

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, DC 20549

Form 10-K

(Mark One)

ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the fiscal year ended December 31, 2018

OR

TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF SECURITIES EXCHANGE ACT OF 1934
For the transition period from ____ to ____

Commission file number 001-37809

Gemphire Therapeutics Inc.

(Exact name of Registrant as specified in its charter)

Delaware

(State or other jurisdiction of incorporation or organization)

17199 N. Laurel Park Drive, Suite 401, Livonia, MI
(Address of principal executive offices)

47-2389984

(IRS Employer Identification No.)

48152
(Zip Code)

(734) 245-1700

(Registrant's telephone number, including area code)

Securities registered pursuant to Section 12(b) of the Securities Exchange Act of 1934:

Title of Each Class
Common stock, \$0.001 par value

Name of Exchange on Which Registered
The Nasdaq Stock Market LLC

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

Indicate by check mark whether 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 (§ 229.405 of this chapter) is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K.

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

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 12(b)-2 of the Securities Exchange Act of 1934). Yes No

The aggregate market value of the registrant's common stock held by non-affiliates of the registrant was approximately \$128 million based on the closing price on the Nasdaq Global Market as of June 29, 2018, the last business day of the registrant's most recently completed second fiscal quarter.

The number of outstanding shares of the registrant's common stock, \$0.001 par value, as of March 11, 2019 was 14,265,411.

Gemphire Therapeutics Inc.
FORM 10-K
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SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

Unless the context requires otherwise, references in this Annual Report on Form 10-K (this "Report") to "we," "us," "the Company" and "our" refer to Gemphire Therapeutics Inc.

This Report, including under the headings "Business," "Risk Factors," and "Management's Discussion and Analysis of Financial Condition and Results of Operations," contains forward-looking statements. We may, in some cases, use words such as "anticipate," "believe," "could," "estimate," "expect," "intend," "may," "plan," "potential," "predict," "project," "should," "will," "would" or the negative of those terms, and similar expressions that convey uncertainty of future events or outcomes to identify these forward-looking statements. Any statements contained herein that are not statements of historical facts may be deemed to be forward-looking statements. Forward-looking statements in this Report include, but are not limited to, statements about:

- § our anticipated timing of regulatory submissions; commencement and completion of preclinical studies and clinical trials, meetings with the FDA and other regulatory authorities; and product approvals and initiation of commercialization, if approved, for gemcabene or any other product candidates we may pursue in the future;
- § our ability to successfully pursue any strategic alternatives;
- § the outcome of our ongoing preclinical toxicology studies related to our partial clinical hold with respect to clinical trials of longer than six months in duration;
- § the outcome and timing of a decision by the FDA regarding whether to lift our partial clinical hold;
- § the outcome of clinical trials of gemcabene and our ability to replicate positive results from a completed clinical trial in a future clinical trial;
- § our expected clinical trial designs and regulatory pathways;
- § our expectation that the FDA will not require us to complete a cardiovascular outcomes trial prior to approval;
- § our expectations for the attributes of gemcabene or any other product candidate we may pursue in the future, including pharmaceutical properties, mechanisms of action, efficacy, safety, dosing regimens and cost, as compared to other lipid-lowering therapies;
- § our ability to design an efficient development plan;
- § our expectations regarding our existing capital resources;
- § our plans to advance the late-stage clinical development of gemcabene across multiple target indications, pursue oral combination opportunities for gemcabene, maximize the global commercial value of gemcabene and leverage the expertise and experience of our management team to evaluate future in-license acquisition opportunities;
- § our estimates regarding industry trends and market potential for gemcabene;
- § if approved, our ability to maintain regulatory approval of gemcabene and respond and adhere to regulatory requirements;

- § our ability to identify, in-license or acquire, develop and, if approved, successfully commercialize best-in-class products, including gemcabene or any other product candidates we may pursue in the future;
- § our ability to identify and execute on strategic alternatives, including in connection with our December 2018 announcement that we are pursuing a review of strategic alternatives and any potential transactions and partnerships we may pursue in the future;
- § our ability to out-license gemcabene to strategic partner(s) seeking to develop and/or commercialize it;
- § our ability to enhance brand awareness among key thought leaders and physicians;
- § if approved, the rate and degree of market acceptance of gemcabene or any other product candidates we may pursue in the future;
- § if approved, our ability to compete with other companies that are, or may be, developing or selling products that may compete with gemcabene;
- § reimbursement policies, including any future changes to such policies or related government legislation and our ability to sell gemcabene, if approved;
- § regulatory and legal developments in the United States and in foreign countries;
- § our ability to obtain and maintain intellectual property protection for gemcabene or any other product candidates we may pursue in the future and not infringe upon the intellectual property of others;
- § our ability to fund our working capital requirements;
- § our estimates of our expenses, ongoing losses, future revenue, capital requirements and our needs for, or ability to, obtain additional financing;
- § the ability of any third parties with whom we collaborate for the development and commercialization of gemcabene to successfully perform their assigned functions;
- § our ability to retain and recruit key scientific and management personnel;
- § our financial performance; and
- § our expectations regarding the period during which we qualify as an emerging growth company under the JOBS Act.

These forward-looking statements reflect our management's beliefs and views with respect to future events and are based on estimates and assumptions as of the date of this Report and are subject to risks and uncertainties. We discuss many of these risks in greater detail under "Risk Factors." Moreover, we operate in a very competitive and rapidly changing environment. New risks emerge from time to time. It is not possible for our management to predict all risks, nor can we assess the impact of all factors on our business or the extent to which any factor, or combination of factors, may cause actual results to differ materially from those contained in any forward-looking statements we may make. Given these uncertainties, you should not place undue reliance on these forward-looking statements.

Except as required by law, we undertake no obligation to publicly update any forward-looking statements, whether as a result of new information, future events or otherwise.

In addition, statements that "we believe" and similar statements reflect our beliefs and opinions on the relevant subject. These statements are based upon information available to us as of the date of this Report, and while we believe such information forms a reasonable basis for such statements, such information may be limited or incomplete, and our statements should not be read to indicate that we have conducted an exhaustive inquiry into, or review of, all potentially available relevant information. These statements are inherently uncertain and investors are cautioned not to unduly rely upon these statements.

PART I

ITEM 1. BUSINESS

Overview

We are a clinical-stage biopharmaceutical company focused on developing and commercializing therapies for the treatment of dyslipidemia, a serious medical condition that increases the risk of life-threatening cardiovascular disease, focused on orphan indications, as well as nonalcoholic fatty liver disease (NAFLD/NASH). Our product candidate, gemcabene, has been tested as monotherapy and in combination with statins and other drugs in more than 1,100 subjects, which we define as healthy volunteers and patients, across 25 Phase 1 and Phase 2 clinical trials and has demonstrated promising evidence of efficacy, safety and tolerability.

We are pursuing gemcabene in dyslipidemia conditions where patients are unable to reach their lipid lowering goals, including patients already receiving maximally tolerated statin therapy. Within dyslipidemia, indications broadly include Familial Hypercholesterolemia (FH), Atherosclerotic Cardiovascular Disease (ASCVD), Severe Hypertriglyceridemia (SHTG) and Nonalcoholic Steatohepatitis (NASH). Within these broader indications are orphan diseases including Homozygous Familial Hypercholesterolemia (HoFH), Familial Chylomicronemia Syndrome (FCS; TGs>880mg/dL), and Familial Partial Lipodystrophy (FPL) which represent clear unmet clinical needs because current therapies are considered inadequate. Historically, clinical trials for these orphan indications are smaller and FDA approvals have previously been based on surrogate endpoints (e.g., serum LDL-C or serum TGs). Consequently, we believe we can design efficient development plans to provide gemcabene as a treatment alternative for HoFH patients as well as FCS and FPL patients. If approved for one or more of these indications, this could enable us to go to market initially by treating patients in the most severe segment of the dyslipidemia market, which could subsequently lead to trials in broader indications representing millions of individuals, such as SHTG and potentially ASCVD and NASH. This strategy of "orphan-first" trials can enhance brand awareness among key thought leaders and physicians and has the potential to provide a more rapid, less expensive path through trials and regulatory approvals. It also provides the potential for initiating sales with a small, focused sales force.

We plan to develop gemcabene for multiple clinical indications given its: (1) promising clinical data and mechanism in these indications; (2) cost-effective manufacturing process; (3) convenient oral dosing; (4) viability as adjunct combination therapy; and (5) large commercial potential. During 2016 to 2018, we initiated and completed three Phase 2b clinical trials for gemcabene in HoFH, hypercholesterolemia, including Heterozygous Familial Hypercholesterolemic (HeFH) and ASCVD patients on maximally tolerated statins, and SHTG. Previously we reported top line data from our 8 patient trial for HoFH (COBALT-1) in the second quarter of 2017, top line data from our 105 patient trial for hypercholesterolemia on high-intensity statin therapy including HeFH and ASCVD patients (ROYAL-1) in the third quarter of 2017, and top line data from our 91 patient trial in SHTG patients (INDIGO-1) in the second quarter of 2018. As previously announced, all three of these trials achieved statistical significance for their primary endpoints.

Gemcabene's mechanism of action is multifaceted. In the liver gemcabene acts in two major ways to reduce levels of circulating LDL-C and triglycerides: 1) inhibition of the two metabolic pathways that synthesize precursors (i.e., cholesterol and fatty acids) of VLDL-C, LDL-C and triglycerides and 2) stimulation of a liver mechanism known as the remnant receptor pathway that removes particles that contain cholesterol and triglycerides from the blood. Gemcabene's stimulation of this remnant receptor pathway involves enhanced removal of an LDL-C precursor known as very low-density lipoprotein remnants. With regard to gemcabene's anti-inflammatory properties, in human clinical trials and animal studies to date, gemcabene has been shown to significantly reduce plasma levels of CRP. Furthermore, in preclinical studies of dyslipidemia as well as NASH, gemcabene inhibited production of a number of known pro-

inflammatory molecules (e.g., CRP, CCR2, CCR5, IL-6, TNF-alpha, MCP-1 and MIP1-beta) as well as pro-fibrotic factors (e.g., TIMP-1, MMP-2). Overall, gemcabene's multifaceted mechanism of action provides the potential for safely addressing multiple major risk factors in a broad array of adult and pediatric cardiometabolic patients who have an elevated risk of cardiovascular or liver disease, even when taking conventional therapies.

Cardiovascular disease is a major health concern, causing more deaths globally than any other disease. Dyslipidemia leads to cardiovascular disease and is generally an important predictor of cardiovascular events including heart attack and stroke. Dyslipidemia is generally characterized by an elevation of low-density lipoprotein cholesterol (LDL-C), or bad cholesterol, triglycerides, or fat in the blood, or both. It represents one of the largest therapeutic areas with annual worldwide drug sales of approximately \$17 billion in 2015. We estimate more than 40% of Americans have elevated LDL-C or triglycerides, or both. Statins, such as atorvastatin, simvastatin or rosuvastatin, are standard of care for LDL-C lowering, while fibrates, prescription active ingredient of fish oils (i.e. EPA) and niacin are standard of care for triglyceride lowering. Although these drugs are highly prescribed and capable of reducing LDL-C and triglyceride levels, many patients are unable to effectively manage their dyslipidemia with currently approved therapies and are in need of additional treatment options. For example, approximately 40% of patients on statins are unable to meet their LDL-C lowering goal and doubling a statin dose has been shown to incrementally lower LDL-C levels by a nominal percentage (approximately 6% based on historical evidence), while increasing safety and tolerability concerns. An even higher percentage of patients with severe hypertriglyceridemia do not achieve triglyceride levels low enough to reduce the risk of developing co-morbidities such as pancreatitis. We believe gemcabene possesses a differentiated product profile compared to other therapies in the market and in clinical development.

Key Business Developments

Clinical and Research Program Updates

In late 2017 we announced the initiation of a Phase 2a investigator initiated trial to assess gemcabene in pediatric patients with non-alcoholic fatty liver disease (NAFLD). The planned scope of this open-label, 12-week study was to evaluate gemcabene 300 mg in 40 adolescent NAFLD patients, 12-17 years of age. The study enrolled 6 patients and in August 2018, the Data Safety Monitoring Board (DSMB) halted the trial early due to "unanticipated problems" in the first three patients. Specifically, the primary efficacy endpoint of alanine amino transferase (ALT) increased beyond baseline levels in two of these three patients. At baseline, i.e., prior to receiving gemcabene, and as outlined in study inclusion criteria, ALT for these two patients were elevated 3-fold and 10-fold compared to ALT levels reported for healthy pediatric patients (~25 IU/L) of similar age. In addition, all three patients had an increase in the secondary endpoint of liver fat fraction as measured by magnetic resonance imaging-estimated proton density fat fraction (MRI-PDFF). All patients gained weight and had increased TGs during study treatment, in contrast to data in other gemcabene trials. Patients were instructed to self-administer the test-agent daily, however compliance was compromised as assessed by return of unused tablets and measurement of blood drug levels. One observation of increased ALT and two observations of increased liver fat were reported as Adverse Events (AEs) considered related to gemcabene. No events were reported as Serious Adverse Events (SAEs). The risk for increased liver fat with gemcabene treatment is unknown at this time. The patients will continue to be monitored for 12 months post-final dose. We intend to work closely with the physicians and other KOLs to identify potential reasons for the unanticipated problems in the pediatric NAFLD study but cannot assure you that it will be possible to determine the reasons for the unexpected problems.

In early 2018 we announced the initiation of a Phase 2 proof-of-concept trial treating FPL/NASH patients for 24 weeks, which is being conducted in an investigator-initiated study at the University of Michigan. In the third quarter of 2018, the principal investigator and DSMB for this trial reviewed the data from the pediatric trial as well interim data from the FPL trial and decided to continue the FPL trial. The principal investigator in the trial intends to closely monitor these patients throughout the study. In the fourth quarter of 2018 the FPL trial was fully enrolled and top-line data is expected in the second quarter of 2019. To date, there was one unrelated SAE of benign paroxysmal positional vertigo in IIT-GEM-602, and no deaths or withdrawals due to adverse events.

As announced in third quarter of 2018, we completed and submitted to the FDA the results from our two year rodent carcinogenicity studies. These studies were submitted as part of a request for the FDA to remove the partial clinical hold that prevents us from conducting human studies of gemcabene that are greater than six months in duration. In response to our submission, the FDA did not lift the hold and requested that we provide additional data, including two preclinical studies, namely, a subchronic (13 week) study of gemcabene in PPAR α knock-out mice and a study of gemcabene in *in vitro* PPAR transactivation assays using monkey and canine PPAR isoforms. We expect to submit this additional data to

the FDA in the fourth quarter of 2019. In addition, the FDA informed us that an End of Phase 2 (EOP2) meeting to reach an agreement on the design of Phase 3 registration and long term safety exposure trials for our target indications in dyslipidemia would not take place until the partial clinical hold is lifted.

Pfizer License Agreement

In the third quarter of 2018, we announced that our gemcabene in-licensing agreement with Pfizer was renegotiated providing three additional years to for us to achieve our first commercial sale, by April 2024. As of today, this additional time is expected to provide sufficient time to achieve regulatory approval and initiate commercialization of gemcabene for at least one indication.

Review of Strategic Alternatives

In December 2018, we announced that our Board of Directors established a committee to oversee a review of strategic alternatives focused on maximizing stockholder value and that we had engaged Ladenburg Thalmann & Co. Inc. to act as our strategic financial advisor in this process. Despite undertaking this process, we may not be successful in completing a transaction, and, even if a strategic transaction is completed, it ultimately may not deliver the anticipated benefits or enhance stockholder value.

Our Strategy

Our goal is to become a leading cardiometabolic biopharmaceutical company that develops and commercializes best-in-class therapies for disorders related to dyslipidemias. Our product candidate, gemcabene, has been found to have numerous notable attributes that position it as a therapeutic potentially capable of benefiting multiple disease indications.

The attributes of gemcabene include:

- Cost-effective, once-daily, oral therapy
- Promising safety and tolerability
- Pleiotropic MOA providing multiple biological benefits
- Significant lipid-lowering of LDL-C, high-sensitivity C-reactive protein (hsCRP) and triglycerides (TGs)
- No drug-drug interactions when combined with high-intensity statin doses

These attributes provide opportunities to pursue gemcabene for multiple clinical indications. Thus there are several potential approaches to clinical, regulatory, and commercialization plans for gemcabene. With the FDA decision in the third quarter of 2018 to require additional preclinical studies in order to consider lifting the partial clinical hold on gemcabene and scheduling an EOP2 meeting, and the consequent delay in initiating our Phase 3 program, we recently refocused our next stage of clinical trials to initially focus on rare/orphan disease indications and subsequently broader indications.

Thus our strategy for gemcabene is:

- **Advance the late-stage clinical development of gemcabene across multiple target indications, beginning with rare diseases within FH and SHTG populations and then expanding into broader indications.** Our “orphan-first” strategy initially includes pursuing orphan indications such as HoFH, FCS, and FPL. Broader indications that may be pursued later include SHTG, HeFH, ASCVD, and NASH. Advancing gemcabene for orphan indications has multiple potential advantages including: 1) smaller, less costly clinical trials, 2) clear unmet need, 3) potential for expedited regulatory review and even Orphan Drug Designation (which gemcabene has already received from the FDA for HoFH), and 4) the likelihood of needing a small commercialization team to initiate sales.
- **Continue to build out our patent portfolio for gemcabene.** We believe our patents and patent applications provide us with a significant competitive advantage. As of February 2019, we had 47 issued patents and 95 pending patent applications for gemcabene in the United States and internationally directed to formulations, compositions, methods of use and methods of manufacturing. We intend to aggressively prosecute and defend our patent portfolio and pursue new patents in order to ensure the long-term commercial success of gemcabene.

- **Maximize the global commercial value of gemcabene.** We have retained all commercial and manufacturing rights to gemcabene. We intend to evaluate our strategic alternatives to collaborate with global biopharmaceutical companies for the development and commercialization of gemcabene. We believe we could independently commercialize gemcabene for the treatment of patients with HoFH, FPL, and FCS in the United States with a targeted sales force and would seek commercial partners outside of the United States. For larger indications such as SHTG, ASCVD, and NASH, we expect to assess partnership opportunities for Phase 3 development and the worldwide commercialization of gemcabene.
- **Leverage the expertise and experience of our management team to evaluate future in-licensing and acquisition opportunities.** Across our leadership team, we have discovered and/or developed Lipitor, Lopid, Bempedoic Acid, ETC-216, ACP-501, and PNT-2258, and commercialized many lipid-regulating and orphan drugs including Crestor, Myalept and Lynparza. Our team is well-qualified to identify and in-license or acquire clinical-stage cardiometabolic assets, and we intend to evaluate these opportunities to diversify our pipeline and generate long-term growth.

We believe that oral, once-daily gemcabene as an add-on to statin and other existing therapies is differentiated by the ability to lower multiple risk factors (LDL-C, hsCRP and triglycerides) and, if approved, presents a significant opportunity across multiple indications in dyslipidemia and NASH. These indications span from orphan indications including HoFH, FCS and FPL to more prevalent conditions, such as SHTG, HeFH, ASCVD and NASH in which therapies are required to reduce elevated levels of LDL-C, triglycerides, inflammation or any combination thereof.

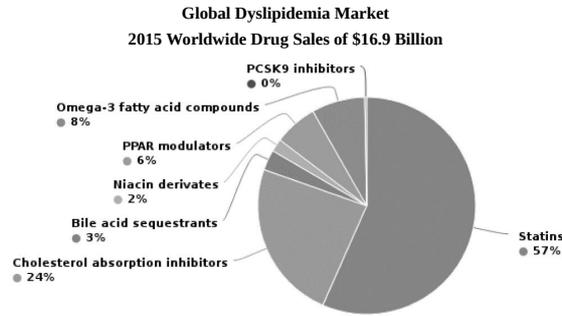
Overview of Dyslipidemia and NASH Markets

According to the World Health Organization, cardiovascular disease is the number one cause of death in the world, responsible for 17.5 million, or approximately one in three, deaths in 2012. Cardiovascular disease is influenced by both environment and genetics. Environmental factors include diet, smoking, excess weight and sedentary lifestyle. Genetic defects can cause certain types of cardiovascular disease, such as familial hypercholesterolemia, a condition in which mutations on one or more genes can result in elevated LDL-C levels in patients. Cardiovascular burden in the US is expanding at an alarming rate. The prevalence of CVD was 41.5% in 2015, due to the rising effects of obesity and the earlier onset of type 2 diabetes. It is estimated that 45% of the US population will have at least one cardiovascular condition by 2035.

