S. Patent 9,549,913, U.S. Patent 9,730,910 and U.S. Patent 9,885,241 (collectively, the Vanda Patents), which cover methods of using HETLIOZ®, are invalid, unenforceable and/or will not be infringed by Teva's manufacture, use or sale of the product described in its ANDA. We received similar notice letters in April 2018 from MSN Pharmaceuticals Inc. and MSN Laboratories Private Limited (together, MSN) and Apotex.

In April 2018, we filed a patent infringement lawsuit in the Delaware District Court against Teva and in May 2018, we filed patent infringement lawsuits in the Delaware District Court against MSN and Apotex. The lawsuits seek an adjudication that Teva, MSN and Apotex have infringed one or more claims of the Vanda Patents by submitting to the FDA an ANDA for a generic version of HETLIOZ® prior to the expiration of the latest to expire of the Vanda Patents in 2034. The relief requested by us in the lawsuits includes requests for permanent injunctions preventing Teva, MSN and Apotex from infringing the asserted claims of the Vanda Patents by engaging in the manufacture, use, offer to sell, sale, importation or distribution of generic versions of HETLIOZ® before the last expiration date of the Vanda Patents and for an order that any effective date of FDA approval of Teva, MSN, and Apotex's generic versions of HETLIOZ® be a date not earlier than the expiration of the Vanda Patents. The lawsuits automatically preclude the FDA from approving the submitted ANDAs until the earlier of seven and one-half years after the January 2014 approval of our application for New Chemical Entity Status or entry of a district court decision finding the Vanda Patents invalid, unenforceable or not infringed. In June 2018, Teva, MSN and Apotex each answered our complaint, and Teva included counterclaims for declarations that the Vanda Patents are invalid. MSN included additional counterclaims for declarations that the Vanda Patents are not infringed. In July 2018, we answered Teva and MSN's counterclaims, denying their allegations.

In October 2018, we received an additional Paragraph IV certification notice letter from Teva concerning our Orange Book listed U.S. Patent No. 10,071,977, which expires in 2035 (the '977 Patent). In November 2018, we received a similar additional Paragraph IV certification notice letter from Apotex concerning the '977 Patent. In December 2018, we filed amended complaints against Teva, Apotex, and MSN alleging infringement of one or more claims of the '977 Patent. The amended complaints seek an adjudication that Teva, Apotex, and MSN have infringed one or more claims of the '977 Patent by submitting to FDA an ANDA for a generic version of HETLIOZ® prior to the expiration of the '977 Patent. The relief requested by us in the amended complaints includes requests for permanent injunctions preventing Teva, Apotex, and MSN from infringing the asserted claims of the '977 Patent by engaging in the manufacture, use, offer to sell, sale, importation or distribution of generic versions of HETLIOZ® before the expiration date of the '977 Patent and for an order that any effective date of FDA approval of Teva, MSN, and Apotex's generic versions of HETLIOZ® be a date not earlier than the expiration of the '977 Patent. In December 2018, Teva, MSN, and Apotex answered our amended complaints, and Teva and MSN included counterclaims for declarations that

the '977 Patent is invalid, and MSN included an additional counterclaim that the '977 Patent is unenforceable for inequitable conduct. In January 2019, we answered Teva and MSN's counterclaims. A trial date for these lawsuits has been set for September 2020.

In February 2019, we received an additional Paragraph IV certification notice letter from Teva concerning our Orange Book listed U.S. Patent No. 10,149,829, which expires in 2033 (the '829 Patent). In its notice letter, Teva alleges that the '829 Patent, which covers methods of using HETLIOZ[®], is invalid, unenforceable and will not be infringed by Teva's manufacture, use or sale of the product described in its ANDA.

Table of Contents

Other Matters. In April 2018, we submitted a protocol amendment to the FDA, proposing a 52-week open-label extension (OLE) period for patients who had completed the tradipitant Phase II clinical study (2301) in gastroparesis. In May 2018, based on feedback from the FDA, we amended the protocol limiting the duration of treatment in the 2301 study to a total of three months, while continuing to seek further dialogue with the FDA on extending the study duration to 52-weeks. As a part of this negotiation process, in September 2018, we submitted a new follow-on 52-week OLE protocol to the FDA (2302) for patients who had completed the 2301 study. While waiting for further feedback, no patients were ever enrolled in any study beyond 12 weeks. On December 19, 2018, the FDA imposed a partial clinical hold (PCH) on the two proposed studies, stating that we are required first to conduct additional chronic toxicity studies in canines, monkeys or minipigs before allowing patients access in any clinical protocol beyond 12 weeks. The PCH was not based on any safety or efficacy data related to tradipitant. Rather, the FDA informed us that these additional toxicity studies are required by a guidance document. We believe that the FDA does not have legal authority to issue the PCH on the basis of the guidance at issue. We also believe that we have provided the FDA with sufficient information regarding the safety of tradipitant to justify the continued study of tradipitant in patients beyond 12 weeks, in accordance with applicable law and FDA regulations. On February 5, 2019, we filed a lawsuit against the FDA in the U.S. District Court for the District of Columbia (DC District Court), challenging the FDA’s legal authority to issue the PCH, and seeking an order to set it aside. On February 14, 2019, the FDA filed a Motion for Voluntary Remand to the Agency and for a Stay of the Case. We intend to continue vigorously pursuing our interests in the matter. The PCH and Vanda’s plans for tradipitant clinical development are discussed in greater detail in Part I, Item 1, Business, of this annual report on Form 10-K.

On February 4, 2019, a qui tam action filed against us was unsealed by order of the DC District Court entered on January 31, 2019. The qui tam action, United States ex rel. Richard Gardner v. Vanda Pharmaceuticals Inc., which was filed under seal on March 10, 2017, was brought by one of our former employees on behalf of the U.S., 28 states and the District of Columbia (collectively, the Plaintiff States) and the policyholders of certain insurance companies under the Federal False Claims Act and state law equivalents to the Federal False Claims Act and related state laws. The complaint alleges that the Company violated these laws through the promotion and marketing of its products Fanapt® and HETLIOZ®. The complaint seeks, among other things, treble damages, civil penalties for each alleged false claim, and attorneys’ fees and costs.

We have not been served with the qui tam complaint. By virtue of the court having unsealed the case, we learned that on January 29, 2019, the United States, as well as the Plaintiff States, filed notice of their election not to intervene in the qui tam action at this time. The U.S.’ and the Plaintiff States’ election not to intervene does not prevent the plaintiff/relator from litigating this action and the U.S. and the Plaintiff States may later seek to intervene in the action. We intend to vigorously defend ourselves in the litigation if served.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

PART II

ITEM 5. MARKET FOR REGISTRANT’S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES

Our common stock is quoted on The Nasdaq Global Market under the symbol “VNDA.” As of February 12, 2019, there were 7 holders of record of our common stock. The number of holders of record of our common stock does not reflect the number of beneficial holders whose shares are held by depositors, brokers or other nominees.

Market Price of and Dividends on the Registrant’s Common Equity and Related Stockholder Matters

The following graph shows the cumulative five-year total return on our common stock relative to the cumulative total returns of the Nasdaq Composite Index and the Nasdaq Biotechnology Index. An investment of \$100 (with reinvestment of dividends) is assumed to have been made in our common stock and in each of the indexes on December 31, 2013 and its relative performance is tracked through December 31, 2018. The comparisons in the table are required by the Securities and Exchange Commission (SEC) and are not intended to forecast or be indicative of possible future performance of our common stock. We have not paid dividends to our stockholders since the inception

(other than a dividend of preferred share purchase rights which was declared in September 2008) and do not plan to pay dividends in the foreseeable future. The following graph and related information is being furnished solely to accompany this annual report on Form 10-K pursuant to Item 201(e) of Regulation S-K and shall not be deemed “soliciting materials” or to be “filed” with the SEC (other than as provided in

Table of Contents

Item 201), nor shall such information be incorporated by reference into any of our filings under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended, whether made before or after the date hereof, and irrespective of any general incorporation language in any such filing.

Securities Authorized for Issuance under Equity Incentive Plans

Information regarding securities authorized for issuance under equity incentive plans will be contained in our Proxy Statement for the 2019 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the fiscal year ended December 31, 2018, under the captions “Equity Compensation Plan Information” and “Security Ownership of Certain Beneficial Owners and Management” and is incorporated herein by reference pursuant to General Instruction G (3) to Form 10-K.

Table of Contents

ITEM 6. SELECTED CONSOLIDATED FINANCIAL DATA

The consolidated statements of operations data for the years ended December 31, 2018, 2017 and 2016 and the consolidated balance sheet data as of December 31, 2018 and 2017 are each derived from our audited consolidated financial statements included in this annual report on Form 10-K. The consolidated statements of operations data for the years ended December 31, 2015 and 2014, and the consolidated balance sheet data as of December 31, 2016, 2015 and 2014 are each derived from our audited consolidated financial statements not included herein. Our historical results for any prior period are not necessarily indicative of results to be expected in any future period.

The following data should be read together with our consolidated financial statements and accompanying notes and the section entitled Management's Discussion and Analysis of Financial Condition and Results of Operations included in this annual report on Form 10-K.

(in thousands, except for share and per share amounts)	Year Ended December 31,				
	2018 (1)	2017 (1)	2016 (1)	2015 (1)	2014 (1)(2)
Statements of Operations Data					
Total revenues	\$193,118	\$165,083	\$146,017	\$109,925	\$50,157
Operating expenses:					
Cost of goods sold excluding amortization	20,508	17,848	24,712	23,462	1,583
Research and development	43,594	38,547	29,156	29,145	19,230
Selling, general and administrative	105,751	123,841	99,787	84,531	84,644
Intangible asset amortization	1,527	1,750	10,933	12,972	2,254
Gain on arbitration settlement	—	—	—	—	(77,616)
Total operating expenses	171,380	181,986	164,588	150,110	30,095
Income (loss) from operations	21,738	(16,903)	(18,571)	(40,185)	20,062
Other income	3,608	1,472	665	320	124
Income (loss) before income taxes	25,346	(15,431)	(17,906)	(39,865)	20,186
Provision for income taxes	138	136	104	—	—
Net income (loss)	\$25,208	\$(15,567)	\$(18,010)	\$(39,865)	\$20,186
Net income (loss) per share:					
Basic	\$0.50	\$(0.35)	\$(0.41)	\$(0.94)	\$0.58
Diluted	\$0.48	\$(0.35)	\$(0.41)	\$(0.94)	\$0.55
Weighted average shares outstanding:					
Basic	50,859,947	44,735,146	43,449,441	42,250,254	34,774,163
Diluted	53,045,257	44,735,146	43,449,441	42,250,254	36,686,723

Balance Sheet Data	December 31,				
	2018	2017	2016	2015	2014
Cash and cash equivalents	\$61,005	\$33,627	\$40,426	\$50,843	\$60,901
Marketable securities	196,355	109,786	100,914	92,337	68,921
Working capital	246,117	99,494	123,855	115,230	133,944
Total assets	332,130	205,425	210,374	213,050	171,704
Total liabilities	56,708	74,038	79,044	80,023	10,887
Accumulated deficit	(336,218)	(361,426)	(345,859)	(327,849)	(287,984)
Total stockholders' equity	275,422	131,387	131,330	133,027	160,817

- (1) We adopted Accounting Standards Codification (ASC) Subtopic 606 Revenue from Contracts with Customers (ASC 606), effective January 1, 2018, using the modified retrospective method to those contracts which were not completed as of January 1, 2018. Results for the years ended December 31, 2017, 2016,

2015 and 2014 are accounted for in accordance with ASC 605.

Table of Contents

(2) Net income for the year ended December 31, 2014 includes a gain on arbitration settlement of \$77.6 million, or \$2.23 and \$2.12 per basic and diluted share, respectively.

54

Table of Contents

ITEM 7. MANAGEMENT’S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

You should read the following discussion and analysis of our financial condition and results of operations together with Selected Consolidated Financial Data and our consolidated financial statements and related notes appearing in this annual report on Form 10-K. Some of the information contained in this discussion and analysis or set forth elsewhere in this annual report on Form 10-K include historical information and other information with respect to our plans and strategy for our business and contain 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 “Risk Factors” section of this report and elsewhere in this annual report on Form 10-K.

Overview

Vanda Pharmaceuticals Inc. (we, our or Vanda) is a global biopharmaceutical company focused on the development and commercialization of innovative therapies to address high unmet medical needs and improve the lives of patients. We commenced operations in 2003 and our product portfolio includes:

HETLIOZ® (tasimelteon), a product for the treatment of Non-24-Hour Sleep-Wake Disorder (Non-24), was approved by the U.S. Food and Drug Administration (FDA) in January 2014 and launched commercially in the U.S. in April 2014. In July 2015, the European Commission (EC) granted centralized marketing authorization with unified labeling for HETLIOZ® for the treatment of Non-24 in totally blind adults. HETLIOZ® was commercially launched in Germany in August 2016. HETLIOZ® has potential utility in a number of other circadian rhythm disorders and is presently in clinical development for the treatment of jet lag disorder, Smith-Magenis Syndrome (SMS) and Pediatric Non-24. An assessment of new HETLIOZ® clinical opportunities including the treatment of delayed sleep phase disorder and for sleep disorders in patients with neurodevelopmental disorders is ongoing.

Fanapt® (iloperidone), a product for the treatment of schizophrenia, the oral formulation of which was approved by the FDA in May 2009 and launched commercially in the U.S. by Novartis Pharma AG (Novartis) in January 2010. Novartis transferred all the U.S. and Canadian commercial rights to the Fanapt® franchise to us on December 31, 2014. Additionally, our distribution partners launched Fanapt® in Israel in 2014. Fanapt® has potential utility in a number of other disorders. Initial clinical work studying a long acting injectable (LAI) formulation of Fanapt® began in 2018. An assessment of new Fanapt® clinical opportunities including the treatment of bipolar depression is ongoing.

Tradipitant (VLY-686), a small molecule neurokinin-1 receptor (NK-1R) antagonist, which is presently in clinical development for the treatment of chronic pruritus in atopic dermatitis and the treatment of gastroparesis. An assessment of new tradipitant clinical opportunities including the treatment of motion sickness is ongoing.

VTR-297, a small molecule histone deacetylase (HDAC) inhibitor presently in clinical development for the treatment of hematologic malignancies.

Portfolio of Cystic Fibrosis Transmembrane Conductance Regulator (CFTR) activators and inhibitors. An early stage CFTR activator program is planned for the treatment of dry eye and ocular inflammation. In addition, an early stage CFTR inhibitor program is planned for the treatment of secretory diarrhea disorders, including cholera.

QW-765, a Phase II alpha-7 nicotinic acetylcholine receptor partial agonist.

Operational Highlights

Tradipitant - Clinical Development

In December 2018, we announced positive results from a Phase II clinical study (2301) of tradipitant in gastroparesis. Gastroparesis patients treated with tradipitant demonstrated significant improvement in nausea and most of the core gastroparesis symptoms.

We expect to meet with the FDA to further define and confirm the path towards approval of tradipitant in the treatment of patients with gastroparesis, including the planned initiation of a Phase III clinical study in the second quarter of 2019.

Enrollment in the Phase III clinical study (EPIONE) of tradipitant in atopic dermatitis is ongoing. Results are expected in the first half of 2020. A second Phase III clinical study is expected to begin in the first quarter of 2020.

Table of Contents

In January 2019, we initiated a Phase II clinical study of tradipitant in motion sickness. Study results are expected in the second quarter of 2019.

HETLIOZ®

In December 2018, we announced positive results from a clinical study of HETLIOZ® in SMS. SMS patients treated with HETLIOZ® demonstrated significant improvement in overall sleep quality and overall total nighttime sleep duration.

We expect to meet with the FDA in the second quarter of 2019 to confirm the regulatory path forward for HETLIOZ® in the treatment of patients with SMS and expects to file a supplemental New Drug Application (sNDA) in the third quarter of 2019.

In December 2018, we announced that the FDA had accepted the HETLIOZ® sNDA for the treatment of jet lag disorder with a Prescription Drug User Fee Act target action date of August 16, 2019.

We plan in the third quarter of 2019 to initiate a Phase II clinical study of HETLIOZ® in delayed sleep phase disorder (DSPD) in patients who have a mutation in the CRY1 gene which is believed to be causative in a subset of patients with the disorder.

Fanapt®

Enrollment is ongoing in a pharmacokinetic study for the LAI formulation of Fanapt®. A randomized clinical study of the LAI formulation in schizophrenia is planned to begin in 2019.

A randomized study of Fanapt® in bipolar disorder is planned to begin in 2019.

VTR-297

Enrollment is ongoing in a Phase I clinical study (1101) of VTR-297 in hematologic malignancies.

Tradipitant - Partial Clinical Hold and FDA Dispute

In April 2018, we submitted a protocol amendment to the FDA, proposing a 52-week open-label extension (OLE) period for patients who had completed the tradipitant Phase II clinical study (2301) in gastroparesis. In May 2018, based on feedback from the FDA, we amended the protocol limiting the duration of treatment in the 2301 study to a total of three months, while continuing to seek further dialogue with the FDA on extending the study duration to 52-weeks. As a part of this negotiation process, in September 2018, we submitted a new follow-on 52-week OLE protocol to the FDA (2302) for patients who had completed the 2301 study. While waiting for further feedback, no patients were ever enrolled in any study beyond 12 weeks.

On December 19, 2018, the FDA imposed a partial clinical hold (PCH) on the two proposed studies, stating that we are required first to conduct additional chronic toxicity studies in canines, monkeys or minipigs before allowing patients access in any clinical protocol beyond 12 weeks. The PCH was not based on any safety or efficacy data related to tradipitant. Rather, the FDA informed us that these additional toxicity studies are required by a guidance document.

On February 5, 2019, we filed a lawsuit against the FDA in the United States District Court for the District of Columbia, challenging the FDA's legal authority to issue the PCH, and seeking an order to set it aside (see Part I, Item 3, Legal Proceedings of this annual report on Form 10-K for additional information).

We do not expect the PCH to have any material impact on our ongoing clinical studies in atopic dermatitis and motion sickness or the planned Phase III study in gastroparesis. At present, the PCH has not had any impact on the potential timing of an NDA filing or approval for these indications. We will continually reassess this situation as events unfold. Since we began operations in March 2003, we have devoted substantially all of our resources to the in-licensing, clinical development and commercialization of our products. Our ability to generate meaningful product sales and achieve profitability largely depends on our level of success in commercializing HETLIOZ® and Fanapt® in the U.S. and Europe, on our ability, alone or with others, to complete the development of our products, and to obtain the regulatory approvals for and to manufacture, market and sell our products. The results of our operations will vary significantly from year-to-year and quarter-to-quarter and depend on a number of factors, including risks related to our business, risks related to our industry, and other risks which are detailed in Risk Factors reported in Item 1A of Part I of this annual report on Form 10-K.

Table of Contents

As described in Part I, Item 3, Legal Proceedings, of this annual report on Form 10-K, we have initiated lawsuits to enforce our patent rights against certain generic pharmaceutical companies.

Critical Accounting Policies

The preparation of our consolidated financial statements requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the date of our financial statements, as well as the reported revenues and expenses during the reported periods. We base our estimates on historical experience and on various other factors that we believe are reasonable under the circumstances, the results of which form the basis for making judgments about the carrying value of assets and liabilities that are not apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions. A summary of our significant accounting policies appears in the notes to our audited consolidated financial statements for the year ended December 31, 2018 included in this annual report on Form 10-K. However, we believe that the following accounting policies are important to understanding and evaluating our reported financial results, and we have accordingly included them in this discussion.

Inventory. Inventory, which is recorded at the lower of cost or net realizable value, includes the cost of third-party manufacturing and other direct and indirect costs and is valued using the first-in, first-out method. We capitalize inventory costs associated with our products upon regulatory approval when, based on management's judgment, future commercialization is considered probable and the future economic benefit is expected to be realized; otherwise, such costs are expensed as research and development. Inventory not expected to be sold within 12 months following the balance sheet date are classified as non-current.

