ENANTA PHARMACEUTICALS INC
Form 10-K
November 29, 2018

UNITED STATES

SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

Form 10-K

ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the fiscal year ended September 30, 2018

OR

TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
Commission File Number 001-35839

ENANTA PHARMACEUTICALS, INC.

(Exact name of registrant as specified in its charter)

DELAWARE	2834	04-3205099
(State or other jurisdiction of incorporation or organization)	(Primary Standard Industrial Classification Code Number)	(I.R.S. Employer Identification Number)

500 Arsenal Street

Watertown, Massachusetts 02472

(617) 607-0800

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

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

Title of each class:	Name of each exchange on which registered:

Common Stock, $0.01 Par Value The NASDAQ Stock Market LLC (NASDAQ Global Select Market)
Securities registered pursuant to Section 12(g) of the Act: None

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

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

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

Indicate by check mark whether the registrant has submitted electronically 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.

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

Large accelerated filer	Accelerated filer
Non-accelerated filer	Smaller reporting company
Emerging growth company	

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

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

The aggregate market value of the registrant's common stock held by non-affiliates of the registrant as of the last business day of the registrant's most recently completed second fiscal quarter, March 31, 2018, based on the last reported sale price of the registrant's common stock of $80.91 per share was $1,280,474,378. The number of shares of the registrant's Common Stock, $0.01 par value, outstanding as of November 1, 2018 was 19,423,949 shares.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's Definitive Proxy Statement for its 2018 Annual Meeting of Stockholders scheduled to be held on February 28, 2019, which Definitive Proxy will be filed with the Securities and Exchange Commission not later than 120 days after the registrant's fiscal year end of September 30, 2018 are incorporated by reference into Part

III of this Form 10-K.

As used in this Form 10-K, “Enanta,” “the Company,” “we,” “our,” and “us” refer to Enanta Pharmaceuticals, Inc., and “MAVYRET/MAVIRET” refers to AbbVie’s HCV regimen consisting of tablets of glecaprevir/pibrentasvir, except where the context otherwise requires or as otherwise indicated. MAVYRET™, MAVIRET™, VIEKIRA PAK™, TECHNIVIE™, VIEKIRAX™, VIEKIRA XR™ and, EXVIERA™ are trademarks of AbbVie, Inc.

NOTE REGARDING FORWARD LOOKING STATEMENTS

This Annual Report on Form 10-K contains forward-looking statements concerning our business, operations and financial performance and condition, as well as our plans, objectives and expectations for our business operations and financial performance and condition. Any statements contained herein that are not statements of historical facts may be deemed to be forward-looking statements. In some cases, you can identify forward-looking statements by terminology such as “aim,” “anticipate,” “assume,” “believe,” “contemplate,” “continue,” “could,” “due,” “estimate,” “expect,” “may,” “objective,” “plan,” “predict,” “potential,” “positioned,” “seek,” “should,” “target,” “will,” “would,” and other similar e are predictions of or indicate future events and future trends, or the negative of these terms or other comparable terminology. These forward-looking statements include, but are not limited to, statements about overall trends, royalty revenue trends, research and clinical development plans, liquidity and capital needs and other statements of expectations, beliefs, future plans and strategies, anticipated events or trends and similar expressions. These forward-looking statements are based on our management’s current expectations, estimates, forecasts and projections about our business and the industry in which we operate and our management’s beliefs and assumptions. These forward-looking statements are not guarantees of future performance or development and involve known and unknown risks, uncertainties and other factors that are in some cases beyond our control. As a result, any or all of our forward-looking statements in this Annual Report on Form 10-K may turn out to be inaccurate. Factors that may cause actual results to differ materially from current expectations include, among other things, those listed under “Risk Factors” and discussed elsewhere in this Annual Report on Form 10-K. These forward-looking statements speak only as of the date of this Annual Report on Form 10-K. Except as required by law, we assume no obligation to update or revise these forward-looking statements for any reason, even if new information becomes available in the future. You should, however, review the factors and risks we describe in the reports we will file from time to time with the SEC after the date of this Annual Report on Form 10-K.

ENANTA PHARMACEUTICALS, INC.

ANNUAL REPORT ON FORM 10-K

For the year ended September 30, 2018

INDEX

PART I

ITEM 1. BUSINESS
BUSINESS

Overview

We are a biotechnology company that uses our robust, chemistry-driven approach and drug discovery capabilities to create small molecule drugs primarily for the treatment of viral infections and liver diseases. We discovered glecaprevir, the second of two protease inhibitors discovered and developed through our collaboration with AbbVie for the treatment of chronic hepatitis C virus, or HCV. Glecaprevir is co-formulated as part of AbbVie's newest direct-acting antiviral (DAA) combination and marketed under the tradenames MAVYRET™ (U.S.) or MAVIRET™ (ex-U.S.) (glecaprevir/pibrentasvir). Our royalties from our AbbVie collaboration and our existing financial resources provide us funding to support our wholly-owned research and development programs, which are currently focused on the following disease targets:

- respiratory syncytial virus, or RSV, the most common cause of bronchiolitis and pneumonia in children under one year of age in the U.S., resulting in an estimated 57,000 to 125,000 U.S. hospitalizations each year;
- non-alcoholic steatohepatitis, or NASH, a liver disease estimated to affect approximately 1.5% to 6.5% of the population in the developed world (which translates to approximately 5 to 20 million individuals in the U.S. alone);
- primary biliary cholangitis, or PBC, a chronic liver disease that slowly destroys bile ducts in the liver, which affects an estimated 17,000 individuals in the U.S.; and
- hepatitis B virus, or HBV, the most prevalent chronic hepatitis, which is estimated to affect approximately 250 million individuals worldwide.

We had $325.1 million in cash, cash equivalents and marketable securities at September 30, 2018. In fiscal 2018, we earned $191.6 million in per-product royalties on AbbVie's net sales of its HCV regimens and we earned the remaining $15.0 million milestone payment from AbbVie upon reimbursement approval for MAVIRET™ in Japan. We expect our existing financial resources and future royalties from our AbbVie collaboration will allow us to continue to fund our wholly-owned research and development programs for the foreseeable future.

Our Wholly-Owned Programs

Our wholly-owned research and development programs are in virology, namely RSV and HBV, and in liver disease (non-virology), namely NASH and PBC:

- RSV: We discovered EDP-938, a potent N-protein inhibitor of activity of both major subgroups of RSV, referred to as RSV-A and RSV-B, and have tested it as our first clinical candidate for RSV. We believe EDP-938 is differentiated from fusion inhibitors currently in development for RSV because N-protein inhibitors directly target the viral replication process of RSV and have demonstrated high barriers to resistance against RSV in vitro.
  - In our fiscal 2018, we completed a Phase 1 clinical study demonstrating that EDP-938 was generally safe and well tolerated over a broad range of single and multiple doses with good pharmacokinetic data.
  - We initiated a Phase 2a challenge study of EDP-938 in October 2018. The challenge study will test the effect of EDP-938 on healthy volunteers who will be infected with RSV and then treated with EDP-938 or placebo during the course of the study. Primary and secondary outcome measures include changes in viral load measurements and change of baseline symptoms.
  - Preclinical data demonstrated that EDP-938 is a potent inhibitor of both RSV-A and RSV-B activity, maintaining antiviral activity post-infection while presenting a high barrier to resistance in vitro.

- NASH and PBC: We are working on multiple compounds that selectively bind to and activate the farnesoid X receptor, or FXR. We plan to develop these compounds, referred to as FXR agonists, for use in the treatment of NASH and PBC, both of which are liver diseases with very few therapeutic options. Our lead FXR agonist, EDP-305, represents a new class of FXR agonists designed to take advantage of increased binding interactions with the receptor. We believe this class is significantly different from other FXR agonists in clinical development.
  - In October 2017, we announced results of a Phase 1a/b clinical study of EDP-305, which was generally safe and well tolerated over a broad range of single and multiple doses with pharmacokinetic data supporting once daily oral dosing. Additional data from this study were also presented at the 2018 NASH-TAG conference and the International Liver Congress™ (ILC) 2018. The study included 98 healthy volunteer subjects, or HV subjects, and 48 subjects who were obese and with or without pre-diabetes or type 2 diabetes, whom we refer to as subjects with presumptive non-alcoholic fatty liver disease, or PN subjects.
  - We have presented data at the 2017 and 2018 annual meetings of the American Association for the Study of Liver Diseases (AASLD), the 2017 and 2018 NASH-TAG conferences and the 2017 and 2018 ILC conferences that demonstrated that EDP-305 is a highly selective FXR agonist and shows more potent activity in a variety of in vitro and in vivo NASH models compared to the most advanced NASH candidate in development today, obeticholic acid, or OCA.
  - We initiated a Phase 2 clinical study, known as ARGON-1, of EDP-305 in NASH patients and a Phase 2 clinical study, known as INTREPID, of EDP-305 in PBC patients.
    - EDP-305 has been granted Fast Track designation by the U.S. Food and Drug Administration (FDA) for the treatment of NASH patients with liver fibrosis and separately for the treatment of PBC.
  - In addition, we are pursuing research in other classes of FXR agonists as well as other mechanisms that may provide therapeutic benefit in NASH, any of which could be used in combination therapies for NASH.
- HBV: We also have a program to discover and develop new chemical entities for the treatment of HBV. Our initial focus is on core inhibitors, a mechanism with early clinical validation. In November 2018, we announced our first clinical candidate for HBV. EDP-514 is an HBV core inhibitor, also known as a core protein allosteric modulator or capsid assembly modulator.
  - EDP-514 was selected from our lead class of HBV compounds that are characterized by potent antiviral activity. In vitro, they are capable of preventing the establishment of cccDNA, are pan-genotypic, are active against known nucleos(t)ide resistant mutants, and are additive to synergistic with nucleoside analogs and other core inhibitors. Members of this class have also demonstrated excellent reduction in HBV titers in a chimeric mouse model with human liver cells.
  - In addition, we are also seeking patent protection and conducting preclinical experiments with compounds we have discovered that use other mechanisms to target HBV. We believe that it may be necessary to utilize more than one compound/mechanism for the treatment of HBV and therefore we are pursuing multiple approaches.

We have utilized our internal chemistry and drug discovery capabilities to generate all of our development-stage programs.

Our Out-Licensed Products

Through our Collaborative Development and License Agreement with AbbVie, we have developed and out-licensed to AbbVie two protease inhibitor compounds that have been clinically tested, manufactured, and commercialized by AbbVie. To date, we have earned all $330.0 million milestone payments under the agreement related to clinical development and commercialization regulatory approvals of these regimens in major markets.

- Glecaprevir: Glecaprevir is the protease inhibitor we discovered that was developed by AbbVie in a fixed-dose combination with its NS5A inhibitor, pibrentasvir, for the treatment of HCV. This combination, currently marketed under the brand name MAVYRET™ (U.S.) and MAVIRET™ (ex-U.S.) and referred to in this report as MAVYRET/MAVIRET, is a novel, once daily, all oral, fixed-dose, ribavirin-free treatment for HCV genotypes 1-6, or GT1-6, which is referred to as being pan-genotypic. In the U.S., EU and Japan it was approved as an 8-week treatment for patients without cirrhosis and new to treatment. Today, these patients are estimated to represent the majority of HCV patients in developed country markets.

Since August 2017, substantially all of our royalty revenue has been derived from AbbVie's net sales of MAVYRET/MAVIRET. Our ongoing royalty revenues from this regimen consist of annually tiered, double-digit, per-product royalties (see Note 7 in Notes to Consolidated Financial Statements) on 50% of the calendar year net sales of the 2-DAA glecaprevir/pibrentasvir combination in MAVYRET/MAVIRET. These royalties are calculated separately from the royalties on AbbVie's paritaprevir-containing regimens.

- Paritaprevir: Paritaprevir is the protease inhibitor contained in AbbVie's initial HCV treatment regimens sold under the tradenames VIEKIRAX® (ex-U.S.) and VIEKIRA PAK® (U.S.) (paritaprevir/ritonavir/ ombitasvir/dasabuvir). These regimens are no longer being actively marketed in markets where MAVYRET/MAVIRET is approved and reimbursed. AbbVie's paritaprevir-containing regimens were first approved and sold in the U.S. in December 2014. Through our 2017 fiscal year end, our royalty revenues were generated substantially through worldwide net sales of these regimens.

Our Strategy

Our primary objective is to become a leader in the field of viral infections and liver diseases in order to provide new treatments for patients with unmet medical needs. Our focus is on antiviral targets for viruses such as RSV and HBV as well as liver diseases, such as NASH and PBC. All of these disease areas involve significant market opportunities and have attracted the research and development efforts of many competitors. Our strategy includes the following key elements:

- Develop novel treatment options for RSV, NASH, PBC and HBV. We have potential candidates in clinical development for RSV, NASH and PBC. We completed a Phase 1 clinical study of our lead RSV candidate, EDP-938, and have initiated a Phase 2a challenge study in RSV in October 2018. We also completed a Phase 1 a/b clinical study of EDP-305, our lead FXR agonist, and initiated two Phase 2 clinical studies of this compound during fiscal 2018 – one in NASH patients and one in PBC patients. In addition, we recently selected a development candidate for HBV, EDP-514, which we plan to test in a Phase 1 a/b clinical study initiating in 2019.
- Invest in research and development of additional product candidates in RSV, NASH/PBC and HBV. We are continuing to invest significant resources in our RSV, NASH, PBC and HBV research programs in an effort to identify and advance additional novel compounds that have the potential to address significant unmet medical needs in these disease areas. We may clinically explore other diseases where our assets could play a role. In addition, we may seek to augment our product candidate pipeline through the acquisition or in-licensing of external assets and/or technologies in one or more of our disease areas of focus.
- Use our existing resources and future cash flow from our AbbVie collaboration to fund our research and development activities. Our existing financial resources and future royalty payments from our AbbVie collaboration will provide us substantial resources to fund our research and development programs for the foreseeable future.

These resources will allow us to continue to advance compounds in clinical development as well as to progress the most promising candidates at least through proof-of-

3

concept for further development as a monotherapy or in combinations with other therapeutic agents when we believe such combinations will provide the most promising opportunities.

- Collaborate, where and when appropriate, with pharmaceutical partners to create combination therapies and accelerate the development and commercialization of our proprietary compounds. We are prepared to join forces, where and when appropriate, with collaborators with compounds targeting other mechanisms of action in diseases such as NASH and HBV, where there is the potential for better treatments with combination therapies. Our decisions regarding our proprietary programs will be based on the results of our early phase clinical studies and the potential for combinations with one or more drugs targeting other mechanisms of action in these diseases.

Our Research and Development Pipeline

The following table summarizes our product development pipeline in our virology and liver disease programs:

Our RSV Program

Background and Overview of RSV

Respiratory syncytial virus, or RSV, is a virus that infects the lungs and represents a serious unmet medical need in infants and children, as well as immune-compromised individuals and the elderly. RSV is the most common cause of bronchiolitis (inflammation of the small airways in the lung) and pneumonia in children under 1 year of age in the United States. Each year, 57,000 to 125,000 patients in the U.S. are hospitalized due to RSV infection. In one large U.S.-based study, RSV infection in children was associated with 20% of hospitalizations, 18% of emergency

department visits, and 15% of pediatric office visits for acute respiratory infections in the November-April timeframe. Though a prophylactic monoclonal antibody-based treatment is available for infants considered at high risk for RSV infection, this study found that most young children affected by RSV infection were previously healthy, and thus would not normally be considered for prophylaxis. There are currently no safe and effective therapies for already established RSV infection. Several companies are seeking new antiviral treatments for RSV infection in adult and pediatric settings and others are developing vaccines.

Scientific Background

RSV is a single-stranded, negative-sense RNA virus. The RSV genome consists of ten genes that encode for 11 proteins, namely NS1, NS2, N, P, M, SH, G, F, M2-1, M2-2, and L. The F and G proteins are the predominant target proteins for RSV vaccines. Similarly, small molecule therapeutics have focused primarily on the F (or fusion) protein, while some efforts have targeted the N and L proteins. There are two major subgroups of RSV, designated RSV-A and RSV-B, each of which contains numerous genotypes. Both groups are viewed as capable of causing RSV infections that can result in hospitalization.

EDP-938 and Our Approach to the Treatment of RSV

While a number of companies are developing potential approaches geared towards the F protein (or fusion protein, responsible for mediating viral entry of RSV into host cells), we are focused on other mechanisms, such as the N-protein pathway, that target the replication process of RSV. It is possible that N-protein inhibitors may also be effective treatments at later stages of infection. We are currently the only company with an N inhibitor in clinical development.

Through our internal chemistry efforts, we identified a clinical candidate, EDP-938. During preclinical studies, EDP-938 demonstrated a greater than 4-log reduction in viral load in an animal model challenged with RSV. Further, EDP-938 maintained antiviral potency across all clinical isolates tested in vitro, as well as virus that was resistant to fusion inhibitors. The compound inhibited RSV at a post-entry replication step and maintained its activity in vitro when given 24 hours post infection. In addition, combination studies of EDP-938 with other types of RSV inhibitors, such as fusion inhibitors, showed synergistic antiviral effects.

During fiscal 2018, we initiated and completed a Phase 1 clinical study of EDP-938. On November 1, 2018, we presented full Phase 1 data at the 11th International Respiratory Syncytial Virus Symposium. The Phase 1, randomized, double-blind, placebo (PBO)-controlled, first-in-human study was conducted to evaluate the safety, tolerability, and pharmacokinetics (PK) of single- and multiple- (7 days) ascending doses (SAD: 50 - 800 mg and MAD: 100 - 600 mg once daily and 300 mg twice daily) and food effect (FE) of EDP-938 in healthy subjects. In the SAD phase, 50 subjects [EDP-938 (n=38) and PBO (n=12)] were enrolled in 6 dose cohorts; in the MAD phase, 40 subjects [EDP-938 (n=30) and PBO (n=10)] were enrolled in 5 dose cohorts. Overall, no safety concerns were reported in 68 healthy subjects receiving a broad range of single and multiple doses of EDP-938. Headache was the most frequently reported AE during the SAD and MAD phases. There were no SAEs, and AEs were of mild intensity, with none leading to study drug discontinuation. EDP-938 was rapidly absorbed and exposure increased with increasing single and multiple dosing, resulting in a PK profile suitable for once or twice daily oral dosing regardless of food. In the MAD phase, half-life ranged from 12.9 to 17.6 hours, and at doses comparable to those under study in the Phase 2a trial, and mean trough levels were approximately 30x higher than the EC90 of EDP-938 against RSV-infected human cells.

Based on the results above, we initiated a Phase 2a challenge study of EDP-938 in October 2018. In this randomized, double-blind, placebo-controlled, human challenge study, up to 114 healthy adult subjects will be randomized into 1 of 3 arms (1:1:1) and will be dosed for 5 days. All subjects will be infected with RSV-A Memphis 37b virus, and approximately 76 subjects will receive EDP-938 and 38 subjects will receive placebo. Arm 1 will receive placebo, Arm 2 will receive a single 500 mg loading dose of EDP-938 followed by 300 mg doses twice daily, and Arm 3 will receive a 600 mg dose daily.

Our FXR Program in NASH and PBC

Background and Overview of NASH and PBC

Non-alcoholic fatty liver disease, or NAFLD, is the accumulation of excessive fat in liver cells in the form of triglycerides, a process known as hepatic steatosis, that is not associated with alcohol abuse. It is normal for the liver to contain some fat. However, if more than 5%-10% of the liver's weight is fat, then it is called a fatty liver. A subgroup of NAFLD patients have liver cell injury and inflammation (steatohepatitis) in addition to excessive fat. Progression of this condition leads to non-alcoholic steatohepatitis, or NASH. Patients with NASH can develop fibrosis, a fibrous scarring of the liver, and ultimately cirrhosis of the liver. Typically scored on a scale of 1-4, also referred to as F1-F4, fibrosis in its earlier stages has been shown to be reversible, but in its most advanced stage results in cirrhosis, which is understood to be a more advanced, irreversible scarring of the liver, potentially leading to hepatocellular carcinoma (HCC) or requiring a liver transplant. NASH is widely considered to be the liver expression of metabolic diseases related to type 2 diabetes, insulin resistance, obesity, hyperlipidemia and hypertension.

Stages of Liver Injury

According to the World Gastroenterology Organization Global Guidelines 2014, NASH is an increasingly common chronic liver disease with worldwide distribution that is closely associated with diabetes and obesity, which have both reached epidemic proportions. It is estimated that there are at least 1.46 billion obese adults worldwide. Approximately 3%-5% of individuals in the U.S. are estimated to have progressed to NASH, 20% of whom are likely to develop cirrhosis. NASH and NAFLD are now considered the number one cause of liver disease in Western countries.

Currently, there are no approved treatments for NASH. While patients presenting with NASH are counseled on lifestyle modifications, new effective treatments are urgently needed, particularly in the setting of advanced fibrosis and cirrhosis. We expect significant competition from other companies in the development of treatments for NASH and related conditions. Currently, Intercept Pharmaceuticals, Genfit, Gilead and Allergan (Tobira) have compounds in one or more Phase 3 trials in NASH. In addition, many Phase 2 and earlier stage studies of other classes of compounds are underway by various companies.

Primary biliary cholangitis (formerly known as primary biliary cirrhosis), or PBC, is a chronic, or long-term, disease of the liver that slowly destroys the medium-sized bile ducts within the liver. Bile is a digestive liquid that is made in the liver. It travels through the bile ducts to the small intestine, where it helps digest fats and absorb fatty vitamins. In patients with PBC, the bile ducts are destroyed by inflammation. This causes bile to remain in the liver, where gradual injury damages liver cells and causes cirrhosis, or scarring of the liver. As cirrhosis progresses and the amount of scar tissue in the liver increases, the liver loses its ability to function, leading to potential liver failure, liver transplantation or hepatocellular carcinoma. While PBC is a relatively rare disease (the incidence in Europe, North America, Asia and Australia ranges from 0.33-5.8 cases per 100,000, and is 10 times more common in women than in men), it remains one of the major causes of liver failure and/or the need for liver transplant.

Agonists of the farnesoid X receptor, referred to as FXR agonists, have shown promising activity in many preclinical models of liver disease. One FXR agonist, obeticholic acid, or OCA (brand name Ocaliva ®), which was approved by the FDA in May 2016 for the treatment of PBC, has already demonstrated favorable clinical results in NASH. We believe that new FXR agonists may provide substantial therapeutic benefit in NASH and PBC and may overcome some of the potential shortcomings of OCA, including limited effects on resolution of NASH, elevation of low-density lipoprotein, or LDL, and itching, also called pruritis.

Scientific Background

FXR is a nuclear hormone receptor that functions to modulate gene expression in response to various metabolic stimuli. FXRs are expressed at high levels in the liver and intestine. Bile acids have been identified as important physiological ligands for FXRs, able to bind and activate the receptor. The downstream gene modulation resulting from bile acid engagement of FXRs not only contribute to the regulation of bile acid synthesis and metabolism, but is also involved in a number of other metabolic processes, in particular lipid metabolism. More recently, it has been discovered that bile acids, via FXR, are able to promote insulin sensitivity and decrease lipid synthesis in the liver. In addition, studies have shown that bile acid-dependent FXR activation is able to provide beneficial effects on fibrosis in the liver as well. For these reasons, FXR is considered to be a viable target for NASH. Recent Phase 2b trials with OCA, a synthetic analog of natural bile acids known to activate FXR, demonstrated efficacy in NASH patients. In PBC, improved outcomes would be expected due to the reduction of bile acid synthesis by activation of FXR. OCA demonstrated efficacy in a Phase 3 trial in PBC, which was the basis for its conditional approval in the U.S. in May 2016 for the treatment of PBC in combination with first line therapy ursodeoxycholic acid (UDCA) in adults with an inadequate response to UDCA, or as monotherapy in adults unable to tolerate UDCA.

EDP-305 and Our Approach to the Treatment of NASH and PBC

Even though there has been clinical validation demonstrated by the FXR agonist, OCA, we believe that there is an opportunity for the development of a treatment that shows improvements in potency and efficacy and reductions in potential safety liabilities for the treatment of NASH and PBC. Using our strong chemistry capabilities, we have undertaken the discovery and development of new FXR agonists that we believe may provide substantial improvements over the FXR agonists currently in advanced clinical development.

EDP-305, our lead FXR agonist candidate, represents a new class of FXR agonists that has been designed to take advantage of increased binding interactions with the receptor. Further, this non-bile acid class contains steroidal and non-steroidal components and does not contain the carboxylic acid group that can lead to the formation of taurine and glycine conjugates normally associated with bile acids, which may also be present in other classes of FXR agonists.

We reported the results of our Phase 1 a/b clinical study of EDP-305 in October 2017. Our double-blind, placebo-controlled Phase 1 study was designed to evaluate the safety, tolerability and pharmacokinetics of single ascending doses, or SAD, and multiple ascending doses, or MAD, of EDP-305 in adult healthy volunteer subjects, or

HV subjects, and subjects with presumptive NAFLD, or PN subjects. By presumptive NAFLD, we mean adults who are obese, with or without pre-diabetes or type 2 diabetes.

In this Phase 1 study, EDP-305 was shown to be generally safe and well tolerated over a broad range of single and multiple doses with pharmacokinetic, or PK, data supporting once daily oral dosing. EDP-305 exhibited strong engagement of the FXR receptor as evidenced by increased FGF19 levels and reduced C4 levels, which are proteins that can be monitored as downstream markers indicating FXR activity. The results of the study support the ability to administer EDP-305 in future trials at doses that neither elicit clinically significant changes in lipids nor result in pruritus.

- A total of 146 subjects received at least one dose of EDP-305 (n=110) or placebo (n=36) including 50 HV subjects in the SAD phases of the study and 96 (48 HV and 48 PN) subjects in the MAD phases of the study. Overall, mean body mass index, or BMI, in the PN cohort was 32 (29, 35). SAD had 6 cohorts at doses of 1, 5, 10, 20, 40 and 80 mg EDP-305/placebo, and MAD had 6 cohorts at doses of 0.5, 1, 2.5, 5, 10 and 20 mg EDP-305/placebo for 14 days.
- Strong FXR target engagement was demonstrated, with doses of EDP-305 > 1 mg increasing FGF19 and reducing C4 in all subjects, while PN subjects were even more sensitive with significant effects also observed in both parameters at the lowest multiple doses of 0.5 and 1 mg.
    - No serious adverse events (SAEs) were reported, and EDP-305 was generally well tolerated at all doses tested.
- Treatment-emergent adverse events occurring in ≥ 2 EDP-305 treated subjects in MAD cohorts were: headache and pruritus in HV subjects, and constipation and pruritus in PN subjects.
- Of the cases of pruritus noted (9% for EDP-305, 3% in placebo), the majority were mild or moderate and occurred at multiple doses of 20 mg, with no cases below 10mg. Notably, EDP-305 demonstrated potent engagement of the FXR receptor across the lower dose range where there was no pruritus.
- Two subjects discontinued treatment in the MAD phase at the 20 mg dose level, one for a transient grade 2 elevation of ALT/AST liver enzymes, and one for moderate pruritus.
- No dose-related changes in lipids were observed in HV subjects at any doses; and no dose-related changes in lipids were observed in PN subjects except for reductions of total cholesterol and high-density lipoprotein, or HDL, cholesterol at the multiple 20mg dose, with no concomitant increase in low-density lipoprotein, or LDL, cholesterol.

We initiated two Phase 2 dose-ranging studies in fiscal 2018 – one in PBC patients, known as INTREPID, and one in NASH patients, known as ARGON-1. Both studies are 12-week, dose ranging, randomized, double-blind, placebo-controlled trials. The main goals of the studies will be to evaluate safety, tolerability, PK, and efficacy based on reduction in the level of key enzymes in subjects' plasma (alanine aminotransferase, or ALT, reduction in NASH and alkaline phosphatase, or ALP, reduction in PBC). A new tablet formulation will be utilized in these Phase 2 studies at strengths of 1mg and 2.5mgs (tablet formulation yields ~ 2X greater exposure than the suspension formulation used in the Phase 1 study.

Our HBV Program

Background and Overview of HBV

Hepatitis B virus, or HBV, can cause potentially life-threatening liver infection. The virus is transmitted through contact with the blood or other bodily fluids of an infected person. It is estimated that approximately 250 million people worldwide are chronically infected, and 15-25% of patients with chronic HBV infection develop chronic liver disease, including cirrhosis, liver cancer, or liver decompensation. It is also estimated that more than 885,000 people worldwide died in 2015 due to complications of HBV. Estimates for the total number of persons chronically infected with HBV in the U.S. vary but generally range between 0.5 million and 2.0 million. Combining U.S., Japan, and major EU populations, estimates of HBV prevalence have been as high as 4.8 million.

Current approaches to treatment include interferon therapy and/or inhibitors of HBV reverse transcriptase, the enzyme responsible for viral DNA synthesis, which is necessary for HBV replication. Treatment with interferon offers modest cure rates, and is accompanied by serious side effects, including flu-like symptoms, fatigue, headache and nausea. Reverse transcriptase inhibitors can be very effective at suppressing the virus but often require lifelong therapy and rarely result in full eradication of the virus from the liver. New treatments that can provide functional cures to chronically-infected patients are urgently needed.