Dyslipidemia is characterized by an elevation of LDL-C, triglycerides or both. Dyslipidemia leads to cardiovascular disease and is generally an important predictor of cardiovascular events, including heart attack and stroke. It is estimated that 71 million American adults, or approximately 33%, have high LDL-C levels, which is a major risk factor for cardiovascular disease. We estimate from 2015 data that over 33 million patients are prescribed statins, of which a little more than half, or 19 million, are secondary prevention patients. Of these 19 million secondary prevention patients, approximately 10 million are ASCVD patients who are not at their LDL-C goal. Furthermore, it is estimated that over 30% of American adults have elevated triglycerides above 150 mg/dL, and high levels of triglycerides are even evident in patients with normal cholesterol levels. If untreated, elevated triglycerides levels may lead to more serious illnesses, such as atherosclerosis (plaque build-up in the arteries) and severely elevated triglyceride levels may lead to pancreatitis (inflammation of the pancreas). The dyslipidemia market has achieved approximately \$17 billion in worldwide drug sales in 2015 and remains one of the largest therapeutic markets.

NASH is an advanced form of NAFLD in which a buildup of excess triglycerides in the liver (steatosis), usually in the context of metabolic dysregulation, results in liver damage (hepatocyte ballooning) and increased inflammation. This condition can lead to hepatic fibrosis and cirrhosis and eventually hepatocellular carcinoma (HCC) in some patients. NASH is now the second most common cause for liver transplantation in the U.S. We believe there are currently no approved medications for treating NASH in any market across the globe. Disease management chiefly involves lifestyle modification, some off-label medication use, and monitoring for disease progression. Off-label medications typically include antioxidant, antidiabetic, and lipid modifying agents. Despite the potentially serious liver complications, the natural progression of NASH is relatively slow, and CV disease is the leading cause of death among NASH patients.

partly as a result of the disease and partly due to the common comorbidities in patients with NASH, including type 2 diabetes and obesity.

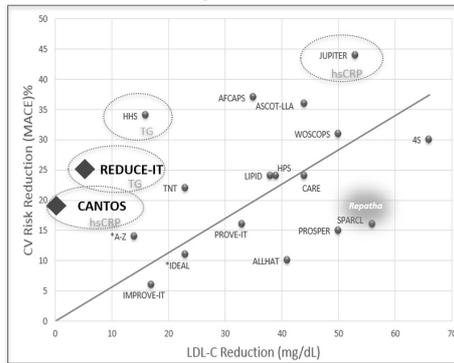


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Regulatory Precedents for Approval in Dyslipidemia Indications

Historical data suggest a linear relationship between LDL-C and cardiovascular disease, showing that lower LDL-C levels reduces the risk of mortality and other cardiovascular events (for example, for about every 2mg/dL reduction in LDL-C, an additional 1.2 % reduction in cardiovascular risk reduction is realized). The chart below by the Cholesterol Treatment Trialists' (CTT) Collaboration provides the foundation for this 'LDL-C hypothesis'.

Lowering LDL-C Decreases Cardiovascular Risk
Elevated LDL-C lowering is the #1 Modifiable Risk Factor



Sources: CTT Cholesterol Treatment Trialist's Collaboration and Study Papers for each Trial; CV = Cardiovascular; MACE=Major Adverse Cardiovascular Events; *A-Z p=.14 and IDEAL p=.07

Key For LDL-C Lowering Drug with Successful Trial Results: **Genfibrozil:** HHS; **Atorvastatin:** IDEAL, TNT, PROVE-IT, ASCOT-LLA, SPARCL; **Pravastatin:** ALLHAT, CARE, PROSPER, LIPID, WOSCOPS; **Simvastatin:** A-Z, HPS, 4S; **Lovastatin:** AFCAPS; **Rosuvastatin:** JUPITER; **Ezetimibe:** IMPROVE-IT; **Canakinumab:** CANTOS; **Vascepa:** REDUCE-IT.

Since 1987 the FDA has accepted LDL-C lowering as a surrogate endpoint for reducing cardiovascular risk for *traditional* approval on over 15 lipid-lowering drugs without requirements to initiate or complete a cardiovascular outcomes trial. Traditional approval may be based on surrogate endpoints such as LDL-C and blood pressure that are *known* to predict clinical benefit, in contrast to accelerated approval based on surrogate endpoints that are only *reasonably likely* to predict clinical benefit and require confirmatory evidence of actual benefit after approval. With traditional approval based on LDL-C reduction, the FDA does not have a regulatory mechanism to require any further efficacy trials and does not require sponsors to conduct a post-approval cardiovascular outcomes trial. Sponsors who have chosen to conduct cardiovascular outcomes trials before or after traditional approval, which is encouraged by the FDA, have voluntarily done so to seek additional claims.

In approving drugs, the FDA considers the magnitude of effect in relation to the safety profile. Not only has the use of LDL-C as a surrogate marker to predict the risk of cardiovascular events been accepted by the FDA but the importance of LDL-C lowering has also been recognized by clinical organizations such as American College of Cardiology, American Heart Association (AHA), National Cholesterol Education Program Adult Treatment Panel III (NCEP ATP-III), American Association of Clinical Endocrinologists, and National Lipid Association.

There have also been several studies showing that certain LDL-C lowering statin and non-statin drugs did not in fact provide cardiovascular benefits (e.g., Niacin in AIM-HIGH trial) and/or showed unexpected safety concerns (e.g., ezetimibe in ENHANCE with cancer). In addition, studies of a class of drugs known as cholesteryl ester transfer protein inhibitors (CETPi) with a different mechanism (i.e., increased high-density lipoprotein cholesterol (HDL-C) while sometimes lowering LDL-C), has led to three drugs that failed to demonstrate efficacy in Phase 3 cardiovascular outcome trials. The first CETPi drug, Pfizer's torcetrapib, lowered LDL-C but showed increased cardiovascular event rates in patients due to off-target effects in ILLUMINATE, which we believe established a higher FDA standard for cardiovascular outcomes trials for the CETPi class.

In patient populations such as HoFH and SHTG including FCS, we believe the FDA recognizes that an outcomes trial would be difficult and as a result has established precedent drug approvals over time based on surrogate endpoints, LDL-C for cardiovascular risk and triglycerides for pancreatitis risk, respectively. Recent examples include Juxtapid (2012), Kynamro (2013) and Repatha (2015) for HoFH and Vascepa (2012) for SHTG.

In the case of more moderate hypertriglyceridemia which includes millions of patients with serum TGs between 150 mg/dL and 499 mg/dL, the FDA has required a cardiovascular outcome trial. Recently Vascepa was evaluated in the Phase 3 REDUCE-IT trial for these patients and demonstrated significant reductions in MACE and serum TGs. There has been no FDA decision regarding Vascepa for this patient population.

In broader dyslipidemia populations, such as HeFH and ASCVD, the FDA recently approved PCSK9 inhibitors based on LDL-C as the surrogate endpoint and did not require the completion of cardiovascular outcomes trial in these high-risk dyslipidemia patients. The FDA approved Praluent and Repatha based on LDL-C reduction as an adjunct to maximally tolerated statin therapy (and diet), but did not approve these drugs for monotherapy or primary prevention patients, noting that such approval may be premature in the absence of cardiovascular outcomes data.

Collectively, recent approvals of new cardiovascular drugs, results from clinical trials of non-statin product candidates, and our regulatory guidance that we received from the FDA regarding our development plans have provided us with some assurance that LDL-C and/or TG lowering product candidates in development, such as gemcabene, will not be required to conduct cardiovascular outcomes trials in the United States and Europe prior to approval for our initial target indications.

hsCRP - A Biomarker of Interest

Inflammation plays a significant role in the propagation of atherosclerosis and susceptibility to cardiovascular events. Of the wide array of inflammatory biomarkers that have been studied, hsCRP (or CRP) has received the most attention for

its use in risk reclassification of cardiovascular disease. At the 2015 European Society for Cardiology meeting, Merck presented a post-hoc analysis of the IMPROVE-IT trial which confirmed the importance of lowering both LDL-C and hsCRP levels to below 70 mg/dL and 2 mg/L, respectively, with a 27% relative risk reduction in cardiovascular events occurring in patients that were able to attain these target levels compared to those patients who achieved neither of these target levels. In 2017, in the CANTOS trial, Novartis' canakinumab demonstrated an outcomes benefit for mortality and other modifiable risk factors for CV disease by lowering hsCRP (median hsCRP reduction of 37% led to a 15% reduction in cardiovascular related MACE) without affecting LDL-C. These findings support the potential for novel non-statin therapies that can demonstrate clinical efficacy in both LDL-C and hsCRP reduction. Gemcabene's ability to substantially lower hsCRP in conjunction with LDL-C may offer further benefit to the cardiovascular health of patients.

Target Indications for Gemcabene

Our target indications are summarized below with a total of approximately 14 million addressable dyslipidemia patients in the United States who could be treated with gemcabene, and another six million patients with NASH in the U.S. That said, we are pursuing an "Orphan-First" strategy in our clinical trial and commercialization plans. This approach has the potential to provide a more rapid, less expensive path through trials and regulatory approvals. It also provides the potential for initiating sales with a small, focused sales force.

Orphan Indications

Homozygous Familial Hypercholesterolemia (HoFH)

HoFH is a rare genetic disease that is usually caused by mutations in both alleles of the LDL receptor gene responsible for removing LDL from the blood. As a result of having defective or deficient LDL receptor function, HoFH patients exhibit severely high LDL-C levels, are at very high risk of experiencing premature cardiovascular events, such as a heart attack or stroke, and develop premature and progressive atherosclerosis. LDL-C levels in HoFH patients are often in the range of 500 mg/dL to 1,000 mg/dL, compared to a normal target range of 70 mg/dL to 100 mg/dL. Unless treated, most patients with HoFH do not survive adulthood beyond 30 years of age. There are approximately 300 to 2,000 HoFH patients in the United States and 6,000 to 45,000 patients in the rest of the world based on an estimated prevalence rate of one in 160,000 to one in one million.

Current available treatments for HoFH generally include a combination of dietary intervention, statins, ezetimibe and other approved LDL-C lowering therapies, including lipoprotein apheresis. However, even when combination therapies are utilized, many patients still have high LDL-C levels and are still at high risk of cardiovascular disease. The FDA has approved two non-statin therapies for HoFH, Juxtapid, marketed by Aegerion Pharmaceuticals, Inc. (Aegerion), and Kynamro, marketed by Sanofi. Although these drugs have demonstrated efficacy, they have significant safety and tolerability concerns, including boxed warnings for liver toxicity on the product labels. Recently, the FDA has also approved Amgen's PCSK9 inhibitor, Repatha, for HoFH patients, but this therapy has limitations due to its mechanism of action reliant on functional LDL-receptors. In clinical trials, Repatha has shown substantially less LDL-C lowering from baseline in patients with HoFH compared to LDL-C lowering in patients with other hypercholesterolemia indications.

On February 6, 2014, gemcabene received Orphan Drug Designation by the FDA for treatment of HoFH. We believe that pursuing the HoFH indication may enable gemcabene to reach the market sooner than for other indications due to: (1) approval pathway based on a single, small Phase 3 trial; (2) no requirement for cardiovascular outcomes trials; and (3) potential for priority review by the FDA in light of the unmet medical need in this orphan population. Furthermore, we believe that gemcabene's potential to treat patients in the most severe segment of the dyslipidemia market on top of statins and other lipid-lowering therapies (including ezetimibe, Repatha, and Praluent) will enhance brand awareness among key thought leaders and physicians.

Familial Cholesterolemia Syndrome (FCS)

FCS is a rare disease caused by a mutation in one or more genes of the lipoprotein lipase (LPL) complex, which breaks down triglycerides. FCS can result from mutations in LPL gene itself, or from mutations in apoC-II, GPIIb/IIIa, LMF1 factor 1, or apoA-V. When any part of the LPL complex is defective, there is a massive accumulation of chylomicrons in the blood. Diagnosis based on fasting triglyceride levels >880 mg/dL, and patients often experience recurrent abdominal pain and/or pancreatitis. FCS represents ~3000-5000 patients worldwide (~1000 in the US). There are currently no FDA-approved treatments for FCS.

Familial Partial Lipodystrophy (FPL)

FPL is a rare genetic disorder and orphan disease characterized by an abnormal distribution of fatty (adipose) tissue. As the body is unable to store fat correctly, a buildup can occur around all vital organs and in the blood (hypertriglyceridemia). FPL can also cause an abnormal buildup of fats in the liver (hepatic steatosis), which can result in an enlarged liver (hepatomegaly) and abnormal liver function. FPL can lead to loss of metabolic control and a variety of metabolic abnormalities, including diabetes, cardiovascular disease, hypertriglyceridemia and NASH.

Broader Indications

Severe Hypertriglyceridemia (SHTG)

Elevated triglycerides are often caused by an inherited disorder or exacerbated by uncontrolled diabetes mellitus, obesity, hypothyroidism and sedentary habits. A recent scientific statement on “Triglycerides and Cardiovascular Disease” issued by the American Heart Association based on a review of the pivotal role of triglycerides in lipid metabolism, reaffirmed that triglycerides are not directly atherogenic, but represent an important biomarker of cardiovascular disease. Patients with severe triglycerides greater than 500 mg/dL, or SHTG, have increased risk of developing pancreatitis, a painful and potentially life-threatening inflammation of the pancreas. Based on a 1.1% prevalence rate in the United States, as published by the American Heart Association, we estimate there are approximately 3.5 million patients with SHTG in the United States and 75 million patients in the rest of the world.

Current available treatments for SHTG consist of dietary modifications to lower the intake of fatty foods and the use of fibrates, prescription fish oils and niacin. These treatments are often inadequate in lowering triglyceride levels below 500 mg/dL, the level at which patients are at an increased risk for developing pancreatitis. Due to the severely elevated triglyceride levels in this patient population, reducing triglyceride levels below 500 mg/dL may require reductions in triglyceride levels of 40% or more. Current therapies, even in combination, are often insufficient in achieving such a result. In addition, many of the existing treatments do not combine well with statins for treating SHTG.

We believe that pursuing SHTG may enable gemcabene to reach a large population of patients with triglyceride levels above 500 mg/dL and offer a convenient, oral, once-daily dosing with no food effects that may have the potential to result in better efficacy than standard of care, while being well-tolerated with statins.

Non-alcoholic Steatohepatitis (NASH)

NAFLD (“fatty liver” where patients have fat in their liver, but no inflammation or liver damage) affects 10-30% of Americans. NASH is a severe form of fatty liver disease with the presence of hepatocyte ballooning, inflammation and fibrosis in the organ. In the United States, NASH affects up to approximately 2-5% of the population roughly at 6 million adult NASH patients and 2 million pediatric NASH patients. The underlying cause of NASH is unclear, but it most often occurs in persons who are middle-aged and overweight or obese. Many patients with NASH have elevated serum lipids, diabetes or pre-diabetes. Progression of NAFLD/NASH can lead to liver fibrosis, cirrhosis, hepatocellular carcinoma, liver failure and liver-related death. Liver transplantation is currently the only treatment for advanced cirrhosis with liver failure.

At this time, there are no approved treatments by the FDA for NAFLD/NASH. Based on the current understanding of pathophysiological mechanisms associated with NASH, several compounds are in clinical development. The Clinical Trials website lists many trials for NASH. These compounds target the regulation of dyslipidemia (e.g., acetyl CoA carboxylase inhibitors, bile acid/fatty acid conjugates), inflammation (e.g., combined CCR2/CCR5 inhibitor) and/or

fibrosis (e.g., obeticholic acid). Recently, it was announced that obeticholic acid achieved statistically significant improvement in liver fibrosis without worsening of NASH in a Phase 3 study.

Gemcabene may be effective in treating patients for NASH given its mechanism of action around inflammation and triglycerides, especially for obese and diabetic patients. If approved, we expect gemcabene to be used as an oral combination with statins and other drugs approved for NASH with complementary mechanisms.

Atherosclerotic Cardiovascular Disease (ASCVD) and Heterozygous Familial Hypercholesterolemia (HeFH)

ASCVD and HeFH patients are at elevated risk of experiencing a cardiovascular event. Herein we combine these two groups of patients because historically they are frequently grouped together for the purposes of conducting clinical trials and seeking regulatory approvals.

ASCVD represents patients who have experienced or are at risk of a cardiovascular event and are unable to meet their LDL-C lowering goal of less than 70 mg/dL with maximally tolerated statin therapy. This population also includes many patients who, in addition to not being able to meet their LDL-C lowering goal, often have elevated triglyceride levels and may benefit in reduction of both their elevated LDL-C and TG from gemcabene. We estimate that approximately 10 million patients in the United States and 200 million patients in the rest of the world have a need for additional therapies to effectively and safely bring them closer to their LDL-C and triglyceride lowering goals.

The HeFH patient population is generally comprised of individuals who have one defective gene that leads to elevated LDL-C levels at or above 190 mg/dL. These patients are prone to premature cardiovascular events. The incidence of patients with HeFH is estimated to be approximately one in 200 to one in 500, and, accordingly, we estimate there are approximately 0.5 to 1.5 million patients with HeFH in the United States and 15 to 30 million in the rest of the world.

Currently approved treatments for both ASCVD and HeFH include statins, ezetimibe, bile acid sequestrants, niacin, fibrates and injectable PCSK9 inhibitors. While these drugs have demonstrated efficacy in lipid-lowering in this population, they do not sufficiently address the patients with mixed dyslipidemia who need to lower both LDL-C and triglycerides.

We believe that there is a meaningful number of underserved ASCVD/HeFH patients who are: (1) unable to reach LDL-C and triglyceride goals on maximally tolerated statin therapy; (2) require LDL-C reduction beyond the 6% reduction observed when statin dose is doubled; or (3) unable to tolerate higher doses of statins. Nonetheless, if gemcabene is ultimately approved for ASCVD/HeFH, it may potentially offer patients, especially cardiometabolic patients, a preferred well-tolerated combination therapy with a statin and/or ezetimibe that is convenient, oral, once-daily, cost effective, and impacts multiple factors, LDL-C, hsCRP and triglycerides, that all add to the residual cardiovascular risk in these patients. We believe obtaining approval for ASCVD/HeFH patient populations will enable gemcabene to reach a large market of patients with the inability to attain their LDL-C goal using current therapies (including high-intensity statins, ezetimibe and PCSK9 inhibitors).

Our Drug Product Candidate — Gemcabene

Our drug product candidate, gemcabene, is a novel, once-daily, oral therapy designed to target known lipid metabolic pathways to lower levels of LDL-C, hsCRP and triglycerides. Gemcabene shares many of the attributes of statin therapy, including broad therapeutic applications, convenient route of administration and cost-effective manufacturing process, but does not appear to increase the reporting of myalgia when added to statin therapy. Gemcabene has also shown additive LDL-C lowering in combination with stable low, moderate or high-intensity statin therapy.

We licensed global rights to gemcabene from Pfizer in April 2011. In the third quarter of 2018, the license with Pfizer was renegotiated providing three additional years for us to achieve our first commercial sale, by April 2024. We will continue to leverage the extensive preclinical, clinical, drug product development and manufacturing work previously conducted to further advance the development of gemcabene.

Mechanism of Action

Gemcabene mainly distributes to the liver where it has its effects as the active molecule. Gemcabene has a mechanism of action that involves: (1) enhancing the clearance of VLDL and (2) blocking the overall production of hepatic triglyceride

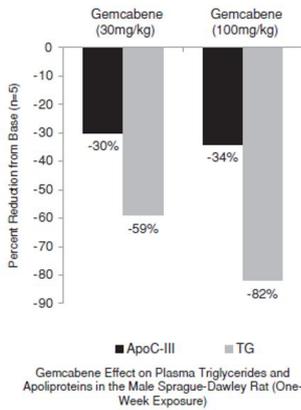
and cholesterol synthesis. Based on prior clinical trials, the combined effect for these mechanisms has been observed to result in a reduction of plasma VLDL-C, LDL-C, triglycerides and hsCRP, as well as an elevation of HDL-C.

In mixed dyslipidemia patients in the INDIGO-1 clinical trial, in addition to reducing LDL-C, gemcabene was shown to significantly reduce the level of non-HDL cholesterol, a fraction of plasma that contains extremely atherogenic VLDL-remnants, as well as VLDL-C, apoB, apoE and apoC-III. Reduction of non-HDL cholesterol is believed to reduce residual cardiovascular risk, the risk that still persists even though LDL-C may already be lowered. In addition, in INDIGO-1, in the mixed dyslipidemia patients, inflammation (also considered to contribute to residual risk) was also reduced by gemcabene, evidenced by a reduction in both hsCRP and serum amyloid A (SAA).