Net Product Sales. Our net product sales consist of sales of HETLIOZ[®] and sales of Fanapt[®]. In accordance with Accounting Standards Codification (ASC) Subtopic 606 Revenue from Contracts with Customers (ASC 606), which we adopted January 1, 2018, we account for a contract when it has approval and commitment from both parties, the rights of the parties are identified, payment terms are identified, the contract has commercial substance and collectability of consideration is probable. We recognize revenue when control of the product is transferred to the customer in an amount that reflects the consideration we expect to be entitled to in exchange for those product sales, which is typically once the product physically arrives at the customer. Sales, value add, and usage-based taxes are excluded from revenues.

HETLIOZ[®] is only available in the U.S. for distribution through a limited number of specialty pharmacies, and is not available in retail pharmacies. Fanapt[®] is available in the U.S. for distribution through a limited number of wholesalers and is available in retail pharmacies. We invoice and record revenue when customers, specialty pharmacies and wholesalers, receive product from the third-party logistics warehouse which is the point at which control is transferred to the customer. Revenues and accounts receivable are concentrated with these customers.

Outside the U.S., we commercially launched HETLIOZ[®] in Germany in August 2016. We have also entered into a distribution agreement with Megapharm Ltd. for the commercialization of Fanapt[®] in Israel.

The transaction price is determined based upon the consideration to which we will be entitled in exchange for transferring product to the customer. Our product sales are recorded net of applicable discounts, rebates, chargebacks, service fees, co-pay assistance and product returns that are applicable for various government and commercial payors. We estimate the amount of variable consideration that should be included in the transaction price utilizing the most likely amount method and update our estimate at each reporting date. Variable consideration is included in the transaction price if, in our judgment, it is probable that a significant future reversal of cumulative revenue under the contract will not occur. Reserves for variable consideration for rebates, chargebacks and co-pay assistance are based upon the insurance benefits of the end customer, which are estimated using historical activity and, where available, actual and pending prescriptions for which we have validated the insurance benefits. Reserves for variable consideration are classified as product revenue allowances on the consolidated balance sheets, with the exception of prompt-pay discounts which are classified as reductions of accounts receivable. The reserve for product returns for products that may not be returned for a period of greater than one year from the balance sheet date is classified other non-current liabilities on the consolidated balance sheets. Uncertainties related to variable consideration are generally resolved in the quarter subsequent to period end, with the exception of product returns which are resolved during the

product expiry period specified in the customer contract. We currently record sales allowances for the following:
Prompt-pay: Specialty pharmacies and wholesalers are offered discounts for prompt payment. We expect that the specialty pharmacies and wholesalers will earn prompt payment discounts and, therefore, deduct the full amount of these discounts from total product sales when revenues are recognized.

Table of Contents

Rebates: Allowances for rebates include mandated and supplemental discounts under the Medicaid Drug Rebate Program as well as contracted rebate programs with other payors. Rebate amounts owed after the final dispensing of the product to a benefit plan participant are based upon contractual agreements or legal requirements with public sector benefit providers, such as Medicaid. The allowance for rebates is based on statutory or contracted discount rates and expected patient utilization.

Chargebacks: Chargebacks are discounts that occur when contracted indirect customers purchase directly from specialty pharmacies and wholesalers. Contracted indirect customers, which currently consist primarily of Public Health Service institutions, non-profit clinics, and Federal government entities purchasing via the Federal Supply Schedule, generally purchase the product at a discounted price. The specialty pharmacy or wholesaler, in turn, charges back the difference between the price initially paid by the specialty pharmacy or wholesaler and the discounted price paid to the specialty pharmacy or wholesaler by the contracted customer.

Medicare Part D Coverage Gap: Medicare Part D prescription drug benefit mandates manufacturers to fund approximately 50% of the Medicare Part D insurance coverage gap for prescription drugs sold to eligible patients through 2018. Public Law No. 115-123, also known as the Bipartisan Budget Act of 2018 enacted on February 9, 2018 increased the manufacturer discount from 50% to 70% effective in 2019 for applicable drugs. We account for the Medicare Part D coverage gap using a point of sale model. Estimates for expected Medicare Part D coverage gap are based in part on historical activity and, where available, actual and pending prescriptions for we have validated the insurance benefits.

Service Fees: We receive sales order management, data and distribution services from certain customers. These fees are based on contracted terms and are known amounts. We accrue service fees at the time of revenue recognition, resulting in a reduction of product sales and the recognition of an accrued liability, unless it is a payment for a distinct good or service from the customer in which case the fair value of those distinct goods or services are recorded as selling, general and administrative expense.

Co-payment Assistance: Patients who have commercial insurance and meet certain eligibility requirements may receive co-payment assistance. Co-pay assistance utilization is based on information provided by our third-party administrator.

Product Returns: Consistent with industry practice, we generally offer direct customers a limited right to return as defined within our returns policy. We consider several factors in the estimation process, including historical return activity, expiration dates of product shipped to specialty pharmacies, inventory levels within the distribution channel, product shelf life, prescription trends and other relevant factors. We do not expect returned goods to be resalable. There was no right of return asset as of December 31, 2018 or 2017.

The following table summarizes sales discounts and allowance activity as of and for the years ended December 31, 2018, 2017 and 2016:

(in thousands)	Rebates & Chargebacks	Discounts, Returns and Other	Total
Balances at December 31, 2015	\$ 33,423	\$ 3,557	\$36,980
Provision related to current period sales	56,133	19,451	75,584
Adjustments for prior period sales	(1,842)	790	(1,052)
Credits/payments made	(56,512)	(17,340)	(73,852)
Balances at December 31, 2016	31,202	6,458	37,660
Provision related to current period sales	53,406	23,751	77,157
Adjustments for prior period sales	(3,883)	1,362	(2,521)
Credits/payments made	(60,496)	(24,214)	(84,710)
Balances at December 31, 2017	20,229	7,357	27,586
Provision related to current period sales	59,317	23,796	83,113
Adjustments for prior period sales	811	370	1,181

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Credits/payments made	(58,223)	(21,823)	(80,046)
Balances at December 31, 2018	\$ 22,134		\$ 9,700		\$31,834	

The provision for rebates and chargebacks of \$59.3 million and \$53.4 million for the years ended December 31, 2018 and 2017, respectively, primarily represents Medicaid rebates applicable to sales of Fanapt® and HETLIOZ®. The provision for

58

Table of Contents

discounts, returns and other of \$23.8 million for each of the years ended December 31, 2018 and 2017, primarily represents wholesaler distribution fees applicable to sales of Fanapt® and, to a lesser extent, estimated product returns of Fanapt®, as well as co-pay assistance costs and prompt pay discounts applicable to the sales of both HETLIOZ® and Fanapt®.

Stock-based compensation. Compensation costs for all stock-based awards to employees and directors are measured based on the grant date fair value of those awards and recognized over the period during which the employee or director is required to perform service in exchange for the award. We use the Black-Scholes-Merton option pricing model to determine the fair value of stock options. The determination of the fair value of stock options on the date of grant using an option pricing model is affected by our stock price as well as assumptions regarding a number of complex and subjective variables. These variables include the expected stock price volatility over the expected term of the awards, actual and projected employee stock option exercise behaviors, risk-free interest rate and expected dividends. Expected volatility rates are based on the historical volatility of our publicly traded common stock and other factors. The risk-free interest rates are based on the U.S. Treasury yield for a period consistent with the expected term of the option in effect at the time of the grant. We have not paid dividends to our stockholders since our inception (other than a dividend of preferred share purchase rights which was declared in September 2008) and do not plan to pay dividends in the foreseeable future. As stock-based compensation expense recognized in the consolidated statements of operations is based on awards ultimately expected to vest, it has been reduced for estimated forfeitures. Forfeitures are estimated at the time of grant and revised, if necessary, in subsequent periods if actual forfeitures differ from those estimates.

Research and development expenses. Research and development expenses consist primarily of fees for services provided by third parties in connection with the clinical trials, costs of contract manufacturing services for clinical trial use, milestone payments made under licensing agreements prior to regulatory approval, costs of materials used in clinical trials and research and development, costs for regulatory consultants and filings, depreciation of capital resources used to develop products, related facilities costs, and salaries, other employee-related costs and stock-based compensation for research and development personnel. We expense research and development costs as they are incurred for products in the development stage, including manufacturing costs and milestone payments made under license agreements prior to FDA approval. Upon and subsequent to FDA approval, manufacturing and milestone payments made under license agreements are capitalized. Milestone payments are accrued when it is deemed probable that the milestone event will be achieved. Costs related to the acquisition of intellectual property are expensed as incurred if the underlying technology is developed in connection with our research and development efforts and has no alternative future use.

Clinical trials are inherently complex, often involve multiple service providers, and can include payments made to investigator physicians at study sites. Because billing for services often lags delivery of service by a substantial amount of time, we often are required to estimate a significant portion of our accrued clinical expenses. Our assessments include, but are not limited to: (i) an evaluation by the project manager of the work that has been completed during the period, (ii) measurement of progress prepared internally and/or provided by the third-party service provider, (iii) analyses of data that justify the progress, and (iv) management's judgment. In the event that we do not identify certain costs that have begun to be incurred or we under- or over-estimates the level of services performed or the costs of such services, our reported expenses for such period would be too low or too high.

Selling, general and administrative expenses. Selling, general and administrative expenses consist primarily of salaries, other related costs for personnel, including stock-based compensation, related to executive, finance, accounting, information technology, marketing, medical affairs and human resource functions. Other costs include facility costs not otherwise included in research and development expenses and fees for marketing, medical affairs, legal, accounting and other professional services. Selling, general and administrative expenses also include third party expenses incurred to support sales, business development, and other business activities. Additionally, selling, general and administrative expenses included our estimate for the annual Patient Protection and Affordable Care fee.

Intangible Assets. Our intangible assets consist of capitalized license costs for products approved by the FDA. We amortize our intangible assets on a straight-line basis over estimated useful economic life of the related product

patents. We assess the impairment of intangible assets whenever events or changes in circumstances indicate that the carrying value may not be recoverable. Factors we consider important which could trigger an impairment review include significant underperformance relative to expected historical or projected future operating results, a significant adverse change in legal or regulatory factors that could affect the value or patent life including our ability to defend and enforce patent claims and other intellectual property rights and significant negative industry or economic trends. When we determine that the carrying value of our intangible assets may not be recoverable based upon the existence of one or more of the indicators of impairment, we measure any impairment based on the amount that carrying value exceeds fair value. No impairments have been recognized on our intangible assets.

Table of Contents

Income taxes. We assess the need for a valuation allowance against its deferred tax asset each quarter through the review of all available positive and negative evidence. Deferred tax assets are reduced by a tax valuation allowance when, in the opinion of management, it is more likely than not that some portion or all of the deferred tax assets will not be realized. The fact that we have historically generated pretax losses in the U.S. serves as strong evidence that it is more likely than not that deferred tax assets in the U.S. will not be realized in the future. Therefore, we have recorded a full tax valuation allowance against all net deferred tax assets in the U.S. as of December 31, 2018 and 2017. A reduction of the valuation allowance, in whole or in part, would result in a non-cash income tax benefit during the period of reduction. The potential timing and amount of any future valuation allowance release has yet to be determined and requires an analysis that is highly dependent upon historical and future projected earnings, among other factors. Any such adjustment could have a material impact our finance position and results of operations.

Recent Accounting Pronouncements

See Note 2, Summary of Significant Accounting Policies, to the consolidated financial statements included in Part II of this annual report on Form 10-K for information on recent accounting pronouncements.

Results of Operations

We anticipate that our results of operations will fluctuate for the foreseeable future due to several factors, including our and our partners' ability to successfully commercialize our products, any possible payments made or received pursuant to license or collaboration agreements, progress of our research and development efforts, the timing and outcome of clinical trials and related possible regulatory approvals. Since our inception, we have incurred significant losses resulting in an accumulated deficit of \$336.2 million as of December 31, 2018. Our total stockholders' equity was \$275.4 million as of December 31, 2018.

Year ended December 31, 2018 compared to year ended December 31, 2017

Revenues. Total revenues increased by \$28.0 million, or 17%, to \$193.1 million for the year ended December 31, 2018 compared to \$165.1 million for the year ended December 31, 2017. Revenues were as follows:

(in thousands)	Year Ended December 31,			
	2018	2017	Net Change	Percent
HETLIOZ [®] product sales, net	\$115,835	\$89,978	\$25,857	29 %
Fanapt [®] product sales, net	77,283	75,105	2,178	3 %
	\$193,118	\$165,083	\$28,035	17 %

HETLIOZ[®] product sales, net increased by \$25.9 million, or 29%, to \$115.8 million for the year ended December 31, 2018 compared to \$90.0 million for the year ended December 31, 2017. The increase to net product sales was attributable to an increase in volume and an increase in price net of deductions.

Fanapt[®] product sales, net increased by \$2.2 million, or 3%, to \$77.3 million for the year ended December 31, 2018 compared to \$75.1 million for the year ended December 31, 2017. The increase to net product sales was attributable to an increase in price net of deductions.

Cost of goods sold. Cost of goods sold increased by \$2.7 million, or 15%, to \$20.5 million for the year ended December 31, 2018 compared to \$17.8 million for the year ended December 31, 2017. Cost of goods sold includes third party manufacturing costs of product sold, third party royalty costs and distribution and other costs. Third party royalty costs were 10% of net sales of HETLIOZ[®] in the U.S. and 9% of net sales of Fanapt[®].

In addition to third party royalty costs, HETLIOZ[®] and Fanapt[®] cost of goods sold as a percentage of revenue depends upon our cost to manufacture inventory at normalized production levels with our third party manufacturers. We expect that, in the future, total HETLIOZ[®] manufacturing costs included in cost of goods sold will continue to be less than 2% of our net HETLIOZ[®] product sales. We expect that, in the future, total U.S. Fanapt[®] manufacturing costs included in cost of goods sold will continue to be less than 3% of our net U.S. Fanapt[®] product sales.

Research and development expenses. Research and development expenses increased by \$5.0 million, or 13%, to \$43.6 million for the year ended December 31, 2018 compared to \$38.5 million for the year ended December 31, 2017. The increase

Table of Contents

was primarily due to an increase in clinical trial expenses associated with the tradipitant gastroparesis and chronic pruritus in atopic dermatitis programs, preclinical expenses associated with the CFTR programs, as well as clinical manufacturing expenses for our Fanapt LAI program, partially offset by a decrease in expenses associated with the HETLIOZ® clinical programs and a \$2.0 million expense accrued during the year ended December 31, 2017 for a milestone obligation payable to Eli Lilly and Company (Lilly) for tradipitant.

The following table summarizes the costs of our product development initiatives for the year ended December 31, 2018 and 2017.

(in thousands)	Year Ended	
	2018	2017
Direct project costs (1)		
HETLIOZ®	12,709	16,894
Fanapt®	3,438	2,179
Tradipitant	16,978	11,645
VTR-297	2,190	1,978
CFTR	3,870	1,949
Other	619	425
	39,804	35,070
Indirect project costs (1)		
Stock-based compensation	1,290	1,152
Other indirect overhead	2,500	2,325
	3,790	3,477
Total research and development expense	\$43,594	\$38,547

We record direct costs, including personnel costs and related benefits, on a project-by-project basis. Many of our research and development costs are not attributable to any individual project because we share resources across several development projects. We record indirect costs that support a number of our research and development activities in the aggregate, including stock-based compensation.

We expect to incur significant research and development expenses as we continue to develop our products. In addition, we expect to incur licensing costs in the future that could be substantial, as we continue our efforts to expand our product pipeline.

Selling, general and administrative expenses. Selling, general and administrative expenses decreased by \$18.1 million, or 15%, to \$105.8 million for the year ended December 31, 2018 compared to \$123.8 million for the year ended December 31, 2017. The decrease was primarily the result of lower spend on Non-24 direct to consumer advertising and sales force costs relating to HETLIOZ® and Fanapt® in the U.S.

Intangible asset amortization. Intangible asset amortization was \$1.5 million for the year ended December 31, 2018 compared to \$1.8 million for the year ended December 31, 2017.

Other income. Other income was \$3.6 million for the year ended December 31, 2018 compared to \$1.5 million for the year ended December 31, 2017. The increase was primarily the result of an increase in investment income due to an increase in our balance of marketable securities from the proceeds of the public offering of our common stock completed in March 2018 and a higher yield on investments.

Provision for income taxes. The provision for income taxes was \$0.1 million for each of the years ended December 31, 2018 and 2017. As a result of the tax valuation allowance against deferred tax assets in the U.S., there was no expense (benefit) for U.S. federal income taxes associated with the income (loss) before income taxes for the years ended December 31, 2018 and 2017. Taxes have been recorded related to certain U.S. state jurisdictions and non-U.S. income for the years ended December 31, 2018 and 2017.

The effective tax rate for the year ended December 31, 2017 included our estimate of the effect of the Tax Cuts and Jobs Act (TCJA). The adjustment that was recorded results in no tax expense as it is fully offset by a change in our valuation

Table of Contents

allowance. In the fourth quarter of 2018 we completed our accounting of the income tax effects of the TCJA. No material measurement period adjustments were recorded in 2018 to adjust estimated effects of the TCJA that were recorded in 2017. Immaterial measurement period adjustments that were recorded resulted in no tax expense as they were fully offset by a change in our valuation allowance.

Year ended December 31, 2017 compared to year ended December 31, 2016

Revenues. Total revenues increased by \$19.1 million, or 13%, to \$165.1 million for the year ended December 31, 2017 compared to \$146.0 million for the year ended December 31, 2016. During the years ended December 31, 2017 and 2016, revenues consisted of the following:

(in thousands)	Year Ended December 31,			
	2017	2016	Net Change	Percent
HETLIOZ [®] product sales, net	\$89,978	\$71,671	\$ 18,307	26 %
Fanapt [®] product sales, net	75,105	74,346	759	1 %
	\$165,083	\$146,017	\$ 19,066	13 %

HETLIOZ[®] product sales, net increased by \$18.3 million, or 26%, to \$90.0 million for the year ended December 31, 2017 compared to \$71.7 million for the year ended December 31, 2016. The increase to net product sales was attributable to an increase in volume and, to a lesser extent, an increase to price net of deductions.

Fanapt[®] product sales, net increased by \$0.8 million, or 1%, to \$75.1 million for the year ended December 31, 2017 compared to \$74.3 million for the year ended December 31, 2016. The increase to net product sales was attributable to an increase in price net of deductions and partially offset by a decrease in volume.

Cost of goods sold. Cost of goods sold was \$17.8 million for the year ended December 31, 2017 compared to \$24.7 million for the year ended December 31, 2016. Cost of goods sold includes third party manufacturing costs of product sold, third party royalty costs and distribution and other costs. Third party royalty costs are 10% of net sales of HETLIOZ[®]. Third party royalty costs were 23% of net U.S. sales of Fanapt[®] through November 15, 2016 and 9% thereafter. The decrease was primarily the result of the change in the royalty rate on Fanapt[®] sales partially offset by an increase in HETLIOZ[®] third party royalty costs due to increase in revenue.

In addition to third party royalty costs, HETLIOZ[®] and Fanapt[®] cost of goods sold as a percentage of revenue depends upon our cost to manufacture inventory at normalized production levels with our third party manufacturers. We expect that, in the future, total HETLIOZ[®] manufacturing costs included in cost of goods sold will continue to be less than 2% of our net HETLIOZ[®] product sales. We expect that, in the future, total U.S. Fanapt[®] manufacturing costs included in cost of goods sold will continue to be less than 4% of our net U.S. Fanapt[®] product sales.