Scientific Background

HBV is a partially double-stranded DNA virus with a complex life cycle. There are multiple mechanisms associated with HBV replication that could potentially be targeted with new drugs, and combination approaches may ultimately provide the most effective therapy for HBV. Mechanisms under study for HBV include:

- Entry inhibitors that interfere with the initial binding of HBV to hepatocytes, thus preventing new infection from occurring.
- Inhibitors of covalently closed circular DNA, or cccDNA, the template for HBV replication, which are in early stages of development. Most of these inhibitors act in an indirect manner, such as preventing formation of cccDNA or silencing its transcription.
- RNA silencing of gene expression, another prominent approach in the search for HBV inhibitors, which utilizes small interfering RNA's (siRNA's). This mechanism has the potential to significantly reduce HBV RNA, HBV DNA, and HBV protein levels.
- Inhibition of the hepatitis B core protein, which plays a critical role in viral replication, intracellular trafficking, and maintenance of chronic infections. Using this core inhibitor mechanism (also known as capsid assembly inhibitor or core protein allosteric modifier), some initial data shows reduction in HBV DNA and HBV RNA in early clinical trials.
- The surface antigen of HBV, or HBsAg, which is the main envelope protein of the virus and, another target in the HBV life cycle. HBsAg is critical to ongoing infection, and loss of serum HBsAg is associated with a functional cure of HBV, characterized by no inflammation, normal liver enzymes, and normal liver biopsy. Therefore, HBsAg is the target of several therapeutic approaches, including indirect ones such as siRNA mentioned above, but also specific approaches including the inhibition of HBsAg release.
- The modulators of the human immune system, or immunomodulators, another major mechanism being researched. HBV has evolved to evade the natural host immune mechanisms that normally would clear a viral infection, thus approaches that can augment the immune response are being actively pursued. In fact, interferon has been used for the treatment of HBV for decades and while it can induce a functional cure, the cure is only seen in a small percentage of patients and the treatment is generally not well tolerated. More targeted immunological approaches are being studied, including agonists of toll-like receptors, modulators of apoptotic signaling, and checkpoint inhibition.

Also, while past attempts at developing successful therapeutic vaccines have been unsuccessful, efforts continue to develop an effective HBV vaccine, using new vaccine technologies.

Our Approach to the Treatment of HBV

We are initially focusing on new core inhibitors that we expect to have an impact on capsid assembly and possibly interfere with other viral processes. Core inhibitors, also known as capsid assembly modulators or core protein allosteric modulators, are a novel class of replication inhibitors that have been shown to act at multiple steps in the HBV lifecycle. These inhibitors would be expected to prevent proper uncoating, nuclear import, assembly, and recycling. This approach is supported by early clinical validation, with the core inhibitor NVR 3-778 from Novira, JNJ-56136379 from Janssen, and ABI-H0731 from Assembly, demonstrating clinical reduction of viral DNA in chronic HBV patients in short-term Phase 1b or Phase 2 clinical studies.

We recently identified our first core inhibitor candidate, EDP-514, which we are planning to advance into a Phase 1 a/b study in 2019. In addition, we are conducting preclinical experiments with other mechanisms that target HBV. Due to the complex nature of HBV infection, it is widely believed that combination therapy may be necessary to provide the optimal therapeutic approach for this disease.

Our Out-Licensed HCV Protease Inhibitor Products

Background and Overview of HCV Market

HCV is a virus that is a common cause of viral hepatitis, an inflammation of the liver. HCV is typically contracted by contact with the blood or other body fluids of another individual infected with HCV. HCV is a leading cause of chronic liver disease, including cirrhosis, liver failure and cancer, and the leading cause of death from liver disease in the United States. HCV disease progression occurs over a period of 20 to 30 years, with the majority of HCV-infected individuals generally exhibiting no major symptoms in the early stages of the disease. Therefore, until a major symptom is diagnosed, many individuals are unaware they are infected and live undiagnosed without seeking treatment. For that reason, combined with the new availability of effective treatments for HCV, the United States Centers for Disease Control and Prevention, or CDC, issued new guidelines in 2013 recommending screening for all Americans born between the years 1945 and 1965 so that HCV-infected individuals will be aware of their condition and can consider treatment options.

An estimated 71 million people worldwide are chronically infected with HCV and have an increased risk of eventually developing liver cirrhosis or liver cancer. Approximately 399,000 people die every year from HCV-related liver diseases. The CDC estimated in 2016 that approximately 3.5 million people in the United States are chronically infected with HCV, with an estimated 41,200 new infections in 2016, the most recent year for which the CDC has published data. We believe that the chronically infected population remains significantly untreated, even with the introduction of several new regimens beginning in 2013.

The approved treatments for HCV have provided significant benefit to HCV patients. To date, these treatments have cure rates approaching 100% in several subpopulations. Medical practice defines a “cure” as the point at which there is no quantifiable virus in a patient’s blood for a sustained period of time after cessation of therapy, which is often referred to as a sustained virologic response, or SVR. For AbbVie’s MAVYRET/MAVIRET regimen, the majority of chronic HCV patients only require 8 weeks of treatment compared to 12 weeks with VIEKIRA PAK® and other HCV regimens, including Gilead’s EPCLUSA® and HARVONI® in almost all HCV genotypes.

Since the introduction of Gilead's Harvoni® and AbbVie's VIEKIRA PAK® in late 2014, the reported worldwide sales of the leading HCV therapies have declined from $23 billion in 2015 to $12 billion in 2017. Through the first nine months of calendar 2018, reported worldwide net sales were $2.1 billion in the first calendar quarter, $2.1 billion for the second calendar quarter and $1.9 billion for the third calendar quarter. HCV sales have declined since their peak in 2015 due to payers obtaining additional discounts, competitive market dynamics and a decline in the number of patients treated annually after the initial wave of diagnosed chronic HCV patients who had urgency for treatment. After the regulatory approvals of MAVYRET and Gilead's VOSEVI in 2017, Johnson & Johnson and Merck announced they had terminated their development of additional HCV treatments. Despite the high numbers of HCV patients that have been successfully treated, there remains a large population of chronic HCV-infected patients who have yet to be treated with one of the newer "high cure" regimens. In addition, and as noted above, new HCV infections (principally in association with IV drug use) also represent an ongoing target population for treatment.

Scientific Background

Most of the currently approved HCV therapies targeting HCV focus directly on the viral life cycle and proteins that are critical to HCV replication. Replication of the HCV genome occurs on intracellular membranes and requires the participation of multiple viral proteins, some of which have enzymatic activities. Agents, often referred to as inhibitors, that target viral proteins directly are generally referred to as direct acting antivirals, or DAAs. All currently approved DAA therapies include one or a combination of two or more inhibitors of the NS3 protease, the NS5A protein, and the NS5B polymerase.

NS3 Protease. As HCV replicates, it generates long strands of protein that must be processed into many individual active functional proteins that are referred to as non-structural proteins with the designated abbreviation NS, including NS3 and NS5A. The NS3 protease is responsible for most of this protein processing of the newly translated HCV protein, and plays an essential role in the viral life cycle. Inhibition of the protease prevents these new critical proteins from forming and therefore prevents replication and survival of the virus.

NS5A. The NS5A protein has key roles in both the RNA replication of HCV and modulation of the physiology of its host cell in the body. Research has shown that targeting NS5A gives rise to profound antiviral activity, and as a result, this protein has emerged as an additional important DAA target for anti-HCV drugs.

NS5B Polymerase. HCV is a single-stranded RNA virus, and NS5B is an HCV RNA polymerase responsible for synthesis of new HCV RNA, allowing the HCV genome to be copied and the virus to survive and replicate. Two separate classes of DAA inhibitors of NS5B polymerase are used as treatments for HCV. Nucleoside/nucleotide inhibitors of NS5B directly inhibit the active site of that enzyme and prevent further elongation of the RNA, and thus are equally active against all HCV genotypes. A second class, known as non-nucleoside inhibitors, affects replication of the RNA by altering the shape of the enzyme at remote sites on the enzyme surface, with the result being that any given non-nucleoside inhibitor is usually only active against certain HCV genotypes.

Our Out-Licensed Products in AbbVie's Marketed Therapies

Glecaprevir - Our protease inhibitor, glecaprevir, which is part of the latest HCV regimen from AbbVie, was developed by AbbVie in combination with pibrentasvir, AbbVie's second NS5A inhibitor. This co-formulated combination, marketed as MAVYRET™ (U.S.) and MAVIRET™ (ex-U.S.), contains two novel DAAs that target and inhibit proteins essential for the replication of the hepatitis C virus. MAVYRET/MAVIRET is approved in the U.S., EU and Japan as an 8-week, pan-genotypic, fixed-dose combination treatment, dosed once-daily as three oral tablets, taken with food, for chronic HCV patients without cirrhosis and new to treatment. MAVYRET/MAVIRET is also approved as a treatment for patients with specific treatment challenges, including those GT-1 patients not cured by prior treatment experience with either a protease inhibitor or an NS5A inhibitor (but not both), and in patients with

limited treatment options, such as those with severe chronic kidney disease (CKD) or those with genotype 3 chronic HCV. MAVYRET/MAVIRET is approved for use in patients across all stages of CKD with any of the major HCV genotypes (GT1-6). The approvals of MAVYRET/MAVIRET are supported by data from nine registrational studies in AbbVie's clinical development program, which evaluated more than 2,300 patients in 27 countries across all major HCV genotypes (GT1-6) and special populations:

- 8 weeks for treatment-naïve, non-cirrhotics: In November 2016, results from several Phase 3 studies of this combination demonstrated 97.5% of chronic HCV infected patients without cirrhosis and new to treatment across all major genotypes (GT1-6) achieved sustained virologic response at 12 weeks post-treatment, referred to as SVR_{12}, with just 8 weeks of MAVYRET/MAVIRET treatment.

- 8 weeks with chronic kidney disease: Results were also presented from AbbVie's EXPEDITION-4 study in chronic HCV patients with chronic kidney disease (CKD), in which 98% of patients (n=102/104) across all major genotypes (GT1-6) achieved SVR_{12} with 12 weeks of treatment with MAVYRET/MAVIRET.
- 8 weeks for GT-3: Data from AbbVie's ENDURANCE-3 study were presented at the 2017 ILC, demonstrating that 95% of patients with challenging-to-treat, genotype 3 (GT3) chronic HCV infection, without cirrhosis and new to treatment, achieved SVR_{12} after 8 weeks of treatment with MAVYRET/MAVIRET.
- Compensated cirrhosis: Based on data from AbbVie's EXPEDITION-1 study, which demonstrated that 99% of HCV-infected patients with genotype 1, 2, 4, 5 or 6 and compensated cirrhosis (Child-Pugh A) achieved SVR_{12} following 12 weeks of MAVYRET/MAVIRET treatment without ribavirin, 12 weeks of treatment with MAVYRET/MAVIRET is the approved duration for this regimen. Note: Results from one recently announced cohort of AbbVie's Phase 3b EXPEDITION-8 study showed that with 8 weeks of MAVYRET treatment, 100 percent (n=273/273) of genotype 1, 2, 4, 5 and 6 patients achieved a sustained virologic response 12 weeks after treatment (SVR_{12}) per protocol analysis. A second cohort of the study is ongoing in genotype 3 (GT3) chronic HCV-infected patients.

Paritaprevir - The first protease inhibitor developed through our collaboration with AbbVie, paritaprevir, is part of AbbVie's 3-DAA regimen approved for the treatment of genotype 1 and 4 HCV patients. This 3-DAA combination was sold as VIEKIRA PAK® (paritaprevir/ritonavir/ombitasvir/dasabuvir) in the U.S. from December 2014 to December 2018, and as VIEKIRAX®+EXVIERA® in most other jurisdictions, for non-cirrhotic patients and those with early stage, or compensated, cirrhosis. These regimens are in the process of being replaced by MAVYRET/MAVIRET in jurisdictions around the world since the latter was introduced in the U.S. in August 2017.

Collaboration and License Agreement with AbbVie

We entered into a Collaborative Development and License Agreement with Abbott Laboratories in November 2006 to develop and commercialize HCV NS3 and NS3/4A protease inhibitors. The agreement, which was amended in January and December 2009, was then assigned to AbbVie Inc. on January 1, 2013 in connection with Abbott's transfer of its research-based pharmaceuticals business to AbbVie. Under the agreement, we have granted AbbVie an exclusive, worldwide, royalty-bearing license, including a right to grant sublicenses, to specified intellectual property, including several issued U.S. patents, relating to protease inhibitors. We also granted AbbVie access to our drug discovery capabilities in the HCV NS3 and NS3/4A protease inhibitor field. AbbVie granted us a co-exclusive (together with AbbVie), royalty-free, fully paid license, without the right to grant sublicenses, to certain of AbbVie's intellectual property, AbbVie's interest in joint intellectual property and improvements discovered by AbbVie, for the purpose of allowing us to conduct certain development and commercialization activities in the United States relating to protease inhibitors. AbbVie is responsible for and has funded all costs associated with the development, manufacturing and commercialization of paritaprevir, glecaprevir and any other compounds under this agreement. Under the agreement, we are eligible to receive milestone payments and royalties with respect to these compounds. So long as a product candidate is being developed or commercialized under the agreement, we undertake not to conduct any activity, or grant licenses to a third party, relating to protease inhibitors.

A joint steering committee was established under the agreement with review and oversight responsibilities for all research, development and commercialization activities. The joint steering committee is comprised of three of our senior personnel and three senior personnel from AbbVie; however, AbbVie has final authority to make all decisions regarding development and commercialization activities.

The research program and the evaluation period, which was performed by both parties, ended in June 2011. The first commercialized compound was paritaprevir with the second commercialized compound, glecaprevir, approved in 2017 and marketed under the tradenames MAVYRET™ (U.S.) or MAVIRET™ (ex-U.S.). Under this collaboration, we

have received payments from AbbVie for license fees, proceeds from a sale of preferred stock, research funding payments and milestone payments totaling $396.0 million through September 30, 2018.

We also receive annually tiered, double-digit royalties per protease inhibitor product developed under the agreement, which range from ten percent up to twenty percent, or on a blended basis from the low double digits up to the high teens. However, if a product is determined to be a combination product, as is the case for both glecaprevir and paritaprevir, the net sales of the combination product are adjusted on a country-by-country and product-by-product basis to reflect a good faith determination of the relative value of each pharmaceutically active ingredient, based on the estimated fair market value. This means that a portion of AbbVie's worldwide annual net sales of a combination product or regimen is first allocated to one of our protease inhibitors and then that royalty-bearing portion is multiplied by the annually tiered royalty rates to determine our actual royalty for the protease product in that regimen in a given period. Under the terms of our agreement, as amended in October 2014, 50% of AbbVie's net sales of MAVYRET/MAVIRET are allocated to glecaprevir. In the case of regimens containing paritaprevir, 30% of net sales of 3-DAA regimens containing paritaprevir and 45% of net sales of 2-DAA regimens containing paritaprevir are allocated to paritaprevir for purposes of calculating our annually tiered royalties. Beginning with each January 1, the cumulative net sales of a given royalty-bearing protease inhibitor product start at zero for purposes of calculating the tiered royalties on a product-by-product basis. Under this collaboration, we have received royalty payments from AbbVie totaling $254.0 million through September 30, 2018. Further details of these tiered royalties are set forth in Note 7 in Notes to Consolidated Financial Statements included in this report, which are incorporated herein by this reference.

Royalties owed to us under the agreement can be reduced by AbbVie in certain circumstances, including (i) if AbbVie exercises its right to license or otherwise acquire rights to intellectual property controlled by a third party where a product could not be legally developed or commercialized in a country without the third-party intellectual property right, (ii) where a product developed under the collaboration agreement is sold in a country and not covered by a valid patent claim in such country, or (iii) where sales of a generic product are equal to at least a specified percentage of AbbVie's market share of a product in a country.

AbbVie's obligation to pay royalties on products developed under the agreement expires on a country-by-country and product-by-product basis upon the later of (i) the date of expiration of the last of the licensed patents with a valid claim covering the product in the applicable country, and (ii) ten years after the first commercial sale of the product in the applicable country.

Our intellectual property existing as of the effective date of the agreement remains our property. Any intellectual property jointly developed is jointly owned. We will have the unilateral right to enforce our patent rights on any covered product following the first commercial sale of such product, as will AbbVie. In the event of infringement related to any of our patents, we will have the first right and option to initiate legal proceedings or take other actions. In the event of infringement related to any AbbVie patents, AbbVie will have the first right and option to initiate legal proceedings or take other actions. In the event of infringement of a joint patent right, we will discuss with AbbVie whether to initiate legal proceedings or take other actions. AbbVie will have the obligation to defend at its sole expense any actions brought against either party alleging infringement of third-party rights by reason of the activities conducted under the agreement and we will have the right to obtain separate counsel at our own expense. Additionally, AbbVie, at its sole expense, will be responsible for all trademark prosecution.

Subject to the exceptions described above, a party's rights and obligations under the agreement continue until: (i) such time as AbbVie is no longer developing a product candidate or (ii) if, as of the time AbbVie is no longer developing any product candidates, AbbVie is commercializing any other protease inhibitor product, such time as all royalty terms for all covered products and all co-development terms for all co-developed products have ended. Accordingly, the final expiration date of the agreement is currently indeterminable.

Either party may terminate the agreement for cause in the event of a material breach, subject to prior notice and the opportunity to cure, or in the event of the other party's bankruptcy. Additionally, AbbVie may terminate the agreement

for any reason upon specified prior notice.

If we terminate the agreement for cause or AbbVie terminates without cause, any licenses and other rights granted to AbbVie will terminate and AbbVie will be deemed to have granted us (i) a non-exclusive, perpetual, fully paid, worldwide, royalty-free license, with the right to sublicense, under AbbVie's intellectual property used in any product candidate and (ii) an exclusive (even as to AbbVie), perpetual, fully paid, worldwide, royalty-free license, with the right to sublicense, under AbbVie's interest in joint intellectual property rights to develop product candidates resulting from covered compounds and to commercialize any products derived from such compounds. Upon our request, AbbVie will also transfer to us all right, title and interest in any related product trademarks, regulatory filings and clinical trials.

If AbbVie terminates the agreement for our uncured breach, the milestone and royalty payments payable by AbbVie may be reduced, the licenses granted to AbbVie will remain in place, we will be deemed to have granted AbbVie an exclusive license under our interest in joint intellectual property, AbbVie will continue to have the right to commercialize any covered products, and all rights and licenses granted to us by AbbVie will terminate.

Drug Discovery

We have internally discovered all of the compounds in our research and development programs. Our scientists have expertise in the areas of medicinal chemistry, molecular virology, pharmacology, and toxicology, with highly developed sets of skills in compound generation, target selection, screening and pharmacology, preclinical development and lead optimization. We are utilizing these skills and capabilities in our discovery and development of virology and liver disease product candidates.

We focus on virology and liver disease indications representing large and growing market opportunities with significant unmet medical needs. Our selection of a particular therapeutic target within those disease indications takes into consideration the experience and expertise of our scientific team and includes our ability to generate robust medicinal chemistry structure-activity relationships to assist lead optimization and secure relevant intellectual property rights. Once we have identified lead compounds, they are tested using in vitro and in vivo pharmacology studies and in vivo research models of antiviral or antibacterial efficacy.

Competition

We are engaged in segments of the pharmaceutical industry that are highly competitive and rapidly changing. Many large pharmaceutical and biotechnology companies, academic institutions, governmental agencies and other public and private research organizations are commercializing or pursuing the development of products that target HCV, NASH, PBC, RSV and HBV and other viral infections or liver diseases that we may target in the future.

Many of our competitors have substantially greater commercial infrastructures and financial, technical and personnel resources than we have, as well as drug candidates in late-stage clinical development. We will not be able to compete successfully unless we are able to:

- design and develop products that are superior to other products in the market;
- attract qualified scientific, medical, regulatory, sales and marketing and commercial personnel;
- obtain patent and/or other proprietary protection for our processes and product candidates;
- obtain required regulatory approvals; and
- collaborate with others in the development and commercialization of new products.

Established competitors may invest heavily to quickly discover and develop novel compounds that could make our product candidates obsolete. In addition, any new product that competes with an approved product must demonstrate compelling advantages in efficacy, convenience, tolerability and safety, or some combination of these factors, to overcome competition and to be commercially successful.

We expect AbbVie's MAVYRET/MAVIRET to continue to face price competition from existing approved products in the HCV market. This regimen currently faces competition in various world markets and subpopulations of HCV from Gilead's Epclusa® (a fixed dose combination of sofosbuvir and velpatasvir), Vosevi™ (a triple combination therapy of sofosbuvir, velpatasvir and voxilaprevir approved by the FDA in July 2017 for specified sofosbuvir -treatment failures and NS5A-inhibitor treatment failures) and Harvoni® (a fixed-dose combination of sofosbuvir and ledipasvir); and to a lesser extent - Merck's Zepatier® (a fixed-dose combination of grazoprevir and elbasvir). Lastly, Gilead has announced plans to launch its own authorized generic versions of Epclusa and Harvoni in January 2019 to be more competitive with MAVYRET/MAVIRET in managed Medicaid and Medicare Part D accounts. Gilead has announced

that it will price these authorized generics to reflect more closely the discounts that health insurers and government payers receive for the branded versions of Epclusa and Harvoni. There are no other generic versions of Epclusa or Harvoni on the market and none are anticipated given the patents covering these drugs.

Competitive products in the form of other treatment methods or a vaccine for HCV may render AbbVie's MAVYRET/MAVIRET obsolete or noncompetitive. This regimen will face competition based on its price, reimbursement coverage, AbbVie's marketing and sales capabilities, patent position, safety and effectiveness, and other factors. If any of AbbVie's HCV regimens face competition from generic versions of these products, the collaboration agreement provides that the royalty rate applicable to our protease product contained in the regimen is reduced significantly by a specified percentage on a product-by-product, country-by-country basis. If AbbVie is not able to compete effectively against its competitors in HCV, our business will not grow and our financial condition, operations and stock price will suffer.

We also expect our other product candidates will face intense and increasing competition in the antiviral and NASH markets as advanced technologies and products become available. For RSV, there are currently no safe and effective therapies for already established RSV infection. Several companies are seeking new antiviral treatments for RSV infection in adult and pediatric settings. Ark Bioscienes, Johnson & Johnson, Gilead, Pulmocide and ReViral each have compounds in clinical development, as does Ablynx with a potential therapeutic antibody. A prophylactic, monoclonal-antibody-based treatment from MedImmune, which is commercialized by AbbVie outside of the U.S., is approved for infants considered at high risk for RSV infection; however studies have found that most young children with RSV infection were previously healthy, and thus would not normally be prescribed prophylactic treatment. In addition, a number of companies have RSV vaccines in development, primarily directed at prevention of RSV infection, and some companies are also evaluating vaccines in a therapeutic mode for treatment of established RSV infection.

Though there is currently no approved treatment for NASH, we expect significant competition from other companies in the development of new treatments for NASH and related conditions. We are aware of several companies with NASH programs that are significantly more advanced than ours, including companies with compounds in Phase 3 clinical trials in NASH, namely Intercept, Genfit, Gilead, and Tobira (Allergan). In May 2016, the FDA granted conditional approval for Intercept's FXR agonist (brand name Ocaliva®) for the treatment of primary biliary cholangitis (PBC) in combination with first line therapy ursodeoxycholic acid (UDCA) in adults with an inadequate response to UDCA, or as monotherapy in adults unable to tolerate UDCA. In addition, a number of companies have NASH or related programs with compounds in Phase 2 clinical trials. These companies include Astra-Zeneca, BMS, Boehringer Ingelheim, Can-Fite BioPharma, Conatus, Cirius, Cymabay, Galectin, Galmed, Gilead, GlaxoSmithKline, Immuron, Inventiva, Madrigal, Medicinova, Novartis, NGM, Novo Nordisk, Pfizer, Viking, and Zydus. A significant number of other companies are conducting earlier stage clinical trials that may be applicable in NASH and other cholestatic diseases. There are also additional companies conducting preclinical studies in these disease areas.

Similarly, HBV represents a competitive therapeutic area. While there are antiviral medications prescribed for treatment for HBV, they generally have low true cure rates. Many companies are seeking to develop new HBV drugs that alone or in combination with other mechanisms could lead to a functional cure of HBV. Arbutus, Assembly, Gilead, HEC, Ionis/GSK, Johnson & Johnson, Maxwell, Replicor, and Spring Bank have Phase 2 programs in progress, with many of these companies conducting earlier stage programs as well. In addition, a number of companies have Phase 1 or earlier stage HBV programs, including Aicuris, Alnylam, Altimmune, Arrowhead, Contravir, Dicerna, Enyo, Roche and Transgene.

If we are not able to develop new products that can compete effectively against our current and future competitors, our business will not grow and our financial condition, operations and stock price will suffer.

Intellectual Property

As part of our business strategy, we actively seek patent protection for our product candidates in the United States and certain major foreign jurisdictions and file additional patent applications, when appropriate, to cover improvements to

our compounds. We also rely on trade secrets, internal know-how, technological innovations and agreements with third parties to develop, maintain and protect our competitive position. Our ability to be competitive will depend on the success of this strategy.

Each of our major programs, including RSV, NASH, PBC, HBV and HCV, typically has several issued patents and pending patent claims in the program area containing claims to compounds, methods of use and processes for synthesis. However, only a few of the issued patents and/or pending patent applications cover the lead product candidate in a given program.

RSV, NASH, PBC and HBV Programs. Our patent portfolio directed to N-protein inhibitors for RSV, FXR agonists for NASH, PBC and fibrosis, and core inhibitors for HBV includes pending U.S. patent applications as well as numerous foreign patent applications.

HCV NS3 Protease Inhibitor Program. The patent portfolio directed to the HCV protease inhibitor program with AbbVie includes U.S. patents and foreign patents, as well as non-provisional applications. The issued U.S. composition-of-matter patent covering paritaprevir is expected to expire in 2031. The issued U.S. composition-of-matter patent covering glecaprevir is expected to expire in 2032. AbbVie is a joint owner of a number of the non-provisional patent applications. AbbVie also has rights to some or all of these patents and patent applications pursuant to its collaboration agreement with us.

We may obtain patents for certain compounds many years before we obtain marketing approval for products containing such compounds. Because patents have a limited life, which usually begins to run well before the first commercial sale of the related product, the commercial value of the patent may be limited. However, we may be able to apply for patent term extensions in the United States and in a number of European countries, compensating in part for delays in obtaining marketing approval, but we cannot be certain we will obtain such extensions.

It is also very important that we do not infringe patents or other proprietary rights of others. If we do infringe such patents or other proprietary rights, we could be prevented from developing or selling products or from using the processes covered by those patents, could be required to pay substantial damages, or could be required to obtain a license from the third party to allow us to use their technology, which may not be available on commercially reasonable terms or at all. If we were not able to obtain a required license or develop alternative technologies, we may be unable to develop or commercialize some or all of our products, and our business could be adversely affected.

In addition, we jointly own patent applications, together with AbbVie, that claim paritaprevir and glecaprevir as a chemical entity. However, there is no guarantee that such applications will issue. Further, the existence of issued patents does not guarantee our right to practice the patented technology or commercialize the patented product. Third parties may have already or could obtain rights to patents that could be used to prevent or attempt to prevent us from commercializing our product candidates. If these other parties are successful in obtaining valid and enforceable patents, and establishing our infringement of those patents, we could be prevented from commercializing our product candidates unless we were able to obtain a license under such patents, which may not be available on commercially reasonable terms or at all.

Much of our scientific capabilities depend upon the knowledge, experience and skills of key scientific and technical personnel. To protect our rights to our proprietary know-how and technology, we endeavor to require all employees, as well as our consultants and advisors, when feasible, to enter into confidentiality agreements that require disclosure and assignment to us of ideas, developments, discoveries and inventions made by these employees, consultants and advisors in the course of their service to us.

We may be unable to obtain, maintain and protect the intellectual property rights necessary to conduct our business, and we may be subject to claims that we infringe or otherwise violate the intellectual property rights of others, which could materially harm our business. For more information, see “Risk Factors—Risks Related to Our Intellectual Property Rights.”

Government Regulation

Government authorities in the United States, at the federal, state and local level, and in other countries extensively regulate, among other things, the research, development, testing, manufacture, quality control, approval, labeling, packaging, storage, record-keeping, promotion, advertising, distribution, post-approval monitoring and reporting,

marketing and export and import of products such as those we develop. Any pharmaceutical candidate that we develop must be approved by the FDA before it may be legally marketed in the United States and by the appropriate foreign regulatory agency before it may be legally marketed in foreign countries.

United States Drug Development Process

In the United States, the FDA regulates drugs under the Federal Food, Drug and Cosmetic Act, or FDCA, and implementing regulations. Drugs are also subject to other federal, state and local statutes and regulations. The process of obtaining regulatory approvals and the subsequent compliance with appropriate federal, state, local and foreign statutes and regulations require the expenditure of substantial time and financial resources. Failure to comply with the applicable United States requirements at any time during the product development process, approval process or after approval, may subject an applicant to administrative or judicial sanctions. FDA sanctions could include refusal to approve pending applications, withdrawal of an approval, a clinical hold, warning letters, product recalls, product seizures, total or partial suspension of production or distribution, injunctions, fines, refusals of government contracts, restitution, disgorgement or civil or criminal penalties. Any agency or judicial enforcement action could have a material adverse effect on us.

The process required by the FDA before a drug may be marketed in the United States generally involves the following:

- Completion of preclinical laboratory tests, animal studies and formulation studies according to Good Laboratory Practice, or GLPs, or other applicable regulations;
- Submission to the FDA of an Investigational New Drug Application, or an IND, which must become effective before human clinical trials may begin;
- Performance of adequate and well-controlled human clinical trials according to the FDA's current Good Clinical Practice, or GCPs, to establish the safety and efficacy of the proposed drug for its intended use;
- Submission to the FDA of a New Drug Application, or an NDA, for a new drug product;
- Satisfactory completion of an FDA inspection of the manufacturing facility or facilities where the drug is to be produced to assess compliance with the FDA's current Good Manufacturing Practice standards, or cGMP, to assure that the facilities, methods and controls are adequate to preserve the drug's identity, strength, quality and purity;
- Potential FDA audit of the nonclinical and clinical trial sites that generated the data in support of the NDA; and
- FDA review and approval of the NDA.

The lengthy process of seeking required approvals, which can often take anywhere from six months from the time the NDA is filed if there is a priority review for a breakthrough therapy to twelve months for a standard review, and the continuing need for compliance with applicable statutes and regulations require the expenditure of substantial resources. There can be no certainty that approvals will be granted.