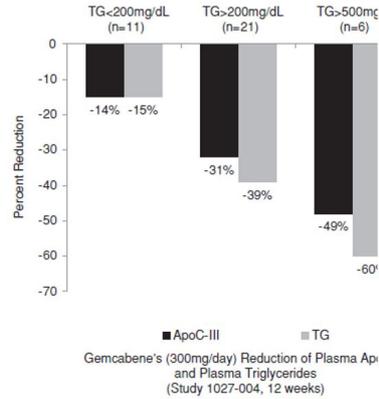
The pleiotropic actions of gemcabene are supported by the following preclinical and clinical observations:

- ApoC-III protein is known to be causal in cardiovascular disease. Gemcabene enhances VLDL clearance by decreasing apoC-III messenger RNA (mRNA) expression, thereby reducing apoC-III protein production and plasma levels. ApoC-III is a small protein (~9 kDa) that inhibits hepatic uptake of triglyceride-rich particles such as VLDL. VLDL lipoproteins are catabolized to VLDL remnants in plasma. The VLDL remnants are either cleared from the plasma via remnant receptors or are further catabolized to LDL. The reduction in apoC-III exposes apolipoprotein E (apoE), a 35 kDa protein that is also present on the VLDL lipoproteins and VLDL remnants. ApoE is essential for the normal catabolism of triglyceride-rich particles. This favors the enhanced clearance of the VLDL remnants via ApoE remnant receptors and reduces the formation of LDL particles, while also breaking down triglycerides by lipoprotein lipase to deliver more fatty acids to muscle and adipose tissue. We observed in preclinical studies that gemcabene significantly clears VLDL in the plasma with corresponding reductions in the liver apoC-III mRNA levels and apoC-III plasma protein levels in rats. In a hypertriglyceridemic human clinical trial, gemcabene was shown to significantly decrease both apoC-III and triglycerides.

Reduction of Plasma ApoC-III and TG



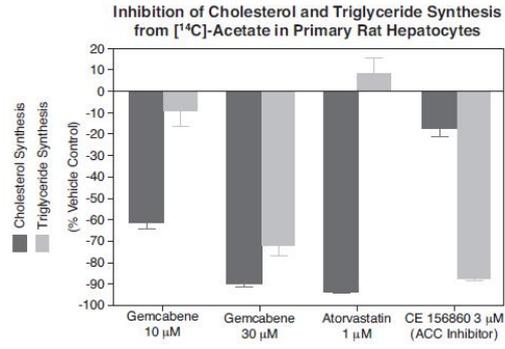
Reduction of Plasma ApoC-III and TG in Humans



- Gemcabene reduces *de novo* lipogenesis by inhibiting both hepatic cholesterol and TG synthesis, which lowers TG-rich lipoproteins (e.g., VLDLs) and their metabolic product (LDL) in the plasma. Gemcabene has been shown to inhibit radiolabeled acetate incorporation into TG and cholesterol in primary rat hepatocytes in culture and in the liver of mice, supporting gemcabene's mechanism of

action by inhibition of the synthesis of both fatty acids and cholesterol. Gemcabene may act as an inhibitor of Acetyl CoA Carboxylase (ACC), the rate-limiting enzyme in fatty acid synthesis, subsequently leading to a decreased hepatic triglyceride production.

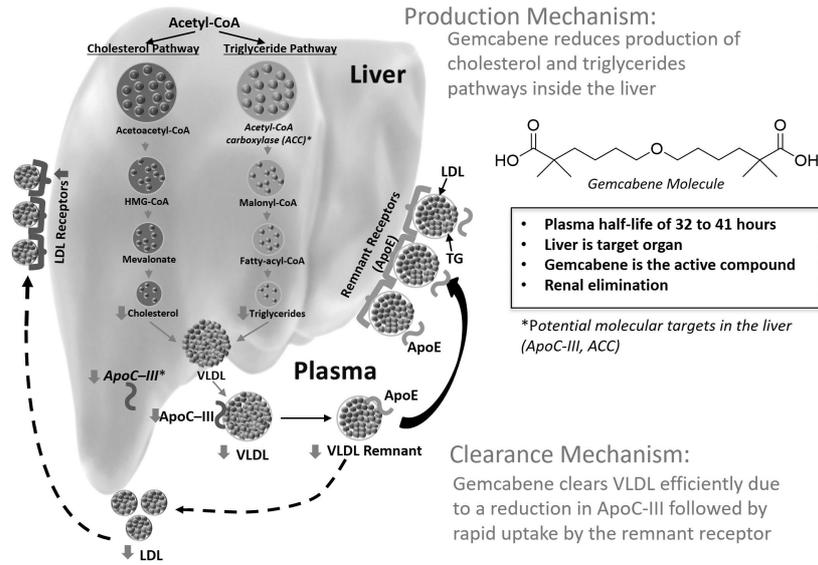
Gemcabene Inhibits *de novo* Synthesis of Both Cholesterol and Triglycerides



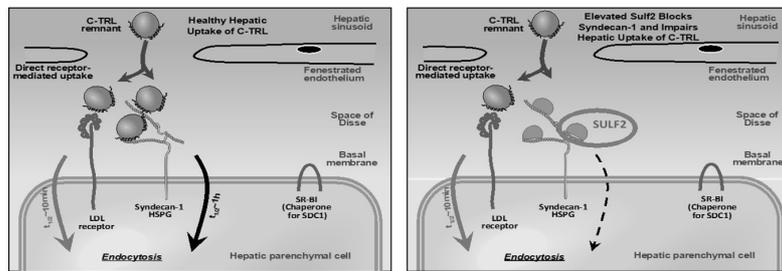
Source: Research Report 76100065

The diagram below depicts the novel mechanisms of gemcabene. We will continue to undertake preclinical studies to further clarify gemcabene's involvement in various metabolic pathways.

Gemcabene Novel Mechanism of Action



Gemcabene, which has been shown to lower plasma ApoB-lipoprotein concentrations in mice and in humans, appears to regulate remnant receptor via SULF2 in the liver, as illustrated in the diagram below. In the left panel of the diagram, under normal conditions, the VLDL remnant receptor, also known as syndecan-1, a receptor containing heparin sulfate proteoglycan, has a high capacity to bind and remove VLDL and VLDL remnants from circulating blood. Under normal conditions, the intrahepatic levels of the mRNA for the enzyme sulfatase-2 are low and likely allow syndecan-1 to maintain intact negatively charged sulfate groups that bind the positively charged apoE of VLDL and VLDL-remnants. In the right panel, in a disease such as diabetes, the intrahepatic mRNA levels of the enzyme sulfatase 2 levels are highly elevated and may cause reduced levels of syndecan-1 sulfation, and thereby lessen the capacity of the receptor to bind and remove VLDL and VLDL remnants from the circulation. In diabetic mice, gemcabene has been shown to markedly reduce elevated hepatic sulfatase-2 mRNA levels and plasma triglycerides.



In addition, we believe gemcabene may result in the reduction of inflammation, inflammatory markers and triglycerides (as a result of reduced apoC-III production) in the plasma of a patient in an inflammatory state. C-reactive Protein (CRP) is an inflammatory marker protein. CRP levels increase in response to inflammatory states and are associated with medical conditions such as atherosclerosis and other cardiovascular diseases, arthritis, hypertension, obesity, insulin resistance, and fatty liver disease. CRP expression is regulated by proteins in the nucleus of cells known as nuclear hormone receptors (NHRs). In inflammatory states, cytokines, such as interleukin-6 (IL-6) and interleukin (IL-1 β), activate NHRs, such as C/EPB- β , C/EPB- δ and nuclear factor kappa B (NF- κ B), and lead them to bind to the CRP promoter and increase CRP mRNA production. Based on preclinical studies, gemcabene may inhibit the interaction of these NHRs on the CRP promoter and therefore reduce CRP mRNA production. Gemcabene has also been shown in preclinical studies to inhibit tissue necrosis factor- α (TNF- α) induced expression of the inflammatory cytokine IL-6 in human coronary artery endothelial cells and in a human hepatoma cell line. Overall, gemcabene may not only decrease the expression of CRP, but may also decrease the expression of the inflammatory cytokine IL-6 resulting in a reduction of inflammation. Gemcabene has been shown to reduce the level of CRP in human clinical trials, to decrease inflammation in a mouse model of arthritis, in a mouse model of NASH, and to decrease pain in a rat model of thermal hyperalgesia.

The apoC-III promoter also contains a NF- κ B binding site, and as such, the apoC-III gene may be upregulated under a chronic inflammatory state. Gemcabene's ability to reduce apoC-III mRNA levels may result from gemcabene inhibiting NF- κ B interaction with its binding site on the apoC-III promoter. *In vitro* transactivation assays in multiple species including humans and mice, gemcabene did not directly activate PPARs.

Clinical Experience with Gemcabene

Gemcabene has been assessed in 25 Phase 1 and Phase 2 clinical trials. Across these trials, over 1,500 adult subjects have participated, including healthy volunteers and patients with various underlying conditions (see summary table below). Of these subjects, over 1,100 have been exposed to at least one dose of gemcabene.

We believe that gemcabene's efficacy across the clinical and non-clinical trials support our development plan focused initially on orphan indications such as HoFH, FCS, and FPL disease with subsequent potential expansion into broader indications such as HeFH and ASCVD, SHTG, as well as mixed dyslipidemia and possibly nonalcoholic steatohepatitis/non-alcoholic fatty liver disease (NASH/NAFLD).

Across the company-sponsored clinical trials, gemcabene was observed to be well tolerated at single doses up to 1,500 mg and multiple doses up to 900 mg/day. Safety of the subjects in these trials was evaluated by AE monitoring, clinical laboratory assessments, electrocardiograms (ECGs), physical examinations, and vital sign assessments. Across all trials, 10 gemcabene treated healthy volunteers or patients reported a treatment-emergent SAE, none of which were considered by the clinician to be related to gemcabene. No deaths occurred in any of the trials. AEs reported were generally mild to moderate in intensity with the most common events being headache, weakness, nausea, dizziness, upset stomach, infection and abnormal bowel movements. Gemcabene, when compared with placebo, was not associated

with an increased incidence of myalgia or liver enzyme elevations, whether as monotherapy or in combination with statin therapy. Elevated levels of liver enzymes, specifically alanine transaminase (ALT) and/or aspartate aminotransferase (AST), were observed in three patients (0.27% of gemcabene treated subjects). These three patients had ALT or AST levels more than three times the upper limit of normal (ULN) returning to near baseline after cessation of treatment. Small mean increases in serum creatinine and blood urea nitrogen (BUN) have been observed in some trials. The increase in creatinine values was reversible returning to baseline within approximately four weeks of cessation of gemcabene. No clinically meaningful changes were observed in physical examinations or vital signs, including blood pressure.

In addition, gemcabene demonstrated promising clinical pharmacology attributes across 15 completed company-sponsored Phase 1 trials in healthy subjects, such as once-daily dosing, no meaningful drug-drug interactions with high-intensity statins and no observed food effect. Gemcabene can be taken with or without food. Gemcabene was observed to: (1) be rapidly absorbed following oral administration with time of maximum concentration within two hours and (2) reach maximum plasma concentration (C_{max}) and area under the curve over 24 hours (AUC_{0-24}) that were dose proportional following both single- and multiple-dose administration. Steady state concentrations were achieved within six days of repeated dose administration. Average half-life ranged from 32 to 41 hours. Gemcabene's primary route of elimination was renal. No significant drug-drug interactions (DDIs) were observed with digoxin, a cardiovascular drug for the treatment of atrial fibrillation, statins (atorvastatin, simvastatin and rosuvastatin) used as background therapy in patients with HoFH, HeFH and many SHTG patients. In addition, no significant DDIs were observed with oral contraceptives (such as ethinyl estradiol/norethindrone) nor drugs that are probes for renal transporters including metformin, furosemide and rosuvastatin. There were no observed clinically relevant effects on QTc, a measure of cardiac rhythm, and no observed clinically relevant effects on blood pressure. Trials in subjects with varying degrees of renal insufficiency (RI) and hepatic insufficiency (HI) showed that overall exposure and $t_{1/2}$ increased incrementally with each relative increase in renal impairment and plasma concentration of gemcabene was unchanged in subjects with mild and moderate HI. No gemcabene dose adjustments were recommended for patients with mild RI or mild/moderate HI; however, gemcabene should be dose adjusted in patients having moderately impaired renal function. The use of gemcabene should be avoided in subjects with severe RI or HI. An iohexol trial conducted to evaluate the effect of gemcabene on GFR showed an historically observed increased serum creatinine was most likely due to a hemodynamic change rather than a direct nephrotoxic etiology.

Company-Sponsored Phase 2 Clinical Trials

Gemcabene has been evaluated in ten company-sponsored Phase 2 trials across a diverse patient population. These trials explored safety, tolerability and efficacy using multiple doses of gemcabene as monotherapy and in combination with low-, moderate- and high-intensity statins. In company-sponsored Phase 2 trials, patients treated with gemcabene were observed to have significantly lowered LDL-C, hsCRP and triglycerides with results from the trials summarized in the table below followed by text descriptions for a subset of these trials (indicated by underlined Trial Number):

Summary of Phase 2 Completed Clinical Trials with Gemcabene

Trial Number	Patient / Indication	Trial Objectives	Doses	# Patients	Duration	Key Lipid and Other Endpoints
1027-004	Low HDL-C and normal or elevated TG (including SHTG)	Double-blind, placebo-controlled, randomized trial to determine the efficacy and safety of gemcabene in patients with low HDL-C and either normal or elevated triglycerides	150, 300, 600, 900 mg	GEM=129 placebo=32	12 weeks	HDL-C, TG, LDL-C, hsCRP, apoB, Total cholesterol
1027-012	Hypertension	Double-blind, placebo-controlled, randomized trial to determine the effect of gemcabene compared to quinapril	900 mg (with quinapril 20 mg)	GEM=43 quinapril=18 placebo=41	12 weeks	Systolic BP, Diastolic BP
1027-014	Healthy Obese Non-diabetic	Double-blind, placebo-controlled, randomized trial to determine the effect of gemcabene on insulin sensitivity	900 mg	GEM=26 placebo=27	4 weeks	Insulin sensitivity
1027-015	Hypertension	Double-blind, placebo-controlled, randomized trial to determine the effect of gemcabene on blood pressure	900 mg	GEM=23	4 weeks	Systolic BP, Diastolic BP
1027-018	Hypercholesterol-emia (not at goal on stable statin)	Double-blind, placebo-controlled, randomized trial to determine the efficacy and safety of gemcabene on stable statin therapy	300, 900 mg (with various low, moderate and high intensity statins)	GEM=42 placebo=24	8 weeks	LDL-C, hsCRP, apoB, TG, HDL-C, VLDL, Total cholesterol
A4141001	Hypercholesterol-emia	Double-blind, placebo-controlled, randomized trial to determine the efficacy and safety of gemcabene as monotherapy or in combination with atorvastatin (after statin washout)	300, 600, 900 mg (with 10, 40, 80 mg atorvastatin)	GEM=208 atorvastatin=52 placebo=17	8 weeks	LDL-C, hsCRP, apoB, TG, HDL-C, Total cholesterol
A4141004	Osteoarthritis	Double blind, placebo controlled, randomized trial to determine the efficacy and safety of gemcabene in patients with osteoarthritis of the knee	150, 450, 900 mg (with rofecoxib 25 mg)	GEM=242 rofecoxib=7-9 placebo=83	4 weeks	Pain assessment, CGIC, PGIC, SODA
GEM-201 (COBALT-1)	HoFH	Open-label, dose-finding trial assessed the efficacy, safety, and tolerability of gemcabene in patients with HoFH on stable, lipid-lowering therapy	300, 600, 900 mg	GEM=8	12 weeks	LDL-C, hsCRP, apoB, TG, HDL-C, VLDL, Total cholesterol
GEM-301 (ROYAL-1)	Hypercholesterolemia on High- and Moderate-Intensity Statins	Double blind, placebo controlled, randomized trial to determine safety and efficacy of gemcabene on background high- and moderate-intensity statin therapy.	600 mg	GEM=53 Placebo=52	12 weeks	LDL-C, hsCRP, apoB, TG, non-HDL-C, VLDL, Total cholesterol
GEM-401 (INDIGO-1)	Severe Hypertriglyceridemia	Double blind, placebo controlled, randomized trial to determine safety and efficacy of gemcabene in patients with severe hypertriglyceridemia (TG > 500 mg/dL).	300, 600 mg	GEM=30 Placebo=61	12 weeks	TG, LDL-C, hsCRP, apoB, non-HDL-C, VLDL, Total cholesterol

SODA=Sequential occupational dexterity assessment, PGIC=Patients global impression of change, CGIC=Clinical global impression of change, GEM=gemcabene; TG=triglycerides.

Gemcabene Phase 2 Trial in Patients with HoFH (GEM-201, COBALT-1)

This Phase 2 open-label, dose-finding trial assessed the efficacy, safety, and tolerability of gemcabene in patients with HoFH on stable, lipid-lowering therapy. COBALT-1 was a 12-week, dose-escalation trial with n=8 patients with a diagnosis of HoFH by genetic confirmation (including heterozygosity) or a clinical diagnosis based on either: (1) A history of an untreated LDL-C concentration >500 mg/dL (12.92 mmol/L) together with either appearance of xanthoma before 10 years of age, or evidence of heterozygous familial hypercholesterolemia in both parents; or (2) if history is unavailable, LDL-C >300 mg/dL (7.76 mmol/L) on maximally tolerated lipid-lowering drug therapy. Successive escalating doses of 300mg, 600mg, 900mg gemcabene were given every four weeks.

Efficacy: Patients were administered oral gemcabene once daily, with dosage escalating from 300 mg to 600 mg and then 900 mg every 4 weeks, for a total duration of 12 weeks. On various baseline aggressive lipid lowering therapies, the eight FH patients had a mean baseline LDL-C level of 351 mg/dl prior to add-on gemcabene treatment. Treatment with gemcabene 600 mg, the Company’s target commercial dose, resulted in an absolute reduction of 93 mg/dL for the overall population and 92 mg/dL and 94 mg/dL for the HoFH and HeFH patients, respectively. The results for the primary endpoint of mean percent change in LDL-C from baseline at each dose and related time point are presented below.

Primary Endpoint: Change in LDL-C mg/dL Levels by Dose of Gemcabene			
	300 mg, week 4	600 mg, week 8	900 mg, week 12
Overall population (n=8)	-25% p=0.0063	-30% p=0.0047	-29% P=0.0035
HeFH (n=5)	-34% p< 0.0001	-39% p< 0.0001	-40% p< 0.0001
HoFH (n=3)	-10% p=0.3601	-15% p=0.1920	-12% p=0.2912

As shown the table below, gemcabene impacted multiple secondary endpoints, showing reductions from baseline in total cholesterol (TC), triglycerides (TG), non-HDL, apoB, apoE, high sensitivity C-Reaction Protein (hsCRP), and other relevant biomarkers. Importantly, gemcabene 600 mg showed a 34.7% reduction in hsCRP.

% Change in Secondary Endpoints by Dose			
	Gemcabene 300 mg Week 4	Gemcabene 600 mg Week 8	Gemcabene 900 mg Week 12
	% Change from Baseline	% Change from Baseline	% Change from Baseline
Total Cholesterol (mg/dL)	-21.3%	-24.6%	-24.6%
Non-HDL-C (mg/dL)	-23.8%	-27.2%	-26.5%
ApoB (mg/dL)	-18.8%	-24.8%	-22.4%
ApoE (mg/dL)	-19.5%	-23.0%	-19.2%
ApoC-III (mg/dL)	-7.8%	-9.7%	-6.5%
VLDL-C (mg/dL)	-13.5%	-8.4%	-7.2%
Triglycerides (mg/dL)	-12.6%	-9.1%	-7.2%
HDL-C (mg/dL)	-11.9%	-13.3%	-12.9%
hsCRP* (mg/dL)	34.0%	-34.7%	-27.9%

Safety: Safety was assessed by adverse event (AE) monitoring, clinical laboratory assessments, electrocardiograms, physical examinations and vital signs. AEs were mild to moderate in intensity across all doses of gemcabene and

consistent with previously reported AEs. The majority of AEs were gastrointestinal. There were no serious AEs or withdrawals due to AEs in the COBALT-1 trial. There was no evidence of hepatic or muscle injury in the trial.