Research and development expenses. Research and development expenses were \$38.5 million and \$29.2 million for the years ended December 31, 2017 and 2016, respectively. Expenses for tradipitant for the year ended December 31, 2017 include an accrued expense of \$2.0 million for a milestone obligation that is payable to Lilly upon enrollment of the first subject into a Phase III study for tradipitant. The likelihood of achieving this milestone was determined to be probable during 2017. As a result, the future obligation of \$2.0 million tied to such milestone was recorded as research and development expense. Clinical trial expenses associated with the HETLIOZ[®] jet lag disorder program and the tradipitant gastroparesis program increased for the year ended December 31, 2017 compared to year ended December 31, 2016. In addition, during the year ended December 31, 2017, expenses include a \$1.0 million initial license fee to develop and commercialize a portfolio of CFTR activators and inhibitors. These increases were partially offset by a decrease in indirect project costs reflecting lower stock-based compensation expense.

Table of Contents

The following table summarizes the costs of our product development initiatives for the year ended December 31, 2017 and 2016.

(in thousands)	Year Ended December 31,	
	2017	2016
Direct project costs (1)		
HETLIOZ®	\$ 16,894	\$ 12,658
Fanapt®	2,179	2,598
Tradipitant	11,645	7,010
VTR-297	1,978	2,218
CFTR	1,949	—
Other	425	—
	35,070	24,484
Indirect project costs (1)		
Stock-based compensation	1,152	2,087
Other indirect overhead	2,325	2,585
	3,477	4,672
Total research & development expense	\$ 38,547	\$ 29,156

We record direct costs, including personnel costs and related benefits, on a project-by-project basis. Many of our research and development costs are not attributable to any individual project because we share resources across several development projects. We record indirect costs that support a number of our research and development activities in the aggregate, including stock-based compensation expense.

We expect to incur significant research and development expenses as we continue to develop our products. In addition, we expect to incur licensing costs in the future that could be substantial, as we continue our efforts to expand our product pipeline.

Selling, general and administrative expenses. Selling, general and administrative expenses increased by \$24.0 million, or 24%, to \$123.8 million for the year ended December 31, 2017 compared to \$99.8 million for the year ended December 31, 2016. The increase was primarily the result of the Fanapt® sales force expansion, marketing efforts around Fanapt® in the U.S. and HETLIOZ® in the U.S. and Europe and, to a lesser extent, an increase in stock-based compensation expense, partially offset by a decrease in legal fees associated with ongoing patent litigation.

Intangible asset amortization. Intangible asset amortization was \$1.8 million for the year ended December 31, 2017 compared to \$10.9 million for the year ended December 31, 2016. Amortization of intangible assets relating to Fanapt® was completed in November 2016 and had amounted to \$9.2 million for the year ended December 31, 2016. The useful life estimation for the Fanapt® intangible asset was based on the market participant methodology prescribed by ASC 805, and therefore does not reflect the impact of additional Fanapt® patents solely owned by us with varying expiration dates, the latest of which is December 2031. We expect that annual amortization of capitalized intangible asset costs relating to HETLIOZ® will amount to approximately \$1.6 million in future years until the final expiration of the related product patents in 2034.

Provision for income taxes. The provision for income taxes was \$0.1 million for each of the years ended December 31, 2017 and 2016, respectively. The tax provision for each year is attributable to activities at our foreign subsidiaries and state income taxes. The tax benefit relating to the loss before income taxes for the years ended December 31, 2017 and 2016 in the U.S. was fully offset by a tax valuation allowance resulting from our assessment that it is more likely than not that our deferred tax assets will not be realized. The ultimate realization of deferred tax assets is dependent upon the generation of future taxable income during the period in which NOLs and credit carryforwards can be utilized.

The effective tax rate for the year ended December 31, 2017 includes our estimate of the effect of the TCJA. The adjustment that was recorded results in no tax expense as it is fully offset by a change in our valuation allowance.

Because of our valuation allowance in the U.S., ongoing tax effects of the TCJA are not expected to materially change our effective tax rate in future periods.

Table of Contents

Liquidity and Capital Resources

As of December 31, 2018, our total cash and cash equivalents and marketable securities were \$257.4 million compared to \$143.4 million at December 31, 2017. Our cash and cash equivalents are deposits in operating accounts and highly liquid investments with an original maturity of 90 days or less at date of purchase and consist of investments in money market funds with commercial banks and financial institutions, and commercial paper of high-quality corporate issuers. Our marketable securities consist of investments in government sponsored and corporate enterprises and commercial paper.

Our liquidity resources as of December 31, 2018 and 2017 are summarized as follows:

(in thousands)	December 31, December	
	2018	31, 2017
Cash and cash equivalents	\$ 61,005	\$ 33,627
Marketable securities:		
U.S. Treasury and government agencies	69,270	60,618
Corporate debt	105,910	49,168
Asset-backed securities	21,175	—
Total marketable securities	196,355	109,786
Total cash, cash equivalents and marketable securities	\$ 257,360	\$ 143,413

As of December 31, 2018, we maintained all of our cash and cash equivalents in two financial institutions. Deposits held with these institutions may exceed the amount of insurance provided on such deposits, but we do not anticipate any losses with respect to such deposits.

We expect to incur substantial costs and expenses throughout 2019 and beyond in connection with our continued clinical development of tradipitant and our other products, U.S. commercial activities for HETLIOZ® and Fanapt®, the European commercial launch activities for HETLIOZ® and payments due upon achievement of milestones under our license agreements. Additionally, we continue to pursue market approval of HETLIOZ® and Fanapt® in other regions. The actual costs to advance tradipitant and our research and development projects and commercial activities for HETLIOZ® and Fanapt® are difficult to estimate and may vary significantly. Management believes that our existing funds will be sufficient to meet our operating plans for at least the next twelve months. Our future capital requirements and the adequacy of our available funds will depend on many factors, primarily including our ability to generate revenue, the scope and costs of our commercial, manufacturing and process development activities, the magnitude of our discovery, preclinical and clinical development programs, and potential costs to acquire or license the rights to additional products.

We may need or desire to obtain additional capital to finance our operations through debt, equity or alternative financing arrangements. We may also seek capital through collaborations or partnerships with other companies. The issuance of debt could require us to grant liens on certain of our assets that may limit our flexibility and debt securities may be convertible into common stock. If we raise additional capital by issuing equity securities, the terms and prices for these financings may be much more favorable to the new investors than the terms obtained by our existing stockholders. These financings also may significantly dilute the ownership of our existing stockholders. If we are unable to obtain additional financing, we may be required to reduce the scope of our future activities which could harm our business, financial condition and operating results. There can be no assurance that any additional financing required in the future will be available on acceptable terms, if at all.

Table of Contents

Cash flow

The following table summarizes our net cash flows from operating, investing and financing activities for the years ended December 31, 2018, 2017 and 2016:

(in thousands)	Year Ended December 31,		
	2018	2017	2016
Net cash provided by (used in):			
Operating activities:			
Net income (loss)	\$25,208	\$(15,567)	\$(18,010)
Non-cash charges	12,568	13,610	21,015
Net change in operating assets and liabilities	(7,790)	(26)	(11,108)
Operating activities	29,986	(1,983)	(8,103)
Investing activities:			
Acquisition of intangible asset	(25,000)	—	—
Purchases of property and equipment	(368)	(1,664)	(1,407)
Net purchases of marketable securities	(84,292)	(8,567)	(8,618)
Investing activities	(109,660)	(10,231)	(10,025)
Financing activities:			
Net proceeds from offering of common stock	100,870	—	—
Proceeds from exercise of employee stock options and other	6,256	5,251	7,751
Financing activities	107,126	5,251	7,751
Effect of exchange rate changes on cash and cash equivalents	(38)	42	5
Net increase (decrease) in cash and cash equivalents	\$27,414	\$(6,921)	\$(10,372)

Year ended December 31, 2018 compared to year ended December 31, 2017

Net cash provided by operating activities was \$30.0 million for the year ended December 31, 2018, an increase of \$32.0 million compared to net cash used of \$2.0 million for the year ended December 31, 2017. The increase reflects an increase of \$40.8 million in net income, partially offset by a decrease of \$7.8 million from the net change in operating assets and liabilities. The decrease of \$7.8 million from the net change in operating assets and liabilities primarily relates to an increase in accounts receivable attributable to an increase in net product sales, partially offset by an increase in product revenue allowances and the payment of a \$2.0 million accrued milestone obligation during the year ended December 31, 2018.

Year ended December 31, 2017 compared to year ended December 31, 2016

Net cash used in operating activities was \$2.0 million for the year ended December 31, 2017, a decrease of \$6.1 million compared to net cash used of \$8.1 million for the year ended December 31, 2016. The decrease reflects a decrease of \$2.4 million in the net loss and a decrease of \$11.1 million from the net change in operating assets and liabilities, partially offset by a decrease of \$7.4 million in non-cash charges resulting primarily from completion of the amortization of intangible assets related to Fanapt® in November 2016. The decrease of \$11.1 million from the net change in operating assets and liabilities primarily relates to a reduction in accrued government and other rebates, a decrease in accounts receivable attributable to the timing of shipments and payments, and a decrease in prepaid expenses and other associated with a decrease in prepaid marketing expenses and prepaid royalties.

Off-balance sheet arrangements

We have no off-balance sheet arrangements, as defined in Item 303(a)(4) of the Securities and Exchange Commission's Regulation S-K.

Table of Contents

Contractual obligations and commitments

The following is a summary of our non-cancellable long-term contractual cash obligations as of December 31, 2018:

(in thousands)	Cash payments due by year						
	Total	2019	2020	2021	2022	2023	Thereafter
Operating leases (1)	\$22,757	\$2,483	\$2,495	\$2,335	\$2,355	\$2,420	\$ 10,669
Milestone obligation (2) (3)	200	200	—	—	—	—	—
Purchase commitments (4)	7,315	5,122	847	890	456	—	—
	\$30,272	\$7,805	\$3,342	\$3,225	\$2,811	\$2,420	\$ 10,669

This table includes minimum annual future payments under operating leases and subleases for a total of 43,462 square feet of office space for our headquarters office at 2200 Pennsylvania Avenue, N.W. in Washington, D.C. (1) that generally expire in 2028, an operating lease for 2,880 square feet of office space for our European headquarters in London that has a noncancellable lease term ending in 2021, and 1,249 square feet of office space in Berlin under a short-term operating lease.

This table does not include potential future milestone obligations under our license agreement with Lilly for the exclusive rights to develop and commercialize tradipitant of \$97.0 million, which consist of \$2.0 million due upon (2) the filing of the first marketing authorization for tradipitant in either the U.S. or the E.U., \$10.0 million and \$5.0 million for the first approval of a marketing authorization for tradipitant in the U.S. and the E.U., respectively, and up to \$80.0 million for future sales milestones.

This table does not include potential future milestone obligations under our license agreement with the University of California San Francisco for the exclusive rights to develop and commercialize a portfolio of CFTR activators and inhibitors under which we could be obligated to make potential future milestone payments of up to \$45.2 (3) million, which includes \$12.2 million for pre-NDA approval milestones and \$33.0 million for future regulatory approval and sales milestones. Included in the \$12.2 million in pre-NDA approval milestones is a \$350,000 milestone due upon the conclusion of a Phase I study for each licensed product but not to exceed \$1.1 million in total for the CFTR portfolio.

Purchase commitments include noncancellable purchase commitments for agreements longer than one year and primarily relate to commitments for advertising and data services. This table does not include various other (4) long-term agreements entered into for services with other third party vendors due to the cancelable nature of the services. Additionally, this table does not include rebates, chargebacks or discounts recorded as liabilities at the time that product sales are recognized as revenue.

ITEM 7A. QUALITATIVE AND QUANTITATIVE DISCLOSURES ABOUT MARKET RISK

Interest rate risks

Our exposure to market risk is currently confined to our cash and cash equivalents, marketable securities and restricted cash. We currently do not hedge interest rate exposure. We have not used derivative financial instruments for speculation or trading purposes. Because of the short-term maturities of our cash and cash equivalents and marketable securities, we do not believe that an increase in market rates would have any significant impact on the realized value of our investments.

Concentrations of credit risk

We deposit our cash with financial institutions that we consider to be of high credit quality and purchase marketable securities which are generally investment grade, liquid, short-term fixed income securities and money-market instruments denominated in U.S. dollars. Our marketable securities consist of commercial paper, corporate notes, asset-backed securities and U.S. government agency notes.

Revenues and accounts receivable are concentrated with specialty pharmacies and wholesalers. There were 5 major customers that each accounted for more than 10% of total revenues and, as a group, represented 92% of total revenues for the year ended December 31, 2018. There were 5 major customers that each accounted for more than 10% of accounts receivable and, as a group, represented 94% of total accounts receivable at December 31, 2018. We mitigate our credit risk relating to accounts receivable from customers by performing ongoing credit evaluations.

Table of Contents

Foreign currency risk

We are exposed to risks related to changes in foreign currency exchange rates relating to our foreign operations. The functional currency of our international subsidiaries is the local currency. We are exposed to foreign currency risk to the extent that we enter into transactions denominated in currencies other than our subsidiaries' respective functional currencies. We are also exposed to unfavorable fluctuations of the U.S. dollar, which is our reporting currency, against the currencies of our operating subsidiaries when their respective financial statements are translated into U.S. dollars for inclusion in our consolidated financial statements. We do not currently hedge our foreign currency exchange rate risk. Foreign currency has not had a material impact on our results of operations.

Effects of inflation

Inflation has not had a material impact on our results of operations.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

The consolidated financial statements and related financial statement schedules required to be filed are listed in the Index to Consolidated Financial Statements and are incorporated in Item 15 of Part IV of this annual report on Form 10-K.

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

None.

ITEM 9A. CONTROLS AND PROCEDURES

Conclusion Regarding the Effectiveness of Disclosure Controls and Procedures

Under the supervision and with the participation of our management, including the Chief Executive Officer and Chief Financial Officer, we evaluated the effectiveness of the design and operation of our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Securities and Exchange Act of 1934 (Exchange Act)) as of December 31, 2018. Based upon that evaluation, our Chief Executive Officer and Chief Financial Officer concluded that our disclosure controls and procedures are effective as of December 31, 2018, the end of the period covered by this annual report on Form 10-K, to ensure that the information required to be disclosed by us in the reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms, and that such information is accumulated and communicated to our management, including our Chief Executive Officer and Chief Financial Officer, as appropriate to allow timely decisions regarding required disclosures.

Management's Report on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining an adequate system of internal control over financial reporting, as defined in the Exchange Act Rule 13a-15(f). Management conducted an assessment of our internal control over financial reporting based on the original framework established in 2013 by the Committee of Sponsoring Organizations of the Treadway Commission in Internal Control — Integrated Framework. Based on the assessment, management concluded that, as of December 31, 2018, our internal control over financial reporting was effective. The effectiveness of our internal control over financial reporting as of December 31, 2018 has been audited by PricewaterhouseCoopers LLP, an independent registered public accounting firm, as stated in their report included in this annual report on Form 10-K.

Changes in Internal Control over Financial Reporting

There has been no change in our internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) during the fourth quarter of 2018 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Table of Contents

ITEM 9B. OTHER INFORMATION

None.

PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

Information required under this item will be contained in our Proxy Statement for the 2019 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the fiscal year ended December 31, 2018, under the captions “Election of Directors,” “Executive Officers,” “Corporate Governance,” and “Section 16(a) Beneficial Ownership Reporting Compliance” and is incorporated herein by reference pursuant to General Instruction G(3) to Form 10-K.

ITEM 11. EXECUTIVE COMPENSATION

Information required under this item will be contained in our Proxy Statement for the 2019 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the fiscal year ended December 31, 2018, under the captions “Corporate Governance” and “Executive Compensation,” and is incorporated herein by reference pursuant to General Instruction G(3) to Form 10-K, except that information required by Item 407(e)(5) of Regulation S-K will be deemed furnished in this Form 10-K and will not be deemed incorporated by reference into any filing under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended, except to the extent that we specifically incorporate it by reference into such filing.

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS

Information required under this item will be contained in our Proxy Statement for the 2019 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the fiscal year ended December 31, 2018, under the captions “Equity Compensation Plan Information” and “Security Ownership of Certain Beneficial Owners and Management” and is incorporated herein by reference pursuant to General Instruction G(3) to Form 10-K.

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE

Information required under this item will be contained in our Proxy Statement for the 2019 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the fiscal year ended December 31, 2018, under the caption “Corporate Governance” and is incorporated herein by reference pursuant to General Instruction G(3) to Form 10-K.

ITEM 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES

Information required under this item will be contained in our Proxy Statement for the 2019 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the fiscal year ended December 31, 2018, under the caption “Ratification of Selection of Independent Registered Public Accounting Firm” and is incorporated herein by reference pursuant to General Instruction G (3) to Form 10-K.

PART IV

Table of Contents

ITEM 15. EXHIBITS AND FINANCIAL STATEMENTS SCHEDULES

The consolidated financial statements filed as part of this annual report on Form 10-K are listed in the Index to Consolidated Financial Statements. Certain schedules are omitted because they are not applicable, or not required, or because the required information is included in the consolidated financial statements or notes thereto. The Exhibits are listed in the Exhibit Index.

Table of Contents

Signatures

Pursuant to the requirements of Section 13 and 15(d) of the Securities Exchange Act of 1934, as amended, the registrant has duly caused this annual report on Form 10-K to be signed on its behalf by the undersigned, thereunto duly authorized.

Vanda Pharmaceuticals Inc.

February 19, 2019 By: /s/ Mihael H. Polymeropoulos, M.D.
 Mihael H. Polymeropoulos, M.D.
 President and Chief Executive Officer

Pursuant to the requirements of the Securities Act of 1934, this annual report on Form 10-K has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

Name	Title	Date
/s/ Mihael H. Polymeropoulos, M.D. Mihael H. Polymeropoulos, M.D.	President and Chief Executive Officer and Director (principal executive officer)	February 19, 2019
/s/ James P. Kelly James P. Kelly	Executive Vice President, Chief Financial Officer and Treasurer (principal financial officer and principal accounting officer)	February 19, 2019
/s/ H. Thomas Watkins H. Thomas Watkins	Chairman of the Board and Director	February 19, 2019
/s/ Michael Cola Michael Cola	Director	February 19, 2019
/s/ Richard W. Dugan Richard W. Dugan	Director	February 19, 2019
/s/ Vincent J. Milano Vincent J. Milano	Director	February 19, 2019

Table of Contents

Vanda Pharmaceuticals Inc.

Index to Consolidated Financial Statements

	Page
<u>Report of Independent Registered Public Accounting Firm</u>	<u>72</u>
<u>Consolidated Balance Sheets at December 31, 2018 and 2017</u>	<u>74</u>
<u>Consolidated Statements of Operations for the years ended December 31, 2018, 2017 and 2016</u>	<u>75</u>
<u>Consolidated Statements of Comprehensive Income (Loss) for the years ended December 31, 2018, 2017 and 2016</u>	<u>76</u>
<u>Consolidated Statements of Changes in Stockholders' Equity for the years ended December 31, 2018, 2017 and 2016</u>	<u>77</u>
<u>Consolidated Statements of Cash Flows for the years ended December 31, 2018, 2017 and 2016</u>	<u>78</u>
<u>Notes to the Consolidated Financial Statements</u>	<u>79</u>

71

Table of Contents

Report of Independent Registered Public Accounting Firm

To the Board of Directors and Stockholders of Vanda Pharmaceuticals Inc.

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the consolidated financial statements, including the related notes, of Vanda Pharmaceuticals Inc. and its subsidiaries (the “Company”) as listed in the accompanying index (collectively referred to as the “consolidated financial statements”). We also have audited the Company's internal control over financial reporting as of December 31, 2018, based on criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the consolidated financial statements referred to above 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 three years in the period ended December 31, 2018 in conformity with accounting principles generally accepted in the United States of America. Also 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 Internal Control - Integrated Framework (2013) issued by the COSO.