Before testing any compounds with potential therapeutic value in humans, the product candidate enters the preclinical testing stage. Preclinical tests include laboratory evaluations of product chemistry, toxicity and formulation, as well as animal studies to assess the potential safety and activity of the product candidate. The conduct of the preclinical tests must comply with GLP and other federal regulations and requirements. The sponsor must submit the results of the preclinical tests, together with manufacturing information, analytical data, any available clinical data or literature and a proposed clinical protocol, to the FDA as part of the IND. The IND automatically becomes effective 30 days after receipt by the FDA, unless the FDA places the clinical trial on a clinical hold within that 30-day time period. In such a case, the IND sponsor and the FDA must resolve any outstanding concerns before the clinical trial can begin. The FDA may also impose clinical holds on a drug at any time before or during clinical trials due to safety concerns or non-compliance. Accordingly, we cannot assure that submission of an IND will result in the FDA allowing clinical trials to begin, or that, once begun, issues will not arise that result in suspension or termination of such trial.

17

Clinical trials involve the administration of the product candidate to healthy volunteers or patients having the disease being studied under the supervision of qualified investigators, generally physicians not employed by or under the trial sponsor's control. Clinical trials are conducted under protocols detailing, among other things, the objectives of the clinical trial, dosing procedures, subject selection and exclusion criteria, and the parameters to be used to monitor subject safety. Each protocol must be submitted to the FDA as part of the IND. Clinical trials must be conducted in accordance with the FDA's GCP requirements. Further, each clinical trial must be reviewed and approved by an independent institutional review board, or IRB, at or servicing each institution at which the clinical trial will be conducted. An IRB is charged with protecting the welfare and rights of trial participants and considers such items as whether the risks to individuals participating in the clinical trials are minimized and are reasonable in relation to anticipated benefits. The IRB also approves the informed consent form that must be provided to each clinical trial subject or his or her legal representative and must monitor the clinical trial until it is completed.

Human clinical trials prior to approval are typically conducted in three sequential phases that may overlap or be combined:

- Phase 1. The drug is initially introduced into healthy humans and tested for safety, dosage tolerance, absorption, metabolism, distribution and excretion. In the case of some products for severe or life-threatening diseases, especially when the product may be too inherently toxic to ethically administer to healthy volunteers, the initial human testing is often conducted only in patients having the specific disease.
- Phase 2. The drug is evaluated in a limited patient population to identify possible adverse effects and safety risks, to preliminarily evaluate the efficacy of the product for specific targeted diseases and to determine dosage tolerance, optimal dosage and dosing schedule for patients having the specific disease.
- Phase 3. Clinical trials are undertaken to further evaluate dosage, clinical efficacy and safety in an expanded patient population at geographically dispersed clinical trial sites. These clinical trials, which usually involve more patients than earlier trials, are intended to establish the overall risk/benefit ratio of the product and provide an adequate basis for product labeling. Generally, at least two adequate and well-controlled Phase 3 clinical trials are required by the FDA for approval of an NDA.

Post-approval studies, or Phase 4 clinical trials, may be conducted after initial marketing approval. These studies are used to gain additional experience from the treatment of patients in the intended therapeutic indication and may be required by the FDA as part of the approval process.

Progress reports detailing the results of the clinical trials must be submitted at least annually to the FDA and written IND safety reports must be submitted to the FDA by the investigators for serious and unexpected adverse events or any finding from tests in laboratory animals that suggests a significant risk for human patients. Phase 1, Phase 2 and Phase 3 clinical trials may not be completed successfully within any specified period, if at all. The FDA, or the sponsor or its data safety monitoring board, may suspend a clinical trial at any time on various grounds, including a finding that the research patients are being exposed to an unacceptable health risk. Similarly, an IRB can suspend or terminate approval of a clinical trial at its institution if the clinical trial is not being conducted in accordance with the IRB's requirements or if the drug has been associated with unexpected serious harm to patients.

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

U.S. Review and Approval Processes

The results of product development, preclinical studies and clinical trials, along with descriptions of the manufacturing process, analytical tests conducted on the chemistry of the drug, proposed labeling and other relevant information are submitted to the FDA as part of an NDA requesting approval to market the product. The submission of an NDA is subject to the payment of substantial user fees by the applicant; a waiver of such fees may be obtained under certain limited circumstances.

In addition, under the Pediatric Research Equity Act, or PREA, an NDA or supplement to an NDA must contain data to assess the safety and effectiveness of the drug for the claimed indications in all relevant pediatric subpopulations and to support dosing and administration for each pediatric subpopulation for which the product is safe and effective. The FDA may grant deferrals for submission of pediatric data or full or partial waivers.

The FDA reviews all NDAs submitted before it accepts them for filing and may request additional information rather than accepting an NDA for filing. Once the submission is accepted for filing, the FDA begins an in-depth review of the NDA. Under the goals and policies agreed to by the FDA under the Prescription Drug User Fee Act, or PDUFA, the FDA has twelve months in which to complete its initial review of a standard NDA and respond to the applicant, and six months for a priority NDA. The FDA does not always meet its PDUFA goal dates for standard and priority NDAs.

After the NDA submission is accepted for filing, the FDA reviews the NDA to determine, among other things, whether the proposed product is safe and effective for its intended use and whether the product is being manufactured in accordance with cGMP to assure and preserve the product's identity, strength, quality and purity. In addition to its own review, the FDA may refer applications for novel drug products or drug products that present difficult questions of safety or efficacy to an advisory committee, typically a panel that includes clinicians and other experts, for review, evaluation and a recommendation as to whether the application should be approved and under what conditions. The FDA is not bound by the recommendations of an advisory committee, but it considers such recommendations carefully when making decisions. During the approval process, the FDA also will determine whether a Risk Evaluation and Mitigation Strategy, or REMS, is necessary to assure the safe use of the drug. If the FDA concludes that a REMS is needed, the sponsor of the NDA must submit a proposed REMS; the FDA will not approve the NDA without a REMS, if required.

Before approving an NDA, the FDA will inspect the facilities at which the product is to be manufactured. The FDA will not approve the product unless it determines that the manufacturing processes and facilities are in compliance with cGMP requirements and are adequate to assure consistent production of the product within required specifications. Additionally, before approving an NDA, the FDA will typically inspect one or more clinical sites to assure compliance with GCP. If the FDA determines that the application, manufacturing process or manufacturing facilities are not acceptable it will outline the deficiencies in the submission and often will request additional testing or information.

The NDA review and approval process is lengthy and difficult, and the FDA may refuse to approve an NDA if the applicable regulatory criteria are not satisfied or may require additional clinical data or other data and information. Even if such data and information is submitted, the FDA may ultimately decide that the NDA does not satisfy the criteria for approval. Data obtained from clinical trials are not always conclusive and may be susceptible to varying interpretations, which could delay, limit or prevent regulatory approval. The FDA will issue a "complete response" letter if the agency decides not to approve the NDA. The complete response letter usually describes all of the specific deficiencies in the NDA identified by the FDA. The deficiencies identified may be minor, for example, requiring labeling changes, or major, for example, requiring additional clinical trials. Additionally, the complete response letter may include recommended actions that the applicant might take to place the application in a condition for approval. If a complete response letter is issued, the applicant may either resubmit the NDA, addressing all of the deficiencies identified in the letter, or withdraw the application.

If a product receives regulatory approval, the approval may be limited to specific diseases and dosages or the indications for use may otherwise be limited, which could restrict the commercial value of the product. Further, the FDA may require that certain contraindications, warnings or precautions be included in the product labeling. In addition, the FDA may require Phase 4 testing, which involves clinical trials designed to further assess a product's safety and effectiveness and may require testing and surveillance programs to monitor the safety of approved products

that have been commercialized.

Expedited Development and Review Programs

The FDA has four programs intended to expedite the development and review of new drugs addressing unmet medical needs or treating serious or life-threatening conditions: fast track, breakthrough therapy, priority review, and accelerated approval.

The FDA “fast track” program is intended to expedite or facilitate the process for reviewing new products to treat serious or life-threatening conditions and address unmet medical needs. Fast track designation applies to the combination of the product and the specific indication for which it is being studied. Under the fast track program, the sponsor will have more frequent interactions with the FDA during drug development, and may also submit sections of the NDA on a rolling basis to the FDA for review before submitting the complete application. Fast track does not guarantee that a product will be reviewed more quickly or receive FDA approval.

The FDA “breakthrough therapy” program is intended to expedite the development and review of drugs for serious or life-threatening conditions. Preliminary clinical evidence must show that the drug may have substantial improvement over existing therapies on one or more clinically significant endpoints. Although the drug does not have to address an unmet medical need, designation of breakthrough therapy status carries all the “fast track” program features. Additionally, the breakthrough therapy program entitles the sponsor to earlier and more frequent interaction with the FDA review team regarding development of nonclinical and clinical data, and allows the FDA to offer product development and regulatory advice necessary to shorten the time for product approval. The breakthrough therapy status does not guarantee a quicker development or review of the product, and does not ensure FDA approval.

The FDA also has a “priority review” program for products offering significant improvement in the treatment, diagnosis or prevention of a disease. The goal of the priority review program is to shorten the review period to six months from the ten months required for standard review. Any drug with breakthrough therapy, accelerated approval designation, or fast track can be granted priority review if it meets the necessary criteria.

The FDA “accelerated approval” program is intended to expedite the development and review of products with the potential to treat serious or life-threatening illnesses and provide meaningful therapeutic benefit over existing treatments. The program allows approval of a product on the basis of adequate and well-controlled clinical studies establishing that the product has an effect on a surrogate endpoint that is reasonably likely to predict a clinical benefit, or on the basis of an effect on a clinical endpoint that can be measured earlier than survival or irreversible morbidity. As a condition of approval, the FDA generally requires that a sponsor of the product perform adequate and well-controlled post-marketing clinical studies to establish safety and efficacy for the approved indication. Failure to conduct such studies or failure of the studies to establish required safety and efficacy may result in revocation of approval. The FDA also requires, as a condition for accelerated approval, pre-approval of promotional materials, which could adversely impact the timing of the commercial launch or subsequent marketing of the product.

Post-Approval Requirements

Any drug products for which we receive FDA approvals are subject to continuing regulation by the FDA. Certain requirements include, among other things, record-keeping requirements, reporting of adverse experiences with the product, providing the FDA with updated safety and efficacy information on an annual basis or more frequently for specific events, product sampling and distribution requirements, complying with certain electronic records and signature requirements and complying with FDA promotion and advertising requirements. These promotion and advertising requirements include, among others, standards for direct-to-consumer advertising, prohibitions against promoting drugs for uses or in patient populations that are not described in the drug’s approved labeling (known as “off-label use”), rules for conducting industry-sponsored scientific and educational activities and promotional activities involving the internet. Failure to comply with FDA requirements can have negative consequences, including the immediate discontinuation of noncomplying materials, adverse publicity, enforcement letters from the FDA, mandated corrective advertising or communications with doctors, and civil or criminal penalties. Although physicians may prescribe legally available drugs for off-label uses, manufacturers may not market or promote such off-label uses.

We rely, and expect to continue to rely, on third parties for the production of clinical and commercial quantities of our product candidates. Manufacturers of our product candidates are required to comply with applicable FDA manufacturing requirements contained in the FDA's cGMP regulations. These regulations require, among other things, quality control and quality assurance as well as the corresponding maintenance of comprehensive records and documentation. Drug manufacturers and other entities involved in the manufacture and distribution of approved drugs are also required to register their establishments and list any products they make with the FDA and to comply with related requirements in certain states. These entities are further subject to periodic unannounced inspections by the FDA and certain state agencies for compliance with cGMP and other laws. Accordingly, manufacturers must continue to expend time, money and effort in the area of production and quality control to maintain cGMP compliance. Discovery of problems with a product after approval may result in serious and extensive restrictions on a product, manufacturer or holder of an approved NDA. These restrictions may include suspension of a product until the FDA is assured that quality standards can be met, continuing oversight of manufacturing by the FDA under a "consent decree," which frequently includes the imposition of costs and continuing inspections over a period of many years, as well as possible withdrawal of the product from the market. In addition, changes to the manufacturing process generally require prior FDA approval before being implemented. Other types of changes to the approved product, such as adding new indications and additional labeling claims, are also subject to further FDA review and approval.

The FDA also may require post-marketing testing, known as Phase 4 testing, as well as risk minimization action plans and surveillance to monitor the effects of an approved product or place conditions on an approval that could otherwise restrict the distribution or use of the product.

U.S. Patent Term Restoration and Marketing Exclusivity

Drug Price Competition and Patent Term Restoration Act of 1984

Depending upon the timing, duration and specifics of the FDA approval of the use of our product candidates, some of our United States patents may be eligible for limited patent term extension under the Drug Price Competition and Patent Term Restoration Act of 1984, commonly referred to as the Hatch-Waxman Amendments. The Hatch-Waxman Amendments permit a patent restoration term of up to five years as compensation for patent term lost during federal regulatory review preceding the FDA regulatory review process. However, patent term restoration cannot extend the remaining term of a patent beyond a total of 14 years from the product's approval date. The patent term restoration period is generally one-half the time between the effective date of an IND and the submission date of an NDA plus the time between the submission date of an NDA and the approval of that application. Only one patent applicable to an approved drug is eligible for the extension and the application for the extension must be submitted within 60 days of approval, prior to the expiration of the patent. The United States Patent and Trademark Office, in consultation with the FDA, reviews and approves the application for any patent term extension or restoration. In the future, we may apply for restoration of patent term for one of our currently owned or licensed patents to add patent life beyond its current expiration date, depending on the expected length of the clinical trials and other factors involved in the filing of the relevant NDA. However, there is no guarantee that any such application will be approved.

Federal Food, Drug and Cosmetic Act ("FDCA")

Market exclusivity provisions under the FDCA, which are independent of patent status and any patent related extensions, can also delay the submission or the approval of certain applications of other companies seeking to reference another company's NDA. If the new drug is a new chemical entity subject to an NDA, the FDCA provides a five-year period of non-patent marketing exclusivity within the United States to the first applicant to obtain approval of an NDA for a new chemical entity. A drug is a new chemical entity if the FDA has not previously approved any other new drug containing the same active moiety, which is the molecule or functional group of a molecule responsible for the action of the drug substance. During the exclusivity period, the FDA may not accept for review an

abbreviated new drug application, or ANDA, or a so-called Section 505(b)(2) NDA, submitted by another company for another version of such drug where the applicant does not own or have a legal right of reference to all the data required for approval. However, such an application may be submitted after four years if it contains a certification of patent invalidity or non-infringement to one of the patents listed with the FDA by the innovator NDA holder. The FDCA also provides three years of marketing exclusivity for an NDA, or supplement to an existing

NDA if new clinical investigations, other than bioavailability studies, that were conducted or sponsored by the applicant are deemed by the FDA to be essential to the approval of the application, for example new indications, dosages or strengths of an existing drug. This three-year exclusivity covers only the conditions associated with the new clinical investigations and does not prohibit the FDA from approving ANDAs for drugs containing the original active agent. Five-year and three-year exclusivity will not delay the submission or approval of a full NDA. However, an applicant submitting a full NDA would be required to conduct or obtain a right of reference to all of the preclinical studies and adequate and well-controlled clinical trials necessary to demonstrate safety and effectiveness.

Other U.S. Healthcare Laws and Compliance Requirements

In the United States, our activities are potentially subject to regulation by various federal, state and local authorities in addition to the FDA, including the Centers for Medicare and Medicaid Services (formerly the Health Care Financing Administration), other divisions of the United States Department of Health and Human Services (e.g., the Office of Inspector General), the United States Department of Justice and individual United States Attorney offices within the Department of Justice, state attorney generals and state and local governments. For example, sales, marketing and scientific/educational grant programs must comply with the anti-fraud and abuse provisions of the Social Security Act, the False Claims Act, the privacy and security provisions of the Health Insurance Portability and Accountability Act, or HIPAA, and similar state laws, each as amended. Pricing and rebate programs must comply with the Medicaid rebate requirements of the Omnibus Budget Reconciliation Act of 1990 and the Veterans Health Care Act of 1992, each as amended. If products are made available to authorized users of the Federal Supply Schedule of the General Services Administration, additional laws and requirements apply. Under the Veterans Health Care Act, or VHCA, drug companies are required to offer certain pharmaceutical products at a reduced price to a number of federal agencies including the United States Department of Veterans Affairs and United States Department of Defense, the Public Health Service and certain private Public Health Service—designated entities in order to participate in other federal funding programs including Medicare and Medicaid. Recent legislative changes purport to require that discounted prices be offered for certain United States Department of Defense purchases for its TRICARE program via a rebate system. Participation under the VHCA requires submission of pricing data and calculation of discounts and rebates pursuant to complex statutory formulas, as well as the entry into government procurement contracts governed by the Federal Acquisition Regulations.

In order to distribute products commercially, we must comply with state laws that require the registration of manufacturers and wholesale distributors of pharmaceutical products in a state, including, in certain states, manufacturers and distributors who ship products into the state even if such manufacturers or distributors have no place of business within the state. Some states also impose requirements on manufacturers and distributors to establish the pedigree of product in the chain of distribution, including some states that require manufacturers and others to adopt new technology capable of tracking and tracing product as it moves through the distribution chain. Several states have enacted legislation requiring pharmaceutical companies to establish marketing compliance programs, file periodic reports with the state, make periodic public disclosures on sales, marketing, pricing, clinical trials and other activities, and/or register their sales representatives, as well as to prohibit pharmacies and other healthcare entities from providing certain physician prescribing data to pharmaceutical companies for use in sales and marketing, and to prohibit certain other sales and marketing practices. All of our activities are potentially subject to federal and state consumer protection and unfair competition laws.

Europe / Rest of World Government Regulation

In addition to regulations in the United States, we will be subject to a variety of regulations in other jurisdictions governing, among other things, clinical trials and any commercial sales and distribution of our products.

Whether or not we obtain FDA approval for a product, we must obtain the requisite approvals from regulatory authorities in foreign countries prior to the commencement of clinical trials or marketing of the product in those countries. Certain countries outside of the United States have a similar process that requires the submission of a clinical trial application much like the IND prior to the commencement of human clinical trials. In the European Union, for example, a clinical trial application, or CTA, must be submitted to each country's national health authority and an independent ethics committee, much like the FDA and IRB, respectively. Once the CTA is approved in accordance with a country's requirements, clinical trials may proceed.

The requirements and process governing the conduct of clinical trials, product licensing, pricing and reimbursement vary from country to country. In all cases, the clinical trials are conducted in accordance with International Conference on Harmonisation (ICH) / WHO Good Clinical Practice standards and the applicable regulatory requirements and the ethical principles that have their origin in the Declaration of Helsinki.

To obtain regulatory approval of an investigational drug under European Union regulatory systems, we must submit a marketing authorization application to the European Medicines Agency, or the EMA. The application used to file an NDA in the United States is similar to that required in the European Union, with the exception of, among other things, country-specific document requirements.

For other countries outside of the European Union, such as countries in Eastern Europe, Latin America or Asia, the requirements governing the conduct of clinical trials, product licensing, pricing and reimbursement vary from country to country. In all cases, again, the clinical trials are conducted in accordance with GCPs and the applicable regulatory requirements and the ethical principles that have their origin in the Declaration of Helsinki.

If we fail to comply with applicable foreign regulatory requirements, we may be subject to, among other things, fines, suspension or withdrawal of regulatory approvals, product recalls, seizure of products, operating restrictions and criminal prosecution.

Pharmaceutical Coverage, Pricing and Reimbursement

Significant uncertainty exists as to the coverage and reimbursement status of any product candidates for which we obtain regulatory approval. In the United States and markets in other countries, sales of any products for which we receive regulatory approval for commercial sale will depend in part on the availability of reimbursement from third-party payors. Third-party payors include government health administrative authorities, managed care providers, private health insurers and other organizations. The process for determining whether a payor will provide coverage for a drug product may be separate from the process for setting the price or reimbursement rate that the payor will pay for the drug product. Third-party payors may limit coverage to specific drug products on an approved list, or formulary, which might not include all of the FDA-approved drug products for a particular indication. Third-party payors are increasingly challenging the price and examining the medical necessity and cost-effectiveness of medical products and services, in addition to their safety and efficacy. We may need to conduct expensive pharmaco-economic studies in order to demonstrate the medical necessity and cost-effectiveness of our products, in addition to the costs required to obtain the FDA approvals. Our product candidates may not be considered medically necessary or cost-effective. A payor’s decision to provide coverage for a drug product does not imply that an adequate reimbursement rate will be approved. Adequate third-party reimbursement may not be available to enable us to maintain price levels sufficient to realize an appropriate return on our investment in product development.

In 2003, the United States government enacted legislation providing a partial prescription drug benefit for Medicare recipients, which became effective at the beginning of 2006. Government payment for some of the costs of prescription drugs may increase demand for any products for which we receive marketing approval. However, to obtain payments under this program, we would be required to sell products to Medicare recipients through prescription drug plans operating pursuant to this legislation. These plans will likely negotiate discounted prices for our products. Federal, state and local governments in the United States continue to consider legislation to limit the growth of healthcare costs, including the cost of prescription drugs. Future legislation could limit payments for pharmaceuticals such as the product candidates that we are developing.

The Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act, collectively known as the Affordable Care Act, substantially changed the way healthcare is financed by both governmental and private insurers, and significantly impacted the pharmaceutical industry.

23

The comprehensive overhaul has extended coverage to approximately 20 million previously uninsured Americans. Since its adoption, the Affordable Care Act contains a number of provisions, including those governing enrollment in federal healthcare programs, reimbursement changes and fraud and abuse, which have affected existing government healthcare programs and have resulted in the development of new programs, including Medicare payment for performance initiatives and improvements to the physician quality reporting system and feedback program. Additionally, the Affordable Care Act, as limited by the United States Supreme Court's decision in June 2012:

- increases the minimum level of Medicaid rebates payable by manufacturers of brand-name drugs from 15.1% to 23.1%;
- requires collection of rebates for drugs paid by Medicaid managed care organizations;
- requires manufacturers to participate in a coverage gap discount program, under which they must agree to offer 50% point-of-sale discounts off negotiated prices of applicable brand drugs to eligible beneficiaries during their coverage gap period, as a condition for the manufacturer's outpatient drugs to be covered under Medicare Part D, beginning January 2011; and
- imposes a non-deductible annual fee on pharmaceutical manufacturers or importers who sell "branded prescription drugs" to specified federal government programs.

There have been proposals by President Trump and the Republican majorities in both houses of the U.S. Congress to repeal or replace all or portions of the Affordable Care Act but to date no such legislation has been agreed upon. At this time, it remains unclear what legislation, if any, to repeal or replace the Affordable Care Act will become law, or what impact any such legislation may have on our existing product candidates, any of our future product candidates or AbbVie's commercialization of its HCV regimens.

Different pricing and reimbursement schemes exist in other countries. In the European Union, governments influence the price of pharmaceutical products through their pricing and reimbursement rules and control of national healthcare systems that fund a large part of the cost of those products to consumers. Some jurisdictions operate positive and negative list systems under which products may only be marketed once a reimbursement price has been agreed. To obtain reimbursement or pricing approval, some of these countries may require the completion of clinical trials that compare the cost-effectiveness of a particular product candidate to currently available therapies. Other member states allow companies to fix their own prices for medicines but monitor and control company profits. The downward pressure on healthcare costs in general, particularly prescription drugs, has become very 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 a commercial pressure on pricing within a country.

The marketability of any drug candidates for which we receive regulatory approval for commercial sale may suffer if the government and third-party payers fail to provide adequate coverage and reimbursement. In addition, emphasis on managed care in the United States has increased and we expect will continue to increase the pressure on pharmaceutical drug pricing. 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 we receive regulatory approval, less favorable coverage policies and reimbursement rates may be implemented in the future.

Research and Development

Our research and development expenses were $94.9 million, $57.5 million and $40.5 million for the fiscal years ended September 30, 2018, 2017 and 2016, respectively.

Manufacturing

We do not have our own manufacturing capabilities, except with respect to limited amounts of active pharmaceutical ingredients needed for preclinical development. In the past, we have relied on third-party manufacturers, including

manufacturers in China, for supply of active pharmaceutical ingredients, and we expect that in the future we will rely on such manufacturers for the supply of ingredients that will be used in clinical trials of our product candidates that we are developing ourselves and to produce commercial quantities of any product candidates that we commercialize ourselves. Manufacturing for paritaprevir and glecaprevir are conducted by AbbVie. Wherever possible, we seek to identify multiple suppliers for raw materials and key intermediaries to be used in our manufacturing process.

Sales and Marketing

We currently do not have any commercialization or sales and marketing capabilities, and currently have no fixed plans to invest in or build such capabilities internally. We have partnered our protease inhibitor compounds for HCV with AbbVie. We may also partner or collaborate with, or license commercial rights to, other larger pharmaceutical or biopharmaceutical companies to support the development of one or more of our wholly-owned product candidates through late-stage clinical development and, if successful, commercialization. However, we still retain all commercial rights to our independent programs and we will continue to evaluate our alternatives for commercializing them once they are more advanced in their clinical development.

Our Corporate Information

We are a Delaware corporation, incorporated in 1995. Our principal executive offices are located at 500 Arsenal Street, Watertown, Massachusetts 02472, and our telephone number is (617) 607-0800. Our web site address is www.enanta.com.

Segment Information

We provide segment information in Note 2 to our Consolidated Financial Statements included in Item 8 of this report. We are incorporating that information into this section by this reference.

Employees

As of September 30, 2018, we had 113 full-time employees, 59 of whom hold Ph.D. or M.D. degrees. None of our employees are subject to a collective bargaining agreement or represented by a trade or labor union. We consider our relations with our employees to be good.

Available Information

Our Internet website address is http://www.enanta.com. Through our website, we make available, free of charge, our annual report on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and any amendments to those reports, as well as proxy statements, and, from time to time, other documents as soon as reasonably practicable after we electronically file such material with, or furnish it to, the Securities and Exchange Commission, or SEC. These SEC reports can be accessed through the “Investors” section of our website. The information found on our website is not part of this or any other report we file with or furnish to the SEC.

Investors may read and copy any materials we file with the SEC at the SEC’s Public Reference Room at 100 F Street, NE, Washington, DC 20549. You may obtain information on the operation of the Public Reference Room by calling the SEC at 1-800-SEC-0330. The SEC also maintains an Internet website that contains reports, proxy and information statements, and other information regarding Enanta Pharmaceuticals, Inc. and other issuers that file electronically with the SEC. The SEC’s Internet website address is http://www.sec.gov.

25

ITEM 1A.RISK FACTORS

RISK FACTORS

Our business faces significant risks and uncertainties. Certain factors may have a material adverse effect on our business prospects, financial condition and results of operations, and you should carefully consider them. Accordingly, in evaluating our business, we encourage you to consider the following discussion of risk factors, in its entirety, in addition to other information contained in or incorporated by reference into this Annual Report on Form 10-K and our other public filings with the SEC. Other events that we do not currently anticipate or that we currently deem immaterial may also affect our business, prospects, financial condition and results of operations.

Risks Related to Our Business

Our financial prospects for the next several years are dependent upon the commercialization efforts of AbbVie for combination therapies incorporating our protease inhibitor, glecaprevir, for the treatment of HCV. AbbVie may act in its best interest rather than in our best interest, which could adversely affect our business.

We rely on AbbVie to fund and conduct the commercialization of its regimen containing glecaprevir (our second protease inhibitor, which is one of the two DAAs in AbbVie's MAVYRET/MAVIRET treatment), over which we have granted AbbVie complete control. Our ability to generate revenue will depend primarily on the success of AbbVie's continued efforts to commercialize MAVYRET/MAVIRET. Such success is subject to significant uncertainty, and we have no control over the resources, time and effort that AbbVie may devote to this regimen. Any of several events or factors could have a material adverse effect on our ability to generate revenue from AbbVie's commercialization of glecaprevir in combination therapies. For example, AbbVie:

- may not achieve satisfactory levels of market acceptance and reimbursement by physicians, patients and third-party payers for the MAVYRET/MAVIRET regimen in the various markets of the world where it is being introduced and sold by AbbVie;
- may not compete successfully with its MAVYRET/MAVIRET regimen against other products and therapies for HCV;
- may have to comply with additional requests and recommendations from the FDA, including label restrictions for its regimen containing glecaprevir;
- may not make all regulatory filings and obtain all necessary approvals from foreign regulatory agencies and all commercially necessary reimbursement approvals;
- may not commit sufficient resources to the marketing and distribution of MAVYRET/MAVIRET, whether for competitive or strategic reasons or otherwise due to a change in business priorities;
- may cease to perform its obligations under the terms of our collaboration agreement;
- may unilaterally terminate our collaboration agreement on specified prior notice without any reason and without any further commitment; and
- may not be able to manufacture paritaprevir or glecaprevir in compliance with requirements of the FDA and similar foreign regulatory agencies and in commercial quantities sufficient to meet market demand.

We do not have access to all information regarding the HCV regimens being commercialized by AbbVie, including certain information about spontaneous safety reports for any marketed product, regulatory affairs, process development, manufacturing, marketing, sales and other areas known by AbbVie. Thus, our ability to keep our stockholders informed about the status of products licensed under our collaboration is limited by the degree to which AbbVie keeps us informed. If AbbVie does not perform in the manner we expect or fulfill its responsibilities in a timely manner, or at all, the global commercialization of MAVYRET/MAVIRET could be delayed or terminated in

selected jurisdictions or be commercially unsuccessful. In addition, AbbVie has the right to make decisions regarding the commercialization of licensed products without consulting us. For example, in November 2018, AbbVie entered into a royalty-free licensing agreement with the Medicines Patent Pool to accelerate access to AbbVie's pan-genotypic HCV treatment glecaprevir/pibrentasvir (G/P) in 99 low- and middle-income countries and

territories by granting World Health Organization prequalified generic manufacturers licenses to manufacture and supply generic versions of G/P for distribution in those countries. AbbVie may also make decisions with which we do not agree. If AbbVie acts in a manner that is not in our best interest, then it could adversely affect our business and prospects.

Our royalty revenues are primarily derived from AbbVie's net sales of its MAVYRET/MAVIRET regimen for HCV. If AbbVie is unable to maintain sales of this regimen at or above current levels of sales, our royalty revenues would be adversely affected.