Gemcabene Phase 2 Trial in Patients with Hypercholesterolemia on High- and Moderate-Intensity Statin Therapy (GEM-301, ROYAL-1)

ROYAL-1 was designed to largely address the safety of gemcabene in patients on the highest doses of statins. In patients with hypercholesterolemia, despite being on moderate and high-intensity statins, gemcabene produced significant reductions in both atherogenic and inflammatory markers without evidence of increased muscle or liver toxicities. A total of 105 hypercholesterolemic patients, including ASCVD or HeFH, were randomized 1:1 to either gemcabene 600 mg or placebo with 50 (24 gemcabene 600 mg; 26 placebo) patients on baseline high-intensity statins (atorvastatin 40 mg or 80 mg QD; or rosuvastatin 20 mg or 40 mg QD) and 55 (29 gemcabene 600 mg; 26 placebo) patients on baseline moderate-intensity (MI) statins (atorvastatin 10 mg or 20 mg QD; rosuvastatin 5 mg or 10 mg QD; or simvastatin 20 or 40 mg QD). Baseline LDL-C was 127 mg/dL and 134 mg/dL in the moderate and high-intensity statin stratum, respectively. The double-blind treatment phase of the trial was 12 weeks.

Efficacy: Top-line data for ROYAL-1 showed gemcabene produced a mean percent decrease of 17% in LDL-C (vs 5% for placebo) and a median percent decrease of 40% in hsCRP (vs 6% for placebo). Gemcabene reduced LDL-C by 20% and hsCRP by 53% when added to moderate intensity statin therapy. Greater effects were observed in a cardiometabolic population, patients with mixed dyslipidemia, who have a particularly high atherogenic particle burden. In the mixed dyslipidemia group of patients, gemcabene 600 mg demonstrated a placebo adjusted LDL-C reduction of 23% ($p < 0.05$). Consistent with the mechanism of action of gemcabene, patients with mixed dyslipidemia showed greater reductions in LDL-C, non-HDL-C, ApoB, ApoE and TG of 23%, 19%, 26%, 34% and 33%, respectively.

Safety: Overall, gemcabene was well tolerated with a profile consistent with earlier trials. There were no SAEs and no deaths reported in the trial. 33 of 54 patients (61.1%) in the gemcabene group and 24 of 51 patients (47.1%) in the placebo group who reported at least one AE during the trial. The most prevalent AEs were those associated with infections. Reported AEs were similar for the MI and HI statin strata. There was no difference in myalgias between placebo and gemcabene groups. There were no transaminase elevations $> 3 \times$ ULN and no clinically significant CK elevations.

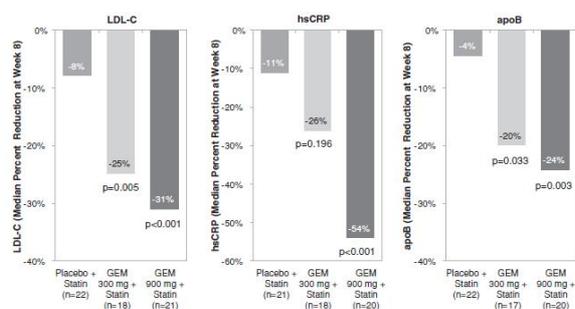
Gemcabene Phase 2 Trial in Patients with Hypercholesterolemia on Stable Statin Therapy (Trial 1027-018)

This Phase 2 double-blind, placebo-controlled, randomized trial in patients with hypercholesterolemia was designed to assess the efficacy and safety of gemcabene when added to stable statin therapy. A majority of the patients were on moderate- to high-intensity statin therapy for at least three months (high $\approx 20\%$, mod $\approx 60\%$ and low $\approx 20\%$). Gemcabene was administered at 300 mg and 900 mg once-daily for eight weeks. The primary endpoint was median percent change from baseline in LDL-C. Other endpoints included median percent change from baseline in hsCRP, apoB, total cholesterol, VLDL-C and triglycerides at Week 8. A total of 66 patients were randomized and 61 patients were evaluated for efficacy. Baseline LDL-C levels were similar across the treatment arms at approximately 150 mg/dL.

Efficacy: As presented in the figure below, patients treated with gemcabene were observed to have significantly lowered LDL-C from baseline at 300 mg and 900 mg by 25% ($p=0.005$) and 31% ($p<0.001$), respectively. Patients treated with gemcabene were also observed to have significantly lowered hsCRP, apoB and total cholesterol. At 900 mg, patients treated with gemcabene demonstrated significantly lowered hsCRP by 54% ($p<0.001$). At 300 mg and 900 mg, patients treated with gemcabene demonstrated significantly lowered apoB by 20% ($p=0.033$) and 24% ($p=0.003$), respectively. At 300 mg and 900 mg, patients treated with gemcabene demonstrated significantly lowered total cholesterol by 18% ($p=0.008$) and 22% ($p<0.001$), respectively. It was further observed that all four (4) patients treated with 900 mg gemcabene on high-intensity statins have a mean LDL-C reduction of 24%.

We believe these results support the continued development of gemcabene for the treatment HoFH and HeFH indications on maximally tolerated statins. Classification of statin dose intensity is defined in the 2013 ACC guidelines.

Median Percent Change from Baseline at Week 8 in Patients with Hypercholesterolemia on Background Stable Statin Therapy



LDL-C Median Percent Change from Baseline at Week 8 in Patients with Hypercholesterolemia on Background Stable Statin Therapy

	Placebo + Statin	GEM 300 mg + Statin	GEM 900 mg + Statin
n	22	18	21
Median Baseline LDL-C	153.3	143.5	142.5
Median Week 8 LDL-C	137	101.5	103
Median % Change	-7.9%	-24.8%	-31.0%
p-Value vs. Placebo	N/A	0.005	<0.001

*N/A = not applicable

Safety: Gemcabene was observed to be well tolerated. Patients taking either 300 mg or 900 mg of gemcabene were observed to have a safety profile similar to that of placebo (300 mg: 20%; 900 mg: 23%; placebo: 29%). One patient experienced an SAE in the gemcabene 900 mg treatment arm, which was not considered related to treatment. Three patients (placebo: 2, gemcabene 300 mg: 1) withdrew from the trial due to an AE, all of which were considered possibly related to treatment. AEs reported were generally mild to moderate in intensity. The most frequent AE in the placebo arm was infection (13%). The most frequent AEs in the gemcabene treatment arms were headache (10%) and infection (10%). There were no meaningful changes in liver enzymes ALT and AST. One patient in the 300 mg gemcabene treatment arm had a single laboratory assessment with a rise in creatine kinase of 5 × upper limit of normal (ULN). No clinically meaningful changes in physical examinations or vital signs from baseline to the end of the trial were observed for any patient.

Gemcabene Phase 2 Trial in Patients with Hypercholesterolemia (Trial A4141001)

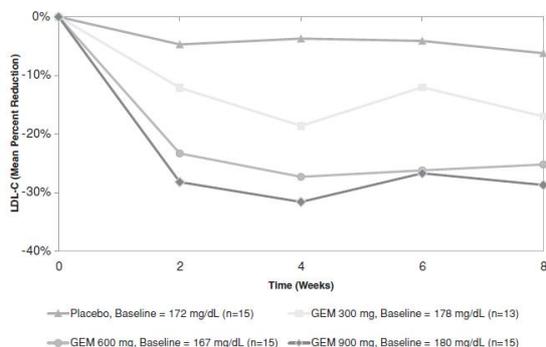
This Phase 2 double-blind, placebo-controlled, randomized trial was designed to assess the efficacy and safety of gemcabene administered as monotherapy, atorvastatin monotherapy or gemcabene initiated simultaneously in combination with atorvastatin in the treatment of patients with hypercholesterolemia. When applicable, patients were washed out of statins and other lipid-lowering therapies. Gemcabene was administered as monotherapy once-daily at 300 mg, 600 mg or 900 mg or in combination with atorvastatin once-daily at 10 mg, 40 mg and 80 mg. The primary endpoint was percent change in LDL-C from baseline at Week 8. Secondary endpoints included percent change in hsCRP, apoB, HDL-C and triglycerides from baseline at Week 8. A total of 277 patients were randomized and 255 patients with at least one post baseline assessment were included in the efficacy analysis. Baseline LDL-C levels for the evaluable patients after washout were similar across treatment arms at approximately 175 mg/dL.

Efficacy: As presented in the figure below, patients treated with gemcabene were observed to have significantly lowered LDL-C by 17% ($p=0.0013$), 26% ($p=0.0001$) and 29% ($p=0.0001$) as monotherapy at 300 mg, 600 mg and 900 mg, respectively. The LDL-C lowering effect was seen within two weeks and was stable for the duration of the eight week trial. It is important to note that the patients included in this trial were statin responsive (able to reach goal near or below 100 mg/dL) at 10 mg, 40 mg and 80 mg atorvastatin monotherapy. While the trial demonstrated gemcabene provided additional dose dependent LDL-C lowering (statistically significant at 600 mg and 900 mg when compared to atorvastatin alone), the gemcabene treatment effect was less pronounced due to the patients already being at or below LDL-C goal of 100 mg/dL on atorvastatin monotherapy. Patients treated with gemcabene were observed to have lowered hsCRP by 26% ($p=0.1612$), 42% ($p=0.0070$) and 35% ($p=0.0018$) as monotherapy at 300 mg, 600 mg and 900 mg, respectively.

Patients treated with gemcabene in combination with atorvastatin aggregated over the dose range were observed to have mean LDL-C lowering of 50% ($p=0.0852$), 52% ($p=0.0045$) and 54% ($p=0.0006$) at 300 mg, 600 mg and 900 mg, respectively. Patients treated with gemcabene in combination with atorvastatin aggregated over the dose range were observed to have median hsCRP lowering of 47% ($p=0.0237$), 54% ($p=0.0017$) and 60% ($p=0.0001$) at 300 mg, 600 mg and 900 mg, respectively.

We believe these results support the continued development of gemcabene for the treatment HoFH, HeFH and ASCVD indications including mixed dyslipidemia.

LDL-C Mean Percent Change from Baseline in Patients with Hypercholesterolemia (with wash-out of statins)



Safety: Gemcabene was observed to be well tolerated. Patients taking any dose of gemcabene (300 mg, 600 mg or 900 mg) were observed to have a safety profile similar to that of atorvastatin monotherapy. A similar percentage of patients experienced an associated AE between placebo (18%), atorvastatin monotherapy arms (14%) compared to gemcabene monotherapy (18%) and gemcabene plus atorvastatin treatment arms (17%). Three patients in the gemcabene plus atorvastatin arm experienced a SAE, none of which were considered related to treatment. 16 patients (placebo: 1, atorvastatin monotherapy: 2, gemcabene monotherapy: 6, gemcabene plus atorvastatin: 7) withdrew from the trial due to AEs, nine (atorvastatin monotherapy: 2, gemcabene monotherapy: 4, gemcabene plus atorvastatin: 3) of which were considered possibly related to treatment. AEs reported were generally mild to moderate in intensity. 14 patients (placebo: 1, atorvastatin monotherapy: 2, gemcabene monotherapy: 1, gemcabene plus atorvastatin: 10) reported an AE considered severe in intensity, one (gemcabene plus atorvastatin: 1) of which was considered possibly related to treatment. The most frequently occurring AEs across all treatment arms were infection (8%), pain (6%) and headache (6%). Small mean increases in serum creatinine and BUN were observed in the gemcabene monotherapy arms. One patient treated with 600 mg gemcabene plus atorvastatin had a clinically significant ALT elevation ($>3 \times$ ULN on two separate occasions) that returned to near normal levels while treatment continued. No other patient had a pre-specified clinically significant lab abnormality in ALT, AST, creatine kinase or serum creatinine. No clinically meaningful

changes in physical examinations or vital signs from baseline to the end of the trial were observed for any patient. The AEs experienced by more than 10% of patients in any treatment group are summarized below.

**Adverse Events by Body System Occurring With \geq 10% of Patients in
Any Treatment Group for Trial A4141001**

AE Category	Pbo N=17	Atorvastatin Mono			Gemcabene 300 mg + Atorvastatin				Gemcabene 600 mg + Atorvastatin				Gemcabene 900 mg + Atorvastatin			
		10 mg N=17	40 mg N=18	80 mg N=17	Mono N=16	10 mg N=17	40 mg N=18	80 mg N=18	Mono N=18	10 mg N=18	40 mg N=16	80 mg N=18	Mono N=17	10 mg N=18	40 mg N=16	80 mg N=18
		All Adverse Events	5 (29)	4 (24)	5 (28)	4 (24)	5 (31)	3 (18)	5 (28)	4 (22)	7 (39)	7 (39)	4 (25)	4 (22)	4 (24)	5 (28)
Body as a whole	0 (0)	0 (0)	1 (6)	2 (11)	0 (0)	0 (0)	0 (0)	0 (0)	1 (6)	2 (11)	0 (0)	1 (6)	1 (6)	0 (0)	1 (6)	0 (0)
Asthenia	0 (0)	0 (0)	1 (6)	2 (11)	0 (0)	0 (0)	0 (0)	0 (0)	1 (6)	2 (11)	0 (0)	1 (6)	1 (6)	0 (0)	1 (6)	0 (0)
Back Pain	0 (0)	0 (0)	1 (6)	0 (0)	0 (0)	0 (0)	1 (6)	1 (6)	1 (6)	2 (11)	0 (0)	2 (11)	0 (0)	0 (0)	1 (6)	0 (0)
Headache	0 (0)	1 (6)	3 (17)	1 (6)	1 (6)	0 (0)	1 (6)	0 (0)	1 (6)	2 (11)	1 (6)	1 (6)	1 (6)	2 (11)	0 (0)	1 (6)
Infection	3 (18)	1 (6)	1 (6)	0 (0)	3 (19)	1 (6)	1 (6)	1 (6)	3 (17)	2 (11)	0 (0)	0 (0)	0 (0)	2 (11)	1 (6)	3 (17)
Pain	0 (0)	2 (12)	1 (6)	0 (0)	0 (0)	1 (6)	3 (17)	1 (6)	2 (11)	1 (6)	1 (6)	0 (0)	0 (0)	1 (6)	1 (6)	2 (11)
Digestion	2 (12)	2 (12)	5 (28)	3 (18)	3 (31)	3 (18)	4 (22)	3 (17)	4 (22)	5 (28)	3 (19)	4 (22)	4 (24)	3 (17)	0 (0)	3 (17)
Constipation	1 (6)	1 (6)	3 (17)	0 (0)	0 (0)	2 (12)	1 (6)	1 (6)	1 (6)	1 (6)	1 (6)	1 (6)	1 (6)	1 (6)	0 (0)	0 (0)
Diarrhea	1 (6)	0 (0)	0 (0)	3 (15)	2 (13)	0 (0)	1 (6)	0 (0)	1 (6)	1 (6)	1 (6)	1 (6)	0 (0)	0 (0)	0 (0)	0 (0)
Dyspepsia	0 (0)	1 (6)	0 (0)	0 (0)	1 (6)	1 (6)	0 (0)	1 (6)	0 (0)	1 (6)	1 (6)	2 (11)	1 (6)	0 (0)	0 (0)	0 (0)
Flatulence	1 (6)	0 (0)	1 (6)	0 (0)	2 (13)	0 (0)	1 (6)	1 (6)	1 (6)	1 (6)	0 (0)	0 (0)	0 (0)	1 (6)	0 (0)	0 (0)
Musculoskeletal	0 (0)	0 (0)	1 (6)	1 (6)	2 (13)	0 (0)	2 (11)	2 (11)	0 (0)	1 (6)	1 (6)	0 (0)	3 (18)	1 (6)	0 (0)	2 (11)
Nausea	1 (6)	2 (12)	3 (17)	2 (12)	0 (0)	0 (0)	2 (11)	2 (11)	0 (0)	3 (17)	3 (19)	0 (0)	0 (0)	3 (17)	0 (0)	0 (0)
Arthralgia	0 (0)	2 (12)	2 (11)	0 (0)	0 (0)	0 (0)	1 (6)	0 (0)	0 (0)	1 (6)	2 (13)	0 (0)	0 (0)	2 (11)	0 (0)	0 (0)
Myalgia	0 (0)	1 (6)	1 (6)	1 (6)	0 (0)	0 (0)	0 (0)	1 (6)	0 (0)	2 (11)	1 (6)	0 (0)	0 (0)	1 (6)	0 (0)	0 (0)

AE = adverse event; Mono = monotherapy; Pbo = placebo.
Source: Report A4141001, Table 40 (Cowmeadow et al., 2003)

Gemcabene Phase 2 Trial in Patients with Elevated Triglycerides (Trial 1027-004)

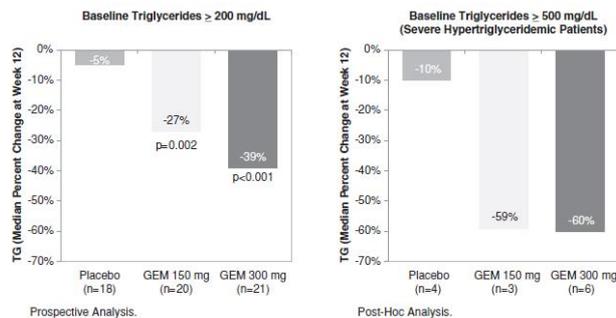
This Phase 2 double-blind, placebo-controlled, randomized trial was designed to assess the efficacy and safety of gemcabene in patients with low HDL-C and either normal or elevated triglycerides. Gemcabene was administered at 150, 300, 600 and 900 mg once-daily for 12 weeks. The objectives of this trial were to evaluate percentage change from baseline in HDL-C, LDL-C, triglycerides and other lipids and apolipoprotein variables at Week 12. A total of 161 patients were randomized. At baseline, 67 patients were normotriglyceridemic (<200 mg/dL) and 94 patients were hypertriglyceridemic (≥ 200 mg/dL). Baseline triglycerides were approximately 370 mg/dL across the treatment arms with hypertriglyceridemia with the exception of the 600 mg treatment arm (580 mg/dL). A total of 155 patients (89 hypertriglyceridemic patients) had a post randomization assessment to be evaluated for efficacy. Baseline LDL-C levels for the evaluable patients, regardless of the triglyceride stratum, were similar across the treatment arms at approximately 110 mg/dL.

Efficacy: As presented in the figure below, patients with triglyceride levels greater than 200 mg/dL (hypertriglyceridemic patients), treated with gemcabene at 150 mg and 300 mg were observed to have lowered triglycerides by 27% ($p=0.002$) and 39% ($p<0.001$), respectively compared to baseline. Although patients treated with gemcabene at 600 mg and 900 mg were observed to have lower triglycerides, the lowering effect was not significant when compared to placebo. Therefore, the anticipated dose for treatment of patients with elevated triglyceride levels is 150 mg or 300 mg. Notably, patients treated with gemcabene were observed to have significantly lowered LDL-C by 19% ($p<0.001$) and 20% ($p<0.001$) at 600 mg and 900 mg, respectively, compared to baseline.

A post-hoc analysis of the nine patients with severe triglyceride levels (≥ 500 mg/dL; baseline means of two weeks prior and time zero was approximately 600 mg/dL) treated with 150 mg and 300 mg suggest gemcabene has the potential to lower triglycerides by as much as 60%.

We believe these results support the continued development of gemcabene for the treatment SHTG and ASCVD patients with mixed dyslipidemia.

Triglyceride Median Percent Change from Baseline at Week 12 in Patients with High to Severe Hypertriglyceridemia



Safety: Gemcabene was observed to be well tolerated. Patients taking any dose of gemcabene (150 mg, 300 mg, 600 mg or 900 mg) were observed to have a safety profile similar to that of placebo. Fewer patients experienced an associated AE in the placebo arm (9%) compared to gemcabene treatment arms (17%). Three patients (placebo: 1, gemcabene: 2) experienced SAEs, none of which were considered related to treatment. Six patients (placebo: 2, gemcabene: 4) withdrew from the trial due to AEs, four (placebo: 1, gemcabene: 3) of which were considered possibly related to treatment. AEs reported were generally mild to moderate in intensity. Two patients (placebo: 1, gemcabene: 1) reported an AE considered severe in intensity. The most frequent AEs in the placebo arm were infection (16%), accidental injury (6%), back pain (6%), dyspepsia (6%), headache (6%) and sinusitis (6%). The most frequently observed AEs in the gemcabene arms were infection (12%), headache (7%) and asthenia (5%). Two patients had ALT values that met the definition of a clinically important laboratory abnormality (placebo: 1, 600 mg gemcabene: 1). One patient had elevated BUN values considered clinically significant (600 mg gemcabene: 1). All of these laboratory abnormalities were considered mild to moderate. No clinically meaningful changes in physical examinations or vital signs from baseline to the end of the trial were observed for any patient.