Basis for Opinions

The Company's management is responsible for these consolidated financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in Management's Report on Internal Control over Financial Reporting appearing under Item 9A. Our responsibility is to express opinions on the Company's consolidated financial statements and on the Company's internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (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 audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the consolidated financial statements included performing procedures to assess the risks of material misstatement of the consolidated 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 regarding the amounts and disclosures in the consolidated 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 consolidated financial statements. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

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 (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (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 receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (iii) 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.

Table of Contents

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/ PricewaterhouseCoopers LLP

Baltimore, MD

February 19, 2019

We have served as the Company's auditor since 2003.

73

Table of ContentsVANDA PHARMACEUTICALS INC.
CONSOLIDATED BALANCE SHEETS

(in thousands, except for share and per share amounts)	December 31, 2018	December 31, 2017
ASSETS		
Current assets:		
Cash and cash equivalents	\$61,005	\$ 33,627
Marketable securities	196,355	109,786
Accounts receivable, net	28,780	17,601
Inventory	994	840
Prepaid expenses and other current assets	11,998	8,003
Total current assets	299,132	169,857
Property and equipment, net	4,417	5,306
Intangible assets, net	24,542	26,069
Non-current inventory and other	4,039	4,193
Total assets	\$332,130	\$ 205,425
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable and accrued liabilities	\$21,584	\$ 20,335
Product revenue allowances	31,231	23,028
Milestone obligations under license agreements	200	27,000
Total current liabilities	53,015	70,363
Other non-current liabilities	3,693	3,675
Total liabilities	56,708	74,038
Commitments and contingencies (Notes 9 and 16)		
Stockholders' equity:		
Preferred stock, \$0.001 par value; 20,000,000 shares authorized, and no shares issued or outstanding	—	—
Common stock, \$0.001 par value; 150,000,000 shares authorized; 52,477,593 and 44,938,133 shares issued and outstanding at December 31, 2018 and 2017, respectively	52	45
Additional paid-in capital	611,587	492,802
Accumulated other comprehensive income (loss)	1	(34)
Accumulated deficit	(336,218)	(361,426)
Total stockholders' equity	275,422	131,387
Total liabilities and stockholders' equity	\$332,130	\$ 205,425

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

Table of ContentsVANDA PHARMACEUTICALS INC.
CONSOLIDATED STATEMENTS OF OPERATIONS

	Year Ended December 31,		
(in thousands, except for share and per share amounts)	2018	2017	2016
Revenues:			
Net product sales	\$193,118	\$165,083	\$146,017
Total revenues	193,118	165,083	146,017
Operating expenses:			
Cost of goods sold excluding amortization	20,508	17,848	24,712
Research and development	43,594	38,547	29,156
Selling, general and administrative	105,751	123,841	99,787
Intangible asset amortization	1,527	1,750	10,933
Total operating expenses	171,380	181,986	164,588
Income (loss) from operations	21,738	(16,903)	(18,571)
Other income	3,608	1,472	665
Income (loss) before income taxes	25,346	(15,431)	(17,906)
Provision for income taxes	138	136	104
Net income (loss)	\$25,208	\$(15,567)	\$(18,010)
Net income (loss) per share:			
Basic	\$0.50	\$(0.35)	\$(0.41)
Diluted	\$0.48	\$(0.35)	\$(0.41)
Weighted average shares outstanding:			
Basic	50,859,947	44,735,146	43,449,441
Diluted	53,045,257	44,735,146	43,449,441

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

Table of Contents

VANDA PHARMACEUTICALS INC.

CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME (LOSS)

(in thousands)	Year Ended December 31,		
	2018	2017	2016
Net income (loss)	\$25,208	\$(15,567)	\$(18,010)
Other comprehensive income (loss):			
Net foreign currency translation gain (loss)	(22)	30	(1)
Change in net unrealized gain (loss) on marketable securities	57	(122)	20
Tax provision on other comprehensive income	—	—	—
Other comprehensive income (loss), net of tax	35	(92)	19
Comprehensive income (loss)	\$25,243	\$(15,659)	\$(17,991)

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

Table of Contents

VANDA PHARMACEUTICALS INC.

CONSOLIDATED STATEMENTS OF CHANGES IN STOCKHOLDERS' EQUITY

(in thousands, except for share amounts)	Common Stock		Additional Paid-in Capital	Other Comprehensive Income (Loss)	Accumulated Deficit	Total
	Shares	Par Value				
Balances at December 31, 2015	42,815,291	\$ 43	\$ 460,794	\$ 39	\$(327,849)	\$ 133,027
Issuance of common stock from the exercise of stock options and settlement of restricted stock units	1,185,323	1	7,750	—	—	7,751
Stock-based compensation expense	—	—	8,543	—	—	8,543
Net loss	—	—	—	—	(18,010)	(18,010)
Other comprehensive income, net of tax	—	—	—	19	—	19
Balances at December 31, 2016	44,000,614	44	477,087	58	(345,859)	131,330
Issuance of common stock from the exercise of stock options and settlement of restricted stock units	937,519	1	5,250	—	—	5,251
Stock-based compensation expense	—	—	10,465	—	—	10,465
Net loss	—	—	—	—	(15,567)	(15,567)
Other comprehensive loss, net of tax	—	—	—	(92)	—	(92)
Balances at December 31, 2017	44,938,133	45	492,802	(34)	(361,426)	131,387
Net proceeds from public offering of common stock	6,325,000	6	100,864	—	—	100,870
Issuance of common stock from the exercise of stock options and settlement of restricted stock units	1,214,460	1	6,255	—	—	6,256
Stock-based compensation expense	—	—	11,666	—	—	11,666
Net income	—	—	—	—	25,208	25,208
Other comprehensive income, net of tax	—	—	—	35	—	35
Balances at December 31, 2018	52,477,593	52	611,587	1	(336,218)	275,422

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

Table of ContentsVANDA PHARMACEUTICALS INC.
CONSOLIDATED STATEMENTS OF CASH FLOWS

(in thousands)	Year Ended December 31,		
	2018	2017	2016
Cash flows from operating activities			
Net income (loss)	\$25,208	\$(15,567)	\$(18,010)
Adjustments to reconcile net income (loss) to net cash provided by (used in) operating activities:			
Depreciation of property and equipment	1,429	1,234	935
Stock-based compensation	11,666	10,465	8,543
Amortization of premiums (discounts) on marketable securities	(2,221)	(426)	62
Intangible asset amortization	1,527	1,750	10,933
Other non-cash adjustments, net	167	587	542
Changes in operating assets and liabilities:			
Accounts receivable	(11,207)	2,525	(4,298)
Prepaid expenses and other assets	(4,258)	3,652	(6,159)
Inventory	70	(1,060)	200
Accounts payable and other liabilities	(618)	5,953	575
Product revenue allowances	8,223	(11,096)	(1,426)
Net cash provided by (used in) operating activities	29,986	(1,983)	(8,103)
Cash flows from investing activities			
Acquisition of intangible asset	(25,000)	—	—
Purchases of property and equipment	(368)	(1,664)	(1,407)
Purchases of marketable securities	(282,395)	(148,135)	(165,405)
Maturities of marketable securities	198,103	139,568	156,787
Net cash used in investing activities	(109,660)	(10,231)	(10,025)
Cash flows from financing activities			
Net proceeds from offering of common stock	100,870	—	—
Proceeds from exercise of employee stock options	6,256	5,251	7,751
Net cash provided by financing activities	107,126	5,251	7,751
Effect of exchange rate changes on cash, cash equivalents and restricted cash	(38)	42	5
Net increase (decrease) in cash, cash equivalents and restricted cash	27,414	(6,921)	(10,372)
Cash, cash equivalents and restricted cash			
Beginning of year	34,335	41,256	51,628
End of year	\$61,749	\$34,335	\$41,256

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

Table of Contents

VANDA PHARMACEUTICALS INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

1. Business Organization and Presentation

Business organization

Vanda Pharmaceuticals Inc. (the Company) is a global biopharmaceutical company focused on the development and commercialization of innovative therapies to address high unmet medical needs and improve the lives of patients. The Company commenced its operations in 2003 and operates in one reporting segment. The Company's portfolio includes the following products:

HETLIOZ[®] (tasimelteon), a product for the treatment of Non-24-Hour Sleep-Wake Disorder (Non-24), was approved by the U.S. Food and Drug Administration (FDA) in January 2014 and launched commercially in the U.S. in April 2014. In July 2015, the European Commission (EC) granted centralized marketing authorization with unified labeling for HETLIOZ[®] for the treatment of Non-24 in totally blind adults. HETLIOZ[®] was commercially launched in Germany in August 2016. HETLIOZ[®] has potential utility in a number of other circadian rhythm disorders and is presently in clinical development for the treatment of jet lag disorder, Smith-Magenis Syndrome (SMS) and Pediatric Non-24. An assessment of new HETLIOZ[®] clinical opportunities including the treatment of delayed sleep phase disorder and for sleep disorders in patients with neurodevelopmental disorders is ongoing.

Fanapt[®] (iloperidone), a product for the treatment of schizophrenia, the oral formulation of which was approved by the FDA in May 2009 and launched commercially in the U.S. by Novartis Pharma AG (Novartis) in January 2010. Novartis transferred all the U.S. and Canadian commercial rights to the Fanapt[®] franchise to the Company on December 31, 2014. Additionally, the Company's distribution partners launched Fanapt[®] in Israel in 2014. Fanapt[®] has potential utility in a number of other disorders. Initial clinical work studying a long acting injectable (LAI) formulation of Fanapt[®] began in 2018. An assessment of new Fanapt[®] clinical opportunities including the treatment of bipolar depression is ongoing.

Tradipitant (VLY-686), a small molecule neurokinin-1 receptor (NK-1R) antagonist, which is presently in clinical development for the treatment of chronic pruritus in atopic dermatitis and the treatment of gastroparesis. An assessment of new tradipitant clinical opportunities including the treatment of motion sickness is ongoing.

VTR-297, a small molecule histone deacetylase (HDAC) inhibitor presently in clinical development for the treatment of hematologic malignancies.

Portfolio of Cystic Fibrosis Transmembrane Conductance Regulator (CFTR) activators and inhibitors. An early stage CFTR activator program is planned for the treatment of dry eye and ocular inflammation. In addition, an early stage CFTR inhibitor program is planned for the treatment of secretory diarrhea disorders, including cholera.

QW-765, a Phase II alpha-7 nicotinic acetylcholine receptor partial agonist.

Basis of presentation

The accompanying consolidated financial statements includes the accounts of Vanda Pharmaceuticals Inc. and its wholly-owned subsidiaries and have been prepared in accordance with accounting principles generally accepted in the United States of America (U.S.). All intercompany accounts and transactions have been eliminated in consolidation.

2. Summary of Significant Accounting Policies

Use of Estimates

The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America requires management to make estimates that affect the reported amounts of assets and liabilities at

the date of the financial statements, disclosure of contingent assets and liabilities, and the reported amounts of revenue and expenses during the reporting period. Management continually re-evaluates its estimates, judgments and assumptions, and management's evaluation could change. Actual results could differ from those estimates.

Table of Contents

Cash and Cash Equivalents

For purposes of the consolidated balance sheets and consolidated statements of cash flows, cash equivalents represent highly-liquid investments with a maturity date of three months or less at the date of purchase. Cash and cash equivalents includes investments in money market funds with commercial banks and financial institutions, and commercial paper of high-quality corporate issuers.

Marketable Securities

The Company classifies all of its marketable securities as available-for-sale securities. The Company's investment policy requires the selection of high-quality issuers, with bond ratings of AAA to A1+/P1. Available-for-sale securities are carried at fair market value, with unrealized gains and losses reported as a component of stockholders' equity in accumulated other comprehensive income (loss). At each balance sheet date, the Company assesses available-for-sale securities in an unrealized loss position to determine whether the unrealized loss is other-than-temporary. If declines in the value of available for-sale securities are determined to be other-than-temporary, a loss is recorded in earnings in the current period. Interest and dividend income is recorded when earned and included in interest income. Premiums and discounts on marketable securities are amortized and accreted, respectively, to maturity and included in interest income. The Company uses the specific identification method in computing realized gains and losses on the sale of investments, which would be included in the consolidated statements of operations when generated. Marketable securities with a maturity of more than one year as of the balance sheet date and which the Company does not intend to sell within the next twelve months are classified as non-current. All other marketable securities are classified as current.

Inventory

Inventory, which is recorded at the lower of cost or net realizable value, includes the cost of third-party manufacturing and other direct and indirect costs and is valued using the first-in, first-out method. The Company capitalizes inventory costs associated with its products upon regulatory approval when, based on management's judgment, future commercialization is considered probable and the future economic benefit is expected to be realized; otherwise, such costs are expensed as research and development. Inventory not expected to be sold within 12 months following the balance sheet date are classified as non-current.

Intangible Assets

Costs incurred for products not yet approved by the FDA and for which no alternative future use exists are recorded as expense. Obligations for milestone payments to other pharmaceutical companies that may result in a capitalized intangible asset are recognized when it is deemed probable that the milestone event will occur. In the event a product has been approved by the FDA or an alternative future use exists for a product, patent and license costs are capitalized and amortized on a straight-line basis over the estimated useful economic life of the of the related product patents. For intangible assets related to HETLIOZ[®], the estimated useful life is the estimated economic useful life of the related product patents, the latest of which expires in February 2035. Intangible assets related Fanapt[®] have been fully amortized on a straight-line basis to November 2016. The useful life estimate for Fanapt[®] was based on the market participant methodology prescribed by ASC 805, and therefore does not reflect the impact of additional Fanapt[®] patents solely owned by the Company with varying expiration dates, the latest of which is December 2031.

Property and Equipment

Property and equipment are stated at cost less accumulated depreciation. The costs of leasehold improvements funded by or reimbursed by the lessor are capitalized and amortized as leasehold improvements along with a corresponding deferred rent liability. Depreciation of most property and equipment is provided on a straight-line basis over the estimated useful lives of the assets. Leasehold improvements are amortized using a straight-line basis over the lesser of the estimated useful lives of the assets or the terms of the related leases. The costs of additions and improvements are capitalized, and repairs and maintenance costs are charged to operations in the period incurred. Upon retirement or disposition of property and equipment, the cost and accumulated depreciation are removed from the accounts and any resulting gain or loss is reflected in the statement of operations for that period.

Accounts Payable and Accrued Liabilities

The Company's management is required to estimate accrued liabilities as part of the process of preparing financial statements. The estimation of accrued liabilities involves identifying services that have been performed on the Company's

80

Table of Contents

behalf, and then estimating the level of service performed and the associated cost incurred for such services as of each balance sheet date in the financial statements. Accrued liabilities include research and development expenses, such as accrued costs under contracts with clinical monitors, data management organizations and investigators in conjunction with clinical trials, fees to contract manufacturers in conjunction with the production of clinical materials, consulting and professional fees, such as lawyers and fees for marketing and other commercialization activities, accrued compensation and employee benefits, such as accrued bonus, royalties payable under licensing agreements, and other accrued fees. Pursuant to management's assessment of the services that have been performed on clinical trials and other contracts, the Company recognizes these expenses as the services are provided. Such management assessments include, but are not limited to: (i) an evaluation by the project manager of the work that has been completed during the period, (ii) measurement of progress prepared internally and/or provided by the third-party service provider, (iii) analyses of data that justify the progress, and (iv) management's judgment. In the event that the Company does not identify certain costs that have begun to be incurred or the Company under- or over-estimates the level of services performed or the costs of such services, the Company's reported expenses for such period would be too low or too high.

Revenue Recognition

In accordance with Accounting Standards Codification (ASC) Subtopic 606 Revenue from Contracts with Customers (ASC 606), which the Company adopted January 1, 2018, the Company accounts for a contract when it has approval and commitment from both parties, the rights of the parties are identified, payment terms are identified, the contract has commercial substance and collectability of consideration is probable. The Company recognizes revenue when control of the product is transferred to the customer in an amount that reflects the consideration the Company expects to be entitled to in exchange for those product sales, which is typically once the product physically arrives at the customer. Sales taxes, value add taxes, and usage-based taxes are excluded from revenues.

The Company's net product sales consist of sales of HETLIOZ[®] and Fanapt[®]. Net sales by product for the years ended December 31, 2018, 2017 and 2016 were as follows:

(in thousands)	Year Ended December 31,		
	2018	2017	2016
HETLIOZ [®] product sales, net	\$115,835	\$89,978	\$71,671
Fanapt [®] product sales, net	77,283	75,105	74,346
	\$193,118	\$165,083	\$146,017

Major Customers

HETLIOZ[®] is only available in the U.S. for distribution through a limited number of specialty pharmacies, and is not available in retail pharmacies. Specialty pharmacy customers include Diplomat Pharmacy, Inc., Accredo (a subsidiary of Express Scripts) and Walgreens Company. Fanapt[®] is available in the U.S. for distribution through a limited number of wholesalers and is available in retail pharmacies. Wholesaler customers include Cardinal Health, Inc., AmerisourceBergen Drug Corporation, and McKesson Corporation. The Company invoices and records revenue when its customers, specialty pharmacies and wholesalers, receive product from the third-party logistics warehouse which is the point at which control is transferred to the customer. Revenues and accounts receivable are concentrated with these customers. The following table presents each major customer that represented more than 10% of total revenues for the years ended December 31, 2018, 2017 and 2016:

Percent of Net Product Sales	Year Ended December 31,		
	2018	2017	2016
Distributor A	37 %	32 %	23 %
Distributor B	17 %	10 %	1 %
Distributor C	14 %	15 %	16 %
Distributor D	12 %	12 %	15 %
Distributor E	12 %	15 %	16 %
Distributor F	5 %	11 %	16 %

Table of Contents

The following table presents each major customer that represented more than 10% of accounts receivable, net, as of December 31, 2018 and 2017:

Percent of Accounts Receivable, Net	December 31,	
	2018	2017
Distributor A	30 %	28 %
Distributor B	15 %	9 %
Distributor C	20 %	18 %
Distributor D	16 %	21 %
Distributor E	13 %	10 %

Reserves for Variable Consideration

The transaction price is determined based upon the consideration to which the Company will be entitled in exchange for transferring product to the customer. The Company's product sales are recorded net of applicable discounts, rebates, chargebacks, service fees, co-pay assistance and product returns that are applicable for various government and commercial payors. The Company estimates the amount of variable consideration that should be included in the transaction price utilizing the most likely amount method and updates its estimate at each reporting date. Variable consideration is included in the transaction price if, in the Company's judgment, it is probable that a significant future reversal of cumulative revenue under the contract will not occur. Reserves for variable consideration for rebates, chargebacks and co-pay assistance are based upon the insurance benefits of the end customer, which are estimated using historical activity and, where available, actual and pending prescriptions for which the Company has validated the insurance benefits. Reserves for variable consideration are classified as product revenue allowances on the consolidated balance sheets, with the exception of prompt-pay discounts which are classified as reductions of accounts receivable. The reserve for product returns for which the product may not be returned for a period of greater than one year from the balance sheet date is included as a component of other non-current liabilities in the consolidated balance sheets. Uncertainties related to variable consideration are generally resolved in the quarter subsequent to period end, with the exception of product returns which are resolved during the product expiry period specified in the customer contract. The Company currently records sales allowances for the following:

Prompt-pay: Specialty pharmacies and wholesalers are offered discounts for prompt payment. The Company expects that the specialty pharmacies and wholesalers will earn prompt payment discounts and, therefore, deducts the full amount of these discounts from total product sales when revenues are recognized.