Our quarterly royalty revenue from AbbVie's net sales of its MAVYRET/MAVIRET regimen have grown substantially even as it is priced well below the pricing of AbbVie's first HCV regimens, and below that of its principal competitor, Gilead. While commercialization of this regimen is exclusively in AbbVie's control without any input from us, we believe it is possible that prices will decline further due to payers obtaining additional discounts or competitive market dynamics and that there may be fluctuation in AbbVie's market share over time due to competitive actions by Gilead. We also note Gilead has reported a decline year over year across most major geographic markets in the number of new patients starting on DAA treatments for HCV.

In addition, in light of continued fiscal crises experienced by several countries in the European Union and Japan, governments have announced or implemented measures to manage and reduce healthcare expenditures. AbbVie may experience global pricing pressure for its HCV regimens from such measures, which may be reflected in larger discounts or rebates on its regimens or delayed reimbursement. Also, private and public payers may choose to exclude AbbVie's MAVYRET/MAVIRET regimen from their formulary coverage lists or limit the types of patients for whom coverage will be provided. Any such change in formulary coverage, discounts or rebates or reimbursement for MAVYRET/MAVIRET would negatively affect the demand for such regimen and our royalty revenue derived from its sale.

We and AbbVie face substantial competition in the markets for HCV drugs, and there are many companies developing potential therapies for NASH, PBC, RSV and HBV, as well as other liver diseases and viral infections, which may result in others discovering, developing or commercializing products before we do or doing so more successfully than we do.

The pharmaceutical and biotechnology industries are intensely competitive and rapidly changing. Many large pharmaceutical and biotechnology companies, academic institutions, governmental agencies and other public and private research organizations are commercializing or pursuing the development of products that target HCV, NASH, PBC, RSV, HBV and other viral infections or liver diseases that we may target in the future. Many of our competitors have substantially greater commercial infrastructure and greater financial, technical and personnel resources than we have, as well as drug candidates in late-stage clinical development.

In all the disease areas currently under the focus of our research and development efforts, there are other companies with product candidates that are more advanced than ours. Our competitors may succeed in developing these product candidates or others and obtaining regulatory approval before we can do so with any of our product candidates. If we are not "first to market" with one of our product candidates in one or more of these disease indications, our competitive position could be compromised because it may be more difficult for us to obtain marketing approval for that product candidate and market acceptance of that product candidate as a follow-on competitor. In addition, any new product that competes with an approved product typically must demonstrate compelling advantages in efficacy, convenience, tolerability or safety, or some combination of these factors, in order to gain regulatory approvals, overcome price competition and be commercially successful.

We expect AbbVie's MAVYRET/MAVIRET to continue to face intense competition due to existing approved products in the HCV market. AbbVie's HCV treatment regimens currently face competition in various world markets and subpopulations of HCV from Gilead's Epclusa® (a fixed dose combination of sofosbuvir and velpatasvir), Vosevi™ (a triple combination therapy of sofosbuvir, velpatasvir and voxilaprevir approved by the FDA in July 2017 for specified sofosbuvir -treatment failures and NS5A-inhibitor treatment failures) and Harvoni® (a fixed-dose combination of sofosbuvir and ledipasvir); and to a lesser extent - Merck's Zepatier® (a fixed-dose combination of grazoprevir and elbasvir). Recently, Gilead announced plans to launch authorized generic versions of Epclusa and Harvoni in January 2019 through a newly created subsidiary, Asegua Therapeutics, LLC. Competitive products in the form of other treatment methods or a vaccine for HCV may render AbbVie's HCV

regimens obsolete or noncompetitive. AbbVie's regimens that contain one of our collaboration's protease inhibitors will face competition based on their safety and effectiveness, reimbursement coverage, price, patent position, AbbVie's marketing and sales capabilities, and other factors. If any of AbbVie's HCV regimens face competition from generic products, the collaboration agreement provides that the royalty rate applicable to our protease product contained in the regimen is reduced significantly by a specified percentage on a product-by-product, country-by-country basis. If AbbVie is not able to compete effectively against its competitors in HCV, our business will not grow and our financial condition, operations and stock price will suffer.

We also expect our other product candidates to face intense and increasing competition in the NASH and antiviral markets as advanced technologies and products become available. Though there is currently no approved treatment for NASH, we expect significant competition from other companies in the development of new treatments for NASH and related conditions. We are aware of several companies with NASH programs that are significantly more advanced than ours, including companies with compounds in Phase 3 clinical trials in NASH, namely Intercept, Genfit, Gilead, and Tobira (Allergan). In May 2016, the FDA granted conditional approval for Intercept's FXR agonist (brand name Ocaliva®) for the treatment of primary biliary cholangitis (PBC) in combination with first line therapy ursodeoxycholic acid (UDCA) in adults with an inadequate response to UDCA, or as monotherapy in adults unable to tolerate UDCA. In addition, a number of companies have NASH or related programs with compounds in Phase 2 clinical trials. These companies include Alberio, Astra-Zeneca, BMS, Boehringer Ingelheim, Can-Fite BioPharma, Conatus, Cirius, Cymabay, Galectin, Galmed, Gemphire Therapeutics, Gilead, GlaxoSmithKline, Immuron, Inventiva, Madrigal, Medicinova, Northsea Therapeutics, Novartis, NGM, Novo Nordisk, Pfizer and Viking. A significant number of other companies are conducting earlier stage clinical trials that may be applicable in NASH and other cholestatic diseases. There are also additional companies conducting preclinical studies in these disease areas.

Similarly, HBV and RSV represent competitive therapeutic areas. While there are effective antiviral medications prescribed for HBV, they generally have low true cure rates. Many companies are seeking to develop new HBV drugs that alone or in combination with other mechanisms could lead to a functional cure of HBV. Arbutus, Gilead, HEC, Ionis, Johnson & Johnson, Maxwell, Replicor, Roche and Spring Bank have Phase 2 programs in progress, with many of these companies conducting earlier stage programs as well. In addition, a number of companies have Phase 1 or earlier stage HBV programs, including Aicuris, Alnylam, Altimmune, Assembly, Arrowhead, Enyo and Transgene.

For RSV, there are currently no safe and effective therapies for already established RSV infection. Several companies are seeking new antiviral treatments for RSV infection in adult and pediatric settings. Ark Bioscienes, Johnson & Johnson, Gilead, Pulmocide and ReViral each have compounds in clinical development, as does Ablynx with a potential therapeutic antibody. A prophylactic, monoclonal-antibody-based treatment from MedImmune, which is commercialized by AbbVie outside of the U.S., is approved for infants considered at high risk for RSV infection; however studies have found that most young children with RSV infection were previously healthy, and thus would not normally be prescribed prophylactic treatment. In addition, a number of companies have RSV vaccines in development, primarily directed at prevention of RSV infection, and some companies are also evaluating vaccines in a therapeutic mode for treatment of established RSV infection.

If we are not able to develop new products that can compete effectively against our current and future competitors, our business will not grow and our financial condition, operations and stock price will suffer.

We have not developed independently any approved products and we have limited clinical development experience, which makes it difficult to assess our ability to develop and commercialize our product candidates.

AbbVie has been responsible for all of the clinical development of our paritaprevir and glecaprevir protease inhibitor products. We have not yet demonstrated an ability to address successfully many of the risks and uncertainties associated with late stage clinical development, regulatory approval and commercialization of therapeutic products such as the ones we plan to develop independently. For example, to execute our business plan for development of our independent RSV, NASH, PBC and HBV programs, we will need to successfully:

- execute clinical development of our product candidates and demonstrate acceptable safety and efficacy for them alone or in combination with other drugs or drug candidates;
- obtain required regulatory approvals for the development and commercialization of our product candidates;
- develop and maintain any future collaborations we may enter into for any of these programs;
- obtain and maintain patent protection for our product candidates and freedom from infringement of intellectual property of others;
- establish acceptable commercial manufacturing arrangements with third-party manufacturers;
- build and maintain robust sales, distribution and marketing capabilities, either independently or in collaboration with future collaborators;
- gain market acceptance for our product candidates among physicians, payers and patients; and
- manage our spending as costs and expenses increase due to clinical trials, regulatory approvals and commercialization.

If we are unsuccessful in accomplishing these objectives, we may not be able to successfully develop and commercialize our product candidates and expand our business or continue our operations.

If we are not successful in developing EDP-305, EDP-938 and/or EDP-514 or in discovering further product candidates in addition to those product candidates, our ability to expand our business and achieve our strategic objectives will be impaired.

Much of our internal research is at preclinical stages. Research programs designed to identify product candidates require substantial technical, financial and human resources, whether or not any product candidates are ultimately identified. Our research programs may initially show promise in identifying additional potential product candidates, yet fail to yield product candidates for clinical development or commercialization for many reasons, including the following:

- the research methodology used may not be successful in identifying additional potential product candidates;
- competitors may develop alternatives that render our product candidates less commercially viable or obsolete;
- competitors may obtain intellectual property protection that effectively prevents us from developing a product candidate;
- a product candidate may, on further study, be shown not to be an effective treatment in humans or to have harmful side effects or other characteristics that indicate it is unlikely to be effective or otherwise does not meet applicable regulatory criteria; and
- a product candidate may not be capable of being produced in commercial quantities at an acceptable cost, or at all.

Additional drug candidates that we may develop will require significant research, preclinical and clinical studies, regulatory approvals and commitments of resources before they can be commercialized. We cannot give assurance that our research will lead to the discovery of any additional drug candidates that will generate additional revenue for us. If we are unable to identify additional compounds suitable for preclinical and clinical development, we may not be able to obtain sufficient product revenue in future periods, which likely would result in significant harm to our financial position and adversely impact our stock price.

Expenses associated with development of our product candidates may cause our results of operations to fluctuate from period to period, which may result in operating losses.

Many of the preclinical and clinical development activities required for our product candidates must be contracted out to contract research organizations (CROs) at significant expense. We expect these expenses to increase substantially in the coming years as we advance compounds and conduct more clinical studies. It is difficult to accurately predict the timing and amounts of these expenses, and we expect that they will vary from quarter to quarter. In addition, the FDA or other regulatory agencies may require more preclinical or clinical testing than we originally anticipated for any of our product candidates. We may also be required to purchase expensive competitor drugs for use in our trials, either to demonstrate potential treatment combinations or as comparators to our product candidates. We also conduct clinical development activities outside the U.S. and are therefore exposed to foreign currency fluctuations for payments made to CROs in currencies other than the U.S. dollar. As a result, the expenses of our development programs and our operating results may fluctuate significantly from quarter to quarter, and our stock price may be adversely affected.

If we fail to attract and keep senior management and key scientific personnel, we may be unable to successfully develop our product candidates, conduct our clinical trials and commercialize our product candidates.

Our success depends in part on our continued ability to attract, retain and motivate highly qualified management, clinical and scientific personnel. We are highly dependent upon our senior management, particularly Jay R. Luly, Ph.D., our Chief Executive Officer and President, Yat Sun Or, Ph.D., our Senior Vice President, Research and Development and Chief Scientific Officer, and Nathalie Adda, M.D., our Senior Vice President, Chief Medical Officer, as well as other employees and consultants. Although none of these individuals has informed us to date that he or she intends to retire or resign in the near future, the loss of the services of any of these individuals or one or more of our other members of senior management could delay or prevent the successful development of our product candidates.

Although we have not historically experienced unique difficulties attracting and retaining qualified employees, we could experience such problems in the future. For example, competition for qualified personnel in the biotechnology and pharmaceutical fields is intense. In addition, we will need to hire additional personnel as we expand our clinical development and ultimately seek regulatory approvals and prepare for commercial activities. We may not be able to attract and retain quality personnel on acceptable terms.

We may encounter difficulties in managing our growth and expanding our operations successfully.

As we expand our research efforts and seek to advance our product candidates through clinical trials, we will need to expand our development, regulatory, manufacturing, marketing and sales capabilities or contract with third parties to provide these capabilities for us. As our operations expand, we expect that we will need to manage additional relationships with various strategic partners, suppliers and other third parties. Future growth will impose significant added responsibilities on members of management. Our future financial performance and our ability to commercialize our product candidates and to compete effectively will depend, in part, on our ability to manage any future growth effectively. To that end, we must be able to manage our development efforts and clinical trials effectively and hire, train and integrate additional management, administrative and sales and marketing personnel. We may not be able to

accomplish these tasks, and our failure to accomplish any of them could prevent us from successfully growing our company.

To date, our principal sources of revenue have been our collaboration agreements, including our current agreement with AbbVie. Future levels of royalties under the AbbVie agreement are uncertain. We have had no other products approved for commercial sale by us. Therefore, it is possible that we may incur operating losses in one or more years in the future, and our ability to achieve sustained profitability is unproven.

In each of our past four fiscal years, our net income resulted primarily from license payments, including milestone payments we earned from AbbVie and royalties we earned since December 2014 on net sales of AbbVie's HCV regimens allocated to our protease inhibitors included in those regimens. There is no assurance, however, that we will report net income in subsequent years. To date, we have not commercialized any products ourselves.

Our principal source of revenue historically has been our collaboration agreements, including our current agreement with AbbVie. The level of future royalties on products containing paritaprevir or glecaprevir is uncertain given the competitive nature of the market for HCV therapies. This is attributed to price competition, the changing nature of payer contracts of AbbVie and others, and the varying rates of reimbursement in different countries. At any time, AbbVie may choose not to continue its commercialization activities for the MAVYRET/MAVIRET regimen. If we are unable to develop and commercialize any more of our product candidates, either alone or with a collaborator, or if any such product candidate does not achieve market acceptance, we may not generate sufficient product sales or product royalties. In addition, for any of our product candidates included in a treatment regimen with more than one active compound, it would be uncertain what portion of net sales of the regimen would be allocated to our product candidate. Even if we do generate significant product royalties or product sales, we may not be able to sustain profitability on a quarterly or annual basis. Our failure to sustain profitability could depress the market price of our common stock and ultimately could impair our ability to raise capital, expand our business, diversify our product offerings or continue our operations. A decline in the market price of our common stock also could cause you to lose all or a part of your investment.

We may require substantial additional financing in the longer term to achieve our goals if the further commercialization of MAVYRET/MAVIRET is not successful. A failure to obtain this necessary capital when needed could force us to delay, limit, reduce or terminate some or all of our product development efforts.

Since our inception, most of our resources have been dedicated to the discovery and preclinical development of our product candidates. In particular, we have expended, and believe that we will continue to expend for the foreseeable future, substantial resources discovering and developing our proprietary product candidates. These expenditures will include costs associated with research and development, preclinical manufacturing of product candidates, conducting preclinical experiments and clinical trials and obtaining regulatory approvals, as well as commercializing any products later approved for sale. For the foreseeable future, we expect to incur substantial additional costs associated with research and development for our internally developed programs, exclusive of costs incurred by AbbVie in developing MAVYRET/MAVIRET. In addition, we may seek opportunities to in-license or otherwise acquire new therapeutic candidates and therapies.

Our future capital requirements depend on many factors, including:

- whether our existing collaboration continues to generate substantial royalties to us;
- the number and characteristics of the product candidates we pursue;
- the scope, progress, results and costs of researching and developing any of our product candidates on our own, including conducting preclinical research and clinical trials;
- opportunities to in-license or otherwise acquire new therapeutic candidates and therapies;
- the timing, receipt and amount of royalties on paritaprevir and glecaprevir and any sales of our product candidates, if any, or royalties thereon;
-

the timing of, and the costs involved in, obtaining regulatory approvals for any product candidates we develop independently;

- the cost of commercialization activities, if any, of any product candidates we develop independently that are approved for sale, including marketing, sales and distribution costs;

- the cost of manufacturing our product candidates and any products we successfully commercialize independently, including manufacturing for clinical development;
- our ability to maintain our existing collaboration and to establish new collaborations, licensing or other arrangements and the financial terms of such agreements; and
- the costs involved in preparing, filing, prosecuting, maintaining, defending and enforcing patents, including any litigation costs and the outcomes of any such litigation.

Additional funds may not be available if and when we need them, on terms that are acceptable to us, or at all. Our ability to raise funds will depend on financial, economic and market conditions and other factors, many of which are beyond our control. If adequate funds are not available to us on a timely basis, we may be required to delay, limit, reduce or terminate preclinical studies, clinical trials or other research and development activities for one or more of our product candidates.

The U.S. Tax Cuts and Jobs Act enacted in December 2017 includes significant changes from prior tax law which could result in significant changes to our future tax positions.

The U.S. Tax Cuts and Jobs Act (the “Tax Act”) enacted in December 2017 contains many provisions which differ from prior tax law. These changes include, but are not limited to, the reduction in the federal corporate income tax rate from 35% to 21%, the elimination of a corporation’s ability to carryback net operating losses to prior taxable income periods and the elimination of the deductibility of certain performance-based equity awards under Section 162(m). We accounted for the Tax Act during the year ended September 30, 2018 , which resulted in an adjustment that decreased our deferred tax assets by $3.8 million due to the reduction of the federal corporate income tax rate from 35% to 21%. Estimates used to prepare our income tax expense are based on our analysis of the Tax Act. Given the complexity of the act, anticipated guidance from the U.S. Treasury regarding implementation of the Tax Act, and potential for guidance from the Securities and Exchange Commission or the Financial Accounting Standards Board related to the act, these estimates may be adjusted in future periods to reflect any such guidance provided.

Risks Related to Development, Clinical Testing and Regulatory Approval of Our Product Candidates

Clinical drug development involves a lengthy and expensive process with uncertain timelines and uncertain outcomes. If clinical trials of any of our proprietary product candidates are prolonged or delayed, we may be unable to commercialize our product candidates on a timely basis.

Clinical testing is expensive and, depending on the stage of development, can take a substantial time period to complete. Its outcome is inherently uncertain, and failure can occur at any time during clinical development. None of our product candidates in our pipeline other than paritaprevir and glecaprevir, which have been clinically developed by AbbVie, has yet to advance beyond completion of Phase 2 clinical trials. Any future clinical trials of our product candidates may fail to demonstrate sufficient safety and efficacy. Moreover, regulatory and administrative delays for any product candidate in our pipeline may adversely affect our or any future collaborator’s clinical development plans and jeopardize our or any future collaborator’s ability to attain product approval, commence product sales and compete successfully against other therapies.

Clinical trials can be delayed for a variety of reasons, including delays related to:

- reaching an agreement on acceptable terms with prospective contract research organizations, or CROs, and clinical trial sites, the terms of which can be subject to extensive negotiation and may vary significantly among different CROs and trial sites;
- failure of third-party contractors, such as CROs, or investigators to comply with regulatory requirements;
- delay or failure in obtaining the necessary approvals from regulators or institutional review boards, or IRBs, in order to commence a clinical trial at a prospective trial site, or their suspension or termination of a clinical trial once

commenced;

- difficulty in recruiting suitable patients to participate in a trial;

- difficulty in having patients complete a trial or return for post-treatment follow-up;
- clinical sites deviating from trial protocol or dropping out of a trial;
- problems with drug product or drug substance storage and distribution;
- adding new clinical trial sites;
- our inability to manufacture, or obtain from third parties, adequate supply of drug product sufficient to complete our preclinical studies and clinical trials;
- governmental or regulatory delays and changes in regulatory requirements, policy and guidelines, including guidelines specifically addressing requirements for the development of treatments for RSV, NASH, PBC or HBV;
- program discontinuations or clinical holds for a program of a competitor, which could increase the level of regulatory scrutiny or delay data review or other response times by regulators with respect to one of our programs in the same class as the competitor's program; or
- varying interpretations of data by the FDA, the EMA and similar foreign regulatory agencies.

We could also encounter delays if a clinical trial is suspended or terminated by us, by the IRBs of the institutions in which such trial is being conducted, by any Data Safety Monitoring Board, or DSMB, for such trial, or by the FDA, the EMA or other regulatory authorities. Such authorities may impose such a suspension or termination due to a number of factors, including failure to conduct the clinical trial in accordance with regulatory requirements or our clinical protocols, inspection of the clinical trial operations or trial site by the FDA or other regulatory authorities resulting in the imposition of a clinical hold, unforeseen safety issues or adverse side effects, failure to demonstrate a benefit from using a drug, changes in governmental regulations or administrative actions or lack of adequate funding to continue the clinical trial. In addition, delays can occur due to safety concerns arising from trials or other clinical data regarding another company's product candidate in the same compound class as one of ours. If we or any future collaborators experience delays in the completion of, or termination of, any clinical trial of one of our product candidates, the commercial prospects of the product candidate will be harmed, and our ability to commence product sales and generate product revenues from the product candidate will be delayed. In addition, any delays in completing our clinical trials will increase our costs and slow down our product candidate development and approval process. Any of these occurrences may harm our business, financial condition and prospects significantly. In addition, many of the factors that cause, or lead to, a delay in the commencement or completion of clinical trials may also ultimately lead to the denial of regulatory approval of our product candidates.

We may choose to test any of our clinical candidates preclinically and/or clinically in combination with other compounds with different mechanisms of action, and any adverse results from such testing may have adverse consequences for the further development potential of not only the combination but also the clinical candidate itself as a monotherapy or in combination with other mechanisms of action.

We expect that the further development of successful therapies in our principal disease areas of RSV, NASH and HBV may require combining one or more of our compounds with other compounds with different mechanisms of action. To advance our programs and achieve favorable opportunities for any such combinations we may conduct preclinical testing, as well as clinical testing, with one of our other compounds or with a compound of a third party, with or without a longer-term collaboration with any such party. We may choose to disclose such testing in advance, but we can anticipate that some of the testing would be done without any public disclosure. If any such testing produces adverse results, we may have to disclose it to regulatory authorities as part of the data available with respect to our product candidate and the data may have adverse consequences for the further development and the ultimate conditions attached to any approved use of the product candidate, whether in the combination tested or even as a monotherapy or in combination with other mechanisms.

EDP-305, EDP-938, EDP-514 or any other product candidate emerging from our current NASH, PBC, RSV and HBV programs may have undesirable side effects which may delay or prevent marketing approval, or, if approval is received, require our product candidate to be taken off the market, require us to include safety warnings or otherwise limit sales.

In our NASH/PBC program, we are developing agonists of the farnesoid X receptor, or FXR, that are designed to bind to that receptor and then trigger a response from it. The adverse effects from long-term exposure to the FXR drug class are not well known since within this class only two drugs have been approved by the FDA—Ocaliva®, approved in May 2016 for PBC, and an older drug not commonly used but approved to treat cholesterol gallstones (by dissolving them) and a rare lipid storage disease. Unforeseen side effects from any of our product candidates could arise either during clinical development or, if approved, after the approved product has been marketed. The range and potential severity of possible side effects from systemic therapies like FXR agonists could be significant.

In addition, our drug candidates for NASH may be developed as a potential treatment for a severe disease that commonly occurs in patients with other serious conditions, including metabolic syndrome and diabetes. Any clinical trials in NASH will necessarily be conducted in patient populations that may be more prone than the general population to exhibit certain disease states or adverse events. It may be difficult to discern whether certain events or symptoms observed during our trials were due to our drug candidates or placebo, resulting in our company and our development programs being negatively affected even if such events or symptoms are ultimately determined to be unlikely related to our drug candidates.

In our RSV program, we are developing inhibitors of the N protein. No inhibitor of the RSV N protein has progressed beyond a Phase 2 clinical trial, so we are not yet able to assess the potential liabilities of an N inhibitor in large scale studies or in the general population. In addition, in RSV the principal target populations, namely infants, the elderly, and the immunocompromised, represent sensitive patient populations that could be more prone to adverse effects of therapy.

In our HBV program, we are developing modulators of capsid assembly. This is a new mechanistic approach to HBV, and no capsid assembly modulators have advanced beyond Phase 2 clinical studies. Thus, we are not able to predict what adverse effects may arise in longer term studies conducted in larger populations. In addition, in HBV, long term consequences of an HBV infection can include hepatocellular carcinoma, liver failure, or liver transplant. It may be difficult to determine whether our drug candidates are playing a direct role in contributing to (or protecting from) these downstream effects of HBV infection.

If any of our product candidates receives marketing approval and we or others later identify undesirable or unacceptable side effects caused by such products:

- regulatory authorities may require the addition of labeling statements, specific warnings, a contraindication or field alerts to physicians and pharmacies;
- we may be required to change instructions regarding the way the product is administered, conduct additional clinical trials or change the labeling of the product;
- we may be subject to limitations on how we may promote the product;
- sales of the product may decrease significantly;
- regulatory authorities may require us to take our approved product off the market;

- we may be subject to litigation or product liability claims; and
- our reputation and our stock price may suffer.

Any of these events could prevent us from achieving or maintaining market acceptance of the affected product or could substantially increase commercialization costs and expenses, which in turn could delay or prevent us from generating significant revenue from the sale of any product we develop.

If we are required to suspend or discontinue clinical trials due to side effects or other safety risks associated with our product candidates, or if we are required to conduct studies on the long-term effects associated with the use of any of those product candidates, commercialization any of those product candidates could be delayed or halted.

Clinical trials involving our product candidates may be suspended or terminated at any time for a number of safety-related reasons. For example, we may voluntarily suspend or terminate clinical trials if at any time one of our product candidates, or a combination therapy including any of them, presents an unacceptable safety risk to the clinical trial patients. In addition, IRBs or regulatory agencies may order the temporary discontinuation or termination of clinical trials at any time if they believe that the clinical trials are not being conducted in accordance with applicable regulatory requirements, including if they present an unacceptable safety risk to patients. Administering any product candidate to humans may produce undesirable side effects. The existence of undesirable side effects resulting from any of our product candidates, or a combination therapy including any of them, could cause us or regulatory authorities, such as the FDA or EMA, to interrupt, delay or halt clinical trials of our product candidates and could result in the FDA or EMA or other regulatory agencies denying further development or approval of our product candidates for any or all targeted indications. This, in turn, could prevent us from commercializing our product candidates.

Results of earlier clinical trials may not be predictive of the results of later-stage clinical trials.

The results of preclinical studies and early clinical trials of our product candidates may not be predictive of the results of later-stage clinical trials, if any. In addition, results of Phase 3 clinical trials in one or more ethnic groups are not necessarily indicative of results in other ethnic groups. Product candidates in later stages of clinical trials may fail to show the desired safety and efficacy results despite having progressed through preclinical studies and initial clinical trials. Many companies in the biopharmaceutical industry have suffered significant setbacks in advanced clinical trials due to adverse safety profiles or lack of efficacy, notwithstanding promising results in earlier studies. Similarly, future clinical trial results may not be successful for these or other reasons.

Product candidate development risk is heightened by any changes in the planned clinical trials compared to the completed clinical trials. As product candidates are developed through preclinical early and late stage clinical trials towards approval and commercialization, it is customary that various aspects of the development program, such as manufacturing and formulation, are altered along the way in an effort to optimize processes and results. Such changes carry the risk that they will not achieve these intended objectives. Any of these changes could make the results of planned clinical trials or other future clinical trials we may initiate less predictable and could cause our product candidates to perform differently, which could delay completion of clinical trials, delay approval of our product candidates and/or jeopardize our ability to commence product sales and generate revenues.

The regulatory approval processes of the FDA, the EMA and other comparable foreign authorities are lengthy, time-consuming and inherently unpredictable, and if we are ultimately unable to obtain timely regulatory approval for our product candidates, our business will be substantially harmed.

The regulatory approval process is expensive and, while the time required to gain FDA and foreign regulatory approval is uncertain, it may take years. Regulatory approvals are unpredictable and depend upon numerous factors, including the substantial discretion of the regulatory authorities. In addition, approval policies, regulations, or the type and amount of preclinical and clinical data necessary to gain approval may change during the course of a product candidate’s clinical development and may vary among jurisdictions. We may be required to undertake and complete certain additional preclinical studies to generate toxicity and other data required to support the submission of a New Drug Application, or NDA, to the FDA or comparable application to other regulatory authorities. AbbVie obtained all regulatory approvals for its paritaprevir-containing regimens and for MAVYRET/MAVIRET, which contains glecaprevir. We have not obtained regulatory approval by ourself for any of our wholly-owned product candidates and

it is possible that none of our existing product candidates or any of our future product candidates will ever obtain regulatory approval. Furthermore, approval in the United States 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 by the FDA.

Our product candidates could fail to receive regulatory approval for many reasons, including the following:

- the FDA, the EMA or other comparable foreign regulatory authorities may disagree with the design or implementation of our clinical trials;
- we may be unable to demonstrate to the satisfaction of the FDA, the EMA or other comparable foreign regulatory authorities that a product candidate is safe and effective for its proposed indication;
- the results of clinical trials may not meet the level of statistical significance required by the FDA, the EMA or other comparable foreign regulatory authorities for approval;
- we may be unable to demonstrate that a product candidate's clinical and other benefits outweigh its safety risks;
- the FDA, the EMA or other comparable foreign regulatory authorities may disagree with our interpretation of data from preclinical studies or clinical trials;
- the data collected from clinical trials of our product candidates may not be sufficient to support the submission of an NDA or other submissions or to obtain regulatory approval in the United States or elsewhere;
- the FDA or comparable foreign regulatory authorities may fail to approve the manufacturing processes or facilities of third-party manufacturers with which we contract for clinical and commercial supplies of any of our product candidates; and
- the approval policies or regulations of the FDA, the EMA or other comparable foreign regulatory authorities may significantly change in a manner rendering our clinical data insufficient for approval.

We cannot be assured that after spending substantial time and resources, we will obtain regulatory approvals in any desired jurisdiction. Even if we were to obtain approval, regulatory authorities may grant approval contingent on the performance of costly post-marketing clinical trials, or may approve a product candidate with a label that does not include the labeling claims necessary or desirable for the successful commercialization of that product candidate. Significant clinical trial delays could allow our competitors to obtain marketing approval before we do or could in effect shorten the patent protection period during which we may have the exclusive right to commercialize our product candidates. In addition, it may ultimately not be possible to achieve the prices intended for our products. In many foreign countries, including those in the European Union, a product candidate must be approved for reimbursement before it can be approved for sale in that country. Any of the foregoing scenarios could materially harm the commercial prospects for our product candidates and our business.