Gemcabene Phase 2 Trial in Patients with Severe Hypertriglyceridemia (GEM-401, INDIGO-1)

Trial GEM-401 was a 12-week, randomized, double-blind, placebo-controlled, parallel-group, multicenter trial designed to evaluate the efficacy, safety, and tolerability of gemcabene administered orally to patients with severe hypertriglyceridemia. Patients were required to be on a self-reported, stable, low-fat, low-cholesterol diet and if on a stable dose of statins and/or ezetimibe (10 mg), statins and ezetimibe must have been started at least 12 weeks prior to the Screening Visit (S1). Patients were eligible for enrollment if they had a mean fasting TG value ≥ 500 mg/dL to < 1500 mg/dL. A total of 91 patients were randomized and treated (30 to the gemcabene 300 mg group, 30 to the gemcabene 600 mg group, and 31 in the placebo group). Of these, 89 patients completed the trial.

Baseline characteristics were similar between treatment groups and across statin strata with the exception of a higher number of female patients in the placebo group. Mean baseline TG was slightly higher in the placebo group (658.33 mg/dL) than in the gemcabene groups (641.17 mg/dL and 637.00 mg/dL in the 300 mg and 600 mg groups, respectively). There were 47 patients on stable statins and 44 patients not on stable statin.

Efficacy: The median percent change in TG from baseline was -47.32% (p = 0.0063) versus a change of -27.30% with placebo. In the gemcabene 300 mg group, treatment with gemcabene demonstrated a clinically significant, statistically non-significant TG lowering with a median percent change in TG from baseline of -32.95% (ranked ANCOVA p = 0.2350). The table below presents the percent change in TG from baseline to the End of Study (EOS) for Trial GEM-401.

Percent Change in Serum Triglycerides from Baseline to End of Trial for GEM-401 ANCOVA, FAS, LOCF

Lipid Parameter Statistic	Placebo (N = 31)	Gemcabene 300 mg QD (N = 30)	Gemcabene 600 mg QD (N = 30)
TG			
Median baseline ^a (mg/dL)	658.33	641.17	637.00
Median EOS ^b (mg/dL)	538.00	477.00	332.75
Median Percent Change (%)	-27.30	-32.95	-47.32
Ranked ANCOVA p-value ^c		0.2350	0.0063
Median difference estimate ^d		-7.63	-19.02

a. Baseline = average of Screening Visits (S1 and S2) or (S2 and S3) and Trial Day 1 (pre-dose) values, with each given equal weight.

b. EOS is the average of Week 10 and Week 12. If either Week 10 or Week 12 value is missing, then the single value (Week 10 or Week 12) is used. If both Week 10 and Week 12 values are missing, LOCF is applied.

c. Ranked ANCOVA results are obtained from SAS using a model where the outcome is ranked, randomized treatment group and randomized baseline statin (yes or no) are included as factors, and outcome (ranked) at baseline is included as a covariate.

d. Difference calculated gemcabene minus placebo. Estimates generated from Hodges-Lehmann method.

ANCOVA = analysis of covariance; EOS = end of trial; FAS = full analysis set; LOCF = last observation carried forward; QD = once daily; TG = triglyceride.

In patients in the baseline qualifying TG \geq 880 mg/dL strata the median percent decrease from baseline in TG was -55.64% (n=6) in the gemcabene 600 mg group and -37.56% (n=6) in the gemcabene 300 mg group vs a median percent reduction of -36.98% (n=7) with placebo. The result of the ranked ANCOVA was not statistically significantly different than placebo for either treatment group. The gemcabene 600 mg group showed a statistically significant median percent change from baseline in LDL-C as compared with the placebo group at Week 12 (-7.94% vs 25.43%, p = 0.0244) and EOS (-13.36% vs 14.73%, p = 0.0307). None of the median percent changes from baseline in LDL-C in the gemcabene 300 mg group were statistically significantly different from placebo.

It was also of interest to determine if the effects of gemcabene were consistent among patients with both isolated SHTG and mixed dyslipidemia and to determine the optimal patient population type of patients. Regardless of statin status, 34 patients had LDL-C \geq 100 mg/dL at baseline. In this patient population defined by baseline TGs of 530 mg/dL and LDL-C of 120 mg/dL, gemcabene 600 mg showed a statistically significant change from baseline difference from placebo of -30% for TGs, -28% for LDL-C, -38% for non-HDL-C, -61% for VLDL-C, -28% for Apo B, and -43% for Apo E.

Safety: In all patients, including those receiving statins, gemcabene was well-tolerated. Adverse events were reported by approximately half of the patients in the gemcabene groups and by more than half of the patients in the placebo group. The majority of these AEs were considered mild in severity. A total of 4 and 2 patients, respectively in the gemcabene 600 mg and 300 mg groups experienced AEs related to the trial drug, compared to 4 in the placebo group. There were no withdrawals due to Treatment Emergent Adverse Events (TEAEs), 1 SAE in a placebo patient, and no deaths. The patients who experienced potentially clinically significant post baseline laboratory abnormalities with consecutive occurrences, eventually saw their values return to or near their normal ranges. One patient in the gemcabene 600 mg group had a confirmed transient increase in ALT $>$ 3 x ULN and 1 subject in the gemcabene 600 mg group had confirmed transient increase in serum creatinine $>$ 0.3 mg/dL.

Based on the results of these trials, we believe gemcabene has the potential to have a differentiated profile as an oral once-daily, well tolerated adjunct therapy with promising evidence of efficacy in lowering of LDL-C, hsCRP and triglycerides in a range of patients with dyslipidemias.

Non-Company Sponsored Phase 2 Human Trials

Two non-company sponsored Investigator-Initiated proof-of-concept Trials (IIT) are currently ongoing in Pediatric NAFLD and adult FPL.

IIT-GEM-601 (NDA 133247) in Pediatric Non-Alcoholic Fatty Liver Disease (NAFLD)

Investigator Initiated Trial GEM-IIT-601 (Investigational New Drug application [IND] 133247) is an open-label, 12-week Phase 2a study evaluating gemcabene 300 mg in pediatric patients with non-alcoholic fatty liver disease (NAFLD). In 2018 the study enrolled 6 of the planned 40 adolescent patients, 12-17 years in age. In August 2018, the Data Safety Monitoring Board (DSMB) halted the trial early due to “unanticipated problems” in the first three patients. Specifically, the primary efficacy endpoint of ALT increased beyond baseline levels in two of these three patients. At baseline and as outlined in study inclusion criteria, ALT for these two patients were elevated 3-fold and 10-fold compared to ALT levels reported for healthy pediatric patients (~25IU/L) of similar age. In addition, all three patients had an increase in the secondary endpoint of liver fat fraction as measured by MRI-PDFF. All patients gained weight and had increased TGs during study treatment, in contrast to data in other gemcabene trials. Patients were instructed to self-administer the test-agent daily, however compliance was compromised as assessed by return of unused tablets and measurement of blood drug levels. One observation of increased ALT and two observations of increased liver fat were reported as AEs considered related to gemcabene. No events were reported as SAEs. The risk for increased liver fat with gemcabene treatment is unknown at this time. The patients will continue to be monitored for 12 months post-final dose.

IIT-GEM-602 (NDA 137608) in Familial Partial Lipodystrophy (FPL)

Gemcabene is being evaluated in an Investigator Initiated Trial GEM-IIT-602 in adult FPL patients with elevated TGs and NAFLD. It is an open-label, randomized, Phase 2 study to assess the efficacy and safety of 2 dosing regimens of gemcabene (300 mg QD for 24 weeks or 300 mg QD for 12 weeks followed by 600 mg QD for 12 weeks). In August 2018, the principal investigator and DSMB for this trial reviewed the data from the pediatric NAFLD trial as well as interim data from the FPL trial and decided to continue the FPL trial. The principal investigator in the FPL trial intends to closely monitor these patients including MRI-PDFF scans reviewed at interim time points. Enrollment was completed in the fourth quarter of 2018 with a total of five patients enrolled. Top-line data, including serum TGs and MRI-PDFF, is expected in the second quarter of 2019. To date, there was one unrelated SAE of benign paroxysmal positional vertigo in the study, and no deaths or withdrawals due to adverse events.

Gemcabene Phase 1 Clinical Trials

Gemcabene has been evaluated in ten completed Phase 1 trials in healthy volunteers. These trials explored safety, tolerability, pharmacokinetics, pharmacodynamics and dose response as monotherapy and in combination with

high-intensity statin doses and other drugs. The table below summarizes our completed Phase 1 trials. Select trials (shown as underlined Trial Number in the table below) are described in more detail below.

Summary of Phase 1 Clinical Trials of Gemcabene in Healthy Volunteers

Trial Number	Trial Objective	Doses	# Volunteers	Duration
<u>1027-001</u>	To evaluate safety, tolerability and pharmacokinetics (PK) of gemcabene	25, 100, 300, 600, 1,050, 1,500 mg	GEM = 12	Single Dose
1027-002	To evaluate the effect of food on the PK of gemcabene	450 mg	GEM = 12	Single Dose
<u>1027-003</u>	Double blind, placebo controlled, randomized trial to evaluate the PK and pharmacodynamics (PD) at multiple doses of gemcabene	50, 150, 450, 750/600, 900 mg	GEM = 40 placebo = 10	4 Weeks
<u>1027-008</u>	To determine the potential drug-drug interactions of simvastatin with gemcabene	900 mg (with 80 mg simvastatin)	GEM = 20	15 Days
1027-009	To evaluate the bioequivalence between a capsule and tablet formulation of gemcabene	300 mg	GEM = 16	Single Dose
1027-010	To evaluate the mass balance and metabolism of gemcabene	600 mg	GEM = 6	Single Dose
<u>1027-011</u>	To determine the potential drug-drug interactions of digoxin with gemcabene	900 mg (with 0.25 mg digoxin)	GEM = 12	10 Days
<u>A4141002</u>	Trial to determine the potential drug-drug interactions of atorvastatin with gemcabene	300, 900 mg (with 80 mg atorvastatin)	GEM = 20	22 Days
A4141003	To determine effect of gemcabene on QT interval	900 mg	GEM = 20	8 Days
A4141005	To determine effect of gemcabene on the glomerular filtration rate	900 mg (with 3,235 mg lohexol)	GEM = 12	10 Days
<u>GEM-101</u>	To determine effect of mild, moderate and severe renal insufficiency (RI) on gemcabene PK compared to normal volunteers	600 mg	GEM = 28	Single Dose
<u>GEM-102</u>	To determine effect of mild and moderate and hepatic insufficiency (HI) on gemcabene PK compared to normal volunteers	600 mg	GEM = 20	Single Dose
<u>GEM-103</u>	Assess drug interaction effects of steady-state gemcabene on SD furosemide, metformin, and rosuvastatin	600 mg (with furosemide 20 mg, metformin 500 mg and 40 mg rosuvastatin)	GEM = 36	16 Days
<u>GEM-104</u>	Assess steady state effects of gemcabene on the SD PK of oral contraceptive tablets in healthy female subjects	600 mg (with combined 1/35 ethinyl estradiol/norethindrone)	GEM = 16	8 Days

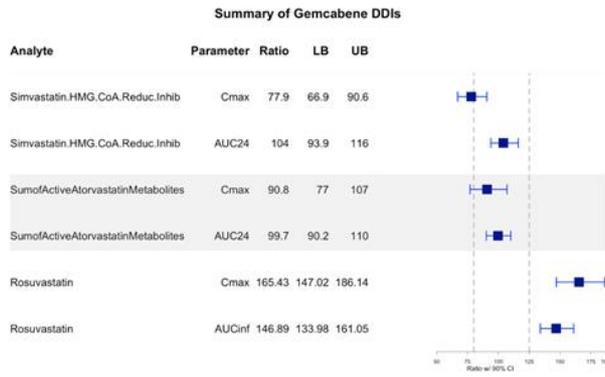
Note: One trial (A4141006; 23 volunteers) was stopped prior to completion as a result of discontinuation of the program. The trial was designed to evaluate multiple fixed-dose combinations of gemcabene with atorvastatin.

Gemcabene Phase 1 Drug-Drug Interaction Trials to Assess Pharmacokinetic Effects on Statins (Trials 1027-008, A4141002, and GEM-103)

The effect of steady-state gemcabene on circulating levels of 3 statins (i.e., simvastatin, atorvastatin, and rosuvastatin) was assessed in 3 separate DDI trials (1027-008, A4141002, GEM-103). A forest plot of the overall results of these trials

is shown in the table below. Summaries of the results from the individual trials detailing effects on the analytes of each statin are presented in the subsequent sections.

Forest Plot of Geometric Mean Ratio and 90% CI for Simvastatin HMG-CoA Reductase Inhibitor, Sum of Active Atorvastatin Metabolites, and Rosuvastatin Following Administration Alone and with Steady-State Gemcabene (Trials 1027-008, A4141002, GEM-103)



AUC₀₋₂₄ = area under the plasma concentration-time curve from time 0 to 24 hours; AUC_{inf} = area under the concentration-time curve extrapolated to infinity; CI = confidence interval; C_{max} = maximum plasma concentration; DDI = drug-drug interaction; HMG-CoA = 3-hydroxy-3-methyl-glutaryl-coenzyme A; LB = lower bound; UB = upper bound.

Simvastatin Interaction Trial (1027-008)

Trial 1027-008 was an open-label, multiple-dose, randomized, 2-way crossover trial in 20 healthy subjects designed to evaluate the oral administration of gemcabene 900 mg QD for 15 days on the PK of simvastatin 80 mg administered QD orally. Three analytes (simvastatin, simvastatin acid, and simvastatin HMG-CoA reductase inhibitor) were measured in the trial. The determination of the clinical relevance of the drug interaction was based on the enzyme immunoassay (EIA) of HMG-CoA reductase since this assay represents the activity of simvastatin.

In summary the magnitude of the observed interaction was small, simvastatin acid and lactone changed in opposing directions, and total HMG-CoA reductase activity either decreased or was within the equivalence boundaries; therefore, no simvastatin dosing adjustments are required.

Atorvastatin Interaction Trial (A4141002)

Trial A4141002 was an open-label, 3-way crossover trial to evaluate the effect of steady-state gemcabene 300 mg and 900 mg QD on the steady-state PK of atorvastatin. Twenty subjects received the following 3 orally-administered treatments: atorvastatin 80 mg QD orally for 5 days; atorvastatin 80 mg QD orally with gemcabene 300 mg QD orally for 11 days; and atorvastatin 80 mg QD orally with gemcabene 900 mg QD orally for 11 days. There were 6 analytes measured in the trial, the determination of the clinical relevance for the drug interaction was based on the sum total of the 3 acid analytes since together these analytes represents the activity of atorvastatin.

The mean ratio for the sum total of atorvastatin acid metabolites AUC₀₋₂₄ following administration of steady-state atorvastatin 80 mg QD during steady-state gemcabene 900 mg administration was 99.7% to atorvastatin alone. The 90% CI for AUC₀₋₂₄ was within the equivalence range of 80% to 125%. This trial demonstrates no clinically meaningful interaction of gemcabene on the PK of atorvastatin, therefore no atorvastatin dosing adjustments are required.

Rosuvastatin Interaction Trial (GEM-103)

Trial GEM-103 was an open-label, randomized, single-site, 2-sequence, 4-period, crossover trial in 36 subjects assessing the effect of steady-state gemcabene on the single dose PK of metformin, furosemide, and rosuvastatin. Within the GEM-103 trial, subjects received single dose rosuvastatin 40 mg orally alone (N = 36) and with steady-state gemcabene 600 mg QD orally (N = 34). Rosuvastatin was included as a substrate probe of BCRP transporter.

The mean ratio for rosuvastatin C_{max} and AUC_{inf} following single dose administration of rosuvastatin 40 mg during steady-state gemcabene 600 mg QD administration were 165.43% and 146.89%, respectively, to rosuvastatin alone. The results indicate a weak interaction for the effect of gemcabene on rosuvastatin. The observed change in rosuvastatin is within the range of those observed with other drugs, such as dronedarone, itraconazole and ezetimibe, where there is no recommendation for dose adjustments for rosuvastatin in the rosuvastatin prescriber information. Although co-administration of gemcabene and rosuvastatin should be monitored; no dose adjustments in rosuvastatin are required.

Conclusions from Drug-Drug Interaction Trials with Statins

The combination of gemcabene with statins was assessed in both single dose (atorvastatin and rosuvastatin) and multiple dose (simvastatin) clinical trials. There were mixed results on the analytes with some analytes showing induction and others showing inhibition; however, all the effects were weak and do not require a dose adjustment for the statins.

Gemcabene Phase 1 Trials to Assess PK on Renal Insufficiency (RI) (GEM-101)

Trial GEM-101 evaluated the PK profile of a single oral dose of 600 mg gemcabene in subjects with varying degrees of RI compared to healthy matched control subjects with normal renal function. A total of 28 subjects completed the trial and were placed into each cohort. Results demonstrated that gemcabene C_{max} and T_{max} were similar across cohorts; however, overall exposure (AUC_{0-1} , $AUC_{0-\infty}$) and $t_{1/2}$ increased incrementally with each relative increase in renal impairment. The geometric mean ratio of gemcabene $AUC_{0-\infty}$ increased in mild, moderate, and severe renal impairment and was 137%, 192%, and 209% of the geometric mean $AUC_{0-\infty}$ for subjects with normal renal function, respectively. The geometric mean gemcabene C_{max} in mild, moderate, and severe impairment was 113%, 117%, and 88% of the C_{max} seen in normal renal function subjects. The results of the linear regression between renal function measurement creatinine clearance (CL_{cr}) and plasma gemcabene PK parameters indicate that there was a statistically significant correlation (based on p-values < 0.05) between the PK parameters AUC_{0-48} , AUC_{0-1} , $AUC_{0-\infty}$, apparent clearance (CL/F), CLr , and $t_{1/2}$ and the renal function measurement CL_{cr} .

These results provide sufficient information to adjust the recommended dose of gemcabene based on baseline renal function. Based on the pharmacokinetics, no gemcabene dose adjustment is needed for subjects with mild RI. Treatment with gemcabene should be initiated at a dose of 300 mg per day or 600 mg every other day (QOD) in subjects having moderately impaired renal function and increased only after evaluation of the effects on renal function and lipid levels at this dose. The use of gemcabene should be avoided in patients with severe RI (see table below).

Proposed Recommended Gemcabene Dose in Renal Impairment

Renal Function	Recommended Dose and Regimen
Normal $CL_{cr} \geq 90$ mL/min to Mild RI eGFR ≥ 60 mL/min/1.73 m ²	600 mg daily
Moderate RI eGFR ≥ 30 to < 60 mL/min/1.73 m ²	300 mg daily or 600 mg every other day
Severe RI eGFR <30 mL/min/1.73 m ²	Do not recommend

CL_{cr} = creatinine clearance, eGFR = estimated glomerular filtration rate, RI = renal insufficiency

Effect on Subjects with Hepatic Impairment (HI) (GEM-102)

Trial GEM-102 was an open-label, non-randomized trial to evaluate the PK, safety, and tolerability of a single oral dose of 600 mg gemcabene in subjects with mild or moderate HI compared to healthy matched control subjects with normal hepatic function. A total of 20 subjects completed the trial. Results demonstrated that gemcabene non-compartment PK parameters were similar across cohorts. The geometric mean ratio (90% CI) for gemcabene C_{max} and $AUC_{0-\infty}$ did not change for moderate HI 86.1% (70.31 to 105.32) and 97.6% (72.83 to 130.67), respectively, compared to normal.

Pharmacokinetic exposure to gemcabene was unchanged in mild and moderate HI. Based on the pharmacokinetics, no gemcabene dose adjustment is needed for patients with mild or moderate HI. Gemcabene pharmacokinetics was not assessed in severe HI, and gemcabene use should be avoided in patients with severe HI.

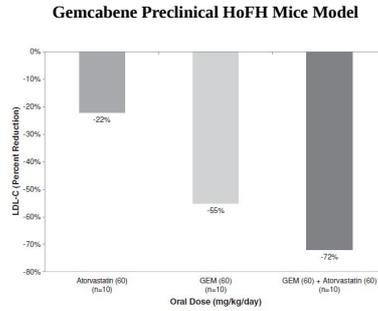
Gemcabene Preclinical Studies

As part of a comprehensive nonclinical toxicology program, over 30 exploratory and definitive single and repeated-dose toxicity trials with gemcabene were conducted in mice, rats, dogs and monkeys. Gemcabene was well-tolerated in these completed trials, including a 26-week repeat dose trial in rats and monkeys and 52-week repeat dose trial in monkeys. The completed trials supported conducting clinical trials up to six months. We completed and submitted to the FDA the results from our two-year rodent carcinogenicity studies. These studies were submitted as part of a request from the FDA to remove the partial clinical hold limiting the conduct of human studies of gemcabene to less than six months in duration. In response to our submission, the FDA did not lift the hold and requested that we provide additional data, including two preclinical studies, namely, a subchronic (13 week) study of gemcabene in PPAR α knock-out mice and a study of gemcabene in *in vitro* PPAR transactivation assays using monkey and canine PPAR isoforms. The results of these two preclinical studies are expected to be submitted to the FDA in the fourth quarter of 2019 as part of the request to lift the partial clinical hold.