Rebates: Allowances for rebates include mandated and supplemental discounts under the Medicaid Drug Rebate Program as well as contracted rebate programs with other payors. Rebate amounts owed after the final dispensing of the product to a benefit plan participant are based upon contractual agreements or legal requirements with public sector benefit providers, such as Medicaid. The allowance for rebates is based on statutory or contracted discount rates and expected patient utilization.

Chargebacks: Chargebacks are discounts that occur when contracted indirect customers purchase directly from specialty pharmacies and wholesalers. Contracted indirect customers, which currently consist primarily of Public Health Service institutions, non-profit clinics, and Federal government entities purchasing via the Federal Supply Schedule, generally purchase the product at a discounted price. The specialty pharmacy or wholesaler, in turn, charges back the difference between the price initially paid by the specialty pharmacy or wholesaler and the discounted price paid to the specialty pharmacy or wholesaler by the contracted customer.

Medicare Part D Coverage Gap: Medicare Part D prescription drug benefit mandates manufacturers to fund approximately 50% of the Medicare Part D insurance coverage gap for prescription drugs sold to eligible patients through 2018. Public Law No. 115-123, also known as the Bipartisan Budget Act of 2018 enacted on February 9, 2018 increased the manufacturer discount from 50% to 70% effective in 2019 for applicable drugs. Vanda accounts for the Medicare Part D coverage gap using a point of sale model. Estimates for expected Medicare Part D coverage gap are based in part on historical activity and, where available, actual and pending prescriptions for which the Company has validated the insurance benefits.

Service Fees: The Company receives sales order management, data and distribution services from certain customers. These fees are based on contracted terms and are known amounts. The Company accrues service fees at the time of revenue recognition, resulting in a reduction of product sales and the recognition of an accrued liability, unless it is a payment for a distinct good or service from the customer in which case the fair value of those distinct goods or services are recorded as selling, general and administrative expense.

Table of Contents

Co-payment Assistance: Patients who have commercial insurance and meet certain eligibility requirements may receive co-payment assistance. Co-pay assistance utilization is based on information provided by the Company's third-party administrator.

Product Returns: Consistent with industry practice, the Company generally offers direct customers a limited right to return as defined within the Company's returns policy. The Company considers several factors in the estimation process, including historical return activity, expiration dates of product shipped to specialty pharmacies and wholesalers, inventory levels within the distribution channel, product shelf life, prescription trends and other relevant factors. The Company does not expect returned goods to be resalable. There was no right of return asset as of December 31, 2018 or 2017. The following table summarizes activity for product returns as of and for the years ended December 31, 2018, 2017 and 2016:

(in thousands)	Reserve for Product Returns
Balances at December 31, 2015	\$ 1,059
Additions	2,507
Credits/payments	(486)
Balances at December 31, 2016	3,080
Additions	5,978
Credits/payments	(4,939)
Balances at December 31, 2017	4,119
Additions	2,684
Credits/payments	(1,616)
Balances at December 31, 2018	\$ 5,187

Cost of Goods Sold

Cost of goods sold includes royalties payable, the cost of inventory sold, manufacturing and supply chain costs and product shipping and handling costs related to sales of HETLIOZ[®] and Fanapt[®] to the Company's distribution partners.

Research and Development Expenses

Research and development expenses consist primarily of fees for services provided by third parties in connection with the clinical trials, costs of contract manufacturing services, milestone payments, costs of materials used in clinical trials and research and development, costs for regulatory consultants and filings, depreciation of capital resources used to develop products, related facilities costs, and salaries, other employee-related costs and stock-based compensation for research and development personnel. The Company expenses research and development costs as they are incurred for products in the development stage, including manufacturing costs and milestone payments made under license agreements prior to FDA approval. Upon and subsequent to FDA approval, manufacturing and milestone payments related to license agreements are capitalized. Milestone payments are accrued when it is deemed probable that the milestone event will be achieved. Costs related to the acquisition of intellectual property are expensed as incurred if the underlying technology is developed in connection with the Company's research and development efforts and has no alternative future use.

Selling, General and Administrative Expenses

Selling, general and administrative expenses consist of salaries, stock-based compensation, facilities and third party expenses. Selling, general and administrative expenses are associated with the activities of the executive, finance, accounting, information technology, business development, commercial support, trade and distribution, sales, marketing, legal, medical affairs and human resource functions. Additionally, selling, general and administrative expenses included an estimate for the annual Patient Protection and Affordable Care fee.

Stock-Based Compensation

Compensation costs for all stock-based awards to employees and directors are measured based on the grant date fair value of those awards and recognized over the period during which the employee or director is required to perform service in exchange for the award. The Company recognizes the expense over the award's vesting period. The fair value of stock options

Table of Contents

granted and restricted stock units (RSUs) awarded are amortized using the straight-line method. As stock-based compensation expense recognized in the consolidated statements of operations is based on awards ultimately expected to vest, it has been reduced for estimated forfeitures. Forfeitures are estimated at the time of grant and revised, if necessary, in subsequent periods if actual forfeitures differ from those estimates.

Advertising Expense

The Company expenses the costs of advertising, including branded promotional expenses, as incurred. Branded advertising expenses, recorded in selling, general and administrative expenses, were \$0.9 million, \$1.3 million and \$1.4 million for the years ended December 31, 2018, 2017 and 2016, respectively.

Foreign Currency

The reporting currency of the Company is the U.S. dollar. The functional currency of the Company's international subsidiaries is the local currency. Assets and liabilities denominated in foreign currencies, including intercompany balances for which settlement is anticipated in the foreseeable future, are translated at exchange rates in effect at the balance sheet date. Foreign currency equity balances are translated at historical rates. Revenues and expenses denominated in foreign currencies are translated at average exchange rates for the respective periods. Foreign currency translation adjustments are recorded in accumulated other comprehensive income (loss).

Transactions denominated in currencies other than subsidiaries' functional currencies are recorded based on exchange rates at the time such transactions arise. Changes in exchange rates with respect to amounts recorded in the consolidated balance sheets related to these items will result in unrealized foreign currency transaction gains and losses based upon period-end exchange rates. The Company also records realized foreign currency transaction gains and losses upon settlement of the transactions. Foreign currency transaction gains and losses are included in other income and amounted to loss of \$0.5 million, income of \$0.1 million, and loss of \$0.2 million for the years ended December 31, 2018, 2017 and 2016, respectively.

Income Taxes

The Company accounts for income taxes using the asset and liability method. Under the asset and liability method, current income tax expense or benefit is the amount of income taxes expected to be payable or refundable for the current year. A deferred income tax asset or liability is recognized for future tax consequences attributable to differences between the financial statement carrying amounts of existing assets and liabilities and their respective tax bases and tax credits and loss carryforwards. Deferred tax assets are reduced by a valuation allowance when, in the opinion of management, it is more likely than not that some portion or all of the deferred tax assets will not be realized. Tax rate changes are reflected in income during the period such changes are enacted. Changes in ownership may limit the amount of NOL carryforwards that can be utilized in the future to offset taxable income.

Non-Cash Investing and Financing Activities

Purchases of property and equipment accrued in current liabilities amounted to \$0.2 million, zero and \$0.2 million for each of the years ended December 31, 2018, 2017 and 2016, respectively.

Certain Risks and Uncertainties

The Company's products under development require approval from the FDA or other international regulatory agencies prior to commercial sales. There can be no assurance the products will receive the necessary clearance. If the Company is denied clearance or clearance is delayed, it may have a material adverse impact on the Company.

The Company's products are concentrated in rapidly-changing, highly-competitive markets, which are characterized by rapid technological advances, changes in customer requirements and evolving regulatory requirements and industry standards. Any failure by the Company to anticipate or to respond adequately to technological developments in its industry, changes in customer requirements or changes in regulatory requirements or industry standards or any significant delays in the development or introduction of products or services could have a material adverse effect on the Company's business, operating results and future cash flows.

The Company depends on single source suppliers for critical raw materials for manufacturing, as well as other components required for the administration of its products. The loss of these suppliers could delay the clinical trials or prevent or delay commercialization of the products.

Table of Contents

Concentrations of Credit Risk

Financial instruments, which potentially subject the Company to significant concentrations of credit risk, consist primarily of cash, cash equivalents and marketable securities. The Company places its cash, cash equivalents and marketable securities with highly-rated financial institutions. At December 31, 2018, the Company maintained all of its cash, cash equivalents and marketable securities in two financial institutions. Deposits held with these institutions may exceed the amount of insurance provided on such deposits. Generally, these deposits may be redeemed upon demand, and the Company believes there is minimal risk of losses on such balances.

Segment and Geographic Information

The Company operates in one reporting segment and, accordingly, no segment disclosures are presented herein. Foreign sales were not material for each of the years ended December 31, 2018, 2017 and 2016.

Recent Accounting Pronouncements

In August 2018, the U.S. Securities and Exchange Commission (SEC) adopted the final rule under SEC Release No. 33-10532, Disclosure Update and Simplification. This final rule amends certain disclosure requirements that are redundant, duplicative, overlapping, outdated or superseded. In addition, the amendments expand the disclosure requirements on the analysis of stockholders' equity for interim financial statements. Under the amendments, an analysis of changes in each caption of stockholders' equity presented in the balance sheet must be provided in a note or separate statement. The analysis should present a reconciliation of the beginning balance to the ending balance of each period for which a statement of comprehensive income is required to be filed. This final rule is effective for the Company for all filings made on or after November 5, 2018. The SEC staff clarified that the first presentation of the changes in shareholders' equity may be included in the first Form 10-Q for the quarter that begins after the effective date of the amendments. The adoption of the final rule did not have a material impact on the Company's consolidated financial statements. The Company will change its presentation of shareholder's equity in the first quarter of 2019.

In November 2016, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update (ASU) 2016-18, Restricted Cash. The new standard requires that a statement of cash flows explain the change during the period in the total of cash, cash equivalents and amounts generally described as restricted cash or restricted cash equivalents. Therefore, amounts generally described as restricted cash and restricted cash equivalents should be included with cash and cash equivalents when reconciling the beginning-of-period and end-of-period total amounts shown on the statement of cash flows. The standard is effective for annual reporting periods beginning after December 15, 2017, and interim periods within annual periods beginning after December 15, 2017. The Company adopted this new standard in the first quarter of 2018 and applied the provisions retrospectively. As a result of the adoption of the new guidance, the Company increased the beginning of year total amount shown on the consolidated statements of cash flows by \$0.7 million, \$0.8 million, and \$0.8 million for the years ended December 31, 2018, 2017 and 2016, equal to the balance of restricted cash included in the consolidated balance sheets as of December 31, 2017, 2016 and 2015, respectively. Restricted cash relates primarily to amounts held as collateral for letters of credit for leases for office space at the Company's Washington, D.C. headquarters. As of December 31, 2018, restricted cash of \$0.1 million and \$0.6 million is included in prepaid and other current assets and other non-current assets, respectively. As of December 31, 2017, restricted cash of \$0.7 million is included in other non-current assets.

In August 2016, the FASB issued ASU 2016-15, Statement of Cash Flows – Classification of Certain Cash Receipts and Cash Payments, to clarify guidance on the classification of certain cash receipts and cash payments in the statement of cash flow. The standard is effective for annual reporting periods beginning after December 15, 2017, and interim periods within annual periods beginning after December 15, 2017. The Company's adoption of this standard in the first quarter of 2018 had no impact to the Company's consolidated financial statements.

In June 2016, the FASB issued ASU 2016-13, Financial Instruments – Credit Losses, related to the measurement of credit losses on financial instruments. The standard will require the use of an "expected loss" model for instruments measured at amortized cost. The standard is effective for years beginning after December 15, 2019, and interim periods within annual periods beginning after December 15, 2019. The Company is evaluating this standard to determine if adoption will have a material impact on the Company's consolidated financial statements.

In February 2016, the FASB issued ASU 2016-2, Leases, which was further clarified by ASU 2018-10, Codification Improvements to Topic 842, Leases, and ASU 2018-11, Leases - Targeted Improvements, issued in July 2018. ASC 842 supersedes existing lease guidance, including ASC 840 - Leases. The new standard requires that lessees will need to recognize a right-of-use asset and a lease liability for virtually all of their leases (other than leases that meet the definition of a short-term

85

Table of Contents

lease). The liability will be equal to the present value of lease payments. The asset will be based on the liability subject to certain adjustments. For income statement purposes, the FASB retained a dual model, requiring leases to be classified as either operating or finance. Operating leases will result in straight-line expense (similar to current operating leases) while finance leases will result in a front-loaded expense pattern (similar to current capital leases). The Company will adopt the new leasing standard in the first quarter of 2019 using the modified retrospective approach transition method through a cumulative-effect adjustment at the beginning of the period of adoption. Results for reporting periods beginning after January 1, 2019 will be presented under ASC 842, while prior period amounts are not adjusted and continue to be reported in accordance with historic accounting under ASC 840. The Company expects to elect the package of practical expedients permitted under the transition guidance within the standard, which eliminates the reassessment of past leases, classification and initial direct costs. The Company does not expect to elect the hindsight practical expedient. The Company expects that the adoption of the new leasing standard will result in the recognition of material right-of-use asset and liabilities on the consolidated balance sheets for its operating lease commitments with terms greater than twelve months.

In May 2014, the FASB issued ASU 2014-9, Revenue from Contracts with Customers. This ASU supersedes the revenue recognition requirements in ASC 605, Revenue Recognition, and creates ASC 606, Revenue from Contracts with Customers. ASC 606 requires companies to recognize revenue when it transfers promised goods or services to customers in an amount that reflects the consideration to which a company expects to be entitled in exchange for those goods or services. Under the new standard, revenue is recognized when a customer obtains control of a good or service. The standard allows for two transition methods—entities can either apply the new standard (i) retrospectively to each prior reporting period presented (full retrospective), or (ii) retrospectively with the cumulative effect of initially applying the standard recognized at the date of initial adoption (modified retrospective). In July 2015, the FASB issued ASU 2015-14, Revenue from Contracts with Customers, which defers the effective date by one year to December 15, 2017 for fiscal years, and interim periods within those fiscal years, beginning after that date. Early adoption of the standard is permitted, but not before the original effective date of December 15, 2016. In March 2016, the FASB issued ASU 2016-8 Revenue from Contracts with Customers, Principal versus Agent Considerations (Reporting Revenue versus Net), in April 2016, the FASB issued ASU 2016-10, Revenue from Contracts with Customers, identifying Performance Obligations and Licensing, and in May 2016, the FASB issued ASU 2016-12, Revenue from Contracts with Customers, Narrow-Scope Improvements and Practical Expedients, which provide additional clarification on certain topics addressed in ASU 2014-9. ASU 2016-8, ASU 2016-10, and ASU 2016-12 follow the same implementation guidelines as ASU 2014-9 and ASU 2015-14. The Company adopted this new standard in the first quarter of 2018 using the modified retrospective method to those contracts which were not completed as of January 1, 2018. Results for reporting periods beginning after January 1, 2018 are presented under ASC 606, while prior period amounts are not adjusted and continue to be reported in accordance with historic accounting under ASC 605. There was no impact to opening retained earnings as of January 1, 2018 as a result of adoption of the new standard. The impact to the consolidated statements of operations if the Company had applied ASC 605 for the years ended December 31, 2017 and 2016 is not material. As a result of adoption, the Company reclassified the provision for product revenue returns of \$5.2 million from accounts receivable, net to product revenue allowances and other non-current liabilities in the consolidated balance sheets as of December 31, 2018. The provision for product returns as of December 31, 2017 of \$4.1 million is included in accounts receivable in the consolidated balance sheet.

3. Marketable Securities

The following is a summary of the Company's available-for-sale marketable securities as of December 31, 2018, all of which have contract maturities of less than one year:

December 31, 2018 (in thousands)	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Fair Market Value
U.S. Treasury and government agencies	\$ 69,275	\$ 12	\$ (17)	\$ 69,270
Corporate debt	105,897	38	(25)	105,910

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Asset-backed securities	21,189	—	(14)	21,175
	\$ 196,361	\$ 50	\$ (56)	\$ 196,355

86

Table of Contents

The following is a summary of the Company's available-for-sale marketable securities as of December 31, 2017:

December 31, 2017 (in thousands)	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Fair Market Value
U.S. Treasury and government agencies	\$ 60,681	\$ —	\$ (63)	\$ 60,618
Corporate debt	49,168	12	(12)	49,168
	\$ 109,849	\$ 12	\$ (75)	\$ 109,786

4. Fair Value Measurements

Authoritative guidance establishes a three-tier fair value hierarchy, which prioritizes the inputs used in measuring fair value. These tiers include:

Level 1 — defined as observable inputs such as quoted prices in active markets

Level 2 — defined as inputs other than quoted prices in active markets that are either directly or indirectly observable

Level 3 — defined as unobservable inputs in which little or no market data exists, therefore requiring an entity to develop its own assumptions

Marketable securities classified in Level 1 and Level 2 as of December 31, 2018 and 2017 consist of cash equivalents and available-for-sale marketable securities. The valuation of Level 1 instruments is determined using a market approach, and is based upon unadjusted quoted prices for identical assets in active markets. The valuation of investments classified in Level 2 also is determined using a market approach based upon quoted prices for similar assets in active markets, or other inputs that are observable for substantially the full term of the financial instrument. Level 2 securities include certificates of deposit, commercial paper and corporate notes that use as their basis readily observable market parameters. The Company did not transfer any assets between Level 2 and Level 1 during the years ended December 31, 2018 and 2017.

The Company held certain assets that are required to be measured at fair value on a recurring basis as of December 31, 2018, as follows:

(in thousands)	December 31, 2018	Fair Value Measurement as of December 31, 2018 Using		
		Quoted Prices in Active Markets Identical Assets (Level 1)	Significant Observable Inputs (Level 2)	Other Significant Unobservable Inputs (Level 3)
U.S. Treasury and government agencies	69,270	69,270	—	—
Corporate debt	105,910	—	105,910	—
Asset-backed securities	21,175	—	21,175	—
	\$ 196,355	\$ 69,270	\$ 127,085	\$ —

The Company held certain assets that are required to be measured at fair value on a recurring basis as of December 31, 2017, as follows:

(in thousands)	December 31, 2017	Fair Value Measurement as of December 31, 2017 Using		
		Quoted Prices in Active Markets Identical Assets (Level 1)	Significant Observable Inputs (Level 2)	Other Significant Unobservable Inputs

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		(Level 1)		(Level 3)
U.S. Treasury and government agencies	\$ 60,618	\$60,618	\$ —	\$ —
Corporate debt	53,164	—	53,164	—
	\$ 113,782	\$60,618	\$ 53,164	\$ —

Total assets measured at fair value as of December 31, 2017 include \$4.0 million of cash equivalents.

The Company also has financial assets and liabilities, not required to be measured at fair value on a recurring basis, which primarily consist of cash and cash equivalents, accounts receivable, restricted cash, accounts payable and accrued

Table of Contents

liabilities, and milestone obligations under license agreements, the carrying values of which materially approximate their fair values.

5. Inventory

The Company evaluates expiry risk by evaluating current and future product demand relative to 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. Inventory levels are evaluated for the amount of inventory that would be sold within one year. At certain times, the level of inventory can exceed the forecasted level of cost of goods sold for the next twelve months. The Company classifies the estimate of such inventory as non-current. Inventory consisted of the following as of December 31, 2018 and 2017:

(in thousands)	December 31, 2018	December 31, 2017
Current assets		
Work-in-process	\$ 48	\$ 80
Finished goods	946	760
	\$ 994	\$ 840
Non-Current assets		
Raw materials	\$ 86	\$ 87
Work-in-process	2,290	2,821
Finished goods	516	408
	\$ 2,892	\$ 3,316

6. Property and Equipment

The following is a summary of the Company's property and equipment, at cost, as of December 31, 2018 and 2017:

(in thousands)	Estimated Useful Life (Years)	December 31, 2018	December 31, 2017
Computer and other equipment	3	\$ 3,642	\$ 3,342
Furniture and fixtures	5 - 7	1,488	1,929
Leasehold improvements	5 - 11	4,506	4,515
		9,636	9,786
Accumulated depreciation and amortization		(5,219)	(4,480)
		\$ 4,417	\$ 5,306

Depreciation expense was \$1.4 million, \$1.2 million and \$0.9 million for the years ended December 31, 2018, 2017 and 2016, respectively.