Even if we receive regulatory approval for any of our product candidates we develop independently, we will be subject to ongoing FDA obligations and continued regulatory review in other jurisdictions, which may result in significant additional expense. Additionally, our product candidates, if approved, could be subject to labeling and other restrictions and market withdrawal and we may be subject to penalties if we or our collaborators fail to comply with regulatory requirements or experience unanticipated problems with our products.

Any regulatory approvals that we receive for our product candidates we develop independently may be subject to limitations on the approved indicated uses for which the product may be marketed or subject to certain conditions of approval, or may contain requirements for potentially costly post-marketing testing, including Phase 4 clinical trials, and surveillance to monitor the safety and efficacy of the product candidate.

In addition, if the FDA approves any of our product candidates, the manufacturing processes, labeling, packaging, distribution, adverse event reporting, storage, advertising, promotion and recordkeeping for the product will be subject to extensive and ongoing regulatory requirements. These requirements include submissions of safety and other post-marketing information and reports, as well as continued compliance with current good manufacturing practices, or cGMP, and good clinical practices, or GCP, for any clinical trials that we or our collaborators conduct post-approval. Later discovery of previously unknown problems with a product, including adverse events of unanticipated severity or frequency, or with third-party manufacturers or manufacturing processes, or failure to comply with regulatory requirements, may result in, among other things:

- restrictions on the marketing or manufacturing of the product, withdrawal of the product from the market or voluntary or mandatory product recalls;
- fines, warning letters or holds on any post-approval clinical trials;
- refusal by the FDA to approve pending applications or supplements to approved applications filed by us, or suspension or revocation of product license approvals;
- product seizure or detention, or refusal to permit the import or export of products; and
- injunctions or the imposition of civil or criminal penalties.

We cannot predict the likelihood, nature or extent of government regulation that may arise from future legislation or administrative action, either in the United States or abroad. If we, or AbbVie in the case of any licensed HCV product, are slow or unable to adapt to changes in existing requirements or the adoption of new requirements or policies, or if we or AbbVie are not able to maintain regulatory compliance, our product candidates or AbbVie's licensed HCV products may lose any marketing approval that may have been obtained and we may not achieve or sustain profitability, which would adversely affect our business.

We may delay or terminate the development of a product candidate at any time if we believe the perceived market or commercial opportunity does not justify further investment, which could materially harm our business and adversely affect our stock price.

Even though the results of preclinical studies and clinical trials that we have conducted or may conduct in the future may support further development of one or more of our product candidates, we may delay, suspend or terminate the future development of a product candidate at any time for strategic, business, financial or other reasons, including the determination or belief that the emerging profile of the product candidate is such that it may not receive regulatory approvals in key markets, gain meaningful market acceptance, otherwise provide any competitive advantages in its intended indication or market or generate a significant return to stockholders. Such a delay, suspension or termination could materially harm our business, results of operations or financial condition. In addition, AbbVie has the right to make decisions regarding the commercialization of paritaprevir and glecaprevir without consulting us, and may make decisions with which we do not agree.

Risks Related to Commercialization of Our Product Candidates

Even if AbbVie continues to successfully commercialize MAVYRET/MAVIRET, or even if we are able to commercialize any other treatment regimen containing one of our product candidates from any of our proprietary discovery programs, MAVYRET/MAVIRET or the resulting products, as the case may be, may become subject to unfavorable pricing regulations, third-party reimbursement practices or healthcare reform initiatives in the United States, which would harm our business.

The regulations that govern marketing approvals, pricing and reimbursement for new drug products vary widely from country to country. In the United States, the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Affordability Reconciliation Act of 2010, collectively referred to as the ACA, is significantly

changing the way healthcare is financed by both governmental and private insurers. While we cannot predict what impact on federal reimbursement policies this law or any amendment to it will continue to have in general or specifically on any product or regimen that we may commercialize, the ACA or any such amendment may result in downward pressure on pharmaceutical reimbursement, which could negatively affect market acceptance of new products. In addition, although the United States Supreme Court has upheld the constitutionality

of most of the ACA, several states have not implemented certain sections of the ACA, including 14 that have rejected the expansion of Medicaid eligibility for low income citizens, and some members of the U.S. Congress are still working to repeal the ACA. More recently, President Trump and the Republicans in both houses of the U.S. Congress have been seeking to repeal or replace all or portions of the ACA but to date they have been unable to agree on any such legislation. We cannot predict what legislation, if any, to repeal or replace the ACA will become law, or what impact any such legislation may have on us or on AbbVie's commercialization of its HCV regimens.

Our ability to commercialize any product candidate successfully, as well as AbbVie's commercialization of MAVYRET/MAVIRET, will also depend in part on the extent to which reimbursement for these products and related treatments will be available from government health administration authorities, private health insurers and other organizations. Government authorities and third-party payors, such as private health insurers and health maintenance organizations, decide which medications they will pay for and establish reimbursement levels. A primary trend in the U.S. healthcare industry is cost containment. Government authorities and third-party payors have attempted to control costs by limiting coverage and the amount of reimbursement for particular medications. In the case of HCV, limitations of coverage have recently been used to limit access to HCV treatments for only those patients with more advanced fibrosis. Increasingly, third-party payors are requiring that drug companies provide them with predetermined discounts from list prices and, in many cases involving HCV drugs, seeking discounts in exchange for greater patient access to a particular HCV drug. In addition, there are private and public payors challenging the prices charged for medical products. We cannot be sure that reimbursement will be available for any product that we may commercialize and, if reimbursement is available, the level of reimbursement. In addition, reimbursement may impact the demand for, or the price of, MAVYRET/MAVIRET or any product candidate for which we may obtain marketing approval. If reimbursement is not available or is available only to limited levels, AbbVie may not be successful in commercializing MAVYRET/MAVIRET and we may not be able to successfully commercialize any product candidate for which we may seek marketing approval.

There may be significant delays in obtaining reimbursement for newly approved drugs, and coverage may be more limited than the purposes for which the drug is approved by the FDA or comparable authorities in other jurisdictions. Moreover, eligibility for reimbursement does not imply that any drug will be paid for in all cases or at a rate that covers our costs, including research, development, manufacture, sale and distribution. Interim reimbursement levels for new drugs, if applicable, may also be insufficient to cover our and any collaborator's costs and may not be made permanent. Reimbursement rates may vary according to the use of the drug and the clinical setting in which it is used, may be based on reimbursement levels already set for lower cost drugs and may be incorporated into existing payments for other services. Net prices for drugs may be reduced by mandatory discounts or rebates required by government healthcare programs or private payors and by any future relaxation of laws that presently restrict imports of drugs from countries where they may be sold at lower prices than in the United States. Third-party payors often rely upon Medicare coverage policy and payment limitations in setting their own reimbursement policies. AbbVie's inability to promptly obtain coverage and profitable payment rates from both government-funded and private payors for MAVYRET/MAVIRET, or our inability to do the same for any product candidate that we develop, could have a material adverse effect on our operating results, our ability to raise capital needed to commercialize products and our overall financial condition.

In general, the United States and several other jurisdictions are considering a number of legislative and regulatory proposals to change the healthcare system in ways that could affect our ability to sell our products profitably. Among policy makers and payors in the United States and elsewhere, there is significant interest in promoting changes in healthcare systems with the stated goals of containing healthcare costs, improving quality and/or expanding access to healthcare. In the United States, the pharmaceutical industry has been a particular focus of these efforts and has been significantly affected by major legislative initiatives. We expect to experience pricing pressures in connection with the sale of any products that we develop or that are being commercialized under our collaboration with AbbVie. The implementation of cost containment measures or other healthcare reforms may limit our ability to generate revenue,

maintain profitability or commercialize our product candidates.

Foreign governments tend to impose strict price controls, which may adversely affect our future profitability.

In most foreign countries, particularly in the European Union and Japan, prescription drug pricing and/or reimbursement is subject to governmental control. In those countries that impose price controls, pricing negotiations with governmental authorities can take considerable time after the receipt of 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 candidate to other available therapies.

Some countries 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 foreign markets, prescription pharmaceutical pricing remains subject to continuing governmental control even after initial approval is granted. As a result, we (or AbbVie in the case of MAVYRET/MAVIRET) might obtain marketing approval for a product in a particular country, but then be subject to price regulations that delay commercial launch of the product, possibly for lengthy time periods, and negatively impact the revenues that are generated from the sale of the product in that country. If reimbursement of MAVYRET/MAVIRET or of any of our product candidates is unavailable or limited in scope or amount, or if pricing is set at unsatisfactory levels, or if there is competition from lower priced cross-border sales, our results of operations will be negatively affected.

If, in the future, we are unable to establish our own sales, marketing and distribution capabilities or enter into licensing or collaboration agreements for these purposes, we may not be successful in commercializing any product candidates.

We do not have a sales or marketing infrastructure and have no sales, marketing or distribution experience. We will seek to either build our own commercial infrastructure to commercialize any products if and when they are approved, or enter into licensing or collaboration agreements where our collaborator is responsible for commercialization, as in the case of our collaboration with AbbVie, or where we have the right to assist in the future development and commercialization of such products.

To develop internal sales, distribution and marketing capabilities, we will have to invest significant amounts of financial and management resources, some of which will be committed prior to any confirmation that any of our proprietary product candidates will be approved. For product candidates for which we decide to perform sales, marketing and distribution functions ourselves, we could face a number of additional risks, including:

- our inability to recruit and retain adequate numbers of effective sales and marketing personnel;
- the inability of sales personnel to obtain access to physicians or persuade adequate numbers of physicians to prescribe any products;
- the lack of complementary products to be offered by sales personnel, which may put us at a competitive disadvantage relative to companies with more extensive product lines; and
- unforeseen costs and expenses associated with creating an independent sales and marketing organization.

Where and when appropriate, we may elect to utilize contract sales forces or distribution partners to assist in the commercialization of our product candidates. If we enter into arrangements with third parties to perform sales, marketing and distribution services for our products, the resulting revenues or the profitability from these revenues to us are likely to be lower than if we had sold, marketed and distributed our products ourselves. In addition, we may not be successful in entering into arrangements with third parties to sell, market and distribute our product candidates or may be unable to do so on terms that are favorable to us. We likely will have little control over such third parties, and any of these third parties may fail to devote the necessary resources and attention to sell, market and distribute our products effectively.

If we do not establish sales, marketing and distribution capabilities successfully, either on our own or in collaboration with third parties, we will not be successful in commercializing our product candidates.

Commercial success of our product candidates depends upon significant market acceptance among physicians, patients and healthcare payors of any resulting approved drug.

MAVYRET/MAVIRET, as well as EDP-305, EDP-938, EDP-514 or any other product candidate that we may develop in the future, whether as part of a combination therapy or as a monotherapy, may not gain market acceptance among physicians, healthcare payors, patients and the medical community. The degree of market acceptance of MAVYRET/MAVIRET or of any product candidate for which we obtain approval for commercial sale, will depend on a number of factors, including:

- the efficacy and safety of treatment regimens containing one of our product candidates, as demonstrated in clinical trials, and the degree to which these regimens represent a clinically meaningful improvement in care as compared with other available therapies;
- the clinical indications for which any treatment regimen containing one of our product candidates become approved;
- acceptance among physicians, major operators of clinics, payors and patients of any treatment regimen containing one of our product candidates;
- the willingness of the target patient population to try new therapies and of physicians to prescribe these therapies;
- the potential and perceived advantages of treatment regimens containing one of our product candidates over alternative treatments;
- the cost of treatment of regimens containing one of our product candidates in relation to the cost of alternative treatments;
- the availability of adequate reimbursement and pricing by third parties and government authorities and successful negotiation of favorable agreements with payors by us or any collaborator of ours, as well as the impact of any agreements among any of the foregoing and one or more of our competitors limiting access to our product in favor of one or more competitive products;
- the continued longevity of the HCV drug market or growth and longevity of any other market for which we develop a drug;
- the levels of funding provided by government-funded healthcare for HCV treatment or treatment of any other disease for which we develop a drug;
- the relative convenience and ease of administration of any treatment regimen containing one of our product candidates compared to competitive regimens;
- the prevalence and severity of adverse side effects, whether involving the use of treatment regimens containing one of our products candidates or similar, competitive treatment regimens; and
- the effectiveness of our sales and marketing efforts and those of AbbVie in the case of MAVYRET/MAVIRET.

If treatment regimens containing one of our product candidates are approved and then fail to achieve market acceptance, we may not be able to generate significant additional revenue. Further, if new, more favorably received therapies are introduced after any such regimen achieves market acceptance, then we may not be able to maintain that market acceptance over time.

Risks Related to Our Dependence on Third Parties

We may not be successful in establishing new product collaborations, which could adversely affect our ability to develop and commercialize one or more of our product candidates. If we are unsuccessful in maintaining or forming alliances on favorable terms, our business may not succeed.

We may seek to enter into additional product collaborations in the future, including alliances with other biotechnology or pharmaceutical companies, to enhance and accelerate the development and commercialization of one or more of our product candidates. We face significant competition in seeking appropriate collaborators and the negotiation process is time-consuming and complex. Moreover, we may not be successful in our efforts to establish other product collaborations or other alternative arrangements for any product candidates and programs because our research and development pipeline may be insufficient, our product candidates and programs may be deemed to be at too early of a stage of development for collaborative effort and/or third parties may not view our product candidates and programs as having the requisite potential to demonstrate safety and efficacy. Even if we are successful in our efforts to establish product collaborations, the terms that we agree upon may not be favorable to us and we may not be able to maintain such product collaborations if, for example, development or approval of a product candidate is delayed or sales of an approved product are disappointing.

If our existing collaboration agreement with AbbVie is terminated, or if we determine that entering into other product collaborations is in our best interest but we either fail to enter into, delay in entering into or fail to maintain such collaborations:

- the development of certain of our product candidates may be terminated or delayed;
- our cash expenditures related to development of certain of our product candidates would increase significantly and we may need to seek additional financing;
- we may be required to hire additional employees or otherwise develop expertise, such as clinical, regulatory, sales and marketing expertise, which we do not currently have;
- we will bear all of the risk related to the development of any such product candidates; and
- the competitiveness of any product candidate that is commercialized could be reduced.

We intend to rely on third-party manufacturers to produce our development-stage product candidate supplies and any commercial supplies of any approved product candidates. Any failure by a third-party manufacturer to produce acceptable supplies for us may delay or impair our ability to initiate or complete our clinical trials or sell any resulting product.

We do not currently own or operate any manufacturing facilities. We plan to continue to work with third-party contract manufacturers to produce sufficient quantities of any product candidates for preclinical testing, clinical trials and commercialization. If we are unable to arrange for such a third-party manufacturing source for any of our product candidates, or fail to do so on commercially reasonable terms, we may not be able to successfully produce, develop and market one or more of our product candidates, or we may be delayed in doing so.

Reliance on third-party manufacturers entails risks to which we would not be subject if we manufactured product candidates ourselves, including reliance on the third party for regulatory compliance and quality control and assurance, volume production, the possibility of breach of the manufacturing agreement by the third party because of factors beyond our control (including a failure to synthesize and manufacture our product candidates in accordance with our product specifications) and the possibility of termination or nonrenewal of the agreement by the third party at a time that is costly or damaging to us. In addition, the FDA and other regulatory authorities require that our product candidates be manufactured according to cGMP and similar foreign standards. Pharmaceutical manufacturers and their subcontractors are required to register their facilities and/or products manufactured at the time of submission of the marketing application and then annually thereafter with the FDA and certain state and foreign agencies. They are also

subject to periodic unannounced inspections by the FDA, state and other foreign authorities. Any subsequent discovery of problems with a product, or a manufacturing or laboratory facility used by us or our collaborators, may result in restrictions on the product or on the manufacturing or laboratory facility, including marketed product recall, suspension of manufacturing, product seizure, or a voluntary withdrawal of the drug from the market. Any failure by our third-party manufacturers to comply with cGMP or failure to scale up manufacturing processes, including any failure to deliver sufficient quantities of product candidates in a timely manner, could lead to a delay in, or failure to obtain, regulatory approval of any of our product candidates.

We plan to rely on third-party manufacturers to purchase from third-party suppliers the materials necessary to produce our product candidates for our clinical studies. There are a small number of suppliers for certain capital equipment and materials that we plan to use to manufacture our drugs. Such suppliers may not sell these materials to our manufacturers at the times we need them or on commercially reasonable terms. Moreover, we currently do not have any agreements for the production of these materials. Although we do not intend to begin a clinical trial unless we believe we have a sufficient supply of a product candidate to complete the clinical trial, any significant delay in the supply of a product candidate or the material components thereof for an ongoing clinical trial due to the need to replace a third-party manufacturer could considerably delay completion of our clinical studies, product testing and potential regulatory approval of our product candidates. If our manufacturers or we are unable to purchase these materials after regulatory approval has been obtained for our product candidates, the commercial launch of our product candidates would be delayed or there would be a shortage in supply, which would impair our ability to generate revenue from the sale of our product candidates.

Contract manufacturers may not be able to manufacture our product candidates at a cost or in quantities or in a timely manner necessary to develop and commercialize them. If we successfully commercialize any of our product candidates, to meet our projected needs we may need to find third parties that will increase their scale of production, or we may have to establish or access large-scale commercial manufacturing capabilities. We may require additional funds, personnel and other resources to build, lease or operate any manufacturing facility.

A portion of our research and a portion of our manufacturing of certain key intermediates used in the manufacture of the active pharmaceutical ingredients for our product candidates takes place in China through third-party researchers and manufacturers. A significant disruption in the operation of those researchers or manufacturers, a trade war, or political unrest in China could materially adversely affect our business, financial condition and results of operations.

Although manufacturing for MAVYRET/MAVIRET is being conducted by AbbVie, we have relied on third parties located in China to manufacture and supply certain key intermediates used in the manufacture of our active pharmaceutical ingredients, or API, for our current product candidates, and we expect to continue to use such third party manufacturers for such intermediates for any product candidates we develop independently. Any disruption in production or inability of our manufacturers in China to produce adequate quantities to meet our needs, whether as a result of a natural disaster or other causes, could impair our ability to operate our business on a day-to-day basis and to continue our research and development of our product candidates. We also use contract researchers in China to conduct a portion of our research for our early stage programs. Any disruption in the team conducting that research could cause delays in one or more of our research programs and could require us to curtail one or more programs, at least until we could contract for that research to be done elsewhere. Furthermore, since these researchers and manufacturers are located in China, we are exposed to the possibility of product supply disruption and increased costs in the event of changes in the policies of the United States or Chinese governments, political unrest or unstable economic conditions in China. For example, a trade war could lead to tarrifs on the chemical intermediates we use that are manufactured in China. Any of these matters could materially and adversely affect our business and results of operations. Any recall of the manufacturing lots or similar action regarding our API used in clinical trials could delay the trials or detract from the integrity of the trial data and its potential use in future regulatory filings. In addition, manufacturing interruptions or failure to comply with regulatory requirements by any of these manufacturers could significantly delay clinical development of potential products and reduce third-party or clinical researcher interest and support of proposed trials. These interruptions or failures could also impede commercialization of our product candidates and impair our competitive position. Further, we may be exposed to fluctuations in the value of the local currency in China. Future appreciation of the local currency could increase our costs. In addition, our labor costs could continue to rise as wage rates increase due to increased demand for skilled laborers and the availability of skilled labor declines in China.

We will rely on third parties to monitor, support, conduct and/or oversee clinical trials of our product candidates that we develop independently and, in some cases, to maintain regulatory files for those product candidates. If we are not able to maintain or secure agreements with such third parties on acceptable terms, if these third parties do not perform their services as required, or if these third parties fail to timely transfer any regulatory information held by them to us, we may not be able to obtain regulatory approval for, or commercialize, our product candidates.

We will rely on CROs, hospitals, clinics, academic institutions and other third-party collaborators who are outside our control to monitor, support, conduct and/or oversee preclinical and clinical studies of our product candidates. We will also rely on third parties to perform clinical trials of our product candidates when they reach that stage. As a result, we have less control over the timing and cost of these studies and the ability to recruit trial subjects than if we conducted these trials wholly by ourselves. If we are unable to maintain or enter into agreements with these third parties on acceptable terms, or if any such engagement is terminated, we may be unable to enroll patients on a timely basis or otherwise conduct our trials in the manner we anticipate. In addition, there is no guarantee that these third parties will devote adequate time and resources to our studies or perform as required by a contract or in accordance with regulatory requirements, including maintenance of clinical trial information regarding our product candidates. If these third parties fail to meet expected deadlines, fail to timely transfer to us any regulatory information, fail to adhere to protocols or fail to act in accordance with regulatory requirements or our agreements with them, or if they otherwise perform in a substandard manner or in a way that compromises the quality or accuracy of their activities or the data they obtain, then clinical trials of our product candidates may be extended, delayed or terminated, or our data may be rejected by the FDA or regulatory agencies.

To the extent we elect to enter into additional licensing or collaboration agreements to partner our product candidates, our dependence on such relationships may adversely affect our business.

Our commercialization strategy for some of our product candidates may depend on our ability to enter into collaboration agreements with other companies to obtain access to other compounds for use in combination with any of our product candidates or for assistance and funding for the development and potential commercialization of any of these product candidates, similar to what we have done with AbbVie. Supporting diligence activities conducted by potential collaborators and negotiating the financial and other terms of a collaboration agreement are long and complex processes with uncertain results. Even if we are successful in entering into one or more additional collaboration agreements, collaborations can involve greater uncertainty for us, as we may have limited or no control over certain aspects of our collaborative programs. We may determine that continuing a collaboration under the terms provided is not in our best interest, and we may terminate the collaboration. Our collaborators could delay or terminate their agreements with us, and our product candidates subject to collaborative arrangements may never be successfully commercialized.

Further, our collaborators may develop alternative products or pursue alternative technologies either on their own or in collaboration with others, including our competitors, and the priorities or focus of our collaborators may shift such that our programs receive less attention or resources than we would like, or they may be terminated altogether. Any such actions by our collaborators may adversely affect our business prospects and ability to earn revenue. In addition, we could have disputes with our collaborators, such as the interpretation of terms in our agreements. Any such disagreements could lead to delays in the development or commercialization of any potential products or could result in time-consuming and expensive litigation or arbitration, which may not be resolved in our favor.

Even with respect to programs that we intend to commercialize ourselves, we may enter into agreements with collaborators to share in the burden of conducting clinical trials, manufacturing and marketing our product candidates or products. In addition, our ability to apply our proprietary technologies to develop proprietary compounds will depend on our ability to establish and maintain licensing arrangements or other collaborative arrangements with the holders of proprietary rights to such compounds. We may not be able to establish such arrangements on favorable

terms or at all, and our collaborative arrangements may not be successful.

Risks Related to Our Intellectual Property Rights

We could be unsuccessful in obtaining or maintaining adequate patent protection for one or more of our product candidates.

Our commercial success will depend, in large part, on our ability to obtain and maintain patent and other intellectual property protection with respect to our product candidates. We cannot be certain that patents will be issued or granted with respect to our patent applications that are currently pending, or that issued or granted patents will not later be found to be invalid and/or unenforceable, be interpreted in a manner that does not adequately protect our products, or otherwise provide us with any competitive advantage. The patent position of biotechnology and pharmaceutical companies is generally uncertain because it involves complex legal and factual considerations. The standards applied by the United States Patent and Trademark Office and foreign patent offices in granting patents are not always applied uniformly or predictably. For example, there is no uniform worldwide policy regarding patentable subject matter or the scope of claims allowable in biotechnology and pharmaceutical patents. Consequently, patents may not issue from our pending patent applications. As such, we do not know the degree of future protection that we will have on our proprietary products and technology, if any, and a failure to obtain adequate intellectual property protection with respect to our product candidates and proprietary technology could have a material adverse impact on our business.

In addition, certain of our activities have been funded, and may in the future be funded, by the United States federal government. For example, the preclinical and early clinical development of the lead antibiotic product candidate in our former antibiotic program, which we are no longer developing, was funded under a contract with NIAID, an entity of the United States federal government. When new technologies are developed with United States federal government funding, the government obtains certain rights in any resulting patents, including a nonexclusive license authorizing the government to use the invention for non-commercial purposes. These rights may permit the government to disclose our confidential information to third parties and to exercise “march-in” rights to use or allow third parties to use our patented technology. The government can exercise its march-in rights if it determines that action is necessary because we fail to achieve practical application of the United States government-funded technology, or because action is necessary to alleviate health or safety needs, to meet requirements of federal regulations or to give preference to United States industry. In addition, United States government-funded inventions must be reported to the government and United States government funding must be disclosed in any resulting patent applications. In addition, our rights in such inventions are subject to certain requirements to manufacture products in the United States.

Issued patents covering one or more of our product candidates could be found invalid or unenforceable if challenged in court.

Despite measures we take to obtain patent and other intellectual property protection with respect to our product candidates and proprietary technology, any of our intellectual property rights could be challenged or invalidated. For example, if we were to initiate legal proceedings against a third party to enforce a patent covering one of our product candidates, the defendant could counterclaim that our patent is invalid and/or unenforceable. In patent litigation in the United States and in some other jurisdictions, defendant counterclaims alleging invalidity and/or unenforceability are commonplace. Grounds for a validity challenge could be an alleged failure to meet any of several statutory requirements, for example, lack of novelty, obviousness or non-enablement. Grounds for an unenforceability assertion could be an allegation that someone connected with prosecution of the patent withheld relevant information from the United States Patent and Trademark Office, or the applicable foreign counterpart, or made a misleading statement, during prosecution. Although we believe that we have conducted our patent prosecution in accordance with the duty of candor and in good faith, the outcome following legal assertions of invalidity and unenforceability during patent litigation is unpredictable. With respect to the validity question, for example, we cannot be certain that there is no invalidating prior art, of which we and the patent examiner were unaware during prosecution. If a defendant were to

prevail on a legal assertion of invalidity and/or unenforceability, we would lose at least part, and perhaps all, of the patent protection on a product candidate. Even if a defendant does not prevail on a legal assertion of invalidity and/or unenforceability, our patent claims may be construed in a manner that would limit our ability to enforce such claims against the defendant and others. Any loss of patent protection could have a material adverse impact on one or more of our product candidates and our business.

Enforcing our intellectual property rights against third parties may also cause such third parties to file other counterclaims against us, which could be costly to defend and could require us to pay substantial damages, cease the sale of certain products or enter into a license agreement and pay royalties (which may not be possible on commercially reasonable terms or at all). Any efforts to enforce our intellectual property rights are also likely to be costly and may divert the efforts of our scientific and management personnel.

Claims that our product candidates or the sale or use of our products infringe the patent or other intellectual property rights of third parties could result in costly litigation or could require substantial time and money to resolve, even if litigation is avoided.

Our commercial success depends upon our ability to develop, manufacture, market and sell our product candidates and use our proprietary technology without infringing the intellectual property rights of others. We cannot guarantee that our product candidates or any uses of our product candidates do not and will not in the future infringe third-party patents or other intellectual property rights. Third parties might allege that we or our collaborators are infringing their patent rights or that we have misappropriated their trade secrets, or that we are otherwise violating their intellectual property rights, whether with respect to the manner in which we have conducted our research or to the composition, use or manufacture of the compounds we have developed or are developing with our collaborators. Such third parties might resort to litigation against us or other parties we have agreed to indemnify, which litigation could be based on either existing intellectual property or intellectual property that arises in the future.

It is also possible that we failed to identify, or may in the future fail to identify, relevant patents or patent applications held by third parties that cover our product candidates. For example, applications filed before November 29, 2000 and certain applications filed after that date that will not be filed outside the United States remain confidential until patents issue. Other patent applications in the United States and several other jurisdictions are published approximately 18 months after the earliest filing for which priority is claimed, with such earliest filing date being commonly referred to as the priority date. Furthermore, publication of discoveries in the scientific or patent literature often lags behind actual discoveries. Therefore, we cannot be certain that we or our collaborators were the first to invent, or the first to file patent applications on, our product candidates or for their uses, or that our product candidates will not infringe patents that are currently issued or that are issued in the future. In the event that a third party has also filed a patent application covering one of our product candidates or a similar invention, we may have to participate in an adversarial proceeding, known as an interference, declared by the U.S. Patent and Trademark Office or its foreign counterpart to determine priority of invention. Additionally, pending patent applications which have been published can, subject to certain limitations, be later amended in a manner that could cover our products or their use.

In order to avoid or settle potential claims with respect to any patent or other intellectual property rights of third parties, we may choose or be required to seek a license from a third party and be required to pay license fees or royalties or both, which could be substantial. These licenses may not be available on acceptable terms, or at all. Even if we were able to obtain a license, the rights may be nonexclusive, which could result in our competitors gaining access to the same intellectual property. Ultimately, we could be prevented from commercializing a product, or be forced, by court order or otherwise, to cease some or all aspects of our business operations, if, as a result of actual or threatened patent or other intellectual property claims, we are unable to enter into licenses on acceptable terms. Further, we could be found liable for significant monetary damages as a result of claims of intellectual property infringement. For example, we have received, and may in the future receive, offers to license and demands to license from third parties claiming that we are infringing their intellectual property or owe license fees and, even if such claims are without merit, there can be no assurance that we will successfully avoid or settle such claims.

In addition, if AbbVie licenses or otherwise acquires rights to intellectual property controlled by a third party in various circumstances, for example, where a product could not be legally developed or commercialized in a country without the third-party intellectual property right, it is entitled under our collaboration agreement to decrease

payments payable to us on a product-by-product basis and, in certain cases, on a country-by-country basis. Any of the foregoing events could harm our business significantly.

Defending against claims of patent infringement, misappropriation of trade secrets or other violations of intellectual property rights could be costly and time consuming, regardless of the outcome. Thus, even if we were to ultimately prevail, or to settle at an early stage, such litigation could burden us with substantial unanticipated costs. In addition, litigation or threatened litigation could result in significant demands on the time and attention of our management team, distracting them from the pursuit of other company business. Claims that our product candidates or the sale or use of our future products infringe, misappropriate or otherwise violate third-party intellectual property rights could therefore have a material adverse impact on our business.

Unfavorable outcomes in intellectual property litigation could limit our research and development activities and/or our ability to commercialize certain products.