In multiple preclinical pharmacology trials, gemcabene was observed to lower plasma LDL-C, triglycerides and anti-inflammatory markers in diet-induced and genetic preclinical models of dyslipidemia and NASH as also outlined below.

In Vivo Preclinical Proof-of-Principle Trial for HoFH

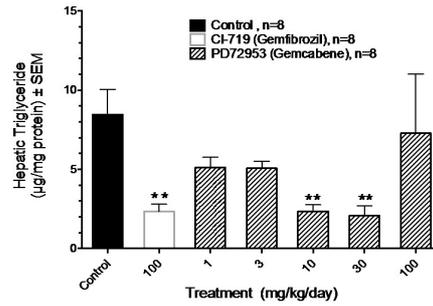
In LDL-receptor deficient mice, gemcabene at 60 mg/kg/day was observed to reduce LDL-C up to 55% as monotherapy and 72% in combination with statins. This dose in mice is equivalent to approximately a 450 mg gemcabene tablet per day in humans. This LDL-receptor deficient animal model has been reported in literature to be fairly predictive of HoFH therapies in practice. For example, statin lowering of approximately 20% in LDL-receptor deficient-mice model correlates well to the approximately 15% to 20% LDL-C lowering observed in HoFH patients, and Juxtapid lowering of approximately 50% to 80% in LDL-receptor deficient-rabbits model correlates well to the approximately 40% to 50% in HoFH patients.



In Vivo Proof of Principle for Hepatic Triglyceride Reduction

Gemcabene was studied in a chow-fed Sprague-Dawley rat model to explore the effects on fat content in the liver. The results of gemcabene 10 and 30 mg/kg/day doses in this rat model were similar to gemfibrozil. Gemcabene treatment significantly reduced hepatic triglycerides by 74% in chow-fed Sprague-Dawley rats.

Hepatic Lipids in Male Sprague-Dawley Rats Treated with Gemfibrozil or Gemcabene

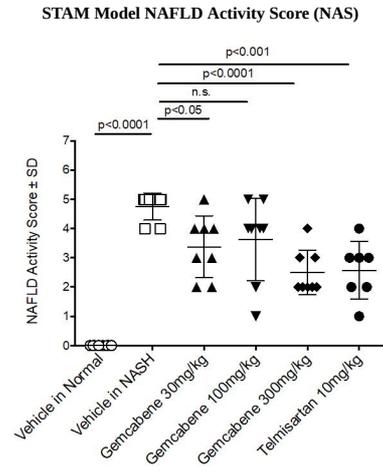


In Vivo Proof of Concept for NASH (STAM Murine Model of NASH and Hepatocellular Carcinoma)

Diabetes was induced in 40 of 48 male mice by a single subcutaneous injection of 200 µg streptozotocin solution 2 days after birth. At 4 weeks of age, all mice were fed a high fat diet to induce NASH. Interventions (Vehicle in non-diabetic mice, Vehicle, 30, 100 or 300 mg/kg/day gemcabene or 10mg/kg/day telmisartan in diabetic NASH mice) began at 6 weeks of age. Treatment effects were assessed at 9 weeks of age. Histological analyses of the liver were the key endpoints for the determination of an effect of gemcabene in this preclinical model of NASH. NASH is defined by the presence and pattern of specific histological abnormalities on liver biopsy. The NAFLD Activity Score (NAS) is a composite score that was developed as a tool to measure changes in NAFLD during therapeutic trials. The NAS is a composite score comprised of three components that includes scores for steatosis, lobular inflammation and hepatocyte ballooning. Steatosis grade is quantified as the percentage of hepatocytes that contain fat droplets. The fibrosis stage of the liver is evaluated separately from NAS by histological evaluation of the intensity of sirius red staining of collagen in the pericentral region of liver lobules. NAS of 0-2 are not considered diagnostic for NASH, NAS of 3-4 are considered either not diagnostic, borderline or positive for NASH, while NAS of 5-8 are largely considered diagnostic for NASH. A treatment effect for NASH is based on differences in both NAS and fibrosis levels.

The gemcabene 30 and 300 mg/kg groups and telmisartan group (included as a positive control) showed significant reduction in NAS compared with the Vehicle in NASH group. Since gemcabene reduced steatosis and ballooning scores,

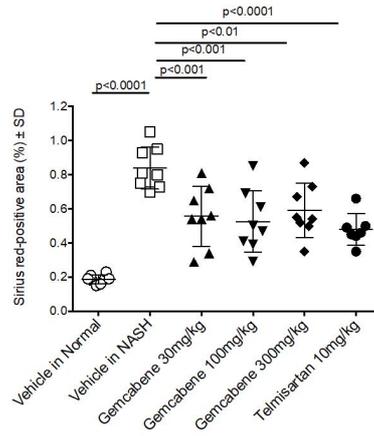
the data suggested that gemcabene improved NASH pathology by inhibiting hepatocyte damage and ballooning cell formation.



Sirius red-stained liver sections were evaluated to determine liver fibrosis. Liver sections from the Vehicle in NASH group showed increased collagen deposition in the pericentral region of liver lobule compared with the Vehicle in

Normal (non-diabetic) group. All gemcabene groups showed significant decreases in fibrosis area compared with the Vehicle in NASH group.

STAM Model Fibrosis (Sirius Red-Positive Area)



Additionally, hepatic gene expression and plasma markers indicative of inflammation (e.g., CRP and CCR2/CCR5), and lipid modulation (e.g., ApoC-III and ACC1) were significantly reduced as were other markers, as displayed in the table below. Gemcabene demonstrated proof of concept on NAS score and fibrosis, supporting further development in the clinic.

Gene Expression Analysis

Parameter (mean ± SD)	Vehicle in Normal (n=8)	^a Vehicle in NASH (n=8)	^b Gemcabene 30 mg/kg (n=8)	^b Gemcabene 100 mg/kg (n=8)	^b Gemcabene 300 mg/kg (n=8)	^b Telmisartan 10 mg/kg (n=7)
TNF-α	1.0 ± 0.3	3.6 ± 1.0 (p<0.0001)	4.0 ± 1.8 (NS)	2.0 ± 0.8 (p<0.05)	1.9 ± 0.7 (p<0.05)	3.0 ± 1.2 (NS)
NF-κB	1.0 ± 0.1	1.3 ± 0.2 (p<0.001)	1.3 ± 0.2 (NS)	0.9 ± 0.1 (p<0.0001)	0.8 ± 0.1 (p<0.0001)	1.1 ± 0.1 (p<0.05)
CRP	1.0 ± 0.2	1.0 ± 0.2 (NS)	0.9 ± 0.2 (NS)	0.6 ± 0.1 (p<0.0001)	0.5 ± 0.1 (p<0.0001)	0.9 ± 0.1 (p<0.0001)
MCP-1	1.0 ± 0.4	3.6 ± 1.7 (p<0.001)	3.2 ± 1.5 (NS)	1.7 ± 0.7 (p<0.01)	1.6 ± 0.7 (p<0.01)	2.1 ± 1.0 (p<0.05)
α-SMA	1.0 ± 0.3	3.1 ± 0.9 (p<0.0001)	2.6 ± 0.6 (NS)	2.4 ± 0.9 (NS)	2.5 ± 0.7 (NS)	2.3 ± 0.7 (NS)
MMP-2	1.0 ± 0.2	1.9 ± 0.7 (p<0.01)	1.7 ± 0.5 (NS)	0.5 ± 0.2 (p<0.0001)	0.9 ± 0.2 (p<0.001)	1.4 ± 0.7 (NS)
TIMP-1	1.0 ± 0.3	12.9 ± 9.0 (p<0.0001)	9.9 ± 4.9 (NS)	3.8 ± 1.6 (p<0.01)	4.4 ± 2.1 (p<0.01)	8.6 ± 5.1 (NS)
MIP-1β	1.0 ± 0.2	5.6 ± 2.0 (p<0.0001)	5.4 ± 3.2 (NS)	2.3 ± 0.9 (p<0.01)	2.8 ± 1.4 (p<0.05)	3.9 ± 1.5 (NS)
CCR5	1.0 ± 0.2	2.3 ± 0.7 (p<0.0001)	2.4 ± 0.9 (NS)	1.4 ± 0.3 (p<0.01)	1.3 ± 0.3 (p<0.01)	1.5 ± 0.3 (p<0.05)
CCR2	1.0 ± 0.2	3.5 ± 1.7 (p<0.0001)	3.3 ± 1.0 (NS)	1.6 ± 0.4 (p<0.001)	1.7 ± 0.7 (p<0.01)	2.4 ± 0.8 (NS)
ACC1	1.0 ± 0.2	0.9 ± 0.2 (NS)	1.0 ± 0.1 (NS)	0.7 ± 0.1 (p<0.05)	0.8 ± 0.1 (NS)	0.7 ± 0.1 (p<0.01)
ACC2	1.0 ± 0.2	0.5 ± 0.1 (p<0.0001)	0.6 ± 0.2 (NS)	0.4 ± 0.1 (NS)	0.5 ± 0.1 (NS)	0.3 ± 0.1 (p<0.05)
ApoC-III	1.0 ± 0.2	0.7 ± 0.1 (p<0.001)	0.7 ± 0.1 (NS)	0.5 ± 0.0 (p<0.01)	0.4 ± 0.1 (p<0.0001)	0.8 ± 0.2 (NS)
SREBP-1	1.0 ± 0.3	0.9 ± 0.2 (NS)	0.9 ± 0.2 (NS)	0.9 ± 0.2 (NS)	0.7 ± 0.1 (NS)	0.7 ± 0.2 (NS)
Sulf-2	1.0 ± 0.3	5.2 ± 1.2 (p<0.001)	5.1 ± 1.1 (NS)	3.8 ± 0.7 (p<0.05)	3.3 ± 0.9 (p<0.001)	3.9 ± 0.9 (NS)
PNPLA3	1.0 ± 0.4	0.3 ± 0.1 (p<0.0001)	0.3 ± 0.1 (NS)	0.2 ± 0.1 (NS)	0.2 ± 0.2 (NS)	0.1 ± 0.0 (NS)
ADH-4	1.0 ± 0.2	0.9 ± 0.3 (NS)	0.8 ± 0.2 (NS)	0.6 ± 0.1 (p<0.05)	0.5 ± 0.1 (p<0.001)	0.6 ± 0.2 (p<0.01)
LDL receptor	1.0 ± 0.1	0.9 ± 0.2 (NS)	0.9 ± 0.2 (NS)	0.9 ± 0.2 (NS)	0.8 ± 0.1 (NS)	0.7 ± 0.3 (NS)

^a Compared to Vehicle Normal; ^b Compared to Vehicle NASH; Abbreviations: ACC = Acetyl-CoA carboxylase; ADH = Alcohol dehydrogenase; C = cholesterol; CCR = C-C chemokine receptor; CRP = C-reactive protein; FA = Fatty acid; FFA = free fatty acid; HSPGs = heparan sulfate proteoglycans; LDL = low-density lipoprotein; MCoA = Malonyl-CoA; MCP = Monocyte chemoattractant protein; MMP = Matrix metalloproteinase;

MIP = Macrophage inflammatory protein; NAD = nicotinamide adenine dinucleotide; NF- κ B = Nuclear factor-kappa B; PNPLA = Patatin-like phospholipase-containing domain; SMA = Smooth muscle actin; SPF = Specific pathogen-free; SREBP = Sterol regulatory element-binding protein; Sulf = Sulfatase; TIMP = Tissue inhibitor of metalloproteinase; TNF = Tumor necrosis factor.

Gemcabene Clinical Development Plan

In June and September 2015, Gemphire received FDA feedback from its Type C meetings related to the development of gemcabene for the treatment of patients with HoFH. The FDA indicated that historically LDL-C has been accepted as a surrogate endpoint for cardiovascular risk reduction for lipid-altering drugs to support traditional approval, including patients with HoFH. The FDA reiterated weighing the magnitude of LDL-C reduction in light of the drug's safety profile (e.g., benefit/risk) when using a surrogate endpoint such as LDL-C. Our IND for the treatment of dyslipidemia including HoFH was submitted to the FDA in December 2015 and is currently in effect.

The future development programs for our targeted indications are described below. In addition to these trials, we expect to conduct a few additional clinical pharmacology Phase 1 trials to support registration.

Target Orphan Indications

Homozygous Familial Hypercholesterolemia (HoFH)

The clinical development program for HoFH patients is expected to include the 25 completed Phase 1 and Phase 2 trials. Additionally, we anticipate a clinical trial program to support HoFH registration. It is anticipated that the program will consist of the following: 1) GEM-202 will be a 6-month double-blind, placebo-controlled trial in HoFH patients older than 12; 2) GEM-203 will be an open-label trial in patients on background LDL apheresis to assess PK and PD; and 3) GEM-204 will be an open-label extension trial to GEM-202 and GEM-203.

After EOP2 discussions with the FDA and other regulatory agencies, assuming the partial clinical hold is lifted, we will be able to better define the Phase 3 trials and long-term safety exposure needed for registration.

Familial Chylomicronemia Syndrome (FCS)

The clinical development program for adult patients with FCS (TGs > 880 mg/dL) is expected to include the 25 completed Phase 1 and Phase 2 clinical trials, including GEM-401 (INDIGO-1), followed by Phase 3 registration trials. It is anticipated that the program will consist of the following: 1) GEM-402 will be a 6-month double-blind, placebo-controlled study in FCS patients; and 2) GEM-403 an open-label extension trial to GEM-402. After completion of our two ongoing Phase 2 trials as well as after the FDA decision on our partial clinical hold and EOP2 discussions with the FDA and other regulatory agencies, we believe we will be able to better define the Phase 3 registration trials and long-term safety exposure needed for registration.

Familial Partial Lipodystrophy (FPL) Disease

The clinical development program for adult patients with FPL is expected to include the 25 completed and ongoing Phase 1 and Phase 2 clinical trials, including the proof-of-concept non-company sponsored IIT-GEM-602 in FPL, followed by Phase 3 registration trials.

It is anticipated that the program will consist of the following: 1) GEM-701 will be a 6-month double-blind, placebo-controlled study in FCS patients; and 2) GEM-702 will be an open-label extension trial to GEM-701. After completion of our two ongoing Phase 2 trials as well as after the FDA decision on our partial clinical hold and EOP2 discussions with the FDA and other regulatory agencies, we believe we will be able to better define the Phase 3 registration trials and long-term safety exposure needed for registration.

Broader Target Indications

The Company may start Phase 3 trials in broader indications once the Phase 3 orphan trials progress. The decision to commence trials in broader indications will depend on available resources, perhaps including the availability of strategic partners, as well as market dynamics.

Heterozygous Familial Hypercholesterolemia and Mixed Dyslipidemia Development

The clinical development program for adult patients with hypercholesterolemia (including HeFH and ASCVD with mixed dyslipidemia and statin-intolerant patients) with elevated LDL-C levels while on maximally tolerated

high-intensity statin therapy is expected to include the 25 completed Phase 1 and Phase 2 clinical trials followed by Phase 3 registration trials. Current precedent for this high-risk population of patients is that a reduction in LDL-C is an acceptable surrogate for registration.

After results are available from the HoFH and FCS development programs, if pursued and completed, and following discussions with the FDA and other regulatory agencies, we believe we will be able to better define the Phase 3 registration trials and long-term safety exposure needed for registration.

NASH/NAFLD

The clinical development program in NASH/NAFLD patients is expected to include the 25 completed Phase 1 and Phase 2 trials. Two non-company sponsored proof-of concept Phase 2a trials were designed to collect within their secondary measures for proof-of-concept in NASH/NAFLD to determine the potential for a path forward in NASH/NAFLD for gemcabene. As outlined above, IIT-GEM-601 terminated early and will be unable to support development in NASH/NAFLD. IIT-GEM-602 is ongoing and when complete a full assessment will be made in regard to a path forward in NASH/NAFLD as well as FPL.

Additional Trials

Rodent Studies in Response to FDA Partial Clinical Hold for Compounds in PPAR Class

Peroxisome proliferation-activated receptor (PPAR) agonists are natural ligands or drugs which bind to PPARs and turn on or off PPAR responsive genes in the cell nucleus. PPARs comprise three subtypes, PPAR α , PPAR γ and PPAR β (also referred to as PPAR δ). When the PPARs are activated by natural or pharmaceutical molecules, those molecules can regulate (turn-off or turn-on) the transcription (making messenger RNA) of genes that regulate the storage and mobilization of lipids (fats), glucose metabolism, and inflammatory responses. PPAR α and PPAR γ are the molecular targets of a number of marketed drugs to treat metabolic syndrome including lowering triglycerides and cholesterol such as fibrate drugs and to treat diabetes mellitus and insulin resistance such as thiazolidinedione drugs.

Beginning in 2004, the FDA began issuing partial clinical holds to all sponsors of PPARs or agents deemed to have PPAR-like properties from preclinical trials. The FDA takes the position that preclinical data suggest PPAR agonists are carcinogenic in rodents. In 2004, the FDA determined that gemcabene was a PPAR agonist and issued a partial clinical hold. Our current IND is held to the same partial clinical hold. The partial clinical hold permits clinical trials of up to six months for gemcabene and also required us to conduct two-year rat and mouse carcinogenicity trials before conducting clinical trials of longer than six months. We completed and submitted to the FDA the results from our two-year rodent carcinogenicity studies. The FDA did not lift the hold and requested that we provide additional data, including two preclinical studies, including, a subchronic (13 week) study of gemcabene in PPAR α knock-out mice to confirm the liver finding observed in the rodent carcinogenicity studies are the result of rodent PPAR transactivation.

We believe the effects observed in rodents, specifically peroxisome proliferation, activation of PPAR α specific genes, elevation of liver weight, and tumors, are likely rodent-specific phenomena seen with PPAR α agonists. Based on historical nonclinical and clinical experience on these type of compounds, we believe rodents share little apparent relevance for human risk assessment. In a recently completed PPAR agonist receptor binding assays we observed little or no gemcabene direct binding to the mouse, rat, or human PPAR α , PPAR β , or PPAR γ receptors, whereas reference agents for each of the receptors showed the expected binding, including marketed PPAR α agents, such as fibrates, including gemfibrozil. We believe the PPAR α responses in rats and mice are secondary and perhaps related to the mobilization or formation of a naturally occurring molecule that binds to PPAR α in response to gemcabene administration. We expect to submit the results of the subchronic mouse study to the FDA in the fourth quarter of 2019.

In the third quarter of 2018, the FDA requested a study of gemcabene in *in vitro* PPAR transactivation assays using monkey and canine PPAR isoforms, which is now complete. The study showed no PPAR- α and PPAR δ agonist activities of gemcabene in canine PPAR subtypes. The canine PPAR- γ receptor is identical to the human receptor. In the dog/human PPAR- γ , low to medium level activation was observed at the highest concentrations for gemcabene. Gemcabene lacked PPAR- α , PPAR- δ , and PPAR- γ antagonism. The study showed no PPAR- α , PPAR- γ , and PPAR- δ agonist activities of gemcabene in cynomolgus monkey PPAR subtypes. Additionally, gemcabene was also found to lack antagonist activity against these receptors. These results are similar to those observed in prior studies of mouse, rat, and human PPAR transactivation studies.

Cardiovascular Outcomes Trials

We believe it is well accepted that every 1.6 mg/dL lowering of LDL-C results in a 1% lowering of cardiovascular disease risk. The FDA has not required any approved therapy targeting LDL-C lowering, including non-statin therapies, to initiate or complete a cardiovascular outcomes trial in connection with its approval of HoFH, HeFH and ASCVD therapies. Based on recent drug approvals, we believe it is unlikely that the FDA will require us to initiate or complete a cardiovascular outcomes trial for any of the targeted indications, although we would plan to initiate a cardiovascular outcomes trial, for illustration in high-risk ASCVD patients with mixed dyslipidemia, prior to NDA filing to pursue broader label indications related to cardiovascular disease risk reduction, if pursued. Notwithstanding our current expectations, the FDA could require us to initiate or complete a cardiovascular outcomes trial as a condition to filing or approving an NDA for gemcabene.

Regional Out-licensing Opportunities

Gemphire is exploring regional partnering opportunities in China and will evaluate the feasibility for clinical collaborations. Recent regulatory changes in China favor US-China partnering, offering potentially faster regulatory times and preferences for innovative medications. There is an unmet need for alternative lipid-lowering therapies in China, considering the high prevalence of hypertriglyceridemia, large population size and a heightened sensitivity to statins. Gemphire may also explore other regional out-licensing or partnership opportunities.