7. Intangible Assets

HETLIOZ®. In January 2014, the Company announced that the FDA had approved the New Drug Application (NDA) for HETLIOZ®. As a result of this approval, the Company met a milestone under its license agreement with Bristol-Myers Squibb (BMS) that required the Company to make a license payment of \$8.0 million to BMS. The \$8.0 million is being amortized on a straight-line basis over the estimated economic useful life of the related product patents, the latest of which expires in February 2035. The estimated economic useful life of the intangible asset was changed from May 2034 to February 2035 based on the February 2035 expiration date of U.S. patent number 10,071,977 ('977 patent) issued by the U.S. Patent and Trademark Office in September 2018.

In April 2018, the Company met its final milestone under its license agreement when cumulative worldwide sales of HETLIOZ® reached \$250.0 million. As a result of the achievement of this milestone, the Company made a payment to BMS of \$25.0 million in 2018. The \$25.0 million obligation was recorded as a current liability as of December 31,

2017. The \$25.0 million was determined to be additional consideration for the acquisition of the HETLIOZ® intangible asset and is being amortized on a straight-line basis over the estimated economic useful life of the related product patents, the latest of which expires in February 2035. The estimated economic useful life of the intangible asset was changed from May 2034 to February

Table of Contents

2035 based on the February 2035 expiration date of the '977 patent issued by the U.S. Patent and Trademark Office in September 2018.

Fanapt®. In 2009, the Company announced that the FDA had approved the NDA for Fanapt®. As a result of this approval, the Company met a milestone under its original sublicense agreement with Novartis that required the Company to make a license payment of \$12.0 million to Novartis. The \$12.0 million was amortized on a straight-line basis over the remaining life of the U.S. composition of matter patent for Fanapt® to November 2016.

Pursuant to a settlement agreement entered into in December 2014, Novartis transferred all U.S. and Canadian rights in the Fanapt® franchise to the Company. As a result, the Company recognized an intangible asset of \$15.9 million on December 31, 2014 related to the reacquired rights to Fanapt®, which was fully amortized on a straight-line basis as of November 2016. The useful life estimation for the Fanapt® intangible asset was based on the market participant methodology prescribed by ASC 805, and therefore does not reflect the impact of additional Fanapt® patents solely owned by the Company with varying expiration dates, the latest of which is December 2031.

The following is a summary of the Company's intangible assets as of December 31, 2018:

		December 31, 2018		
(in thousands)	Estimated Useful Life (Years)	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount
HETLIOZ®	February 2035	\$33,000	\$ 8,458	\$24,542
Fanapt®	November 2016	27,941	27,941	—
		\$60,941	\$ 36,399	\$24,542

The following is a summary of the Company's intangible assets as of December 31, 2017:

		December 31, 2017		
(in thousands)	Estimated Useful Life (Years)	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount
HETLIOZ®	May 2034	\$33,000	\$ 6,931	\$26,069
Fanapt®	November 2016	27,941	27,941	—
		\$60,941	\$ 34,872	\$26,069

Intangible assets are amortized over their estimated useful economic life using the straight-line method. Amortization expense for the years ended December 31, 2018, 2017 and 2016 was as follows:

		Year Ended December 31,		
(in thousands)		2018	2017	2016
HETLIOZ®		\$1,527	\$1,750	\$1,721
Fanapt®		—	—	9,212
		\$1,527	\$1,750	\$10,933

The following is a summary of the future intangible asset amortization schedule as of December 31, 2018:

(in thousands)	Total	2019	2020	2021	2022	2023	Thereafter
HETLIOZ®	\$24,542	\$1,518	\$1,518	\$1,518	\$1,518	\$1,518	\$ 16,952

Table of Contents

8. Accounts Payable and Accrued Liabilities

The following is a summary of the Company's accounts payable and accrued liabilities as of December 31, 2018 and 2017:

(in thousands)	December 31, 2018	December 31, 2017
Compensation and employee benefits	\$ 6,363	\$ 5,323
Research and development expenses	5,593	4,663
Royalties payable	5,172	4,394
Consulting and other professional fees	2,924	3,961
Other	1,532	1,994
	\$ 21,584	\$ 20,335

9. Commitments and Contingencies

The following is a summary of the Company's noncancellable long-term contractual cash obligations as of December 31, 2018:

(in thousands)	Cash Payments Due by Year						
	Total	2019	2020	2021	2022	2023	Thereafter
Operating leases	\$22,757	\$2,483	\$2,495	\$2,335	\$2,355	\$2,420	\$ 10,669
Milestone obligations	200	200	—	—	—	—	—
Purchase commitments	7,315	5,122	847	890	456	—	—
	\$30,272	\$7,805	\$3,342	\$3,225	\$2,811	\$2,420	\$ 10,669

Operating Leases

Commitments relating to operating leases represent the minimum annual future payments under operating leases and subleases for its Company's headquarters at 2200 Pennsylvania Avenue, N.W. in Washington, D.C., and operating leases for office space in London and Berlin.

In June 2011, the Company entered into an operating lease for its headquarters at 2200 Pennsylvania Avenue, N.W. in Washington, D.C. for 21,400 square feet of office space. The Company subsequently amended the lease in March 2014 and March 2018 to increase the office space under lease to 33,534 square feet and, in March 2018, extended the lease term to July 2028. Subject to the prior rights of other tenants, the Company has the right to renew the lease for five years following its expiration. The Company has the right to sublease or assign all or a portion of the premises, subject to standard conditions. The lease may be terminated early by the Company or the landlord under certain circumstances.

In June 2016, the Company entered into a sublease under which the Company leases 9,928 square feet of office space for its headquarters at 2200 Pennsylvania Avenue, N.W. in Washington, D.C. The sublease term began in January 2017 and ends in July 2026, but may be terminated earlier by either party under certain circumstances. The Company has the right to sublease or assign all or a portion of the premises, subject to standard conditions.

The Company has an operating lease for 2,880 square feet of office space for the Company's European headquarters in London that has a noncancellable lease term ending in 2021, and 1,249 square feet of office space in Berlin under a short-term operating lease.

Rent expense under operating leases and subleases was \$3.6 million, \$3.2 million and \$2.5 million for the years ended December 31, 2018, 2017 and 2016, respectively.

Guarantees and Indemnifications

The Company has entered into a number of standard intellectual property indemnification agreements in the ordinary course of its business. Pursuant to these agreements, the Company indemnifies, holds harmless, and agrees to reimburse the indemnified party for losses suffered or incurred by the indemnified party, generally the Company's business partners or customers, in connection with any U.S. patent or any copyright or other intellectual property infringement claim by any third

Table of Contents

party with respect to the Company's products. The term of these indemnification agreements is generally perpetual from the date of execution of the agreement. The maximum potential amount of future payments the Company could be required to make under these indemnification agreements is unlimited. Since inception, the Company has not incurred costs to defend lawsuits or settle claims related to these indemnification agreements. The Company also indemnifies its officers and directors for certain events or occurrences, subject to certain conditions.

License Agreements

The Company's rights to develop and commercialize its products are subject to the terms and conditions of licenses granted to the Company by other pharmaceutical companies.

HETLIOZ®. In February 2004, the Company entered into a license agreement with BMS under which it received an exclusive worldwide license under certain patents and patent applications, and other licenses to intellectual property, to develop and commercialize HETLIOZ®. As a result of the FDA's approval of the HETLIOZ® NDA in January 2014, the Company made an \$8.0 million milestone payment to BMS in the first quarter of 2014 under the license agreement that was capitalized as an intangible asset and is being amortized over the estimated economic useful life of the related product patents for HETLIOZ® in the U.S. In April 2018, the Company met another milestone under its license agreement when cumulative worldwide sales of HETLIOZ® reached \$250.0 million. As a result of the achievement of this milestone, the Company made a payment to BMS of \$25.0 million in the second quarter of 2018. The \$25.0 million milestone obligation was capitalized as an intangible asset in the first quarter of 2015 and is being amortized over the estimated economic useful life of the related product patents for HETLIOZ® in the U.S. The Company has no remaining milestone obligations to BMS. Additionally, the Company is obligated to make royalty payments on HETLIOZ® net sales to BMS in any territory where the Company commercializes HETLIOZ® for a period equal to the greater of 10 years following the first commercial sale in the territory or the expiry of the new chemical entity (NCE) patent in that territory. During the period prior to the expiry of the NCE patent in a territory, the Company is obligated to pay a 10% royalty on net sales in that territory. The royalty rate is decreased by half for countries in which no NCE patent existed or for the remainder of the 10 years after the expiry of the NCE patent. The Company is also obligated under the license agreement to pay BMS a percentage of any sublicense fees, upfront payments and milestone and other payments (excluding royalties) that it receives from a third party in connection with any sublicensing arrangement, at a rate which is in the mid-twenties. The Company has agreed with BMS in the license agreement for HETLIOZ® to use its commercially reasonable efforts to develop and commercialize HETLIOZ®.

Fanapt®. Pursuant to the terms of a settlement agreement with Novartis, Novartis transferred all U.S. and Canadian rights in the Fanapt® franchise to the Company on December 31, 2014. The Company was obligated to make royalty payments to Sanofi S.A. (Sanofi) and Titan Pharmaceuticals Inc. (Titan) at a percentage rate equal to 23% on annual U.S. net sales of Fanapt® up to \$200.0 million, and at a percentage rate in the mid-twenties on sales over \$200.0 million through November 2016. In February 2016, the Company amended the agreement with Sanofi and Titan to remove Titan as the entity through which royalty payments from the Company are directed to Sanofi following the expiration of the new chemical entity patent for Fanapt® in the U.S. on November 15, 2016. Under the amended agreement, the Company pays directly to Sanofi a fixed royalty of 3% of net sales from November 16, 2016 through December 31, 2019 related to manufacturing know-how. The Company made a \$2.0 million payment during the year ended December 31, 2016 that applied to this 3% manufacturing know-how royalty. No further royalties on manufacturing know-how are payable by the Company after December 31, 2019. This amended agreement did not alter Titan's obligation under the license agreement to make royalty payments to Sanofi prior to November 16, 2016 or the Company's obligations to pay Sanofi a fixed royalty on Fanap® net sales equal up to 6% on Sanofi know-how not related to manufacturing under certain conditions for a period of up to 10 years in markets where the new chemical entity patent has expired or was not issued.

Tradipitant. In April 2012, the Company entered into a license agreement with Eli Lilly and Company (Lilly) pursuant to which the Company acquired an exclusive worldwide license under certain patents and patent applications, and other licenses to intellectual property, to develop and commercialize an NK-1R antagonist, tradipitant, for all human indications. The patent describing tradipitant as a NCE expires in April 2023, except in the U.S., where it expires in

June 2024 absent any applicable patent term adjustments. Lilly is eligible to receive future payments based upon achievement of specified development and commercialization milestones as well as tiered-royalties on net sales at percentage rates up to the low double digits. These milestones include \$4.0 million for pre-NDA approval milestones, \$10.0 million and \$5.0 million for the first approval of a marketing authorization for tradipitant in the U.S. and European Union (E.U.), respectively, and up to \$80 million for sales milestones. The \$4.0 million of pre-NDA approval milestones includes \$2.0 million due upon enrollment of the first subject into a Phase III study for tradipitant and \$2.0 million due upon the filing of the first marketing authorization for tradipitant in either the U.S. or the E.U. As a result of enrolling the first subject into a Phase III study for tradipitant in July 2018, the Company made a \$2.0 million milestone payment to Lilly in the third quarter of 2018. The likelihood of achieving this milestone was determined to be probable during 2017 and the obligation of \$2.0 million tied to such milestone was

Table of Contents

recorded as research and development expense in the consolidated statement of operations during the year ended December 31, 2017 and a current liability in the consolidated balance sheet as of December 31, 2017. The Company is obligated to use its commercially reasonable efforts to develop and commercialize tradipitant.

VQW-765. In connection with a settlement agreement with Novartis relating to Fanapt[®], the Company received an exclusive worldwide license under certain patents and patent applications, and other licenses to intellectual property, to develop and commercialize VQW-765, a Phase II alpha-7 nicotinic acetylcholine receptor partial agonist. Pursuant to the license agreement, the Company is obligated to use its commercially reasonable efforts to develop and commercialize VQW-765 and is responsible for all development costs. The Company has no milestone obligations; however, Novartis is eligible to receive tiered-royalties on net sales at percentage rates up to the mid-teens.

Portfolio of CFTR activators and inhibitors. In March 2017, the Company entered into a license agreement with the University of California San Francisco (UCSF), under which Vanda acquired an exclusive worldwide license to develop and commercialize a portfolio of CFTR activators and inhibitors. Pursuant to the license agreement, the Company will develop and commercialize the CFTR activators and inhibitors and is responsible for all development costs under the license agreement, including current pre-investigational new drug development work. UCSF is eligible to receive future payments based upon achievement of specified development and commercialization milestones as well as single-digit royalties on net sales. These milestones include an initial license fee of \$1.0 million that was paid by the Company in 2017, annual maintenance fees, \$12.4 million for pre-NDA approval milestones and \$33.0 million for future regulatory approval and sales milestones. Included in the \$12.4 million in pre-NDA approval milestones is a \$350,000 milestone due upon the conclusion of a Phase I study for each licensed product but not to exceed \$1.1 million in total for the CFTR portfolio. In the fourth quarter of 2018, the Company determined the first pre-NDA approval milestone to be probable and accrued a current liability of \$0.2 million as of December 31, 2018.

Purchase Commitments

In the course of its business, the Company regularly enters into agreements with clinical organizations to provide services relating to clinical development and clinical manufacturing activities under fee service arrangements. The Company's current agreements for clinical and marketing services may be terminated on generally 90 days' notice without incurring additional charges, other than charges for work completed but not paid for through the effective date of termination and other costs incurred by the Company's contractors in closing out work in progress as of the effective date of termination. Purchase commitments included in the noncancellable long-term contractual cash obligations table above include noncancellable purchase commitments longer than one year and primarily relate to commitments for advertising and data services.

10. Public Offering of Common Stock

In March 2018, the Company completed a public offering of 6,325,000 shares of its common stock, including the exercise of the underwriters' option to purchase an additional 825,000 shares of common stock, at a price to the public of \$17.00 per share. Net cash proceeds from the public offering were \$100.9 million, after deducting the underwriting discounts and commissions and offering expenses.

11. Accumulated Other Comprehensive Income (Loss)

The accumulated balances related to each component of other comprehensive income (loss) were as follows for the years ended December 31, 2018 and 2017:

(in thousands)	December 31, 2018	December 31, 2017
Foreign currency translation	\$ 7	\$ 29
Available-for-sale securities	(6)	(63)
	\$ 1	\$ (34)

There were no reclassifications out of accumulated other comprehensive income (loss) for the years ended December 31, 2018, 2017 and 2016.

12. Stock-Based Compensation

As of December 31, 2018, there were 5,682,618 shares that were subject to outstanding options and restricted stock units (RSUs) under the 2006 Equity Incentive Plan (2006 Plan) and the Amended and Restated 2016 Equity Incentive

Plan

92

Table of Contents

(2016 Plan, and together with the 2006 Plan, Plans). The 2006 Plan expired by its terms on April 12, 2016, and the Company adopted the 2016 Plan. Outstanding options and RSUs under the 2006 Plan remain in effect and the terms of the 2006 Plan continue to apply, but no additional awards can be granted under the 2006 Plan. In June 2016, the Company's stockholders approved the 2016 Plan. The 2016 Plan has been amended and restated twice to increase the number of shares reserved for issuance, among other administrative changes. Both amendments and restatements of the 2016 Plan were approved by the Company's stockholders. There are a total of 7,100,000 shares of common stock reserved for issuance under the 2016 Plan, 4,576,126 shares of which remained available for future grant as of December 31, 2018.

Stock Options

The Company has granted option awards under the Plans with service conditions (service option awards) that are subject to terms and conditions established by the compensation committee of the board of directors. Service option awards have 10-year contractual terms and all service option awards granted prior to December 31, 2006, service option awards granted to new employees, and certain service option awards granted to existing employees vest and become exercisable on the first anniversary of the grant date with respect to the 25% of the shares subject to service option awards. The remaining 75% of the shares subject to the service option awards vest and become exercisable monthly in equal installments thereafter over three years. Certain service option awards granted to existing employees after December 31, 2006 vest and become exercisable monthly in equal installments over four years. The initial service option awards granted to directors upon their election vest and become exercisable in equal monthly installments over a period of four years, while the subsequent annual service option awards granted to directors vest and become exercisable in equal monthly installments over a period of one year. Certain service option awards to executives and directors provide for accelerated vesting if there is a change in control of the Company. Certain service option awards to employees and executives provide for accelerated vesting if the respective employee's or executive's service is terminated by the Company for any reason other than cause or permanent disability.

As of December 31, 2018, \$7.2 million of unrecognized compensation costs related to unvested service option awards are expected to be recognized over a weighted average period of 1.4 years. No option awards are classified as a liability as of December 31, 2018.

The following is a summary of option activity for the 2006 Plan and the 2016 Plan for the years ended December 31, 2018, 2017, and 2016:

2006 and 2016 Plans (in thousands, except for share and per share amounts)	Number of Shares	Weighted Average Exercise Price at Grant Date	Weighted Average Remaining Term (Years)	Aggregate Intrinsic Value
Outstanding at December 31, 2015	6,252,448	\$ 11.87	6.16	\$ 7,498
Granted	866,011	8.43		
Forfeited	(392,700)	11.23		
Expired	(279,766)	17.38		
Exercised	(897,657)	8.63		4,264
Outstanding at December 31, 2016	5,548,336	11.62	5.58	32,453
Granted	643,000	14.44		
Forfeited	(290,729)	10.73		
Expired	(605,617)	29.87		
Exercised	(575,206)	9.13		3,140
Outstanding at December 31, 2017	4,719,784	10.03	5.63	24,421
Granted	567,500	19.22		
Forfeited	(232,527)	13.99		
Exercised	(685,715)	9.12		5,945
Outstanding at December 31, 2018	4,369,042	11.15	5.28	65,438

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Exercisable at December 31, 2018	3,487,495	10.01	4.48	56,222
Vested and expected to vest at December 31, 2018	4,248,680	10.96	5.18	64,466

The weighted average grant-date fair value of options granted was \$10.66, \$7.81 and \$4.53 per share for the years ended December 31, 2018, 2017 and 2016, respectively. Proceeds from the exercise of stock options amounted to \$6.3 million, \$5.3 million and \$7.8 million for the years ended December 31, 2018, 2017 and 2016, respectively.

Table of Contents

Restricted Stock Units

An RSU is a stock award that entitles the holder to receive shares of the Company's common stock as the award vests. The fair value of each RSU is based on the closing price of the Company's stock on the date of grant. The Company has granted RSUs under the Plans with service conditions (service RSUs) that vest in four equal annual installments provided that the employee remains employed with the Company. Annual service RSUs granted to directors vest on the first anniversary of the grant date.

As of December 31, 2018, \$14.9 million of unrecognized compensation costs related to unvested service RSUs are expected to be recognized over a weighted average period of 1.8 years. No RSUs are classified as a liability as of December 31, 2018.