If third parties successfully assert their intellectual property rights against us, we might be barred from using certain aspects of our technology, or barred from developing and commercializing certain products. Prohibitions against using certain technologies, or prohibitions against commercializing certain products, could be imposed by a court or by a settlement agreement between us and a plaintiff. In addition, if we are unsuccessful in defending against allegations that we have infringed, misappropriated or otherwise violated patent or other intellectual property rights of others, we may be forced to pay substantial damage awards to the plaintiff. There is inevitable uncertainty in any litigation, including intellectual property litigation. There can be no assurance that we would prevail in any intellectual property litigation, even if the case against us is weak or flawed. If litigation leads to an outcome unfavorable to us, we may be required to obtain a license from the intellectual property owner in order to continue our research and development programs or to market any resulting product. It is possible that the necessary license will not be available to us on commercially acceptable terms, or at all. Alternatively, we may be required to modify or redesign our products in order to avoid infringing or otherwise violating third-party intellectual property rights. This may not be technically or commercially feasible, may render our products less competitive, or may delay or prevent the entry of our products to the market. Any of the foregoing could limit our research and development activities, our ability to commercialize one or more product candidates, or both.

Most of our competitors are larger than we are and have substantially greater resources. They are, therefore, likely to be able to sustain the costs of complex intellectual property litigation longer than we could. In addition, the uncertainties associated with litigation could have a material adverse effect on our ability to raise the funds necessary to conduct our clinical trials, continue our internal research programs, in-license needed technology, or enter into strategic partnerships that would help us bring our product candidates to market.

In addition, any future intellectual property litigation, interference or other administrative proceedings will result in additional expense and distraction of our personnel. An adverse outcome in such litigation or proceedings may expose us or any future strategic partners to loss of our proprietary position, expose us to significant liabilities, or require us to seek licenses that may not be available on commercially acceptable terms, if at all, each of which could have a material adverse effect on our business.

Intellectual property litigation may lead to unfavorable publicity that harms our reputation and causes the market price of our common stock to decline.

During the course of any intellectual property litigation, there could be public announcements of the results of hearings, rulings on motions, and other interim proceedings in the litigation. If securities analysts or investors regard these announcements as negative, the perceived value of our products, programs or intellectual property could be diminished. Accordingly, the market price of our common stock may decline. Such announcements could also harm our reputation or the market for our future products, which could have a material adverse effect on our business.

Confidentiality agreements with employees and third parties may not prevent unauthorized disclosure of trade secrets and other proprietary information.

In addition to patents, we rely on trade secrets, technical know-how and proprietary information concerning our business strategy and product candidates in order to protect our competitive position in the field of HCV, other antivirals and liver disease. In the course of our research and development activities and our business activities, we often rely on confidentiality agreements to protect our proprietary information. Such confidentiality agreements are used, for example, when we talk to vendors of laboratory or clinical development services or potential strategic

partners. In addition, each of our employees is required to sign a confidentiality agreement and invention assignment agreement upon joining our company. We take steps to protect our proprietary information, and our confidentiality agreements and invention assignment agreements are carefully drafted to protect our proprietary interests. Nevertheless, there can be no guarantee that an employee or an outside party will not make an unauthorized disclosure of our proprietary confidential information. This might happen intentionally or inadvertently. It is possible that a competitor will make use of such information, and that our competitive position will be compromised, in spite of any legal action we might take against persons making such unauthorized disclosures. In addition, to the extent that our employees, consultants or contractors use intellectual property owned by others in their work for us, disputes may arise as to the rights in related or resulting know-how and inventions.

Trade secrets are difficult to protect. Although we use reasonable efforts to protect our trade secrets, our employees, consultants, contractors, business partners or outside scientific collaborators might intentionally or inadvertently disclose our trade secret information to competitors or our trade secrets may otherwise be misappropriated. Enforcing a claim that a third party illegally obtained and is using any of our trade secrets is expensive and time consuming, and the outcome is unpredictable. In addition, courts outside the United States sometimes are less willing than United States courts to protect trade secrets. Moreover, our competitors may independently develop equivalent knowledge, methods and know-how.

Our collaborators may have rights to publish data and other information to which we have rights. In addition, we sometimes engage individuals or entities to conduct research relevant to our business. The ability of these individuals or entities to publish or otherwise publicly disclose data and other information generated during the course of their research is subject to certain contractual limitations. These contractual provisions may be insufficient or inadequate to protect our confidential information. If we do not apply for patent protection prior to such publication, or if we cannot otherwise maintain the confidentiality of our proprietary technology and other confidential information, then our ability to obtain patent protection or to protect our trade secret information may be jeopardized, which could adversely affect our business.

Intellectual property rights do not necessarily protect us from all potential threats to our competitive advantage.

The degree of future protection afforded by our intellectual property rights is uncertain because intellectual property rights have limitations, and may not adequately protect our business, or permit us to maintain our competitive advantage. The following examples are illustrative:

- others may be able to make compounds that are similar to our product candidates but that are not covered by the claims of the patents that we own or have exclusively licensed;
- we might not have been the first to make the inventions covered by the issued patents or pending patent applications that we own or may in the future exclusively license, which could result in the patent applications not issuing or being invalidated after issuing;
- we might not have been the first to file patent applications covering certain of our inventions, which could result in the patent applications not issuing or being invalidated after issuing;
- others may independently develop similar or alternative technologies or duplicate any of our technologies without infringing our intellectual property rights;
- it is possible that our pending patent applications will not lead to issued patents;
- issued patents that we own may not provide us with any competitive advantages, or may be held invalid or unenforceable, as a result of legal challenges by our competitors; we may obtain patents for certain compounds many years before we obtain marketing approval for products containing such compounds, and because patents have a limited life, which may begin to run prior to the commercial sale of the related product, the commercial value of our patents may be limited;
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our competitors might conduct research and development activities in countries where we do not have patent rights and then use the information learned from such activities to develop competitive products for sale in our major commercial markets;

- we may fail to develop additional proprietary technologies that are patentable;

- the laws of certain foreign countries may not protect our intellectual property rights to the same extent as the laws of the United States, or we may fail to apply for or obtain adequate intellectual property protection in all the jurisdictions in which we operate; and
- the patents of others may have an adverse effect on our business, for example by preventing us from marketing one or more of our product candidates for one or more indications.

Any of the aforementioned threats to our competitive advantage could have a material adverse effect on our business.

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

As is the case with many other biopharmaceutical companies, our success is heavily dependent on intellectual property, particularly patents. Obtaining, maintaining and enforcing patents in the biopharmaceutical industry involves both technological complexity and legal complexity. Therefore, the process of obtaining, maintaining and enforcing biopharmaceutical patents is costly, time-consuming and inherently uncertain. In addition, recent legislative and judicial developments in the United States and elsewhere have in some cases narrowed the protection afforded to patent owners, made patents more difficult to obtain, or increased the uncertainty regarding the ability to obtain, maintain and enforce patents. For example, Congress recently passed patent reform legislation, and may pass patent reform legislation in the future. The United States Supreme Court has ruled on several patent cases in recent years, and in certain circumstances has narrowed the scope of patent protection available or otherwise weakened the rights of patent owners. In addition to increasing uncertainty with regard to our ability to obtain patents in the future, this combination of events has created uncertainty with respect to the value of patents, once obtained. Depending on decisions and actions by the United States Congress, the federal courts, the United States Patent and Trademark Office, and their respective foreign counterparts, the laws and regulations governing patents could change in unpredictable ways that could weaken our ability to obtain new patents or to maintain and enforce our existing patents and patents that we might obtain in the future.

Risks Related to Our Industry

If product liability lawsuits are brought against us, we may incur substantial liabilities and may be required to limit commercialization of our product candidates.

We face an inherent risk of product liability as a result of the clinical testing of our product candidates, and we will face an even greater risk if we commercialize any product candidates. For example, we may be sued if any of our product candidates, including any that are developed in combination therapies, allegedly causes injury or is found to be otherwise unsuitable during product testing, manufacturing, marketing or sale. Any such product liability claims may include allegations of defects in manufacturing, defects in design, a failure to warn of dangers inherent in the product, negligence, strict liability and a breach of warranties. Claims could also be asserted under state consumer protection acts. If we cannot successfully defend ourselves against product liability claims, we may incur substantial liabilities or be required to limit commercialization of our product candidates. Even successful defense would require significant financial and management resources. There is also risk that third parties we have agreed to indemnify could incur liability.

Regardless of the merits or eventual outcome, liability claims may result in:

- decreased demand for our product candidates or any resulting products;
- injury to our reputation;
- withdrawal of clinical trial participants;
- costs to defend the related litigation;
- a diversion of management's time and our resources;

- substantial monetary awards to trial participants or patients;

- product recalls, withdrawals or labeling, marketing or promotional restrictions;
- loss of revenue;
- the inability to commercialize our product candidates; and
- a decline in our stock price.

Our inability to obtain and retain sufficient product liability insurance at an acceptable cost to protect against potential product liability claims could prevent or inhibit the commercialization of products we develop. We currently carry product liability insurance covering our clinical studies in the amount of $10.0 million in the aggregate. Although we maintain such insurance, any claim that may be brought against us could result in a court judgment or settlement in an amount that is not covered, in whole or in part, by our insurance or that is in excess of the limits of our insurance coverage. Our insurance policies also have various exclusions, and we may be subject to a product liability claim for which we have no coverage. We will have to pay any amounts awarded by a court or negotiated in a settlement that exceed our coverage limitations or that are not covered by our insurance, and we may not have, or be able to obtain, sufficient capital to pay such amounts.

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, 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.

Our relationships with customers and third-party payors in the United States and elsewhere will be subject to applicable anti-kickback, fraud and abuse and other healthcare laws and regulations, which could expose us to criminal sanctions, civil penalties, contractual damages, reputational harm and diminished profits and future earnings.

Healthcare providers, physicians and third-party payors in the United States and elsewhere play a primary role in the recommendation and prescription of any product candidates for which we obtain marketing approval. Our future arrangements with third-party payors and customers may expose us to broadly applicable fraud and abuse and other healthcare laws and regulations that may constrain the business or financial arrangements and relationships through which we market, sell and distribute our products for which we obtain marketing approval. Restrictions under applicable federal, state and foreign healthcare laws and regulations include the following:

- the federal healthcare anti-kickback statute prohibits, among other things, persons from knowingly and willfully soliciting, offering, receiving or providing remuneration, directly or indirectly, in cash or in kind, to induce or reward either the referral of an individual for, or the purchase, order or recommendation of, any good or service for which payment may be made under federal and state healthcare programs such as Medicare and Medicaid;
- the federal False Claims Act imposes criminal and civil penalties, including civil whistleblower or qui tam actions, against individuals or entities for knowingly presenting, or causing to be presented, to the federal government, claims for payment that are false or fraudulent or making a false statement to avoid, decrease or conceal an obligation to pay money to the federal government;
- the federal Health Insurance Portability and Accountability Act of 1996, as amended by the Health Information Technology for Economic and Clinical Health Act, imposes criminal and civil liability for executing a scheme to defraud any healthcare benefit program and also imposes obligations, including mandatory contractual terms, with respect to safeguarding the privacy, security and transmission of individually identifiable health information;
- the federal false statements statute prohibits knowingly and willfully falsifying, concealing or covering up a material fact or making any materially false statement in connection with the delivery of or payment for healthcare benefits, items or services;
- the federal transparency requirements under the Patient Protection and Affordable Care Act of 2010 requires manufacturers of drugs, devices, biologics and medical supplies to report to the Department of Health and Human Services information related to physician payments and other transfers of value and physician ownership and investment interests;
- analogous state laws and regulations, such as state anti-kickback and false claims laws, may apply to sales or marketing arrangements and claims involving healthcare items or services reimbursed by non-governmental third-party payors, including private insurers, and some state laws require pharmaceutical companies to comply with the pharmaceutical industry’s voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government in addition to requiring drug manufacturers to report information related to payments to physicians and other healthcare providers or marketing expenditures; and
- analogous anti-kickback, fraud and abuse and healthcare laws and regulations in foreign countries.

Efforts to ensure that our business arrangements with third parties will comply with applicable healthcare laws and regulations will involve substantial costs. It is possible that governmental authorities will conclude that our business practices may not comply with current or future statutes, regulations 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 and administrative penalties, damages, fines, exclusion from government funded healthcare programs, such as Medicare and Medicaid, and the curtailment or restructuring of our operations, which could have a material adverse effect on our business. If any of the physicians or other providers or entities with whom we expect to do business, including our collaborators, are found not to be in compliance with applicable laws, they may be subject to criminal, civil or administrative sanctions, including exclusions from government funded healthcare programs, which could also materially affect our business.

50

If we fail to comply with environmental, health and safety laws and regulations, we could become subject to fines or penalties or incur costs that could have a material adverse effect on the success of our business.

We are subject to numerous environmental, health and safety laws and regulations, including those governing laboratory procedures and the handling, use, storage, treatment and disposal of hazardous materials and wastes. Our operations involve the use of hazardous and flammable materials, including chemicals. Our operations also produce hazardous waste products. We generally contract with third parties for the disposal of these materials and wastes. We cannot eliminate the risk of contamination or injury from these materials. In the event of contamination or injury resulting from our use of hazardous materials or our or third parties' disposal of hazardous materials, we could be held liable for any resulting damages, and any liability could exceed our resources. We also could incur significant costs associated with civil or criminal fines and penalties.

We may incur substantial costs in order to comply with current or future environmental, health and safety laws and regulations. These current or future laws and regulations may impair our research, development or production efforts. Failure to comply with these laws and regulations also may result in substantial fines, penalties or other sanctions.

We maintain workers' compensation insurance to cover us for costs and expenses we may incur due to injuries to our employees resulting from the use of hazardous materials. This insurance may not provide adequate coverage against potential liabilities. We do not maintain insurance for environmental liability or toxic tort claims that may be asserted against us in connection with our storage or disposal of hazardous or radioactive materials.

Our insurance policies are expensive and only protect us from specified business risks, which will leave us exposed to significant uninsured liabilities.

We do not carry insurance for all categories of risk that our business may encounter. Some of the policies we currently maintain include general liability, employment practices liability, property, auto, workers' compensation, products liability and directors' and officers' insurance. We do not know, however, if we have adequate levels of coverage for any liability we may incur, or whether we will always be able to continue to maintain such insurance. Any significant uninsured liability may require us to make substantial payments, which would adversely affect our financial position and results of operations. Furthermore, any increase in the volatility of our stock price may result in us being required to pay substantially higher premiums for our directors' and officers' liability insurance than those to which we are currently subject and may even cause one or more of our underwriters to be unwilling to insure us.

Risks Related to Our Common Stock

Our stock price has been, and is likely to continue to be, volatile, and thus our stockholders could incur substantial losses.

Our stock price has been volatile and could be subject to wide fluctuations in response to various factors, many of which are beyond our control. Since our initial public offering in March 2013 and through November 1, 2018, the price of our common stock on the NASDAQ Global Select Market has ranged from $16.18 to $127.77. The stock market in general and the market for biopharmaceutical companies, and for those developing potential therapies for viral infections and liver diseases in particular, have experienced extreme volatility that has often been unrelated to the operating performance of particular companies. As a result of this volatility, you may not be able to sell your common stock at or above your purchase price, if at all. The market price for our common stock may be influenced by many factors, including:

- actions by AbbVie regarding HCV treatment regimens containing paritaprevir or the MAVYRET/MAVIRET regimen containing glecaprevir as approved in the U.S., EU and Japan, including announcements regarding clinical,

regulatory or commercial developments or our collaboration;

- market expectations about and response to the levels of sales or scripts achieved by, or the announced prices or discounts for, AbbVie's MAVYRET/MAVIRET regimen or competitive HCV drugs;

- failure of AbbVie's paritaprevir-containing HCV treatment regimens to maintain their sales levels or AbbVie's MAVYRET/MAVIRET regimen to achieve commercial success;
- results from or delays of clinical trials of our other product candidates, as well as results of regulatory reviews relating to the approval of our product candidates;
- new products, product candidates or new uses for existing products or technologies introduced or announced by our competitors and the timing of these introductions or announcements;
- the results of our efforts to discover or develop additional product candidates;
- our dependence on third parties, including our collaborators, CROs, manufacturers, clinical trial sponsors and clinical investigators;
- regulatory, political or legal developments in the United States or other countries;
- developments or disputes concerning patent applications, issued patents or other proprietary rights;
- the recruitment or departure of key scientific or management personnel;
- our ability to commercialize our product candidates we develop independently, if approved;
- the level of expenses related to any of our product candidates or clinical development programs;
- actual or anticipated changes in estimates as to financial results, development timelines or recommendations by securities analysts;
- period-to-period variations in our financial results or those of companies that are perceived to be similar to us;
- sales of common stock by us or our stockholders in the future, as well as the overall trading volume of our common stock;
- changes in the structure of healthcare payment systems or other actions that affect the effective reimbursement rates for treatment regimens containing our products or for competitive regimens;
- market conditions in the pharmaceutical and biotechnology sectors;
- general economic, industry and market conditions and other factors that may be unrelated to our operating performance or the operating performance of our competitors, including changes in market valuations of similar companies; and
- the other factors described in this "Risk Factors" section.

Provisions in our corporate charter documents and under Delaware law could make an acquisition of us, which may be beneficial to our stockholders, more difficult and may prevent attempts by our stockholders to replace or remove our current management.

Provisions in our corporate charter and our bylaws may discourage, delay or prevent a merger, acquisition or other change in control of us that stockholders may consider favorable, including transactions in which they might otherwise receive a premium for their shares.

These provisions could also limit the price that investors might be willing to pay in the future for shares of our common stock, thereby depressing the market price of our common stock. In addition, because our board of directors is responsible for appointing the members of our management team, these provisions may frustrate or prevent any attempts by our stockholders to replace or remove our current management by making it more difficult for stockholders to replace members of our board of directors. Among other things, these provisions:

- establish a classified or staggered board of directors such that not all members of the board are elected at one time;
- allow the authorized number of our directors to be changed only by resolution of our board of directors;
- limit the manner in which stockholders can remove directors from the board;

- establish advance notice requirements for stockholder proposals that can be acted on at stockholder meetings and nominations to our board of directors;
- require that stockholder actions must be effected at a duly called stockholder meeting and prohibit actions by our stockholders by written consent;
- limit who may call stockholder meetings;
- provide that the state courts or, in certain circumstances, the federal courts, in Delaware shall be the sole and exclusive forum for certain actions involving us, our directors, officers, employees and stockholders;
- provide our board of directors with the authority to designate the terms of and issue a new series of preferred stock without stockholder approval, which could be used to institute a "poison pill" that would work to dilute the stock ownership of a potential hostile acquirer, effectively preventing acquisitions that have not been approved by our board of directors; and
- require the approval of the holders of at least 66 2/3% of the votes that all our stockholders would be entitled to cast to amend or repeal certain provisions of our charter or bylaws.

Moreover, because we are incorporated in Delaware, we are governed by the provisions of Section 203 of the Delaware General Corporation Law, which prohibit a person who owns 15% or more of our outstanding voting stock from merging or combining with us for a period of three years after the date of the transaction in which the person acquired in excess of 15% of our outstanding voting stock, unless the merger or combination is approved in a prescribed manner. Any provision in our corporate charter or our bylaws or Delaware law that has the effect of delaying or deterring a change in control could limit the opportunity for our stockholders to receive a premium for their shares of our common stock, and could also affect the price that some investors are willing to pay for our common stock.

Our employment agreements with our executive officers may require us to pay severance benefits to any of those persons who are terminated in connection with a change of control of us, which could harm our financial condition or results.

Our executive officers are parties to employment agreements that provide for aggregate cash payments of up to approximately $4.6 million for severance and other non-equity-based benefits in the event of a termination of employment in connection with a change of control of our company. In addition, based on the closing price of our common stock as of September 30, 2018 of $85.46 per common share, the aggregate intrinsic value of unvested stock options and other equity awards subject to accelerated vesting upon these events was $35.8 million. The accelerated vesting of awards options could result in dilution to our stockholders and harm the market price of our common stock. The payment of these severance benefits could harm our company's financial condition and results. In addition, these potential severance payments may discourage or prevent third parties from seeking a business combination with us.

If we fail to maintain an effective system of internal control over financial reporting, we may not be able to accurately report our financial results or prevent fraud. As a result, stockholders could lose confidence in our financial and other public reporting, which would harm our business and the trading price of our common stock.

Effective internal controls over financial reporting are necessary for us to provide reliable financial reports and, together with adequate disclosure controls and procedures, are designed to prevent fraud. Any failure to implement newly required or improved controls, or difficulties encountered in their implementation, could cause us to fail to meet our reporting obligations. In addition, any testing by us conducted in connection with Section 404 of the Sarbanes-Oxley Act of 2002, or any subsequent testing by our independent registered public accounting firm, may reveal deficiencies in our internal controls over financial reporting that are deemed to be material weaknesses or that may require prospective or retroactive changes to our financial statements or identify other areas for further attention or improvement. Inferior internal controls could also cause investors to lose confidence in our reported financial information, which could have a negative effect on the trading price of our common stock.

53

Because we do not anticipate paying cash dividends on our common stock for the foreseeable future, investors in our common stock may never receive a return on their investment.

You should not rely on an investment in our common stock to provide dividend income. We do not anticipate that we will pay any cash dividends to holders of our common stock for the foreseeable future. Instead, we plan to retain any earnings to maintain and expand our existing operations.

Accordingly, investors must rely on sales of their common stock after price appreciation, which may never occur, as the only way to realize any return on their investment. As a result, investors seeking cash dividends should not invest in our common stock.

A sale of a substantial number of shares of our common stock in the public market could cause the market price of our common stock to drop significantly, even if our business is doing well.

Sales of a substantial number of shares of our common stock in the public market could occur at any time. These sales, or the perception in the market that the holders of a large number of shares intend to sell shares, could reduce the market price of our common stock. As of September 30, 2018, we had 19.4 million shares of common stock outstanding. In addition, as of September 30, 2018, 2.6 million and 0.2 million shares of common stock that are subject to outstanding options or restricted stock unit awards, respectively, under our outstanding equity plans are eligible for sale in the public market to the extent permitted by the provisions of various vesting schedules, and Rules 144 and 701 under the Securities Act. If these additional shares of common stock are sold, or it is perceived that they will be sold, in the public market, the trading price of our common stock could decline.

If securities or industry analysts do not publish research, or publish inaccurate or 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. If those analysts are unable to predict accurately the demand and net sales of AbbVie's HCV regimens, that could result in our reported revenues and earnings being lower than the so-called "market consensus" of our projected revenues, which could negatively affect our stock price. In addition, if too few securities or industry analysts cover our company, the trading price for our stock would likely be negatively impacted. In the event that one or more of the analysts who cover us downgrade our stock or publish inaccurate or unfavorable research about our business, our stock price would likely decline. If one or more of these analysts cease coverage of our company or fail to publish reports on us regularly, demand for our stock could decrease, which might cause our stock price and trading volume to decline.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None.

ITEM 2. PROPERTIES

Our corporate headquarters is located in Watertown, Massachusetts, where we lease approximately 49,000 square feet of office and laboratory space. The term of our current lease expires on September 1, 2022. We also lease additional office space located in Watertown, Massachusetts of approximately 18,000 square feet. The term of this lease expires August 1, 2024.

ITEM 3. LEGAL PROCEEDINGS

We are not a party to any material legal proceedings.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

PART II

ITEM 5. MARKET FOR THE COMPANY'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES

Market and Stockholder Information

Our common stock has been listed on The NASDAQ Global Select Market under the symbol "ENTA" since March 21, 2013. The following table shows the high and low sales price for our common stock as reported by The NASDAQ Global Select Market for the quarterly periods in the fiscal years ended September 30, 2018 and 2017:

	Fiscal 2018	
	High	Low
First Quarter	$59.88	$44.52
Second Quarter	$95.91	$52.39
Third Quarter	$122.43	$78.89
Fourth Quarter	$127.77	$81.24

	Fiscal 2017	
	High	Low
First Quarter	$34.53	$22.32
Second Quarter	$36.05	$27.72
Third Quarter	$37.54	$29.45
Fourth Quarter	$46.80	$33.42

As of November 1, 2018 there were 22 stockholders of record of our common stock, which excludes stockholders whose shares were held in nominee or street name by brokers.

We have never declared or paid cash dividends on our common stock, and we do not expect to declare or pay any cash dividends for the foreseeable future.

Performance Graph[(1)]

The following graph shows a comparison from September 30, 2013 through September 30, 2018 of cumulative total return on assumed investments of $100.00 in cash in each of our common stock, the NASDAQ Composite Index and the NASDAQ Biotechnology Index. Such returns are based on historical results and are not intended to suggest future performance. Data for the NASDAQ Composite Index and the NASDAQ Biotechnology Index assume reinvestment of dividends.

COMPARISON OF FIVE YEARS CUMULATIVE TOTAL RETURN

Among Enanta Pharmaceuticals, Inc., the NASDAQ Composite Index,

and the NASDAQ Biotechnology Index

(1) This performance graph shall not be deemed to be "soliciting material" or to be "filed" with the SEC for purposes of Section 18 of the Securities and Exchange Act of 1934, as amended, or otherwise subject to the liabilities under that Section, and shall not be deemed incorporated by reference into any filing of Enanta Pharmaceuticals, Inc. under the Securities Act of 1933, as amended.

ITEM 6. SELECTED CONSOLIDATED FINANCIAL DATA

We have derived the consolidated statements of operations data for the years ended September 30, 2018, 2017, and 2016 and the consolidated balance sheet data as of September 30, 2018 and 2017 from our audited financial statements included elsewhere in this Annual Report on Form 10-K. The selected statements of operations data for the years ended September 30, 2015 and 2014 and the balance sheet data as of September 30, 2016, 2015 and 2014 are derived from our audited financial statements not included in this Annual Report on Form 10-K. Our historical results for any prior period are not necessarily indicative of any results to be expected for any future period.

	Years Ended September 30,				
	2018	2017	2016	2015	2014
	(in thousands, except per share data)				
Consolidated Statements of Operations Data:					
Revenue	$206,625	$102,814	$88,268	$160,880	$47,741
Operating expenses:					
Research and development	94,856	57,451	40,461	23,189	18,740
General and administrative	23,441	20,749	16,966	13,543	10,016
Total operating expenses	118,297	78,200	57,427	36,732	28,756
Income from operations	88,328	24,614	30,841	124,148	18,985
Other income (expense), net	4,793	2,333	1,719	1,307	283
Net income before income taxes	93,121	26,947	32,560	125,455	19,268
Income tax (expense) benefit	(21,165)	(9,237)	(10,894)	(46,463)	15,170
Net income	$71,956	$17,710	$21,666	$78,992	$34,438
Net income per share:					
Basic	$3.74	$0.93	$1.14	$4.23	$1.88
Diluted	$3.48	$0.91	$1.13	$4.09	$1.80
Weighted average common shares outstanding:					
Basic	19,255	19,066	18,929	18,673	18,355
Diluted	20,650	19,407	19,224	19,295	19,185

	As of September 30,				
	2018	2017	2016	2015	2014
	(in thousands)				
Consolidated Balance Sheet Data:					
Cash, cash equivalents and marketable securities	$325,119	$293,707	$242,203	$209,443	$131,767
Working capital	364,364	216,837	224,267	163,937	103,229
Total assets	414,227	326,637	281,277	246,013	155,415
Capital lease obligation	379	458	531	598	—
Warrant liability	—	807	1,251	1,276	1,584
Series 1 nonconvertible preferred stock	1,628	762	159	163	202
Total stockholders' equity	393,679	301,676	269,936	236,157	148,654

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

You should read the following discussion and analysis of financial condition and results of operations together with the section entitled "Selected Consolidated Financial Data" and our consolidated financial statements and related notes included elsewhere in this Annual Report on Form 10-K. This discussion and other parts of this Annual Report on Form 10-K contain forward-looking statements that involve risks and uncertainties, such as statements regarding our plans, objectives, expectations, intentions and projections. Our actual results could differ materially from those discussed in these forward-looking statements. Factors that could cause or contribute to such differences include, but are not limited to, those discussed in the "Risk Factors" section of this Annual Report on Form 10-K.

Overview

We are a biotechnology company that uses our robust, chemistry-driven approach and drug discovery capabilities to create small molecule drugs primarily for the treatment of viral infections and liver diseases. We discovered glecaprevir, the second of two protease inhibitors discovered and developed through our collaboration with AbbVie for the treatment of chronic hepatitis C virus, or HCV. Glecaprevir is co-formulated as part of AbbVie's newest direct-acting antiviral (DAA) combination and marketed under the tradenames MAVYRET™ (U.S.) or MAVIRET™ (ex-U.S.) (glecaprevir/pibrentasvir). Our royalties from our AbbVie collaboration and our existing financial resources provide us funding to support our wholly-owned research and development programs, which are currently focused on the following disease targets:

- respiratory syncytial virus, or RSV, the most common cause of bronchiolitis and pneumonia in children under one year of age in the U.S., resulting in an estimated 57,000 to 125,000 hospitalizations each year in the U.S.;
- non-alcoholic steatohepatitis, or NASH, a liver disease estimated to affect approximately 1.5% to 6.5% of the population in the developed world (which is the equivalent of approximately 5 to 20 million individuals in the U.S. alone);
- primary biliary cholangitis, or PBC, a chronic liver disease that slowly destroys bile ducts in the liver, which affects an estimated 17,000 individuals in the U.S.; and
- hepatitis B virus, or HBV, the most prevalent chronic hepatitis, which is estimated to affect approximately 250 million individuals worldwide.

We had $325.1 million in cash, cash equivalents and marketable securities at September 30, 2018. In fiscal 2018, we earned $191.6 million in per-product royalties on AbbVie's net sales of its HCV regimens and we earned the remaining $15.0 million milestone payment from AbbVie upon reimbursement approval for MAVIRET™ in Japan. We expect our existing financial resources and future royalties from our AbbVie collaboration will allow us to continue to fund our wholly-owned research and development programs for the foreseeable future.