Sales and Marketing

Given our current stage of development, we have not yet established a commercial organization or distribution capabilities, nor have we entered into any partnership or co-promotion arrangements with an established pharmaceutical company. To develop the appropriate commercial infrastructure to launch gemcabene in the United States, if approved, for the narrower indications of HoFH, we may build out a specialty sales force to reach a concentrated number of approximately 50 lipid centers and 500 lipidologists across the country. This would require additional financial and managerial resources. We may co-promote the SHTG indication if pursued and approved with a partner or use a contract sales force along with our internal sales force and distributor(s). We may engage in partnering discussions with third parties from time to time. As we further develop and seek approval as well as launch commercial sales of gemcabene outside of the United States or for broader patient populations in the United States, including patients with NASH, HeFH, and ASCVD, if pursued and approved, we may establish partnerships with one or more pharmaceutical company collaborators, depending on, among other things, the applicable indications, the related costs and our available resources.

Chemistry, Manufacturing and Controls (CMC)

Gemcabene is a small molecule drug candidate that can be synthesized as a single polymorph crystalline monocalcium salt, using readily available raw materials and based on conventional chemical processes.

We do not own or operate, and currently have no plans to establish, any manufacturing facilities. We rely on contract manufacturers to produce both the drug substance and drug product required for our preclinical studies and clinical trials. All our contract manufacturers have updated cGMP certificates, all our drug products are being manufactured under current good manufacturing practices (cGMP), a quality system regulating CMC activities.

Since 2015, we have been continuously manufacturing Gemcabene Immediate Release (IR) tablets under cGMP to support all our on-going clinical trials. More specifically, drug substance and drug product manufacturing process and analytical method development have been optimized and updated based on ICH/FDA guidelines. In addition, we now have successfully manufactured multiple strengths of tablets under cGMP: 150mg, 300mg, and 600mg strengths. We have obtained updated solid stability data for both the drug substance and drug product. We are currently planning and evaluating our CMC strategies on the initiation of NDA registration batches.

Our contract manufacturers are currently producing, and will produce in the future, our bulk drug substance and drug product for use in our preclinical studies and clinical trials on a purchase order basis, and do not have any long-term arrangements. We will continue to identify and qualify any alternative API and drug product manufacturers to ensure our future commercial supplies at the time of product launch. We plan to continue to rely upon contract manufacturers and, potentially, collaboration partners to manufacture commercial quantities of our drug substances and drug product candidates, if approved for marketing by the applicable regulatory authorities.

Pfizer License Agreement

In August 2018, we entered into an Amended and Restated License Agreement with Pfizer (the "Pfizer Agreement"), which amended and restated in full the Company's prior license agreement with Pfizer dated April 16, 2011.

We agreed to make milestone payments totaling up to \$37 million upon the achievement of certain milestones, including the first new drug application (or its foreign equivalent) in any country, regulatory approval in each of the United States, Europe and Japan, the first anniversary of the first regulatory approval in any country, and upon achieving certain aggregate sales levels of gemcabene. Future milestone payments under the Pfizer Agreement, if any, are not expected to begin for at least several years and extend over a number of subsequent years.

In partial exchange for the rights granted by Pfizer under the prior license agreement, the Company agreed to issue shares of its common stock to Pfizer representing 15% of the Company's fully diluted capital at the close of its first arms-length Series A financing, which occurred on March 31, 2015.

We have also agreed to pay Pfizer tiered royalties on a country-by-country basis based upon the annual amount of net sales as specified in the Pfizer Agreement until the later of: (i) five years after the first commercial sale in such country; (ii) the expiration of all regulatory or data exclusivity for gemcabene in such country; and (iii) the expiration or abandonment of the last valid claim of the licensed patents, including any patent term extensions or supplemental protection certificates in such country. The royalty rates range from the high single digits to the mid-teens depending on the level of net sales. The royalty rates are subject to reduction during certain periods when therapeutically-equivalent generic products represent a certain market share of prescription volume in the country. Under the Pfizer Agreement, the Company is obligated to use commercially reasonable efforts to develop and commercialize gemcabene.

The Pfizer Agreement will expire upon expiration of the last royalty term. On expiration (but not earlier termination), the Company will have a perpetual, exclusive, fully paid-up, royalty-free license under the licensed patent rights and related data to make, use, develop, commercialize, import and otherwise exploit the clinical product candidate gemcabene. Either party may terminate the Pfizer Agreement for the other party's material breach following a cure period or immediately upon certain insolvency events relating to the other party. Pfizer may immediately terminate the Pfizer Agreement in the event that (i) the Company or any of its affiliates or sublicensees contests or challenges, or supports or assists any third party to contest or challenge, Pfizer's ownership of or rights in, or the validity, enforceability or scope of any of the patents licensed under the Pfizer Agreement or (ii) the Company or any of its affiliates or sublicensees fails to achieve the first commercial sale in at least one country by April 16, 2024.

Intellectual Property

Our patent estate includes patents and/or patent applications to forms of gemcabene, methods of using gemcabene, and methods of manufacturing gemcabene. The patent estate includes patents licensed from Pfizer and additional patents and applications that have been filed subsequent to obtaining the license that are entirely owned by Gemphire. Charles Bisgaier, a co-founder of Gemphire, is an inventor on thirteen of the pending fourteen patent families. As of December 31, 2018, Gemphire's patent estate, including patents we own or license from third parties, on a worldwide basis, included 6 issued U.S. patents, 11 pending U.S. patent applications, 40 issued patents in foreign jurisdictions including Australia, Austria, Belgium, Bulgaria, Canada, Czech Republic, Denmark, Finland, France, Germany, Great Britain, Hungary, Ireland, Italy, Japan, Luxembourg, Mexico, Netherlands, Poland, Portugal, Romania, Spain, Sweden, Switzerland and the United Kingdom, and 85 pending patent applications in foreign jurisdictions including Argentina, Australia, Brazil, Canada, China, Europe, Hong Kong, India, Israel, Japan, Mexico, New Zealand, Philippines, Korea, Russia, Singapore, South Africa, Taiwan and Thailand. Of our worldwide patents and pending applications, all relate to our product candidate gemcabene.

U.S. Patent number 6,861,555, which was in-licensed from Pfizer, includes claims directed to the calcium salt crystal form of gemcabene that is used in our clinical formulations and will constitute the commercial product as well as other crystalline forms of gemcabene. This patent is expected to expire in 2021; however, we may select this patent for patent term extension from the U.S. Patent and Trademark Office (USPTO) if such an extension is available. Given the expected length of the regulatory review, the expiry date of this patent may be adjusted to 2023, or possibly 2024. Furthermore, and importantly in our case, the FDA orphan designation for HoFH may provide us seven years of market exclusivity which would provide protection for gemcabene in the United States for treating HoFH out to about 2028 or 2029. Related foreign patents, which have issued in jurisdictions including Canada, Denmark, Finland, France,

Germany, Great Britain, Ireland, Italy, the Netherlands, Sweden, Spain, Japan, and New Zealand, are expected to expire in 2021, absent any adjustments or extensions.

U.S. Patent Number 8,557,835, which was also in-licensed from Pfizer, includes claims directed to pharmaceutical compositions comprised of combinations of gemcabene or gemcabene with statins, and methods of using the combinations, in a patient that does not reach sufficient LDL-C lowering on a statin alone. E.g., for treating several conditions including hyperlipidemia. This patent is expected to expire in 2021, absent any extension. All related foreign patents are now expired.

U.S. Patent No. 8,846,761, which is owned by Gemphire, includes claims directed to methods of reducing risk of pancreatitis for patients with TG \geq 500 mg/dL with gemcabene treatment. This patent is expected to expire in 2032, absent any extension. Foreign patents have issued in Australia, Canada, Japan, Mexico and Europe. The European patent was validated into 21 European countries and foreign counterpart patent applications are pending in China, Europe, Hong Kong and Mexico, and any patents issuing from such applications are expected to expire in 2031, absent any adjustments or extensions.

U.S. Patent No. 10,028,926, which is owned by Gemphire is directed to treating patients on a stable dose, or a maximal dose, of statin to lower their LDL-C levels. This application is granted in Australia and Japan and related patent applications are pending in foreign jurisdictions including Canada, China, Europe, Hong Kong, Japan, Mexico and United States. Any patent that may issue in this family, absent any patent term adjustment or extension, is expected to expire in 2033.

U.S. patent application number 14/942,765 which is due to issue shortly, and owned by Gemphire, is directed to methods of large-scale manufacturing for making dicarboxyalkyl ethers. Foreign counterpart patent applications are pending in Australia, Brazil, Canada, China, Europe, Hong Kong, India, Israel, Japan, Mexico, New Zealand, Korea, Russia, Singapore and South Africa. Any patent issuing from this patent family is expected to expire in 2035.

U.S. patent application number 15/971,491, is a continuation of PCT/US2016/060849, which is owned by Gemphire and is directed to fixed dose combinations and modified release formulations of gemcabene and statins. Foreign counterpart patent applications are pending in Australia, Brazil, Canada, China, Europe, Hong Kong, India, Israel, Japan, Mexico, New Zealand, Korea, Russia, Singapore and South Africa. Any patent issuing from this patent family is expected to expire in 2035.

Two U.S. patent applications were filed as continuations of PCT/US2016/060837 and one as a divisional. U.S. patent application number 15/416,911, now U.S. 9,849,104, is directed to methods of treating NASH by administering gemcabene as a monotherapy. U.S. Patent Application Number 15/424,620, is directed methods for treating Mixed Dyslipidemia by administering gemcabene and a statin, and divisional U.S. Patent Application Number 15/814,118 directed to other aspects of NASH. Any patent that may issue in either of these two families, absent any patent term adjustment or extension, is expected to expire in 2037. Foreign counterpart patent applications are pending in Australia, Brazil, Canada, China, Europe, Hong Kong, India, Israel, Japan, Mexico, New Zealand, Philippines, Korea, Russia, Singapore, South Africa and Thailand.

U.S. patent application number 15/445,118, is a continuation of PCT/US2017/019750, which is owned by Gemphire and directed to the treatment of patients with homozygous familial hypercholesterolemia on stable, lipid lowering therapy. Foreign counterpart patent applications are pending in Australia, Brazil, Canada, China, Europe, Hong Kong, India, Israel, Japan, Mexico, New Zealand, Philippines, Korea, Russia, Singapore, South Africa and Thailand. Any patent issuing from this patent family is expected to expire in 2037.

U.S. patent application number 15/956,172, was parallel filed with PCT/US2018/028113, which is directed to a composition and method of use of gemcabene. Foreign counterpart patent applications are pending in Argentina and Taiwan. Any patent issuing from this patent family is expected to expire in 2038.

U.S. patent application number 15/977,226, was parallel filed with PCT/US2018/032351, which is directed to a composition and method of use of gemcabene. Foreign counterpart patent applications are pending in Argentina and Taiwan. Any patent issuing from this patent family is expected to expire in 2038.

U.S. patent application number 15/956,232, was filed as a continuation-in-part of U.S. patent application number 15/445,118 which is directed to treatment of patients with familial hypercholesterolemia on lipid-lowering therapy. Any patent issuing from this patent is expected to expire in 2037.

In 2018, we also filed U.S. provisional patent applications 62/747,375 and 62/767,079 directed to composition of matter and methods of synthesis which are pending. Additionally, we filed a PCT application (PCT/US2018/021093) directed to the treatment of obesity symptoms. As background, the patent term is typically 20 years from the date of filing a non-provisional application. In the United States, a patent's term may be lengthened several ways. First, patent term adjustment (PTA) compensates a patentee for administrative delays by the USPTO in granting a patent. Second, in certain instances, a patent term extension (PTE) can be granted to recapture a portion of the term effectively lost as a result of the FDA regulatory review period, as provided under the Drug Price Competition and Patent Term Restoration Act of 1984, referred to as the Hatch-Waxman Act. This restoration period cannot be longer than five years for approval of a drug compound, and the total patent term, including the restoration period, must not exceed 14 years following FDA approval. Only one patent applicable to an approved drug is eligible for the PTE and the application for the extension must be submitted prior to the expiration of the patent and within 60 days from market approval. Independent of patent protection, in the United States, the Hatch-Waxman Act provides a five-year period of non-patent data exclusivity within the United States to the first applicant to gain approval of an NDA for a new chemical entity (NCE). Under this provision, gemcabene may be eligible for up to five years of data and market exclusivity under the Hatch-Waxman Act, because it is considered a NCE because the FDA has not previously approved any other drug containing the active ingredient of gemcabene. In Europe, under the Data Exclusivity Directive, pharmaceutical companies may receive up to 11 years to market their product without risk of competition. In Japan, under the Pharmaceuticals Act of Japan, the market authorization holder, based on the length of a required study period reexamination, may have up to 10 years before a generic can enter the market.

Competition

Our industry is highly competitive and subject to rapid and significant innovation and change. The market for lipid regulating therapies is especially large and competitive. Our potential competitors include large pharmaceutical and biopharmaceutical companies, specialty pharmaceutical and generic drug companies, academic institutions, government agencies and research institutions. Gemcabene, if approved, will face intense competition. Key competitive factors affecting its commercial success will include efficacy, safety, tolerability, reliability, convenience of dosing, price and reimbursement. Although there are currently no approved therapies for NASH, the market for NASH is continuing to evolve with many drug candidates in late stage development.

Statins are the most commonly used therapy to lower LDL-C in the dyslipidemia market. They are used by patients with HoFH as well as HeFH and ASCVD. Branded statins include AstraZeneca's Crestor (rosuvastatin), Merck's Zocor (simvastatin) and Pfizer's Lipitor (atorvastatin) among others. Generic statins are marketed by several companies including Apotex Inc., Mylan N.V. (Mylan), Dr. Reddy's Laboratories Ltd. and Lupin Pharmaceuticals, Inc. (Lupin) among others.

Non-statin based therapies are also used to lower LDL-C in dyslipidemia patients. Merck's Zetia (ezetimibe) is a common non-statin therapy that is often combined with statins for HoFH, HeFH and ASCVD patients. Merck's Vytorin and Liptruzet are fixed-dose combination therapies that combine ezetimibe with statins. Non-statin therapies are combined with statins to improve LDL-C lowering or to offer other efficacy benefits, including Daiichi Sankyo Inc.'s (Daiichi Sankyo) Welchol, a bile acid sequestrant and niacin. Non-statin therapies are also used to treat HoFH. These therapies include Aegerion's Juxtapid, a once-daily oral microsomal triglyceride transfer protein (MTP) inhibitor and Ionis and Genzyme Corporation's, a Sanofi Company (Genzyme), Kynamro, a once-weekly injectable apoB antisense therapy. These agents have boxed warnings associated with liver toxicity and significant tolerability issues on their labels. Amgen's Repatha, an injectable PCSK9 inhibitor, was recently approved for HoFH, HeFH and ASCVD, and Sanofi's and Regeneron's PCSK9 inhibitor, Praluent, was recently approved for HeFH and ASCVD.

There are multiple product candidates in late stage development for HoFH, HeFH and ASCVD. Regeneron's evincumab (Phase 3) is in development for the treatment of HoFH. For hypercholesterolemia, including HeFH and ASCVD, drugs in development include oral CETPi, Merck's anacetrapib (recently discontinued Phase 3), Eli Lilly and Company's evacetrapib (recently discontinued Phase 3), and Amgen/Dezima's TA-8995 (Phase 2), current Esperion's oral product, Bempedoic Acid (Phase 3), The Medicines Company/Alnylam Pharmaceuticals, Inc.'s (Alnylam)

injectable PCSK9 inhibitor, ALN-PCSSc (Phase 3), Eli Lilly's injectable PCSK9 inhibitor, LY3015014 (Phase 2), and Pfizer's injectable PCSK9 inhibitor bococizumab (recently discontinued Phase 3).

For severe hypertriglyceridemia, fibrates, niacin and prescription fish oil are common therapies used to lower triglycerides. Examples of branded fibrates include AbbVie Inc.'s (AbbVie) Tricor and Trilipix, and an example of a branded niacin includes AbbVie's Niaspan, an extended-release niacin. In addition, AbbVie markets combination therapies, such as Advicor (niacin extended release and lovastatin) and Simcor (niacin extended release and simvastatin). Prescribed generic versions of fibrates, such as gemfibrozil, are manufactured by many companies including Impax Laboratories, Inc. (Impax), Teva Pharmaceutical Industries Ltd. (Teva), Mylan and Lupin among others. Generic versions of niacins are manufactured by many companies including Teva, Lupin and Zydus Pharmaceuticals (USA), Inc., among others. Commonly used prescription fish oils include GlaxoSmithKline plc's (GlaxoSmithKline) Lovaza, AstraZeneca's Epanova and Amarin's Vascepa.

Currently there are currently no approved therapies for NASH and older medications are written off label to treat the disease. There are currently more than thirty assets in various stages of development for NASH. Several drug candidates are in late stage development and may be approved for the NASH indication as soon as 2019/2020: OCALIVA (Obeticholic Acid) (FXR Agonist) being developed by Intercept Pharmaceuticals, Inc., Elafibranor (PPAR Agonist) being developed by Genfit SA, Selonsertib (formerly GS-4997) (ASK-1 Inhibitor) being developed by Gilead Sciences, Inc., GS-0976 (ACC Inhibitor) being developed by Gilead Sciences, Inc., Cenicriviroc (CVC) (CCR2/CCR5 Inhibitor) being developed by Tobira Therapeutics, Inc. (a wholly-owned subsidiary of Allergan plc), Emricasan (Caspase Inhibitor) being developed by Conatus Pharmaceuticals Inc., Aramchol (Synthetic Fatty Acid/Bile Acid Conjugate) being developed by Galmed, GR-MD-02 (Galectin-3 Inhibitor) being developed by Galectin Therapeutics, and MGL-3196 (THR Agonist) being developed by Madrigal. Recently, Intercept Pharmaceuticals, Inc., announced that obeticholic acid achieved statistically significant improvement in liver fibrosis without worsening of NASH in a Phase 3 study and that it intends to file for regulatory approval in the U.S. and Europe in the second half of 2019.

Government Regulation

Government authorities at the federal, state and local level in the United States and in other countries extensively regulate, among other things, the research, development, testing, manufacture (including any manufacturing changes), packaging, storage, recordkeeping, labeling, advertising, promotion, distribution, marketing, post-approval monitoring and reporting, import and export of pharmaceutical products, such as those we are developing.

United States — FDA Regulation

FDA Approval Process

In the United States, pharmaceutical products are subject to extensive regulation by the FDA. The Federal Food, Drug and Cosmetic Act (FDC Act) and other federal and state statutes and regulations, govern, among other things, the research, development, testing, manufacture, storage, recordkeeping, approval, labeling, promotion and marketing, distribution, post-approval monitoring and reporting, sampling, and import and export of pharmaceutical products. Failure to comply with applicable U.S. requirements may subject a company to a variety of administrative or judicial sanctions by the FDA, including FDA refusal to approve pending New Drug Applications (NDAs), partial or full clinical holds, warning or untitled letters, product recalls, product seizures, total or partial suspension of production or distribution, injunctions, fines, civil penalties and criminal prosecution.

Pharmaceutical product development for a new product or certain changes to an approved product in the United States typically involves preclinical laboratory and animal tests, the submission of an Investigational New Drug (IND) application to the FDA, which must become effective before clinical trials may commence, and adequate and well-controlled clinical trials to establish the safety and effectiveness of the drug for each indication for which FDA approval is sought. Satisfaction of FDA pre-market approval requirements typically takes many years and the actual time required may vary substantially based upon the type, complexity and novelty of the product or disease.

Preclinical studies include laboratory evaluation of product chemistry, formulation and toxicity, as well as animal trials to assess the characteristics and potential safety and efficacy of the product. The conduct of the preclinical studies must comply with federal regulations and requirements, including good laboratory practices, or GLP. The results of preclinical studies are submitted to the FDA as part of an IND application along with other information, including product chemistry, manufacturing and controls, available clinical data, and a proposed clinical trial protocol. Long-term preclinical studies, such as animal tests of reproductive toxicity and carcinogenicity, may continue after the IND is submitted.

Once the IND is submitted, the sponsor must wait 30 calendar days before initiating any clinical trials. During this time, FDA has an opportunity to review the IND for safety to assure that research subjects will not be subjected to unreasonable risk, unless before that time the FDA raises concerns or questions and places the trial on clinical hold. In such a case, the IND sponsor and the FDA must resolve any outstanding concerns before the clinical trial can begin.