The following is a summary of RSU activity for the 2006 Plan and the 2016 Plan for the years ended December 31, 2018, 2017, and 2016:

RSUs	Number of Shares	Weighted Average Grant Date Fair Value
Unvested at December 31, 2015	1,022,681	\$ 10.90
Granted	657,742	8.71
Forfeited	(254,329)	10.38
Vested	(287,666)	9.65
Unvested at December 31, 2016	1,138,428	10.07
Granted	857,336	14.57
Forfeited	(275,613)	11.41
Vested	(362,313)	9.78
Unvested at December 31, 2017	1,357,838	12.72
Granted	714,086	18.93
Forfeited	(229,603)	15.19
Vested	(528,745)	12.69
Unvested at December 31, 2018	1,313,576	15.68

The grant date fair value for the 528,745 shares underlying RSUs that vested during the year ended December 31, 2018 was \$6.7 million.

Stock-Based Compensation Expense

Stock-based compensation expense recognized for the years ended December 31, 2018, 2017 and 2016 was allocated as follows:

(in thousands)	Year Ended		
	December 31,		
	2018	2017	2016
Research and development	\$1,290	\$1,152	\$2,087
Selling, general and administrative	10,376	9,313	6,456
	\$11,666	\$10,465	\$8,543

The fair value of each option award is estimated on the date of grant using the Black-Scholes-Merton option pricing model that uses the assumptions noted in the following table. Expected volatility rates are based on the historical volatility of the Company's publicly traded common stock and other factors. The risk-free interest rates are based on the U.S. Treasury yield for a period consistent with the expected term of the option in effect at the time of the grant. The Company has not paid dividends to its stockholders since its inception (other than a dividend of preferred share purchase rights, which was declared in September 2008) and does not plan to pay dividends in the foreseeable future. Assumptions used in the Black-Scholes-Merton option pricing model for employee and director stock options granted during the years ended December 31, 2018, 2017 and 2016 were as follows:

Table of Contents

	Year Ended December 31,					
	2018		2017		2016	
Expected dividend yield	—	%	—	%	—	%
Weighted average expected volatility	58	%	57	%	57	%
Weighted average expected term (years)	5.90		5.89		6.08	
Weighted average risk-free rate	2.68	%	1.97	%	1.37	%

13. Employee Benefit Plan

The Company has a defined contribution plan under IRC Section 401(k). This plan covers substantially all employees who meet minimum age and service requirements and allows participants to defer a portion of their annual compensation on a pre-tax basis. Currently, the Company matches fifty percent up to the first six percent of employee contributions. All matching contributions have been paid by the Company. The Company match vests over a 4-year period and amounted to \$0.9 million, \$0.8 million and \$0.4 million for the years ended December 31, 2018, 2017 and 2016, respectively.

14. Income Taxes

The Company recorded total tax expense of \$0.1 million on consolidated pretax income of \$25.3 million, consisting of \$25.1 million and \$0.2 million of pretax income in the U.S. and foreign subsidiaries, respectively, for the year ended December 31, 2018. The Company recorded total tax expense of \$0.1 million on consolidated pretax loss of \$15.4 million, consisting of \$15.7 million of pretax loss in the U.S. and \$0.3 million of pretax income from foreign subsidiaries for the year ended December 31, 2017. The Company recorded total tax expense of \$0.1 million on consolidated pretax loss of \$17.9 million, consisting of \$18.1 million of pretax loss in the U.S. and \$0.2 million of pretax income from foreign subsidiaries for the year ended December 31, 2016.

The following is a summary of the provision (benefit) for income taxes for the years ended December 31, 2018, 2017 and 2016:

(in thousands)	Year Ended December 31,		
	2018	2017	2016
Current:			
Federal	\$—	\$—	\$—
State	53	65	66
Foreign	99	(66)	142
Deferred:			
Federal	—	—	—
State	—	—	—
Foreign	(14)	137	(104)
Provision for income taxes	\$138	\$136	\$104

The Company assesses the need for a valuation allowance against its deferred tax asset each quarter through the review of all available positive and negative evidence. Deferred tax assets are reduced by a tax valuation allowance when, in the opinion of management, it is more likely than not that some portion or all of the deferred tax assets will not be realized. The fact that the Company has historically generated pretax losses in the U.S. serves as strong evidence that it is more likely than not that deferred tax assets in the U.S. will not be realized in the future. Therefore, the Company had a full tax valuation allowance against all net deferred tax assets in the U.S. as of December 31, 2018 and 2017. A reduction of the valuation allowance, in whole or in part, would result in a non-cash income tax benefit during the period of reduction. The potential timing and amount of any future valuation allowance release has yet to be determined and requires an analysis that is highly dependent upon historical and future projected earnings, among other factors. Any such adjustment could have a material impact on the Company's finance position and results of operations.

Table of Contents

As a result of the tax valuation allowance against deferred tax assets in the U.S., there was no expense (benefit) for income taxes associated with the U.S. income (loss) before income taxes for each of the years ended December 31, 2018, 2017 and 2016. The following is reconciliation between the federal statutory tax rate and the Company's effective tax rate for the years ended December 31, 2018, 2017 and 2016:

	Year Ended December 31,			
	2018	2017	2016	
Federal tax at statutory rate	21.0 %	35.0 %	35.0 %	%
State taxes	1.7 %	1.7 %	0.8 %	%
U.S. Tax Cuts and Job Act (1)	0.0 %	-262.6 %	0.0 %	%
Change in valuation allowance - U.S. Tax Cuts and Jobs Act	0.0 %	262.6 %	0.0 %	%
Other change in valuation allowance (2)	-16.4 %	-47.8 %	-38.4 %	%
Research and development credit	-9.1 %	9.0 %	3.8 %	%
Orphan drug credit	-2.7 %	6.3 %	7.6 %	%
Section 162(m) limitation	3.1 %	8.1 %	0.0 %	%
Other tax rate changes	-0.7 %	-2.6 %	3.9 %	%
Other changes in state deferred taxes (3)	5.9 %	5.1 %	0.0 %	%
Stock-based compensation	-3.9 %	-13.0 %	-12.5 %	%
Other items	1.6 %	-2.7 %	-0.8 %	%
Effective tax rate	0.5 %	-0.9 %	-0.6 %	%

(1) Includes the effect of the Tax Cuts and Jobs Act, which primarily relates to the remeasurement of existing deferred taxes as a result of the change to the U.S. federal tax rate.

(2) Reductions in 2018 valuation allowances are attributable to profitable 2018 U.S. results.

(3) Includes adjustments to state deferred taxes based on changes to filing jurisdictions.

The following is a summary of the components of the Company's deferred tax liabilities, net, and the related tax valuation allowance as of December 31, 2018 and 2017:

(in thousands)	December 31, 2018	December 31, 2017
Deferred tax assets:		
Net operating loss carryforwards	\$ 55,742	\$ 59,222
Stock-based compensation	5,202	5,383
Accrued and deferred expenses	2,096	1,967
Allowance for returns and uncollectable receivables	1,247	1,051
Research and development and orphan drug credit carryforwards	48,066	43,976
Intangible assets	—	3,745
Other	1,405	1,123
Total deferred tax assets	113,758	116,467
Deferred tax liabilities:		
Intangible assets	(1,247) —
Other	(576) (386
Total deferred tax liabilities	(1,823) (386
Deferred tax assets, net	111,935	116,081
Valuation allowance	111,950	116,110
Net deferred tax assets (liabilities)	\$ (15) \$ (29

The Company's net deferred tax liability of less than \$0.1 million as of December 31, 2018 and 2017 is included as a component of other non-current liabilities.

Table of Contents

The following is a summary of changes in the Company's tax valuation allowance for the years ended December 31, 2018, 2017 and 2016:

(in thousands)	Balance at Beginning of Year	Additions	Reductions	Balance at End of Year
Year Ended:				
December 31, 2018	\$ 116,110	\$ 4,036	\$ (8,196)	\$ 111,950
December 31, 2017	146,012	12,403	(42,305)	116,110
December 31, 2016	139,037	11,031	(4,056)	146,012

The Company has net operating loss (NOL) and other tax credit carryforwards in several jurisdictions. As of December 31, 2018, the Company has \$46.7 million of deferred tax assets relating to U.S. federal NOL carryforwards, along with deferred tax assets of \$12.1 million and \$36.0 million related to U.S. federal research and development credits and orphan drug credits, respectively. These tax attributes will begin to expire in 2029, 2024 and 2030, respectively. In addition, the Company has \$9.0 million of deferred tax assets relating to U.S. state NOL carryforwards, which primarily relate to the District of Columbia. State NOLs for the District of Columbia will begin to expire in 2031 and other state NOLs will begin to expire in 2019. A valuation allowance is recorded against these U.S. federal and U.S. state deferred tax assets.

Because the Company has generated or utilized NOLs from inception through December 31, 2018, all income tax returns filed by the Company are open to examination by tax jurisdictions. As of December 31, 2018, the Company's income tax returns had not been under examination by any federal or state tax jurisdictions. As of December 31, 2018 and 2017, the Company had no uncertain tax positions.

Certain tax attributes of the Company, including NOLs and credits, would be subject to a limitation should an ownership change as defined under the Internal Revenue Code of 1986, as amended (IRC), Section 382, occur. The limitations resulting from a change in ownership could affect the Company's ability to utilize its NOLs and credit carryforward (tax attributes). Ownership changes occurred in the years ending December 31, 2014 and December 31, 2008. The Company believes that the ownership changes in 2014 and 2008 will not impact its ability to utilize NOL and credit carryforwards; however, future ownership changes may cause the Company's existing tax attributes to have additional limitations. Because the Company maintains a valuation allowance on its U.S. tax attributes, any limitation as a result of application of IRC Section 382 limitation would not have a material impact on the Company's provision for income taxes for the year ended December 31, 2018.

The Tax Cuts and Jobs Act (TCJA) was enacted in December 2017. The TCJA reduces the U.S. federal corporate tax rate from 35% to 21%, requires companies to pay a one-time transition tax on earnings of certain foreign subsidiaries that were previously deferred and creates new taxes on certain foreign sourced earnings. During the fourth quarter of 2018, the Company completed its accounting for the tax effects of the TCJA. No material measurement period adjustments were recorded in 2018 to adjust estimated effects of the Act that were recorded in 2017. Immaterial measurement period adjustments that were recorded resulted in no tax expense as they were fully offset by a change in the Company's valuation allowance.

15. Earnings per Share

Basic earnings per share (EPS) is calculated by dividing the net loss by the weighted average number of shares of common stock outstanding. Diluted EPS is computed by dividing the net loss by the weighted average number of shares of common stock outstanding, plus potential outstanding common stock for the period. Potential outstanding common stock includes stock options and shares underlying RSUs, but only to the extent that their inclusion is dilutive.

Table of Contents

The following table presents the calculation of basic and diluted net income (loss) per share of common stock for the years ended December 31, 2018, 2017 and 2016:

(in thousands, except for share and per share amounts)	Year Ended December 31,		
	2018	2017	2016
Numerator:			
Net income (loss)	\$25,208	\$(15,567)	\$(18,010)
Denominator:			
Weighted average shares outstanding, basic	50,859,944	44,735,146	43,449,441
Effect of dilutive securities	2,185,310	—	—
Weighted average shares outstanding, diluted	53,045,254	44,735,146	43,449,441
Net income (loss) per share, basic and diluted:			
Basic	\$0.50	\$(0.35)	\$(0.41)
Diluted	\$0.48	\$(0.35)	\$(0.41)
Antidilutive securities excluded from calculations of diluted net income (loss) per share	903,265	3,136,515	4,943,797

The Company incurred a net loss for each of the years ended December 31, 2017 and 2016 causing inclusion of any potentially dilutive securities to have an anti-dilutive effect, resulting in dilutive loss per share and basic loss per share attributable to common stockholders being equivalent.

16. Legal Matters

Fanapt®. In June 2014, the Company filed suit against Roxane Laboratories, Inc. (Roxane) in the U.S. District Court for the District of Delaware (Delaware District Court). The suit sought an adjudication that Roxane has infringed one or more claims of the Company's U.S. Patent No. 8,586,610 ('610 Patent) by submitting to the U.S. Food and Drug Administration (FDA) an Abbreviated New Drug Application (ANDA) for a generic version of Fanapt® prior to the expiration of the '610 Patent in November 2027. In addition, pursuant to a settlement agreement with Novartis Pharma AG (Novartis), the Company assumed Novartis' patent infringement action against Roxane in the Delaware District Court. That suit alleges that Roxane has infringed one or more claims of U.S. Patent RE39198 ('198 Patent), which is licensed exclusively to the Company, by filing an ANDA for a generic version of Fanapt® prior to the expiration of the '198 Patent in November 2016. These two cases against Roxane were consolidated by agreement of the parties and were tried together in a five-day bench trial that concluded in March 2016. In August 2016, the Delaware District Court ruled that the Company is entitled to a permanent injunction against Roxane enjoining Roxane from infringing the '610 Patent, including the manufacture, use, sale, offer to sell, sale, distribution or importation of any generic iloperidone product described in the '610 Patent ANDA until the expiration of the '610 Patent in November 2027. If the Company obtains pediatric exclusivity, the injunction against Roxane would be extended until May 2028 under the Delaware District Court's order. In September 2016, Roxane filed a notice of appeal with the Federal Circuit Court of Appeals (Federal Circuit). In July 2017, Roxane, now a subsidiary of Hikma Pharmaceuticals PLC (Hikma), petitioned the Federal Circuit to substitute Roxane with new defendants West-Ward Pharmaceuticals International Limited and West-Ward Pharmaceuticals Corp. (each of which is a subsidiary of Hikma and both of which are referred to collectively herein as West-Ward). In April 2018, the Federal Circuit affirmed the Delaware District Court's decision that West-Ward infringed the '610 Patent. In June 2018, West-Ward filed with the Federal Circuit a petition seeking rehearing en banc. The Federal Circuit invited the Company to respond to West-Ward's petition; the Company's response was filed in July 2018. In August 2018, the Federal Circuit denied West-Ward's petition for rehearing. In January 2019, West-Ward filed a petition in the United States Supreme Court for a writ of certiorari seeking reversal of the Federal Circuit's decision. The Company submitted a response to that petition on February 12, 2019.

In 2015, the Company filed six separate patent infringement lawsuits in the Delaware District Court against Roxane, Inventia Healthcare Pvt. Ltd. (Inventia), Lupin Ltd. and Lupin Pharmaceuticals, Inc. (Lupin), Taro Pharmaceuticals USA, Inc. and Taro Pharmaceutical Industries, Ltd. (Taro), and Apotex Inc. and Apotex Corp. (Apotex, and collectively with Roxane, Inventia, Lupin and Taro, the Defendants). The lawsuits each seek an adjudication that the

respective Defendants infringed one or more claims of the '610 Patent and/or the Company's U.S. Patent No. 9,138,432 ('432 Patent) by submitting to the FDA an ANDA for a generic version of Fanap[®] prior to the expiration of the '610 Patent in November 2027 or the '432 Patent in September 2025. The Defendants denied infringement and counterclaimed for declaratory judgment of invalidity and noninfringement of the '610 Patent and the '432 Patent. Certain Defendants have since entered into agreements resolving these lawsuits, as discussed below. The remaining matters have been stayed until the later of November 30, 2018 or 14 days after

Table of Contents

final disposition by the U.S. Supreme Court of any petition for a writ of certiorari filed by West-Ward. The Company entered into a confidential stipulation with each of Inventia and Lupin regarding any potential launch of Inventia's and Lupin's generic ANDA products.

Lupin filed counter claims for declaratory judgment of invalidity and noninfringement of seven of the Company's method of treatment patents that are listed in the Approved Drug Products with Therapeutic Equivalence Evaluations (Orange Book) related to Fanapt® (such seven patents, the Method of Treatment Patents). The Company has not sued Lupin for infringing the Method of Treatment Patents. In October 2016, the Company, along with Lupin, filed a Stipulation of Dismissal in the Delaware District Court pursuant to which Lupin's counterclaims relating to the Method of Treatment Patents were dismissed without prejudice in recognition of an agreement reached between the parties by which the Company would not assert those patents against Lupin absent certain changes in Lupin's proposed prescribing information for its iloperidone tablets.

Taro and Apotex each entered into separate License Agreements (together, the License Agreements) resolving these lawsuits in October 2016 and December 2016, respectively. The License Agreements grant Taro and Apotex non-exclusive licenses to manufacture and commercialize a version of Fanapt® in the U.S. effective November 2027, unless prior to that date the Company obtains pediatric exclusivity for Fanapt®, in which case, the license will be effective May 2028. Taro and Apotex each may enter the market earlier under certain limited circumstances. The License Agreements, which are subject to review by the U.S. Federal Trade Commission (FTC) and the U.S. Department of Justice (DOJ), provide for a full settlement and release of all claims that are the subject of the respective litigation with Taro and Apotex.

In February 2016, Roxane filed suit against the Company in the U.S. District Court for the Southern District of Ohio (Ohio District Court). The suit sought a declaratory judgment of invalidity and noninfringement of the Method of Treatment Patents. In December 2016, the Ohio District Court dismissed Roxane's suit without prejudice for lack of personal jurisdiction.

In February 2016, Roxane filed a Petition for Inter Partes Review (IPR) of the '432 Patent with the Patent Trials and Appeals Board (PTAB) of the U.S. Patent and Trademark Office. In August 2016, the PTAB denied the request by Roxane to institute an IPR of the '432 Patent. In September 2016, Roxane filed a Petition for Rehearing with the PTAB. In November 2016, the PTAB denied Roxane's Petition for Rehearing.

HETLIOZ®. In March 2018, the Company received a Paragraph IV certification notice letter from Teva Pharmaceuticals USA, Inc. (Teva) notifying the Company that Teva had submitted an ANDA for HETLIOZ® to the FDA requesting approval to market, sell and use a generic version of the 20mg HETLIOZ® capsules for Non-24-Hour-Sleep-Wake Disorder. In its notice letter, Teva alleges that the Company's Orange Book listed U.S. Patent No. RE46,604, U.S. Patent No. 9,060,995, U.S. Patent 9,539,234, U.S. Patent 9,549,913, U.S. Patent 9,730,910 and U.S. Patent 9,885,241 (collectively, the Vanda Patents), which cover methods of using HETLIOZ®, are invalid, unenforceable and/or will not be infringed by Teva's manufacture, use or sale of the product described in its ANDA. The Company received similar notice letters in April 2018 from MSN Pharmaceuticals Inc. and MSN Laboratories Private Limited (together, MSN) and Apotex.

In April 2018, the Company filed a patent infringement lawsuit in the Delaware District Court against Teva and in May 2018, the Company filed patent infringement lawsuits in the Delaware District Court against MSN and Apotex. The lawsuits seek an adjudication that Teva, MSN and Apotex have infringed one or more claims of the Vanda Patents by submitting to the FDA an ANDA for a generic version of HETLIOZ® prior to the expiration of the latest to expire of the Vanda Patents in 2034. The relief requested by the Company in the lawsuits includes requests for permanent injunctions preventing Teva, MSN and Apotex from infringing the asserted claims of the Vanda Patents by engaging in the manufacture, use, offer to sell, sale, importation or distribution of generic versions of HETLIOZ® before the last expiration date of the Vanda Patents and for an order that any effective date of FDA approval of Teva, MSN, and Apotex's generic versions of HETLIOZ® be a date not earlier than the expiration of the Vanda Patents. The lawsuits automatically preclude the FDA from approving the submitted ANDAs until the earlier of seven and one-half years after the January 2014 approval of the Company's application for New Chemical Entity Status or entry of a district court decision finding the Vanda Patents invalid, unenforceable or not infringed. In June 2018, Teva, MSN and

Apotex each answered the Company's complaint, and Teva included counterclaims for declarations that the Vanda Patents are invalid. MSN included additional counterclaims for declarations that the Vanda Patents are not infringed. In July 2018, the Company answered Teva and MSN's counterclaims, denying their allegations.