Our Wholly-Owned Programs

Our wholly-owned research and development programs are in virology, namely RSV and HBV, and in liver disease (non-virology), namely NASH and PBC:

- RSV: We discovered EDP-938, a potent N-protein inhibitor of activity of both major subgroups of RSV, referred to as RSV-A and RSV-B, and have tested it as our first clinical candidate for RSV. We believe EDP-938 is differentiated from fusion inhibitors currently in development for RSV because N-protein inhibitors directly target the viral replication process of RSV and have demonstrated high barriers to resistance against RSV in vitro.
  - In our fiscal 2018, we completed a Phase 1 clinical study demonstrating that EDP-938 was generally safe and well tolerated over a broad range of single and multiple doses with good pharmacokinetic data.

- We initiated a Phase 2a challenge study of EDP-938 in October 2018. The challenge study will test the effect of EDP-938 on healthy volunteers who will be infected with RSV and then treated with EDP-938 or placebo during the course of the study. Primary and secondary outcome measures include changes in viral load measurements and change of baseline symptoms.
- Preclinical data demonstrated that EDP-938 is a potent inhibitor of both RSV-A and RSV-B activity, maintaining antiviral activity post-infection while presenting a high barrier to resistance in vitro.

• NASH and PBC: We are working on multiple compounds that selectively bind to and activate the farnesoid X receptor, or FXR. We plan to develop these compounds, referred to as FXR agonists, for use in the treatment of NASH and PBC, both of which are liver diseases with very few therapeutic options. Our lead FXR agonist, EDP-305, represents a new class of FXR agonist designed to take advantage of increased binding interactions with the receptor. We believe this class is significantly different from other FXR agonists in clinical development.

- In October 2017, we announced results of a Phase 1a/b clinical study of EDP-305, which was generally safe and well tolerated over a broad range of single and multiple doses with pharmacokinetic data supporting once daily oral dosing. Additional data from this study were also presented at the 2018 NASH-TAG conference and the International Liver Congress™ (ILC) 2018. The study included 98 healthy volunteer subjects, or HV subjects, and 48 subjects who were obese and with or without pre-diabetes or type 2 diabetes, whom we refer to as subjects with presumptive non-alcoholic fatty liver disease, or PN subjects.
- We have presented data at the 2017 and 2018 annual meetings of the American Association for the Study of Liver Diseases (AASLD), the 2017 and 2018 NASH-TAG conferences and the 2017 and 2018 ILC conferences that demonstrated that EDP-305 is a highly selective FXR agonist and shows more potent activity in a variety of in vitro and in vivo NASH models compared to the most advanced NASH candidate in development today, obeticholic acid, or OCA.
- We initiated a Phase 2 clinical study, known as ARGON-1, of EDP-305 in NASH patients and a Phase 2 clinical study, known as INTREPID, of EDP-305 in PBC patients.
    - EDP-305 has been granted Fast Track designation by the U.S. Food and Drug Administration (FDA) for the treatment of NASH patients with liver fibrosis and separately for the treatment of PBC.
- In addition, we are pursuing research in other classes of FXR agonists as well as other mechanisms that may provide therapeutic benefit in NASH, any of which could be used in combination therapies for NASH.

• HBV: We also have a program to discover and develop new chemical entities for the treatment of HBV. Our initial focus is on core inhibitors, a mechanism with early clinical validation. In November 2018, we announced our first clinical candidate for HBV. EDP-514 is an HBV core inhibitor, also known as a core protein allosteric modulator, or CpAM, or capsid assembly modulator.

- EDP-514 was selected from our lead class of HBV compounds that are characterized by potent antiviral activity. In vitro, they are capable of preventing the establishment of cccDNA, are pan-genotypic, are active against known nucleos(t)ide resistant mutants, and are additive to synergistic with nucleoside analogs and other core inhibitors. Members of this class have also demonstrated excellent reduction in HBV titers in a chimeric mouse model with human liver cells.
- In addition, we are also seeking patent protection and conducting preclinical experiments with compounds we have discovered that use other mechanisms to target HBV. We believe that it may be necessary to utilize more than one compound/mechanism for the treatment of HBV and therefore we are pursuing multiple approaches.

We have utilized our internal chemistry and drug discovery capabilities to generate all of our development-stage programs.

Our Out-Licensed Products

Through our Collaborative Development and License Agreement with AbbVie, we have developed and out-licensed to AbbVie two protease inhibitor compounds that have been clinically tested, manufactured, and commercialized by AbbVie. To date, we have earned all $330.0 million milestone payments under the agreement related to clinical development and commercialization regulatory approvals of these regimens in major markets.

- Glecaprevir: Glecaprevir is the protease inhibitor we discovered that was developed by AbbVie in a fixed-dose combination with its NS5A inhibitor, pibrentasvir, for the treatment of HCV. This combination, currently marketed under the brand name MAVYRET™ (U.S.) and MAVIRET™ (ex-U.S.) and referred to in this report as MAVYRET/MAVIRET, is a novel, once daily, all oral, fixed-dose, ribavirin-free treatment for HCV genotypes 1-6, or GT1-6, which is referred to as being pan-genotypic. In the U.S., EU and Japan it was approved as an 8-week treatment for patients without cirrhosis and new to treatment. Today, these patients are estimated to represent the majority of HCV patients in developed country markets.

Since August 2017, substantially all of our royalty revenue has been derived from AbbVie's net sales of MAVYRET/MAVIRET. Our ongoing royalty revenues from this regimen consist of annually tiered, double-digit, per-product royalties (see Note 7 in Notes to Consolidated Financial Statements) on 50% of the calendar year net sales of the 2-DAA glecaprevir/pibrentasvir combination in MAVYRET/MAVIRET. These royalties are calculated separately from the royalties on other paritaprevir-containing regimens.

- Paritaprevir: Paritaprevir is the protease inhibitor contained in AbbVie's initial HCV treatment regimens sold under the tradenames VIEKIRAX® (ex-U.S.) and VIEKIRA PAK® (U.S.) (paritaprevir/ritonavir/ombitasvir/dasabuvir). These regimens are no longer being actively marketed in markets where MAVYRET/MAVIRET is approved and reimbursed. AbbVie's paritaprevir-containing regimens were first approved and sold in the U.S. in December 2014. Through our 2017 fiscal year end, our royalty revenues were generated substantially through worldwide net sales of these regimens.

Financial Operations Overview

We are currently funding all research and development for our wholly-owned programs, which are targeted towards the discovery and development of novel compounds for the treatment of viral infections and liver diseases. In fiscal 2018, we initiated two Phase 2 studies of EDP-305, one in PBC patients, known as the INTREPID study, and one in NASH patients, known as the ARGON-1 study. We also initiated a Phase 2a clinical study of our lead RSV candidate, EDP-938, in October 2018. In November 2018 we announced our selection of EDP-514 as our first candidate for HBV. As a result of these efforts as well as efforts to advance other compounds into substantial preclinical development, we increased our research and development expenses in fiscal year 2018, as compared to our fiscal year 2017. We expect to incur substantially greater expenses in fiscal 2019 as we continue to advance our FXR agonist program as well as our RSV and HBV programs.

We are funding our operations primarily through payments received under our collaboration agreement with AbbVie. Our revenue from our collaboration agreement has resulted in our reporting net income in each of our past seven fiscal years. Our revenue is dependent on royalty payments we receive from AbbVie on its sales of MAVYRET/MAVIRET.

For its MAVYRET/MAVIRET regimen, which in the majority of chronic HCV patients only requires 8 weeks of treatment compared to 12 weeks with VIEKIRA PAK® and other HCV regimens, AbbVie initially set a lower list price compared to its original HCV regimens and other HCV products on the market. In 2018, AbbVie has reported increasing MAVYRET/MAVIRET market share and has become the leading HCV treatment in the U.S. and several

market geographies in developed countries where it is approved. However, the market for HCV therapies remains very dynamic in several jurisdictions where MAVYRET/MAVIRET is already approved or AbbVie is seeking approval, and we cannot predict how that market will continue to evolve.

Given the uncertainty regarding the level of AbbVie's future MAVYRET/MAVIRET sales that will generate our royalty revenue and the development risks affecting the extent and timing of our future expenditures for the advancement of our internally developed compounds, it is uncertain whether we will continue to report net income in fiscal 2019 and thereafter.

Revenue

Our revenue is derived from our collaboration agreement with AbbVie. In our fiscal year ended September 30, 2016, we generated royalty revenue from AbbVie's net sales allocable to paritaprevir, which was part of AbbVie's initial treatment regimens for HCV approved in the U.S. in December 2014 and in the EU and dozens of other countries subsequently. Since then, AbbVie received approvals of its newest HCV regimen, MAVYRET/MAVIRET, in the U.S. and EU in the summer of 2017. Substantially all our royalty revenues are now derived from the MAVYRET/MAVIRET as this regimen generally has a shorter treatment duration (8-week treatment as approved in the EU, U.S. and Japan versus 12 weeks for paritaprevir and competitive regimens) and is pan-genotypic.

The following table is a summary of revenue recognized for the years ended September 30, 2018, 2017, and 2016:

	Years Ended September 30,		
	2018	2017	2016
	(in thousands)		
AbbVie agreement:			
Milestones	$15,000	$65,000	$30,000
Royalties	191,625	37,814	57,692
NIAID contract:	—	—	576
Total revenue	$206,625	$102,814	$88,268

AbbVie Agreement

Since all of our research obligations under the AbbVie agreement were concluded by June 30, 2011, all milestone payments received since then have been recognized as revenue upon achievement of each milestone by AbbVie. During the fiscal year ended September 30, 2018, we earned and recognized as revenue the last milestone payment for glecaprevir, which was a $15.0 million milestone payment upon AbbVie's achievement of commercialization regulatory approval of MAVIRET™ in Japan. During the fiscal year ended September 30, 2017, we earned and recognized as revenue a total of $65.0 million in milestone payments upon approval of the MAVYRET/MAVIRET regimen in the U.S. and EU. During the fiscal year ended September 30, 2016, we earned and recognized the last milestone payment for paritaprevir, a $30.0 million milestone payment, upon AbbVie's achievement of commercialization regulatory approval of its paritaprevir-containing regimen in Japan.

We currently receive annually tiered, double-digit royalties per protease inhibitor product on AbbVie's net sales allocable to either of our collaboration's protease inhibitor products. Under the terms of our AbbVie agreement, as amended in October 2014, 50% of AbbVie's net sales of MAVYRET/MAVIRET are allocated to glecaprevir. In the case of regimens containing paritaprevir, 30% of net sales of 3-DAA regimens containing paritaprevir and 45% of net sales of 2-DAA regimens containing paritaprevir are allocated to paritaprevir for purposes of calculating our annually tiered royalties. Beginning with each January 1, the cumulative net sales of each royalty-bearing product start at zero for purposes of calculating the tiered royalties on a product-by-product basis. For detail regarding the royalty tier, see Note 7 in Notes to Consolidated Financial Statements of this report which is incorporated herein by this reference.

We expect all of our revenue in 2019 to be generated from our collaboration agreement with AbbVie.

Internal Programs

As our internal product candidates are currently in preclinical or early clinical development, we have not generated any revenue from our own product sales and do not expect to generate any revenue from product sales derived from these product candidates for at least the next several years.

Operating Expenses

The following table summarizes our operating expenses for the years ended September 30, 2018, 2017, and 2016:

	Years Ended September 30,		
	2018	2017	2016
	(in thousands)		
Research and development	$94,856	$57,451	$40,461
General and administrative	23,441	20,749	16,966
Total operating expenses	$118,297	$78,200	$57,427

Research and Development Expenses

Research and development expenses consist of costs incurred to conduct basic research, such as the discovery and development of novel small molecules as therapeutics, as well as any external expenses of preclinical and clinical development activities. We expense all costs of research and development as incurred. These expenses consist primarily of:

- personnel costs, including salaries, related benefits and stock-based compensation for employees engaged in scientific research and development functions;
- third-party contract costs relating to research, formulation, manufacturing, preclinical study and clinical trial activities;
- laboratory consumables;
- allocated facility-related costs; and
- third-party license fees.

Project-specific expenses reflect costs directly attributable to our clinical development candidates and preclinical candidates nominated and selected for further development. Remaining research and development expenses are reflected in research and drug discovery, which represents early-stage drug discovery programs. At any given time, we typically have several active early stage research and drug discovery projects. Our internal resources, employees and infrastructure are not directly tied to any individual research or drug discovery project and are typically deployed across multiple projects. As such, we do not report information regarding costs incurred for our early-stage research and drug discovery programs on a project-specific basis. We expect that our research and development expenses will continue to increase in the future as we advance our RSV, NASH, PBC, and HBV programs.

Our research and drug discovery programs are at early stages; therefore, the successful development of our product candidates is highly uncertain and may not result in approved products. Completion dates and completion costs can vary significantly for each product candidate and are difficult to predict. Given the uncertainty associated with clinical trial enrollments and the risks inherent in the development process, we are unable to determine the duration and completion costs of the current or future clinical trials of our product candidates or if, or to what extent, we will generate revenue from the commercialization and sale of any of our product candidates. We anticipate that we will make determinations as to which development programs to pursue and how much funding to direct to each program on an ongoing basis in response to the preclinical and clinical success and prospects of each product candidate, as well as ongoing assessments of the commercial potential of each product candidate.

General and Administrative Expenses

General and administrative expenses consist primarily of personnel costs, which include salaries, related benefits and stock-based compensation, of our executive, finance, business and corporate development and other administrative

functions. General and administrative expenses also include travel expenses, allocated facility-related costs not otherwise included in research and development expenses, directors and officers liability insurance premiums, and professional fees for auditing, tax, and legal services and patent expenses.

We expect that general and administrative expenses will increase in the future primarily due to ongoing expansion of our operating activities in support of our own research and development programs, as well as potential additional costs associated with operating a growing publicly traded company.

Other Income (Expense)

Other income (expense) consists of interest income, interest expense and the change in fair value of our outstanding Series 1 nonconvertible preferred stock and, during the periods the Series 1 nonconvertible preferred stock warrants were outstanding, the change in fair value of our warrant liability. Interest income consists of interest earned on our cash equivalents and short-term and long-term marketable securities balances as well as interest earned for any refunds received from tax authorities. Interest expense consists of interest expense related to our capital lease obligation. The change in fair value of our Series 1 nonconvertible preferred stock (and warrant liability when the warrants were outstanding) relates to the remeasurement of these financial instruments from period to period as these instruments may require a transfer of assets because of the liquidation preference features of the underlying stock. The change in fair value also includes the forfeiture of unexercised warrants which expired on October 4, 2017.

Income Tax Expense

Income tax expense for the years ended September 30, 2018, 2017, and 2016 resulted from federal and state taxes attributable to our operating income.

Critical Accounting Policies

Our consolidated financial statements are prepared in accordance with accounting principles generally accepted in the United States of America. The preparation of our consolidated financial statements and related disclosures requires us to make estimates and assumptions that affect the reported amount of assets, liabilities, revenue, costs and expenses, and related disclosures. We believe that the estimates and assumptions involved in the accounting policies described below may have the greatest potential impact on our consolidated financial statements and, therefore, consider these to be our critical accounting policies. We evaluate our estimates and assumptions on an ongoing basis. Actual results may differ from these estimates under different assumptions and conditions. See also Note 2 to the consolidated financial statements included elsewhere in this Annual Report on Form 10-K for information about these critical accounting policies as well as a description of our other significant accounting policies.

Revenue Recognition

Our revenue has been generated primarily through collaborative research and license agreements. The terms of these agreements contain multiple deliverables which may include (i) licenses, (ii) research and development activities, and (iii) participation in joint research and development steering committees. The terms of these agreements may include nonrefundable upfront license fees, payments for research and development activities, payments based upon the achievement of certain milestones, and royalty payments based on product sales derived from the collaboration. The majority of revenue is derived under our agreement with AbbVie. Under this agreement, we have no ongoing deliverables and therefore, royalties and milestones received under this arrangement are recognized when earned. In all instances, revenue is recognized only when the price is fixed or determinable, persuasive evidence of an arrangement exists, delivery has occurred or the services have been rendered, collectibility of the resulting receivable is reasonably assured, and we have fulfilled our performance obligations under the contract.

We apply Accounting Standards Codification No. 605-25, Revenue Recognition Multiple-Deliverable Revenue Arrangements, or ASC 605-25, for multiple element arrangements entered into or materially modified on or after October 1, 2011. The selling prices of deliverables under the arrangement may be derived using third-party evidence, (“TPE”) or a best estimate of selling price (“BESP”), if vendor-specific objective evidence (“VSOE”), is not available. The objective of BESP is to determine the price at which we would transact a sale if the element within the license agreement was sold on a standalone basis. Establishing BESP involves management’s judgment and considers multiple factors, including market conditions and company-specific factors such as those factors contemplated in negotiating

the agreements as well as internally developed models that include assumptions related to market opportunity, discounted cash flows, estimated development costs, probability of success, and the time needed to commercialize a product candidate pursuant to the license. In validating our BESP, we consider whether changes in key assumptions used to determine the BESP will have a significant effect on the allocation of the arrangement consideration between the multiple deliverables. Deliverables under a multiple element arrangement are separated into multiple units if (i) the delivered item has value to the customer on a standalone basis and (ii) if

the arrangement includes a general right of return relative to the delivered item, delivery or performance of the undelivered item is considered probable and substantially within our control. In determining the separate units of accounting, we evaluate whether the license has standalone value to the collaborator based on consideration of the relevant facts and circumstances for each arrangement. Factors considered in this determination include the research and development capabilities of the collaborator and the availability of relevant research expertise in the marketplace. In addition, we consider whether or not (i) the collaborator can use the license for its intended purpose without the receipt of the remaining deliverables, (ii) the value of the license is dependent on the undelivered items, and (iii) the collaborator or other vendors can provide the undelivered items. We may exercise significant judgment in determining whether a deliverable is a separate unit of accounting. The arrangement consideration that is fixed or determinable at the inception of the arrangement is allocated to the separate units of accounting based on their relative selling prices. The appropriate revenue recognition model is applied to each element and revenue is accordingly recognized as each element is delivered.

Royalty revenue is recognized based on contractual terms when reported sales are reliably measurable and collectibility is reasonably assured, provided that there are no performance obligations remaining.

During the year ended September 30, 2016, we also generated revenue from a government contract under which we were reimbursed for certain allowable costs incurred for the funded project. Revenue from the government contract was recognized when the related service was performed. The related costs incurred by us under the government contract were included in research and development expense in the consolidated statements of operations. This contract was completed in August 2015.

Amounts received prior to satisfying all revenue recognition criteria are recorded as deferred revenue in the accompanying consolidated balance sheets. Amounts not expected to be recognized as revenue within the next twelve months of the consolidated balance sheet date are classified as long-term deferred revenue.

In the event that a collaborative research and license agreement is terminated and we then have no further performance obligations, we recognize as revenue any amounts that had not previously been recorded as revenue but were classified as deferred revenue at the date of such termination.

Stock-Based Compensation - Stock Options and Restricted Stock Unit Awards

We measure stock awards with service-based conditions granted to employees and directors at fair value on the date of grant and recognize the corresponding stock-based compensation expense of those awards over the requisite service period, which is generally the vesting period of the respective award. Stock awards granted with service-based vesting conditions, which include restricted stock units and stock options, are recorded as an expense using the straight-line method. In the case of performance-based options, we recognize stock-based compensation expense related to these awards when achievement of the underlying research and development performance-based targets become probable, which have typically been in the same period as when the targets are achieved.

The fair value of each restricted stock unit granted is based on the fair value of our common stock on the date of grant. The fair value of each stock option award is estimated on the date of grant using the Black-Scholes option-pricing model. We only grant stock options with exercise prices equivalent to the fair value of our common stock on the date of grant. Generally, our expected volatility has been measured based on a combination of our historical stock volatility since our March 2013 IPO and the historical volatility of our publicly traded peer companies. We expect in fiscal 2019 to solely utilize our historical stock volatility as we will have adequate historical data regarding the volatility of our traded stock price following our March 2013 IPO. The expected term of our options has been determined utilizing the "simplified" method for awards that qualify as "plain-vanilla" options. The risk-free interest rate is determined by reference to the U.S. Treasury yield curve in effect at the time of grant of the award for time periods approximately

equal to the expected term of the award. Our expected dividend yield is 0 and is based on the fact that we have never paid cash dividends and do not expect to pay any cash dividends in the foreseeable future.

We recognize stock-based compensation expense for only the portion of awards that vest. We recognize actual pre-vesting forfeitures for service-based options as they occur.

These assumptions represent our best estimates, but the estimates involve inherent uncertainties and the application of our judgment. As a result, if factors change and we use significantly different assumptions or estimates, our stock-based compensation expense could be materially different.

Stock-Based Compensation - Market and Performance-based Stock Unit Awards

In addition to awards with service-based vesting conditions, we also have granted performance share units, or PSUs, and relative total stockholder return units, or rTSRUs, to certain of our executives. The number of units represents the target number of shares of common stock that may be earned; however, the actual number of shares that may be earned ranges from 0% to 200% or 0% to 150% of the target number, depending on the terms of the award. The fair value of PSUs is based on the fair value of our common stock on the date of grant. The fair value of rTSRUs is based on a Monte Carlo simulation model. Assumptions and estimates utilized in the calculation of the fair value of the rTSRUs include the risk-free interest rate, dividend yield, average closing price, expected volatility based on the historical volatility of publicly traded peer companies and the remaining performance period of the award.

The PSUs vest and result in issuance, at settlement, of common shares for each recipient based upon the recipient's continued employment with us through the settlement date of the award and our achievement of specified research and development milestones. The requisite service period of the PSUs is generally 2 years. In the case of PSUs, we recognize stock-based compensation expense based on the grant date fair value of the award when achievement of the underlying research and development performance-based targets become probable, which have typically been in the same period as when the targets are achieved.

The rTSRUs vest and result in the issuance of common stock based upon the recipient's continuing employment with us through the settlement date of the award and the relative ranking of the total stockholder return, or TSR, of our common stock in relation to the TSR of the component companies in the NASDAQ Biotech Index, generally over a two-year period based on a comparison of average closing stock prices in specified periods noted in the award agreement. The fair value related to the rTSRUs is recorded as stock-based compensation expense over the period from date of grant to the settlement date regardless of whether the related target relative total stockholder return is achieved.

Research and Manufacturing Contract Accruals

We have entered into various research and development and manufacturing contracts. These agreements are generally cancelable, and related payments are recorded as the corresponding expenses are incurred. We record accruals for estimated ongoing costs. When evaluating the adequacy of the accrued liabilities, we analyze progress of the research and development and manufacturing activities, including the phase or completion of events, invoices received and contracted costs. Significant judgments and estimates are made in determining the accrued balances at the end of any reporting period. Actual results could differ from our estimates. Our historical accrual estimates have not been materially different from the actual costs.

Income Taxes

Income taxes are provided for tax effects of transactions reported in the consolidated financial statements and consist of income taxes currently due plus deferred income taxes related to timing differences between the basis of certain assets and liabilities for financial statement reporting purposes and the basis for income tax reporting purposes. Deferred taxes are determined based on the difference between the financial reporting and tax basis of assets and liabilities using enacted tax rates in effect in the years in which the differences are expected to reverse. Changes in deferred tax assets and liabilities are recorded in the provision for income taxes.

A valuation allowance is provided if, based upon the weight of available evidence, it is more likely than not that some or all of the deferred tax assets will not be realized. At each balance sheet date, we assess the likelihood that deferred tax assets will be realized and recognize a valuation allowance if it is more likely than not that some portion of the deferred tax assets will not be realized. Assessment of the potential recovery of deferred tax assets requires judgment

and is evaluated by estimating the future taxable income expected and considering prudent and feasible tax planning strategies. As of September 30, 2018, we continue to believe it is more likely than not that we will be able to realize our deferred tax assets and therefore no valuation allowance has been recorded.

Uncertain tax positions represent tax positions for which reserves have been established. We account for uncertainty in income taxes recognized in the consolidated financial statements by applying a two-step process to determine the amount to be recognized. First, the tax position must be evaluated to determine the likelihood that it will be sustained upon external examination by the taxing authorities. If the tax position is deemed more likely than not to

be sustained, the tax position is then assessed to determine the amount to be recognized in the financial statements. The amount that may be recognized is the largest amount that has a greater than 50% likelihood of being realized upon ultimate settlement. Income tax expense includes the effects of any resulting tax reserves, or unrecognized tax benefits, that are considered appropriate as well as the related net interest and penalties.

Results of Operations

Comparison of Years Ended September 30, 2018, 2017, and 2016

	Years Ended September 30,		
	2018	2017	2016
	(in thousands)		
Revenue	$206,625	$102,814	$88,268
Research and development	94,856	57,451	40,461
General and administrative	23,441	20,749	16,966
Other income (expense):			
Interest income (expense), net	4,852	2,492	1,690
Change in fair value of warrant liability and Series 1 nonconvertible preferred stock, net	(59)	(159)	29
Income tax expense	(21,165)	(9,237)	(10,894)

Revenue. We recognized revenue of $206.6 million during the year ended September 30, 2018, as compared to $102.8 million during the year ended September 30, 2017. The increase in revenue of $103.8 million year-over-year was due to increased royalties of $153.8 million earned under our AbbVie agreement as a result of the launch of MAVYRET/MAVIRET in late 2017, which was partially offset by lower milestone revenue earned in fiscal 2018 under our AbbVie agreement based on timing of milestone payments earned for MAVYRET/MAVIRET commercialization regulatory approvals. During the years ended September 30, 2018 and 2017, we recognized royalty revenue of $191.6 million and $37.8 million, respectively. Substantially all of our royalties earned in fiscal 2018 were related to royalties earned on the portion of AbbVie's net sales of MAVRYET/MAVIRET. Our fiscal 2017 royalties were primarily based on royalties earned on the portion of AbbVie's net sales of paritaprevir-containing regimen, which carry a lower royalty allocation rate compared to MAVYRET/MAVIRET. MAVYRET/MAVIRET has become a leading HCV treatment in the U.S. and the countries where it is approved and has resulted in our cumulative annual royalties earned in calendar 2018 reaching the 17% royalty tier per our calendar year royalty rate schedule under our agreement with AbbVie.

We recognized revenue of $102.8 million during the year ended September 30, 2017 compared to $88.3 million during the year ended September 30, 2016. In fiscal 2017, we earned and received milestone payments totaling $65.0 million as a result of commercialization regulatory approvals for MAVYRET/MAVIRET in the EU and U.S. In early fiscal 2016, we earned and received a $30.0 million milestone payment as a result of commercialization regulatory approval for AbbVie's paritaprevir-containing regimen in Japan. We earned royalties of $37.8 million and $57.7 million during the years ended September 30, 2017 and 2016, respectively, primarily based on the portion of AbbVie's net sales of its HCV regimens allocable to paritaprevir. We recognized lower royalty revenue in 2017 compared to 2016 due to lower sales of paritaprevir-containing regimens as a result of increased competition from other HCV products on the market. We began earning royalties on the portion of AbbVie's net sales of glecaprevir-containing

regimens in the fourth quarter of fiscal 2017.

Our royalty revenues eligible to be earned in the future will be dependent on AbbVie's HCV market share, the pricing of the MAVYRET/MAVIRET regimen and the number of patients treated. In addition, at the beginning of each calendar year (the second quarter of our fiscal year), our royalty rates reset to the lowest tier for each of our royalty-bearing products licensed to AbbVie. (See Note 7 to our consolidated financial statements for further details on our royalty rate tier.)

Research and development expenses.

	Years Ended September 30,		
	2018	2017	2016
	(in thousands)		
R&D programs:			
Liver disease	$54,691	$34,750	$17,840
Virology	40,047	22,399	21,692
Other	118	302	929
Total research and development expenses	$94,856	$57,451	$40,461

Research and development expense increased by $37.4 million for the year ended September 30, 2018 as compared to the same period in 2017. The increase was primarily due to progression of preclinical and clinical activities in our liver disease and virology programs. In fiscal 2018 we initiated two Phase 2 studies of EDP-305 and advanced other compounds in preclinical development in our liver program. In fiscal 2018 we completed a Phase 1 clinical study of EDP-938 and prepared for a Phase 2a challenge study of EDP-938, which we initiated in October 2018, in our virology program. In November 2018, we announced our first clinical candidate for HBV, also in our virology program. Increases in our research and development expenses were driven by an increase in headcount to support our programs and an increase in external costs for clinical and preclinical activities.

Research and development expenses increased by $17.0 million for the year ended September 30, 2017 as compared to the same period in 2016. The increase was primarily due to progression of preclinical and clinical activities in our liver disease and virology programs. Increases were driven by an increase in headcount to support our preclinical activities, expansion of our research facility and an increase in external costs for clinical and preclinical activities.

We expect that our research and development expenses will continue to increase in the future as we advance our RSV, NASH, PBC and HBV programs.

General and administrative expenses. General and administrative expenses increased by $2.7 million for the year ended September 30, 2018 as compared to the same period in 2017. The increase was primarily due to an increase in compensation expense due to increased headcount and to a lesser extent an increase in external accounting and consulting fees.

General and administrative expenses increased by $3.8 million for the year ended September 30, 2017 as compared to the same period in 2016. The increase was primarily due to an increase in compensation expense due to increased headcount as well as the achievement of milestones in 2017 under existing performance-based stock unit awards in 2017.

We expect our general and administrative expenses will continue to increase in the future as our operations grow to support further research and development

Other income (expense). Changes in components of other income (expense) were as follows:

Interest income (expense), net. Interest income (expense), net, increased by $2.4 million for the year ended September 30, 2018 as compared to the same period in 2017, primarily due to higher average investment balances in 2018 as a result of receipt of significant milestones and royalties in 2018 under our AbbVie agreement and an increase in interest rates for fiscal 2018 as compared to the same period in 2017.

Interest income (expense), net, increased by $0.8 million for the year ended September 30, 2017 as compared to the same period in 2016 primarily due to higher average investment balances in fiscal 2017 as compared to the same period in 2016.