In October 2018, the Company received an additional Paragraph IV certification notice letter from Teva concerning its Orange Book listed U.S. Patent No. 10,071,977, which expires in 2035 (the '977 Patent). In November 2018, the Company received a similar additional Paragraph IV certification notice letter from Apotex concerning the '977 Patent. In December 2018, the Company filed amended complaints against Teva, Apotex, and MSN alleging infringement of one or more claims of the '977 Patent. The amended complaints seek an adjudication that Teva, Apotex, and MSN have infringed one or more claims of the '977 Patent by submitting to FDA an ANDA for a generic version of HETLIOZ[®] prior to the expiration of the '977

Table of Contents

Patent. The relief requested by the Company in the amended complaints includes requests for permanent injunctions preventing Teva, Apotex, and MSN from infringing the asserted claims of the '977 Patent by engaging in the manufacture, use, offer to sell, sale, importation or distribution of generic versions of HETLIOZ[®] before the expiration date of the '977 Patent and for an order that any effective date of FDA approval of Teva, MSN, and Apotex's generic versions of HETLIOZ[®] be a date not earlier than the expiration of the '977 Patent. In December 2018, Teva, MSN, and Apotex answered the Company's amended complaints, and Teva and MSN included counterclaims for declarations that the '977 Patent is invalid, and MSN included an additional counterclaim that the '977 Patent is unenforceable for inequitable conduct. In January 2019, the Company answered Teva and MSN's counterclaims. A trial date for these lawsuits has been set for September 2020.

In February 2019, the Company received an additional Paragraph IV certification notice letter from Teva concerning its Orange Book listed U.S. Patent No. 10,149,829, which expires in 2033 (the '829 Patent). In its notice letter, Teva alleges that the '829 Patent, which covers methods of using HETLIOZ[®], is invalid, unenforceable and will not be infringed by Teva's manufacture, use or sale of the product described in its ANDA.

Other Matters. In April 2018, the Company submitted a protocol amendment to the FDA, proposing a 52-week open-label extension (OLE) period for patients who had completed the tradipitant Phase II clinical study (2301) in gastroparesis. In May 2018, based on feedback from the FDA, the Company amended the protocol limiting the duration of treatment in the 2301 study to a total of three months, while continuing to seek further dialogue with the FDA on extending the study duration to 52-weeks. As a part of this negotiation process, in September 2018, the Company submitted a new follow-on 52-week OLE protocol to the FDA (2302) for patients who had completed the 2301 study. While waiting for further feedback, no patients were ever enrolled in any study beyond 12 weeks. On December 19, 2018, the FDA imposed a partial clinical hold (PCH) on the two proposed studies, stating that the Company is required first to conduct additional chronic toxicity studies in canines, monkeys or minipigs before allowing patients access in any clinical protocol beyond 12 weeks. The PCH was not based on any safety or efficacy data related to tradipitant. Rather, the FDA informed the Company that these additional toxicity studies are required by a guidance document. The Company believes that the FDA does not have legal authority to issue the PCH on the basis of the guidance at issue. The Company also believes that it has provided the FDA with sufficient information regarding the safety of tradipitant to justify the continued study of tradipitant in patients beyond 12 weeks, in accordance with applicable law and FDA regulations. On February 5, 2019, the Company filed a lawsuit against the FDA in the United States District Court for the District of Columbia (DC District Court), challenging the FDA's legal authority to issue the PCH, and seeking an order to set it aside. On February 14, 2019, the FDA filed a Motion for Voluntary Remand to the Agency and for a Stay of the Case. The Company intends to continue vigorously pursuing its interests in the matter. The PCH and the Company's plans for tradipitant clinical development are discussed in greater detail in Part I, Item 1, Business, of this annual report on Form 10-K.

On February 4, 2019, a qui tam action filed against the Company was unsealed by order of the DC District Court entered on January 31, 2019. The qui tam action, United States ex rel. Richard Gardner v. Vanda Pharmaceuticals Inc., which was filed under seal on March 10, 2017, was brought by a former Company employee on behalf of the U.S., 28 states and the District of Columbia (collectively, the Plaintiff States) and the policyholders of certain insurance companies under the Federal False Claims Act and state law equivalents to the Federal False Claims Act and related state laws. The complaint alleges that the Company violated these laws through the promotion and marketing of its products Fanapt[®] and HETLIOZ[®]. The complaint seeks, among other things, treble damages, civil penalties for each alleged false claim, and attorneys' fees and costs.

The Company has not been served with the qui tam complaint. By virtue of the court having unsealed the case, it learned that on January 29, 2019, the U.S., as well as the Plaintiff States, filed notice of their election not to intervene in the qui tam action at this time. The U.S.' and the Plaintiff States' election not to intervene does not prevent the plaintiff/relator from litigating this action and the U.S. and the Plaintiff States may later seek to intervene in the action. The Company intends to vigorously defend itself in the litigation if served.

Table of Contents

17. Quarterly Financial Data (Unaudited)

The following is a summary of quarterly financial data for the years ended December 31, 2018 and 2017:

(in thousands, except for per share amounts)	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
Year Ended December 31, 2018				
Revenues	\$43,592	\$47,350	\$49,135	\$53,041
Gross profit (1)	38,680	41,739	43,670	46,994
Income from operations	2,442	3,913	6,233	9,150
Net income	3,066	4,611	7,171	10,360
Net income per share, basic	\$0.07	\$0.09	\$0.14	\$0.20
Net income per share, diluted	\$0.06	\$0.09	\$0.13	\$0.19
Year Ended December 31, 2017				
Revenues	\$37,415	\$42,056	\$41,336	\$44,276
Gross profit (1)	32,958	37,095	36,379	39,053
Loss from operations	(7,906)	(1,924)	(4,923)	(2,150)
Net loss	(7,645)	(1,534)	(4,550)	(1,838)
Net loss per share, basic and diluted	\$(0.17)	\$(0.03)	\$(0.10)	\$(0.04)

(1) Gross profit includes revenues less cost of goods sold, excluding amortization, and less intangible asset amortization.

Table of Contents

VANDA PHARMACEUTICALS INC.
EXHIBIT INDEX

Exhibit Number	Description
3.1	<u>Form of Amended and Restated Certificate of Incorporation of the registrant (filed as Exhibit 3.8 to Amendment No. 2 to the registrant’s registration statement on Form S-1 (File No. 333-130759) on March 17, 2006 and incorporated herein by reference).</u>
3.2	<u>Fourth Amended and Restated Bylaws of the registrant, as amended and restated on December 17, 2015 (filed as Exhibit 3.1 to the registrant’s current report on Form 8-K (File No. 001-34186) on December 21, 2015 and incorporated herein by reference).</u>
4.1	<u>Specimen certificate representing the common stock of the registrant (filed as Exhibit 4.4 to Amendment No. 2 to the registrant’s registration statement on Form S-1 (File No. 333-130759) on March 17, 2006, and incorporated herein by reference).</u>
10.1#	<u>Amended and Restated License, Development and Commercialization Agreement, dated July 24, 2005, by and between Bristol-Myers Squibb Company and the registrant (relating to HETLIOZ®) (filed as Exhibit 10.3 to Amendment No. 1 to the registrant’s registration Statement on Form S-1 (File No. 333-130759) on February 16, 2006 and incorporated herein by reference).</u>
10.2	<u>Form of Indemnification Agreement entered into by directors and executive officers (filed as Exhibit 10.11 to the registrant’s registration statement on Form S-1 (File No. 333-130759) on December 29, 2005 and incorporated herein by reference).</u>
10.3†	<u>2006 Equity Incentive Plan, as amended (filed as Exhibit 10.17 to Amendment No. 2 to the registrant’s Registration Statement on Form S-1 (File No. 333-130759), as filed on March 17, 2006, and incorporated herein by reference).</u>
10.4†	<u>Amended and Restated Employment Agreement, dated December 16, 2008, by and between Mihael H. Polymeropoulos and the registrant (filed as Exhibit 10.34 to the registrant’s quarterly report on Form 10-Q (File No. 001-34186) on August 10, 2009 and incorporated herein by reference).</u>
10.5†	<u>Employment Agreement, dated December 13, 2010, by and between James Kelly and the registrant (filed as Exhibit 10.38 to the registrant’s annual report on Form 10-K (File No. 001-34186) on March 10, 2011 and incorporated herein by reference).</u>
10.6†	<u>Amendment to Amended and Restated Employment Agreement, dated December 16, 2010, by and between Mihael H. Polymeropoulos and the registrant (filed as Exhibit 10.39 to the registrant’s annual report on Form 10-K (File No. 001-34186) on March 10, 2011 and incorporated herein by reference).</u>
10.7	<u>Amended and Restated Tax Indemnity Agreement, dated December 16, 2010, by and between Mihael H. Polymeropoulos and the registrant (filed as Exhibit 10.41 to the registrant’s annual report on Form 10-K (File No. 001-34186) on March 10, 2011 and incorporated herein by reference).</u>
10.8	

Lease, effective as of July 25, 2011, by and between Square 54 Office Owner LLC and the registrant (filed as Exhibit 10.42 to the registrant's quarterly report on Form 10-Q (File No. 001-34186) on November 7, 2011 and incorporated herein by reference).

10.9 Amendment to Amended and Restated License, Development and Commercialization Agreement, dated as of April 15, 2010, by and between Bristol-Myers Squibb Company and the registrant (filed as Exhibit 10.38 to the registrant's current report on Form 8-K (File No. 001-34186) on April 19, 2010 and incorporated herein by reference).

10.10 Amendment to Amended and Restated License, Development and Commercialization Agreement, dated as of May 24, 2012, by and between Bristol-Myers Squibb Company and the registrant (filed as Exhibit 10.46 to the registrant's current report on Form 8-K (File No. 001-34186) on May 30, 2012 and incorporated herein by reference).

10.11# License, Development and Commercialization Agreement, dated as of April 12, 2012, by and between Eli Lilly and Company and the registrant (filed as Exhibit 10.48 to the registrant's quarterly report on Form 10-Q (File No. 001-34186) on August 3, 2012 and incorporated herein by reference).

10.12 Amendment to Amended and Restated License, Development and Commercialization Agreement, dated as of April 25, 2013, by and between Bristol-Myers Squibb Company and the registrant (filed as Exhibit 10.50 to the registrant's current report on Form 8-K (File No. 001-34186) on April 29, 2013 and incorporated herein by reference).

102

Table of Contents

Exhibit Number	Description
10.13#	<u>Manufacturing Agreement, dated January 24, 2014, by and between Patheon Pharmaceuticals Inc. and the registrant (relating to HETLIOZ®) (filed as Exhibit 10.53 to the registrant’s quarterly report on Form 10-Q (File No. 001-34186) on May 8, 2014 and incorporated herein by reference).</u>
10.14	<u>Amendment to Lease Agreement, dated March 18, 2014, by and between Square 54 Office Owner LLC and the registrant (filed as Exhibit 10.54 to the registrant’s quarterly report on Form 10-Q (File No. 001-34186) on May 8, 2014 and incorporated herein by reference).</u>
10.15	<u>Settlement Agreement and Mutual General Release, dated December 22, 2014, by and among Novartis Pharma AG and the registrant (filed as Exhibit 10.55 to the registrant’s annual report on Form 10-K (File No. 001-34186) on March 13, 2015 and incorporated herein by reference).</u>
10.16#	<u>Asset Transfer Agreement, dated December 22, 2014, by and among Novartis Pharma AG, Novartis AG and the registrant (relating to Fanapt®) (filed as Exhibit 10.56 to the registrant’s annual report on Form 10-K/A (File No. 001-34186) on June 10, 2015 and incorporated herein by reference).</u>
10.17#	<u>Sublicense Agreement, dated November 20, 1997, by and between Titan Pharmaceuticals, Inc. and Novartis Pharma AG (filed as Exhibit 10.30 to Titan Pharmaceutical Inc.’s registration statement on Form S-3 (File No. 333-42367) on December 16, 1997 and incorporated herein by reference).</u>
10.18#	<u>Amendment No. 1 to Sublicense Agreement by and between Titan Pharmaceuticals, Inc. and Novartis Pharma AG, dated November 30, 1998 (filed as Exhibit 10.58 to the registrant’s annual report on Form 10-K (File No. 001-34186) on March 13, 2015 and incorporated herein by reference).</u>
10.19#	<u>Amendment No. 2 to Sublicense Agreement, dated April 10, 2001, by and between Titan Pharmaceuticals, Inc. and Novartis Pharma AG (filed as Exhibit 10.59 to the registrant’s annual report on Form 10-K/A (File No. 001-34186) on June 10, 2015 and incorporated herein by reference).</u>
10.20#	<u>Amendment No. 3 to Sublicense Agreement, dated June 4, 2004, by and between Titan Pharmaceuticals, Inc. and Novartis Pharma AG (filed as Exhibit 10.60 to the registrant’s annual report on Form 10-K (File No. 001-34186) on March 13, 2015 and incorporated herein by reference).</u>
10.21	<u>Stock Purchase Agreement, dated December 22, 2014, by and between Novartis AG and the registrant (filed as Exhibit 10.61 to the registrant’s annual report on Form 10-K (File No. 001-34186) on March 13, 2015 and incorporated herein by reference).</u>
10.22#	<u>License Agreement, dated December 22, 2014, by and between Novartis Pharma AG and the registrant (relating to AQW051) (filed as Exhibit 10.62 to the registrant’s annual report on Form 10-K (File No. 001-34186) on March 13, 2015 and incorporated herein by reference).</u>
10.23†	<u>Employment Agreement, dated September 3, 2015, by and between Gian Piero Reverberi, Senior Vice President and General Manager Europe, and the registrant (filed as Exhibit 10.64 to the registrant’s quarterly report on Form 10-Q (File No. 001-34186) on November 4, 2015 and incorporated herein by reference).</u>
10.24	

Agreement, dated February 2, 2016, by and among Titan Pharmaceuticals, Inc., Aventisub LLC, the successor-in-interest to Aventisub II Inc. Sanofi-Aventis and the registrant (filed as Exhibit 10.1 to the registrant's current report on Form 8-K (File No. 001-34186) on February 4, 2016 and incorporated herein by reference).

10.25† Vanda Pharmaceuticals Inc. Amended and Restated 2016 Equity Incentive Plan, effective as of June 13, 2018 (filed as Exhibit 10.1 to the registrant's registration statement on Form S-8 (File No. 333-225599) on June 13, 2018 and incorporated herein by reference).

10.26† Form of Notice of Stock Option Grant and Stock Option Agreement under Amended and Restated 2016 Equity Incentive Plan (filed as Exhibit 10.2 to the registrant's registration statement on Form S-8 (File No. 333-218774) on June 15, 2017 and incorporated herein by reference).

10.27† Form of Restricted Stock Unit Award Agreement under Amended and Restated 2016 Equity Incentive Plan (filed as Exhibit 10.3 to the registrant's registration statement on Form S-8 (File No. 333-218774) on June 15, 2017 and incorporated herein by reference).

10.28† UK Sub Plan under the Amended and Restated 2016 Equity Incentive Plan (filed as Exhibit 10.4 to the registrant's registration statement on Form S-8 (File No. 333-218774) on June 15, 2017 and incorporated herein by reference).

10.29† Form of Stock Option Grant and Stock Option Agreement under the UK Sub Plan under the Amended and Restated 2016 Equity Incentive Plan (filed as Exhibit 10.5 to the registrant's registration statement on Form S-8 (File No. 333-218774) on June 15, 2017 and incorporated herein by reference).

Table of Contents

Exhibit Number	Description
10.30†	<u>Form of Restricted Stock Unit Award Agreement under the UK Sub Plan under the Amended and Restated 2016 Equity Incentive Plan (filed as Exhibit 10.6 to the registrant’s registration statement on Form S-8 (File No. 333-218774) on June 15, 2017 and incorporated herein by reference).</u>
10.31#	<u>Manufacturing Agreement, dated May 6, 2016, by and between Patheon Pharmaceuticals Inc. and the registrant (relating to Fanapt®) (filed as Exhibit 10.42 to the registrant’s quarterly report on Form 10-Q (File No. 001-34186) on July 28, 2016 and incorporated herein by reference).</u>
10.32	<u>Second Amendment to Lease Agreement, dated June 20, 2016, by and between Square 54 Office Owner LLC and the registrant (filed as Exhibit 10.43 to the registrant’s quarterly report on Form 10-Q (File No. 001-34186) on July 28, 2016 and incorporated herein by reference).</u>
10.33	<u>Sublease Agreement, dated June 22, 2016, by and between Hunton & Williams LLP and the registrant (filed as Exhibit 10.44 to the registrant’s quarterly report on Form 10-Q (File No. 001-34186) on July 28, 2016 and incorporated herein by reference).</u>
10.34#	<u>License Agreement, dated October 24, 2016, by and among Taro Pharmaceuticals USA, Inc., Taro Pharmaceuticals Industries Ltd. and the registrant (filed as Exhibit 10.45 to the registrant’s annual report on Form 10-K (File No. 001-34186) on February 17, 2017 and incorporated herein by reference).</u>
10.35#	<u>License Agreement, dated December 7, 2016, by and between Apotex, Inc. and the registrant (filed as Exhibit 10.46 to the registrant’s annual report on Form 10-K (File No. 001-34186) on February 17, 2017 and incorporated herein by reference).</u>
10.36	<u>Third Amendment to Lease Agreement, dated March 28, 2018, by and between Square 54 Office Owner LLC and the registrant (filed as Exhibit 10.38 to the registrant’s quarterly report on Form 10-Q (File No. 001-34186) on May 2, 2018 and incorporated herein by reference).</u>
10.37	<u>Fourth Amendment to Lease Agreement, dated March 29, 2018, by and between Square 54 Office Owner LLC and the registrant (filed as Exhibit 10.39 to the registrant’s quarterly report on Form 10-Q (File No. 001-34186) on May 2, 2018 and incorporated herein by reference).</u>
10.38†	<u>Amended and Restated Employment Agreement, dated April 30, 2018, by and between Gunther Birznieks and the registrant (filed as Exhibit 10.40 to the registrant’s quarterly report on Form 10-Q (File No. 001-34186) on May 2, 2018 and incorporated herein by reference).</u>
10.39†	<u>Employment Agreement, dated August 13, 2018, by and between Timothy Williams and the registrant (filed as Exhibit 10.41 to the registrant’s quarterly report on Form 10-Q (File No. 001-34186) on November 7, 2018 and incorporated herein by reference).</u>
21.1	<u>List of Subsidiaries (filed as Exhibit 21.1 to the registrant’s annual report on Form 10-K (File No. 001-34186) on February 17, 2017 and incorporated herein by reference).</u>
23.1*	<u>Consent of PricewaterhouseCoopers LLP, Independent Registered Public Accounting Firm.</u>
31.1*	<u>Certification of the Chief Executive Officer, as required by Section 302 of the Sarbanes-Oxley Act of 2002.</u>

31.2* Certification of the Chief Financial Officer as required by Section 302 of the Sarbanes-Oxley Act of 2002.

32.1* Certification of the Chief Executive Officer and Chief Financial Officer as required by Section 906 of the Sarbanes-Oxley Act of 2002.

101* The following financial information from this annual report on Form 10-K for the fiscal year ended December 31, 2018, formatted in XBRL (eXtensible Business Reporting Language) and furnished electronically herewith: (i) Consolidated Balance Sheets as of December 31, 2018 and 2017; (ii) Consolidated Statements of Operations for the years ended December 31, 2018, 2017 and 2016; (iii) Consolidated Statements of Comprehensive Income (Loss) for the years ended December 31, 2018, 2017 and 2016; (iv) Consolidated Statements of Changes in Stockholders' Equity for the years ended December 31, 2018, 2017 and 2016; (v) Consolidated Statements of Cash Flows for the years ended December 31, 2018, 2017 and 2016; and (vi) Notes to the Consolidated Financial Statements.

† Indicates management contract or compensatory plan.

Confidential treatment has been granted with respect to certain provisions of this exhibit.

* Filed herewith.

104