Change in fair value of warrant liability and Series 1 nonconvertible preferred stock. We recognized other expense of $0.1 million and expense of $0.2 million for the years ended September 30, 2018 and 2017, respectively. We recognized expense in fiscal 2018 due to the increase in fair value of outstanding Series 1 nonconvertible preferred

stock year over year, offset by the expiration of unexercised warrants outstanding as of October 4, 2017. We recognized expense in our fiscal 2017 due to an increase in fair value of the outstanding liabilities year over year and income in our fiscal 2016 due to a decrease in fair value of the outstanding liabilities year over year.

Income tax expense. Income tax expense was $21.2 million and $9.2 million for the years ended September 30, 2018 and 2017, respectively. The effective tax rates for the years ended September 30, 2018 and 2017 were 22.7% and 34.3%, respectively. The increase in income tax expense was primarily due to an increase in income before income taxes as a result of an increase in royalties earned under our AbbVie agreement year over year as well as a revaluation adjustment against deferred tax assets due to a decrease in the federal corporate income tax rate as enacted under the U.S. Tax Cuts and Jobs Act (the "Tax Act") in December 2017. The decrease in the effective tax rate was primarily due to the enactment of the Tax Act in December 2017, which decreased the U.S. federal statutory rate from 35.0% to 21.0%, as well as an increase in federal research and development tax credits as part of our advancement of our wholly-owned research and development programs and tax benefits from stock option exercises and restricted stock units vesting during 2018.

Estimates used to prepare our 2018 income tax expense are based on our analysis of the Tax Act. Given the complexity of the Tax Act, anticipated guidance from the U.S. Treasury regarding implementation of the act, and potential for guidance from the Securities and Exchange Commission or the Financial Accounting Standards Board related to the act, these estimates may be adjusted during our fiscal 2019 to reflect any such guidance provided.

Income tax expense was $9.2 million and $10.9 million for the years ended September 30, 2017, and 2016, respectively. The effective tax rates for the years ended September 30, 2017 and 2016 were 34.3%, and 33.5%, respectively. The decrease in income tax expense was primarily due to lower income before income taxes as well as an increase in federal research and development tax credits which were deductible for tax purposes. The increase in the effective tax rate was primarily due to an increase in non-deductible stock-based compensation expense but was partially offset by an increase in federal research and development credits as part of our advancement of our wholly-owned research and development programs in 2017.

Income tax expense for all periods presented was attributable to the tax provision on the earnings of our operations, all of which are domestic.

Liquidity and Capital Resources

During fiscal 2018, 2017 and 2016, we funded our operations with cash flows generated from operations. At September 30, 2018, our principal sources of liquidity were cash and cash equivalents and marketable securities of $325.1 million.

The following table shows a summary of our cash flows for each of the years ended September 30, 2018, 2017, and 2016:

	Years Ended September 30,		
	2018	2017	2016
	(in thousands)		
Cash provided by (used in):			
Operating activities	$29,220	$52,653	$35,809
Investing activities	(35,402)	(4,572)	(43,663)
Financing activities	4,409	1,017	2,705

Net increase (decrease) in cash and cash equivalents	$(1,773)	$49,098	$(5,149)

Net cash provided by operating activities

Cash provided by operating activities was $29.2 million for the year ended September 30, 2018 as compared to $52.7 million for the same period in 2017. The decrease in cash provided by operating activities was primarily driven by an increase in accounts receivable due to the timing of payments received under our collaboration with AbbVie and by increased tax payments, partially offset by increased net income year-over-year.

The increase in cash provided by operating activities of $16.8 million for the year ended September 30, 2017 as compared to the same period in 2016 was primarily driven by a $15.9 million increase in cash receipts under our collaboration with AbbVie. We received $105.1 million in cash from AbbVie during 2017, including royalties and $65.0 million in milestone payments, compared to $89.2 million in cash during 2016, including royalties and a $30.0 million milestone payment. In addition, our taxes paid, net of refunds received, decreased by $17.5 million, due to lower profit before tax and timing of tax payments and refunds. These increases were partially offset by increased cash spending on research and development during 2017 in order to progress clinical development and preclinical research in our proprietary programs.

Net cash used in investing activities

The increase in cash used in investing activities of $30.8 million for the year ended September 30, 2018 as compared to the same period in 2017 was driven by timing of purchases, sales and maturities of marketable securities.

The decrease in cash used in investing activities of $39.1 million for the year ended September 30, 2017 as compared to the same period in 2016 was driven by timing of purchases, sales and maturities of marketable securities. In addition, our capital asset outlay decreased by $2.2 million year over year due to the expansion of our research facility which was completed in fiscal 2016.

Net cash provided by financing activities

The increase in cash provided by financing activities of $3.4 million for the year ended September 30, 2018 as compared to the same period in 2017 was driven primarily by an increase in proceeds from stock option exercises as a result of the increase in the price of our common stock year over year and was partially offset by an increase in tax withholding payments for the vesting of performance-based stock unit awards in 2018.

The decrease in cash provided by financing activities of $1.7 million for the year ended September 30, 2017 as compared to the same period in 2016 was driven primarily by tax withholding payments for the vesting of performance-based stock unit awards in 2017 and a lower income tax benefit from stock options exercised in fiscal 2017 as compared to fiscal 2016.

Funding Requirements

As of September 30, 2018, we had $325.1 million in cash, cash equivalents and short-term and long-term marketable securities. We believe that our existing cash, cash equivalents and marketable securities as of September 30, 2018 will be sufficient to meet our anticipated cash requirements for the foreseeable future. However, our forecast of the period of time through which our financial resources will be adequate to support our operations is a forward-looking statement that involves risks and uncertainties, and actual results could vary materially.

Our future capital requirements are difficult to forecast and will depend on many factors, including:

- the amount of royalties generated from our existing collaboration with AbbVie;

- the number and characteristics of the future product candidates we pursue;
- the scope, progress, results and costs of researching and developing any of our product candidates on our own, including conducting advanced clinical trials;
- the cost of manufacturing our product candidates and any products we successfully commercialize independently, including manufacturing for clinical development;

- opportunities to in-license or otherwise acquire new technologies, therapeutic candidates and therapies;
- the timing and amount of royalties and any sales of our product candidates, if any, or royalties thereon;
- the timing of, and the costs involved in, obtaining regulatory approvals for any product candidates we develop independently;
- the cost of commercialization activities, if any, of any product candidates we develop independently that are approved for sale, including marketing, sales and distribution costs;
- our ability to establish new collaborations, licensing or other arrangements, if any, and the financial terms of such agreements; and
- the costs involved in preparing, filing, prosecuting, maintaining, defending and enforcing patents, including any litigation costs and the outcomes of any such litigation.
- potential fluctuations in foreign currency exchange rates;

We do not believe that inflation had a material effect on our business, financial condition or results of operations in the last three fiscal years. If our costs were to become subject to significant inflationary pressures, we could not offset such higher costs through revenue increases because our revenues are substantially outside of our control. Our inability to do so could harm our business, financial condition and results of operations.

Off-Balance Sheet Arrangements

We do not engage in any off-balance sheet financing activities. We do not have any interest in entities referred to as variable interest entities, which include special purpose entities and other structured finance entities.

Recently Issued Accounting Pronouncements

A description of recently issued accounting pronouncements that may potentially impact our financial position and results of operations is set forth in Note 2 to the consolidated financial statements included in this Annual Report on Form 10-K.

Contractual Obligations and Commitments

We lease space in Watertown, Massachusetts under two separate lease agreements.

The first lease, located at 500 Arsenal Street, commenced on October 1, 2011 and was amended in 2015 to expand the rented space and extend the lease term through September 2022. This lease is for office and laboratory space. In conjunction with the amendment of the lease, the Company entered into a capital lease agreement to fund certain leasehold improvements and the purchase of lab equipment.

The second lease, located at 400 Talcott Ave, commenced on September 24, 2018 for office space and extends through August 1, 2024. The Company estimates it will spend approximately $2.0 million in tenant and capital improvements to the space during fiscal 2019.

The following table summarizes our contractual obligations at September 30, 2018 and the effect such obligations are expected to have on our liquidity and cash flow in future periods:

	Payments Due by Period				
	Less than 1 year	1-3 years	3-5 years	More than 5 years	Total
	(in thousands)				
Operating leases	$2,209	$5,531	$3,292	$519	$11,551
Capital leases	86	194	99	—	379
Total contractual commitments and obligations	$2,295	$5,725	$3,391	$519	$11,930

As of September 30, 2018, we had 1.9 million outstanding shares of Series 1 nonconvertible preferred stock, all of which we classified as long-term liabilities on our consolidated balance sheet and recorded at fair value of $1.6 million. The fair value of the preferred stock was measured based on significant inputs not observable in the market, which represented a Level 3 measurement within the fair value hierarchy. The fair value of these instruments represents less than 10% of liabilities measured at fair value as of September 30, 2018. The Series 1 nonconvertible preferred stock issued would require the payment of $2.0 million in the event of a qualifying merger or sale of the company. The table above does not include this liability because we are unable to estimate the timing of this required payment, or if it will be required at all.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Interest Rate Risk

We had cash, cash equivalents and marketable securities of $325.1 million at September 30, 2018, which consisted of cash, money market funds, agency securities, commercial paper, treasury notes and corporate bonds. Interest income is sensitive to changes in the general level of interest rates; however, due to the nature of these investments, a change in market interest rates of 100 basis points would not be expected to have a material impact on our financial condition or results of operations. Other than our capital lease obligation, we had no debt outstanding as of September 30, 2018.

Foreign Exchange Risk

As we continue to progress our wholly-owned programs into clinical development we will conduct clinical trials outside of the U.S. and thus will face exposure to movements in foreign currency exchange rates, primarily the British Pound and Euro, against the U.S. Dollar, arising from our accounts payable and accrued expenses. During fiscal 2018, the impact of foreign currency exposure was immaterial and thus did not have a significant impact on our consolidated financial statements. In fiscal 2019, we expect to face increasing exposure to the British Pound as we conduct our Phase 2a challenge study of EDP-938 in the U.K. However, based on our current contractual commitments outside of the U.S., we estimate that a change of 10% in foreign currency exchange rates would not materially affect our operations. Our operations may become subject to more significant fluctuations in foreign currency exchange rates in the future if we continue to contract with vendors outside of the U.S.

ITEM 8. CONSOLIDATED FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

Our consolidated financial statements, together with the report of our independent registered public accounting firm, appear on pages F-1 through F-32 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

We maintain disclosure controls and procedures that are designed to ensure that information required to be disclosed in the Company's reports under the Securities Exchange Act of 1934, as amended (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 management, including our Chief Executive Officer (CEO) and Chief Financial Officer (CFO), as appropriate, to allow timely decisions regarding required disclosure. In designing and evaluating the disclosure controls and procedures, management recognized that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving the desired control objectives, as the Companies are designed to do, and management necessarily was required to apply its judgment in evaluating the risk related to controls and procedures.

In connection with the preparation of this Form 10-K, as of September 30, 2018, an evaluation was performed under the supervision and with the participation of our management, including the CEO and CFO, of 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 Exchange Act). Based on that evaluation, our management concluded that our disclosure controls and procedures were effective at a reasonable assurance level as of September 30, 2018. These conclusions were communicated to the Audit Committee.

Management's Report on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting as defined in Rule 13a-15(f) and Rule 15d-15(f) under the Exchange Act. Our internal control system is designed to provide reasonable assurance to the Company's management and Board of Directors regarding the preparation and fair presentation of published financial statements. All internal control systems, no matter how well designed, have inherent limitations. Therefore, even those systems determined to be effective can provide only reasonable assurance with respect to financial statement preparation and presentation.

Our management has assessed the effectiveness of our internal control over financial reporting as of September 30, 2018. In making this assessment, management used the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) in its 2013 Internal Control—Integrated Framework. Based on this assessment, our management has concluded that as of September 30, 2018 our internal control over financial reporting is effective.

The effectiveness of the Company's internal control over financial reporting as of September 30, 2018, has been audited by PricewaterhouseCoopers LLP, an independent registered public accounting firm, as stated in their report which appears in Item 8 above.

Change in Internal Control over Financial Reporting—There were no changes in our internal control over financial reporting that occurred during our last quarter that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

ITEM 9B. OTHER INFORMATION

None.

PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

Portions of the response to this item are incorporated herein by reference from the discussion responsive thereto under the captions “Proposal 1 - Election of Directors—Nominees for Director and Current Directors”, “Section 16(a) Beneficial Ownership Reporting Compliance”, “Executive Officers” and “Corporate Governance—Board and Committee Matters” in the Company’s Definitive Proxy Statement relating to the 2019 Annual Meeting of Stockholders, also referred to as the 2019 Proxy Statement, which will be filed within 120 days after September 30, 2018.

We have adopted a Code of Business Conduct and Ethics (the code of ethics) that applies to all of our directors, officers and employees. The code of ethics is available on our website at http://www.enanta.com. In addition, if we make any substantive amendments to the code of ethics or grant any waiver, including any implicit waiver, from a provision of the code to any of our executive officers or directors, we will disclose the nature of such amendment or waiver as required by applicable law.

ITEM 11. EXECUTIVE COMPENSATION

The response to this item is incorporated herein by reference from the discussion responsive thereto under the following captions in the 2019 Proxy Statement: “Executive Compensation” and “Corporate Governance—Certain Relationships and Related Transactions.”

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

The response to this item is incorporated herein by reference in part from the discussion responsive thereto under the caption “Beneficial Ownership of Common Stock” in the 2019 Proxy Statement.

The following table provides information about the securities authorized for issuance under the Company’s equity compensation plans as of September 30, 2018:

Equity Compensation Plan Information

(in thousands, except per share information)

Plan Category	Number of securities to be issued upon exercise of outstanding options, warrants and rights (a)		Weighted average exercise price of outstanding options, warrants and rights (b)	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column (a)) (c)	
	2,873	[2]	$ 33.47	437	[3]

Equity compensation plans approved by security holders [1]			
Equity compensation plans not approved by security holders	—	—	—
Totals	2,873		437

(1) Consists of, the Company's 2012 Equity Incentive Plan, as amended, the Company's Amended and Restated 1995 Equity Incentive Plan, as amended, and the Company's Employee Stock Purchase Plan.

(2) Consists of shares of the Company's common stock issuable upon exercise of outstanding options issued under the Company's 2012 Equity Incentive Plan, and the Company's Amended and Restated 1995 Equity Incentive Plan.

(3) Consists of shares of the Company's common stock reserved for future issuance under the Company's 2012 Equity Incentive Plan and the Company's Employee Stock Purchase Plan. This does not include 583 shares that were automatically added to the Company's 2012 Equity Incentive Plan by its terms as of October 1, 2018.

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

The response to this item is incorporated herein by reference from the discussion responsive thereto under the caption "Corporate Governance—Certain Relationships and Related Transactions" and "Corporate Governance—Board and Committee Matters" in the 2019 Proxy Statement.

ITEM 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES

The response to this item is incorporated herein by reference from the discussion responsive thereto under the captions "Corporate Governance—Board and Committee Matters" and "Audit Committee Report—Audit Fees" in the 2019 Proxy Statement.

PART IV

ITEM 15. EXHIBITS, FINANCIAL STATEMENT SCHEDULES

(a) 1. FINANCIAL STATEMENTS

The financial statements are included under Part II, Item 8 of this Report.

2. FINANCIAL STATEMENTS SCHEDULE

Schedules are omitted because they are not applicable, or are not required, or because the information is included in the consolidated financial statements and notes thereto.

3. EXHIBITS –

The exhibits are listed below under Part IV, Item 15(b) of this Report.

(b) EXHIBITS

Exhibit		Incorporated by Reference				
Number	Exhibit Description	Form	Date	Exhibit Number	File Number	Filed Herewith
3.1	Restated Certificate of Incorporation of Enanta Pharmaceuticals, Inc.	8-K	03/28/2013	3.1	001-35839	
3.2	Amended and Restated Bylaws of Enanta Pharmaceuticals, Inc. (as amended and restated in August 2015).	8-K	08/18/2015	3.2	001-35839	
4.1	Specimen certificate evidencing shares of common stock.	S-1/A	02/05/2013	4.1	333-184779	
4.2	Specimen certificate evidencing shares of Series 1 Non-Convertible Preferred Stock	10-K	12/11/2017	4.3	001-35839	
10.1#	Form of Indemnification Agreement for directors and officers.	S-1/A	02/05/2013	10.7	333-184779	
10.2#		S-1/A	03/05/2013	10.5	333-184779	

	Amended and Restated Employment Agreement between the Company and Jay R. Luly, Ph.D., dated as of March 4, 2013.				
10.3#	Form of Amended and Restated Employment Agreement for Executive Officers other than the Chief Executive Officer.	S-1/A	03/05/2013	10.17	333-184779

Exhibit Number	Exhibit Description	Incorporated by Reference Form	Date	Exhibit Number	File Number	Filed Herewith
10.4†	Collaborative Development and License Agreement between the Company and Abbott Laboratories, dated November 27, 2006; as amended by a First Amendment to Collaborative Development and License Agreement dated January 27, 2009 and a Second Amendment to Collaborative Development and License Agreement dated December 9, 2009 (assigned to AbbVie Inc. as of January 1, 2013).	10-Q	02/09/2016	10.1	001-35839	
10.5†	Third Amendment to Collaborative Development and License Agreement between the Company and AbbVie dated October 20, 2014.	10-K	12/11/2014	10.5	001-35839	
10.6	Fourth Amendment to Collaborative Development and License Agreement between the Company and AbbVie dated as of March 3, 2015.	10-Q	05/08/2015	10.1	001-35839	
10.7	Lease Agreement between Company and ARE-500 Arsenal Street LLC, dated as of April 15, 2011.	S-1	11/06/2012	10.6	333-184779	
10.8	First Amendment to Lease Agreement made as of March 5, 2015 between the Company and ARE-500 Arsenal Street LLC.	10-Q	05/08/2015	10.2	001-35839	
10.9	Third Amended and Restated Registration Rights Agreement, dated as of August 23, 2012.	S-1/A	11/06/2012	10.4	333-184779	
10.10	Lease Agreement between Company and Athena Arsenal, LLC, dated as of September 27, 2018.					X
10.10#	Amended and Restated 1995 Equity Incentive Plan.	S-1/A	03/05/2013	10.8	333-184779	
10.11#	Form of Incentive Stock Option Certificate under Amended and Restated 1995 Equity Incentive Plan.	S-1/A	03/05/2013	10.9	333-184779	
10.12#	Form of Non-Statutory Stock Option Certificate under Amended and Restated 1995 Equity Incentive Plan.	S-1/A	03/05/2013	10.10	333-184779	
10.13#	Form of Non-Statutory Stock Option Certificate for directors under Amended and Restated 1995 Equity Incentive Plan.	S-1/A	03/05/2013	10.11	333-184779	
10.14#	2012 Equity Incentive Plan (As adjusted to reflect the application of the 1-for-4.31 reverse stock split of the Company's common stock effected on March 1, 2013).	10-K/A	01/06/2017	10.14	001-35839	
10.15#	Form of Incentive Stock Option Agreement under 2012 Equity Incentive Plan.	S-1/A	03/05/2013	10.13	333-184779	
10.16#	Form of Non-Statutory Stock Option Agreement under 2012 Equity Incentive Plan.	S-1/A	03/05/2013	10.14	333-184779	
10.17#	Form of Non-Statutory Stock Option Certificate for directors under 2012 Equity Incentive Plan.	S-1/A	03/05/2013	10.15	333-184779	
10.18#	Form of Performance Share Unit Certificate under 2012 Equity Incentive Plan.	10-K	12/11/2017	10.18	001-35839	
10.19#	Form of Relative Total Stockholder Return Unit Certificate under 2012 Equity Incentive Plan.	10-K	12/11/2017	10.19	001-35839	
10.20#	Employee Stock Purchase Plan.	S-1/A	02/05/2013	10.16	333-184779	

21.1	Subsidiaries of the Company.	X

Exhibit Number	Exhibit Description	Incorporated by Reference				Filed Herewith
		Form	Date	Exhibit Number	File Number	
23.1	Consent of PricewaterhouseCoopers LLP, Independent Registered Public Accounting Firm.					X
31.1	Certification of the Chief Executive Officer pursuant to Rule 13a-14(a) or 15d-14(a) of the Securities Exchange Act of 1934.					X
31.2	Certification of Chief Financial Officer pursuant to Rule 13a-14(a) or 15d-14(a) of the Securities Exchange Act of 1934.					X
32.1	Certification of the Chief Executive Officer and Chief Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.					X
101	The following materials from the Annual Report of Enanta Pharmaceuticals, Inc. on Form 10-K for the year ended September 30, 2018 formatted in XBRL (eXtensible Business Reporting Language): (i) Consolidated Balance Sheets as of September 30, 2018 and September 30, 2017 of Enanta Pharmaceuticals, Inc., (ii) Consolidated Statements of Operations for the years ended September 30, 2018, 2017, and 2016 of Enanta Pharmaceuticals, Inc., (iii) Consolidated Statements of Comprehensive Income for the years ended September 30, 2018, 2017, and 2016 of Enanta Pharmaceuticals, Inc., (iv) Consolidated Statements of Stockholders' Equity for the years ended September 30, 2018, 2017, and 2016 of Enanta Pharmaceuticals, Inc., (v) Consolidated Statements of Cash Flows for the years ended September 30, 2018, 2017, and 2016 of Enanta Pharmaceuticals, Inc., and (vi) Notes to Consolidated Financial Statements of Enanta Pharmaceuticals, Inc.					X

#Management contract or compensatory plan, contract or agreement.

†Confidential treatment granted as to portions of this Exhibit. The confidential portions of this Exhibit have been omitted and are marked by asterisks.

††This Exhibit has been filed separately with the commission pursuant to an application for confidentiality treatment. The confidential portions of this Exhibit have been omitted and are marked by asterisks.

ITEM 16. FORM 10-K SUMMARY

None.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the Company has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized, this 29th day of November, 2018.

ENANTA PHARMACEUTICALS, INC.

By: /s/ Jay R. Luly, Ph.D.
Jay R. Luly, Ph.D.
Chief Executive Officer

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

Signature	Title	Date
/s/ Jay R. Luly, Ph.D.	President and Chief Executive Officer and Director (Principal Executive Officer)	November 29, 2018
Jay R. Luly, Ph.D.		
/s/ Paul J. Mellett	Chief Financial Officer (Principal Financial and Accounting Officer)	November 29, 2018
Paul J. Mellett		
/s/ Stephen Buckley, Jr.	Director	November 29, 2018
Stephen Buckley, Jr.		
/s/ Bruce L.A. Carter, Ph.D.	Director	November 29, 2018
Bruce L.A. Carter, Ph.D.		
/s/ George S. Golumbeski, Ph.D.	Director	November 29, 2018

George S. Golumbeski, Ph.D.		
/s/ Kristine Peterson	Director	November 29, 2018
Kristine Peterson		
/s/ Lesley Russell, MB. Ch.B., MRCP	Director	November 29, 2018
Lesley Russell, MB. Ch.B., MRCP		
/s/ Terry Vance	Director	November 29, 2018
Terry Vance		

ENANTA PHARMACEUTICALS, INC.

INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

Report of Independent Registered Public Accounting Firm

To the Board of Directors and Stockholders of

Enanta Pharmaceuticals, Inc.

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of Enanta Pharmaceuticals, Inc. and its subsidiary ("the Company") as of September 30, 2018 and 2017, and the related consolidated statements of operations, comprehensive income, stockholders' equity and cash flows for each of the three years in the period ended September 30, 2018, including the related notes (collectively referred to as the "consolidated financial statements"). We also have audited the Company's internal control over financial reporting as of September 30, 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 September 30, 2018 and 2017, and the results of its operations and its cash flows for each of the three years in the period ended September 30, 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 September 30, 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 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.

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

Boston, Massachusetts

November 29, 2018

We have served as the Company's auditor since 1999.

ENANTA PHARMACEUTICALS, INC.

CONSOLIDATED BALANCE SHEETS

(in thousands, except per share data)

	September 30, 2018	September 30, 2017
Assets		
Current assets:		
Cash and cash equivalents	$ 63,902	$ 65,675
Short-term marketable securities	244,828	157,994
Accounts receivable	67,205	10,614
Prepaid expenses and other current assets	4,454	3,536
Total current assets	380,389	237,819
Long-term marketable securities	16,389	70,038
Property and equipment, net	8,374	8,049
Deferred tax assets	8,375	10,123
Restricted cash	608	608
Other long-term assets	92	—
Total assets	$ 414,227	$ 326,637
Liabilities and Stockholders' Equity		
Current liabilities:		
Accounts payable	$ 4,745	$ 3,714
Accrued expenses and other current liabilities	9,892	7,970
Income taxes payable	1,388	9,298
Total current liabilities	16,025	20,982
Warrant liability	—	807
Series 1 nonconvertible preferred stock	1,628	762
Other long-term liabilities	2,895	2,410
Total liabilities	20,548	24,961
Commitments and contingencies (Note 12)		
Stockholders' equity:		
Common stock; $0.01 par value per share, 100,000 shares authorized; 19,395 and 19,120 shares issued and outstanding at September 30, 2018 and September 30, 2017, respectively	194	191
Additional paid-in capital	276,526	256,241
Accumulated other comprehensive loss	(398)	(112)
Retained earnings	117,357	45,356
Total stockholders' equity	393,679	301,676
Total liabilities and stockholders' equity	$ 414,227	$ 326,637

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

ENANTA PHARMACEUTICALS, INC.

CONSOLIDATED STATEMENTS OF OPERATIONS

(in thousands, except per share data)

	Years Ended September 30,		
	2018	2017	2016
Revenue			
Royalties	$191,625	$37,814	$57,692
Milestones	15,000	65,000	30,000
Other	—	—	576
Total revenue	206,625	102,814	88,268
Operating expenses:			
Research and development	94,856	57,451	40,461
General and administrative	23,441	20,749	16,966
Total operating expenses	118,297	78,200	57,427
Income from operations	88,328	24,614	30,841
Other income (expense):			
Interest income (expense), net	4,852	2,492	1,690
Change in fair value of warrant liability and Series 1 nonconvertible preferred stock	(59)	(159)	29
Total other income (expense), net	4,793	2,333	1,719
Income before income taxes	93,121	26,947	32,560
Income tax expense	(21,165)	(9,237)	(10,894)
Net income	$71,956	$17,710	$21,666
Net income per share:			
Basic	$3.74	$0.93	$1.14
Diluted	$3.48	$0.91	$1.13
Weighted average shares outstanding:			
Basic	19,255	19,066	18,929
Diluted	20,650	19,407	19,224

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

ENANTA PHARMACEUTICALS, INC.

CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME

(in thousands)

	Years Ended September 30,		
	2018	2017	2016
Net income	$71,956	$17,710	$21,666
Other comprehensive loss:			
Net unrealized losses on marketable securities, net of tax benefit of ($109), ($78), and ($9)	(286)	(131)	(14)
Total other comprehensive loss	(286)	(131)	(14)
Comprehensive income	$71,670	$17,579	$21,652

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

ENANTA PHARMACEUTICALS, INC.

CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY

(in thousands)

	Common Stock		Additional Paid-In	Accumulated Other Comprehensive	Retained	Total Stockholders'
	Shares	Amount	Capital	Income (Loss)	Earnings	Equity
Balances at September 30, 2015	18,717	$ 187	$ 229,957	$ 33	$ 5,980	$ 236,157
Exercise of stock options	319	3	1,023	—	—	1,026
Stock-based compensation expense	—	—	9,354	—	—	9,354
Income tax benefit from stock option exercises	—	—	1,747	—	—	1,747
Other comprehensive loss	—	—	—	(14)	—	(14)
Net income	—	—	—	—	21,666	21,666
Balances at September 30, 2016	19,036	190	242,081	19	27,646	269,936
Exercise of stock options	72	1	1,078	—	—	1,079
Vesting of restricted stock units, net of withholding	12	—	(202)	—	—	(202)
Stock-based compensation expense	—	—	13,071	—	—	13,071
Income tax benefit from stock option exercises	—	—	213	—	—	213
Other comprehensive loss	—	—	—	(131)	—	(131)
Net income	—	—	—	—	17,710	17,710
Balances at September 30, 2017	19,120	191	256,241	(112)	45,356	301,676
Exercise of stock options and warrants	230	2	6,242	—	—	6,244
Vesting of restricted stock units, net of withholding	45	1	(1,757)	—	—	(1,756)
Stock-based compensation expense	—	—	15,845	—	—	15,845
Cumulative effect adjustment for adoption of new accounting guidance (Note 2)	—	—	(45)	—	45	—
Other comprehensive loss	—	—	—	(286)	—	(286)
Net income	—	—	—	—	71,956	71,956
Balances at September 30, 2018	19,395	$ 194	$ 276,526	$ (398)	$ 117,357	$ 393,679

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

ENANTA PHARMACEUTICALS, INC.

CONSOLIDATED STATEMENTS OF CASH FLOWS

(in thousands)

	Years Ended September 30,		
	2018	2017	2016
Cash flows from operating activities			
Net income	$71,956	$17,710	$21,666
Adjustments to reconcile net income to net cash provided by operating activities:			
Stock-based compensation expense	15,845	13,071	9,354
Depreciation and amortization expense	2,518	2,137	1,661
Deferred income taxes	1,858	(1,654)	(2,294)
Income tax benefit from stock awards	—	(213)	(1,747)
Premium paid on marketable securities	(319)	(1,229)	(518)
Amortization of (accretion of) premium (discount) on marketable securities	(835)	702	1,511
Change in fair value of warrant liability and Series 1 nonconvertible preferred stock	59	159	(29)
Other non-cash items	(75)	—	34
Change in operating assets and liabilities:			
Accounts receivable	(56,591)	2,227	2,448
Unbilled receivables	—	—	433
Prepaid expenses and other current assets	(918)	5,678	(964)
Accounts payable	1,317	633	1,451
Accrued expenses	1,843	3,443	1,858
Income taxes payable	(7,910)	9,511	548
Other long-term liabilities	564	478	397
Other long-term assets	(92		