Clinical trials involve the administration of the investigational new drug to healthy volunteers or patients under the supervision of a qualified investigator. Clinical trials must be conducted: (1) in compliance with federal regulations; (2) in compliance with good clinical practice (GCP), an international standard meant to protect the rights and health of patients and to define the roles of clinical trial sponsors, administrators and monitors, and (3) under protocols detailing the objectives of the trial, the parameters to be used in monitoring safety, and the effectiveness criteria to be evaluated. Each protocol involving testing on U.S. patients and subsequent protocol amendments must be submitted to the FDA as part of the IND.

The FDA may order the temporary or permanent discontinuation of a clinical trial at any time or impose other sanctions if the FDA believes that the clinical trial is either not being conducted in accordance with FDA requirements or presents an unacceptable risk to the clinical trial patients. The clinical trial protocol and informed consent information for patients in clinical trials must also be submitted to an Institutional Review Board (IRB) for approval. An IRB must operate in compliance with FDA regulations. An IRB may also require the clinical trial at the site to be halted, either temporarily or permanently, for failure to comply with the IRB's requirements or may impose other conditions.

Clinical trials to support NDAs for marketing approval are typically conducted in three sequential phases, but the phases may overlap.

- Phase 1 trials: The drug is initially introduced into healthy volunteers or patients, with the target disease or condition. The drug is tested to assess metabolism, pharmacokinetics, pharmacological actions, side effects associated with increasing doses, and, if possible, early evidence of effectiveness.
- Phase 2 trials: The drug is administered to a limited patient population to determine the effectiveness of the drug for a particular indication, dosage tolerance, optimum dosage and to identify common adverse effects and safety risks.
- Phase 3 trials: If the drug demonstrates evidence of effectiveness and an acceptable safety profile in Phase 2 trials, Phase 3 trials, including registration trials, are undertaken to obtain additional information about clinical efficacy and safety in a larger number of patients, typically at geographically dispersed clinical trial sites, to permit the FDA to evaluate the overall benefit-risk relationship of the drug and to provide adequate information for the labeling of the drug. In most cases, the FDA requires two adequate and well-controlled Phase 3 registration trials to demonstrate the efficacy of the drug. A single Phase 3 registration trial with other confirmatory evidence may be sufficient in rare instances where the study is a large multicenter trial demonstrating internal consistency and a statistically very persuasive finding of a clinically meaningful effect on mortality, irreversible morbidity or prevention of a disease with a potentially serious outcome and confirmation of the result in a second trial would be practically or ethically impossible.

After completion of the required clinical trials, an NDA is prepared and submitted to the FDA for approval, which is required before marketing of the product may begin in the United States. The NDA must include, among other things, the results of all preclinical studies, clinical trials and other testing, a compilation of data relating to the product's pharmacology, chemistry, manufacture and controls, and the proposed product labeling. The cost of preparing and submitting an NDA is substantial. The submission of most NDAs is additionally subject to a substantial application user fee and the manufacturer and/or applicant under an approved NDA are also subject to annual product and establishment user fees.

The FDA has 60 days from its receipt of an NDA to determine whether the application will be accepted for filing based on the FDA's threshold determination that it is sufficiently complete to permit substantive review. Once the submission is accepted for filing, the FDA begins an in-depth review. The FDA has agreed to certain performance goals in the review of new drug applications. Most such applications for standard review drug products are reviewed within ten to twelve months; most applications for priority review drugs are reviewed in six to eight months. Priority review can be applied to drugs that the FDA determines offer major advances in treatment, diagnosis, or prevention of diseases or

provide a treatment where no adequate therapy exists. For biologics, priority review is further limited only for drugs intended to treat a serious or life-threatening disease relative to the currently approved products. The review process for both standard and priority review may be extended by the FDA for three additional months to consider certain late-submitted information, or information intended to clarify information already provided in the submission.

The FDA may also 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. The FDA is not bound by the recommendation of an advisory committee, but it generally follows such recommendations. Before approving an NDA, the FDA will typically inspect one or more clinical sites to assure compliance with GCP. Additionally, the FDA will inspect the facility or the facilities at which the drug is manufactured. The FDA will not approve the product unless it is satisfactorily compliant with cGMP standards and the NDA contains data that provide substantial evidence that the drug is safe and effective in the indication studied.

After the FDA evaluates the NDA and the manufacturing facilities, it issues either an approval letter or a complete response letter. A complete response letter generally outlines the deficiencies in the submission and may require substantial additional testing, or information, in order for the FDA to reconsider the application. If, or when, those deficiencies have been addressed to the FDA's satisfaction in a resubmission of the NDA, the FDA will issue an approval letter. The FDA has committed to reviewing such resubmissions in two or six months depending on the type of information included.

An approval letter authorizes commercial marketing of the drug with specific prescribing information for specific indications. Even if the FDA approves a product, it may limit the approved indications for use for the product, require that contraindications, warnings or precautions be included in the product labeling, or require that post-approval studies, including Phase 4 clinical trials, be conducted to further assess a drug's safety after approval. As a condition of NDA approval, the FDA may also require a Risk Evaluation and Mitigation Strategy (REMS) to help ensure that the benefits of the drug outweigh the potential risks. REMS can include medication guides, communication plans for healthcare professionals, and Elements To Assure Safe Use (ETASU). Elements to assure safe use can include, but are not limited to, special training or certification for prescribing or dispensing, dispensing only under certain circumstances, special monitoring, and the use of patient registries. The requirement for a REMS can materially affect the potential market and profitability of the drug. Moreover, product approval may require substantial post-approval testing and surveillance to monitor the drug's safety or efficacy. Once granted, product approvals may be withdrawn if compliance with regulatory standards is not maintained or problems are identified following initial marketing.

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

Fast Track Designation and Accelerated Approval

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

Under the fast track program and the FDA's accelerated approval regulations, the FDA may approve a drug for a serious or life-threatening illness that provides meaningful therapeutic benefit to patients over existing treatments based upon a surrogate endpoint that is reasonably likely to predict clinical benefit, or on a clinical endpoint that can be measured earlier than irreversible morbidity or mortality, that is reasonably likely to predict an effect on irreversible morbidity or mortality or other clinical benefit, taking into account the severity, rarity, or prevalence of the condition and the availability or lack of alternative treatments.

In clinical trials, a surrogate endpoint is a measurement of laboratory or clinical signs of a disease or condition that substitutes for a direct measurement of how a patient feels, functions, or survives. Surrogate endpoints can often be measured more easily or more rapidly than clinical endpoints. A product candidate approved on this basis is subject to rigorous post-marketing compliance requirements, including the completion of Phase 4 or post-approval clinical trials to

confirm the effect on the clinical endpoint. Failure to conduct required post-approval studies or confirm a clinical benefit during post-marketing studies, will allow FDA to withdraw the drug from the market on an expedited basis. All promotional materials for product candidates approved under accelerated regulations are subject to prior review by FDA.

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

Breakthrough Therapy Designation

The FDA is also required to expedite the development and review of the application for approval of drugs that are intended to treat a serious or life-threatening disease or condition where preliminary clinical evidence indicates that the drug may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints. Under the breakthrough therapy program, the sponsor of a new product candidate may request that the FDA designate the product candidate for a specific indication as a breakthrough therapy concurrent with, or after, the filing of the IND for the product candidate. The FDA must determine if the product candidate qualifies for breakthrough therapy designation within 60 days of receipt of the sponsor's request. The FDA must take certain actions, such as holding timely meetings and providing advice, intended to expedite the development and review of an application for approval of a breakthrough therapy. Even if a product qualifies for this program, the FDA may later decide that the product no longer meets the conditions for qualification.

Orphan Drugs

Under the Orphan Drug Act, the FDA may grant orphan drug designation to drugs intended to treat a rare disease or condition — generally a disease or condition that affects fewer than 200,000 individuals in the U.S. Orphan Drug Designation must be requested before submitting an NDA. After the FDA grants orphan drug designation, the generic identity of the drug and its potential orphan use are disclosed publicly by the FDA. Orphan drug designation does not convey any advantage in, or shorten the duration of, the regulatory review and approval process. The first NDA applicant to receive FDA approval for a particular active ingredient to treat a particular disease with FDA orphan drug designation is entitled to a seven-year exclusive marketing period in the United States for that product, for that indication. During the seven-year exclusivity period, the FDA may not approve any other applications to market the same drug for the same disease, except in limited circumstances, such as a showing of clinical superiority to the product with orphan drug exclusivity. Orphan drug exclusivity does not prevent the FDA from approving a different drug for the same disease or condition, or the same drug for a different disease or condition. Among the other benefits of orphan drug designation are tax credits for certain research and a waiver of the NDA application user fee.

Pediatric Information

Under the Pediatric Research Equity Act (PREA), NDAs or supplements to NDAs 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 drug is safe and effective. The FDA may grant full or partial waivers for submission of data, as well as deferrals for several reasons, including a finding that the drug is ready for approval for use in adults before pediatric studies are complete or that additional safety or effectiveness data needs to be collected before the pediatric studies begin. Unless otherwise required by regulation, PREA does not apply to any drug for an indication for which orphan designation has been granted.

The Best Pharmaceuticals for Children Act (BPCA) provides NDA holders a six-month extension of any exclusivity — patent or non-patent — for a drug if certain conditions are met. Conditions for exclusivity include the FDA's determination that information relating to the use of a new drug in the pediatric population may produce health benefits in that population, the FDA making a written request for pediatric studies, and the applicant agreeing to perform, and reporting on, the requested studies within the statutory timeframe. Applications under the BPCA are treated as priority applications, with all of the benefits that designation confers.

Special Protocol Assessment

A company may reach an agreement with the FDA under the Special Protocol Assessment (SPA) process as to the required design and size of clinical trials intended to form the primary basis of an efficacy claim and adequately addresses scientific and regulatory requirements indicating concurrence by FDA with the adequacy and acceptability to support the ability of a future submitted application to meet regulatory requirements for approval. Under the FDC Act and FDA guidance implementing the statutory requirement, an SPA is generally binding upon the FDA except in limited circumstances, such as if the FDA identifies a substantial scientific issue essential to determining safety or efficacy after the clinical trial begins, public health concerns emerge that were unrecognized at the time of the protocol assessment, the sponsor and FDA agree to the change in writing, or if the clinical trial sponsor fails to follow the protocol that was agreed upon with the FDA.

Disclosure of Clinical Trial Information

Sponsors of clinical trials of FDA-regulated products, including drugs, are required to register and disclose certain clinical trial information. Information related to the product, patient population, phase of investigation, clinical trial sites and investigators, and other aspects of the clinical trial is then made public as part of the registration. Sponsors are also obligated to discuss the results of their clinical trials after completion. Disclosure of the results of these trials can be delayed until the new product or new indication being studied has been approved. Competitors may use this publicly-available information to gain knowledge regarding the progress of development programs.

Post-Approval Requirements

Once an NDA is approved, a product will be subject to certain post-approval requirements. For instance, the FDA closely regulates the post-approval marketing and promotion of drugs, including standards and regulations for direct-to-consumer advertising, off-label promotion, industry-sponsored scientific and educational activities and promotional activities involving the internet. Drugs may be marketed only for the approved indications and in accordance with the provisions of the approved labeling.

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

The Hatch-Waxman Amendments

Orange Book Listing

In seeking approval for a drug through an NDA, applicants are required to list with the FDA each patent whose claims cover the applicant's product. Upon approval of a drug, each of the patents listed in the application for the drug is then published in the FDA's Approved Drug Products with Therapeutic Equivalence Evaluations, commonly known as the Orange Book. Drugs listed in the Orange Book can, in turn, be cited by potential generic competitors in support of approval of an Abbreviated New Drug Application (ANDA). An ANDA provides for marketing of a drug product that has the same active ingredient in the same strength, route of administration and dosage form as the listed drug and has been shown to be bioequivalent to the listed drug. Other than the requirement for bioequivalence testing, ANDA applicants are not required to conduct, or submit results of, preclinical studies or clinical trials to prove the safety or effectiveness of their drug product. Drugs approved in this way are commonly referred to as "generic equivalents" to the listed drug, and can often be substituted by pharmacists under prescriptions written for the original listed drug.

The ANDA applicant is required to certify to the FDA concerning any patents listed for the approved product in the FDA's Orange Book. Specifically, the applicant must certify that: (1) the required patent information has not been filed; (2) the listed patent has expired; (3) the listed patent has not expired, but will expire on a particular date and approval is

sought after patent expiration; or (4) the listed patent is invalid or will not be infringed by the new product. The ANDA applicant may also elect to submit a section viii statement certifying that its proposed ANDA label does not contain (or carves out) any language regarding the patented method-of-use rather than certify to a listed method-of-use patent. If the applicant does not challenge the listed patents, the ANDA application will not be approved until all the listed patents claiming the referenced product have expired.

A certification that the new product will not infringe the already approved product's listed patents, or that such patents are invalid, is called a Paragraph IV certification. If the ANDA applicant has provided a Paragraph IV certification to the FDA, the applicant must also send notice of the Paragraph IV certification to the NDA and patent holders once the ANDA has been accepted for filing by the FDA. The NDA and patent holders may then initiate a patent infringement lawsuit in response to the notice of the Paragraph IV certification. The filing of a patent infringement lawsuit within 45 days of the receipt of a Paragraph IV certification automatically prevents the FDA from approving the ANDA until the earlier of 30 months, expiration of the patent, settlement of the lawsuit, or a decision in the infringement case that is favorable to the ANDA applicant.

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

Exclusivity

Upon NDA approval of a drug containing a New Chemical Entity (NCE), which is a drug substance that contains an active moiety that has not been approved by the FDA in any other NDA, that moiety will receive five years of marketing exclusivity during which the FDA cannot approve any ANDA seeking approval of a generic version of that moiety. Certain changes to a drug, such as the addition of a new indication to the package insert, may receive a three-year period of exclusivity during which the FDA cannot approve an ANDA for a generic drug that includes the change.

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

Patent Term Extension

After NDA approval, owners of relevant drug patents may apply for up to a five year patent extension. The allowable patent term extension is calculated as half of the drug's testing phase — the time between IND application and NDA submission — and all of the review phase — the time between NDA submission and approval up to a maximum of five years. The time can be shortened if the FDA determines that the applicant did not pursue approval with due diligence. The extension may not extend the patent beyond 14 years from market approval.

For patents that might expire during the application phase, the patent owner may request an interim patent extension. An interim patent extension increases the patent term by one year and may be renewed up to four times. For each interim patent extension granted, the post-approval patent extension is reduced by one year. The director of the USPTO must determine that approval of the drug covered by the patent for which a patent extension is being sought is likely. Interim patent extensions are not available for a drug for which an NDA has not been submitted.

Prescription Drug Marketing Act

As part of the sales and marketing process, pharmaceutical companies frequently provide samples of approved drugs to physicians. The Prescription Drug Marketing Act (PDMA) imposes requirements and limitations upon the provision of drug samples to physicians, as well as prohibits states from licensing distributors of prescription drugs unless the state licensing program meets certain federal guidelines that include minimum standards for storage, handling and record keeping. In addition, the PDMA sets forth civil and criminal penalties for violations.

United States — Anti-Kickback, False Claims Laws and Other Healthcare Laws

In addition to FDA restrictions on marketing of pharmaceutical products, several other types of state and federal laws have been applied to restrict certain general business and marketing practices in the pharmaceutical industry in recent

years. These laws include anti-kickback statutes, false claims statutes and other statutes pertaining to health care fraud and abuse.

The federal Anti-Kickback Statute prohibits, among other things, knowingly and willfully offering, paying, soliciting or receiving remuneration to induce, or in return for, purchasing, leasing, ordering or arranging for the purchase, lease or order of any healthcare item or service reimbursable under Medicare, Medicaid, or other federally financed healthcare programs. The Patient Protection and Affordable Care Act as amended by the Health Care and Education Reconciliation Act (PPACA) amended the intent element of the federal Anti-Kickback Statute so that a person or entity no longer needs to have actual knowledge of the statute or specific intent to violate it in order to be in violation. This statute has been interpreted to apply to arrangements between pharmaceutical manufacturers on the one hand and prescribers, purchasers and formulary managers on the other. Although there are a number of statutory exemptions and regulatory safe harbors protecting certain common activities from prosecution or other regulatory sanctions, the exemptions and safe harbors are drawn narrowly, and practices that involve remuneration intended to induce prescribing, purchases, or recommendations may be subject to scrutiny if they do not qualify for an exemption or safe harbor. Violations of the Anti-Kickback Statute are punishable by penalties including imprisonment, criminal fines, civil monetary penalties, damages, disgorgement and exclusion from participation in federal healthcare programs.

Federal false claims laws, including the civil False Claims Act, prohibit any person or entity from knowingly presenting, or causing to be presented, a false claim for payment to the federal government, or knowingly making, or causing to be made, a false statement to have a false claim paid. This includes claims made to programs where the federal government reimburses, such as Medicaid, as well as programs where the federal government is a direct purchaser, such as when it purchases off the Federal Supply Schedule. Recently, several pharmaceutical and other healthcare companies have been prosecuted under these laws for allegedly inflating drug prices they report to pricing services, which in turn were used by the government to set Medicare and Medicaid reimbursement rates, and for allegedly providing free product to customers with the expectation that the customers would bill federal programs for the product. In addition, certain marketing practices, including off-label promotion, may also violate false claims laws. Additionally, PPACA amended the federal Anti-Kickback Statute such that a violation of that statute can serve as a basis for liability under the federal civil False Claims Act. The majority of states also have statutes or regulations similar to the federal Anti-Kickback Statute and False Claims Act, which apply to items and services reimbursed under Medicaid and other state programs, or, in several states, apply regardless of the payor.

Other federal statutes pertaining to healthcare fraud and abuse include the Civil Monetary Penalties Statute, which prohibits the offer or payment of remuneration to a Medicaid or Medicare beneficiary that the offeror/payor knows or should know is likely to influence the beneficiary to order a reimbursable item or service from a particular supplier, and the healthcare fraud provisions of the Health Insurance Portability and Accountability Act of 1996 (HIPAA), which prohibits knowingly and willfully executing or attempting to execute a scheme to defraud any healthcare benefit program or obtain by means of false or fraudulent pretenses, representations, or promises any money or property owned by or under the control of any healthcare benefit program in connection with the delivery of or payment for healthcare benefits, items, or services.

For example, several pharmaceutical and other healthcare companies have been prosecuted under these laws for, among other things, allegedly inflating drug prices they report to pricing services, which in turn were used by the government to set Medicare and Medicaid reimbursement rates, and for allegedly providing free product to customers with the expectation that the customers would bill federal programs for the product. In addition, certain marketing practices undertaken by pharmaceutical companies, including off-label promotion, may violate false claims laws.

Pursuant to PPACA, the Centers for Medicare & Medicaid Services (CMS) has issued a final rule that requires manufacturers of certain prescription drugs, devices, biologics, and medical supplies for which payment is available under Medicare, Medicaid, or the Children's Health Insurance Program, with specific exceptions, to collect and report information on payments or transfers of value to physicians and teaching hospitals, as well as investment interests held by physicians and their immediate family members. The first reports were due in 2014 and must be submitted on an annual basis. The reported data were posted by CMS in searchable form on a public website on September 30, 2014 and will be posted on an annual basis. Failure to submit required information may result in civil monetary penalties.

In addition, several states now require prescription drug companies to report expenses relating to the marketing and promotion of drug products and to report gifts and payments to individual physicians in these states. Other states prohibit various other marketing-related activities. Still other states require the posting of information relating to clinical studies and their outcomes. In addition, California, Connecticut, Nevada and Massachusetts require pharmaceutical companies to implement compliance programs and/or marketing codes. Several additional states are considering similar proposals.

Compliance with these laws is difficult and time consuming, and companies that do not comply with these state laws may face civil penalties.

Other federal and state requirements include the following:

- HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act (the HITECH Act) and its implementing regulations, which imposes obligations, including mandatory contractual terms, on certain people and entities with respect to safeguarding the privacy, security and transmission of individually identifiable health information; and
- State and foreign laws also govern the privacy and security of health information in some circumstances, many of which differ from each other in significant ways and often are not preempted by HIPAA, thus complicating compliance efforts.

United States Healthcare Reform

Current and future legislative proposals to further reform healthcare or reduce healthcare costs may result in lower reimbursement for our products. The cost containment measures that payors and providers are instituting and the effect of any healthcare reform initiative implemented in the future could significantly reduce our revenues from the sale of our products.

For example, in March 2010, PPACA was signed into law. PPACA has begun to, and will likely continue to, substantially change healthcare financing and delivery by both governmental and private insurers, and significantly impact the pharmaceutical industry. The PPACA, among other things: established an annual, nondeductible fee on any entity that manufactures or imports certain specified branded prescription drugs and biologic agents; revised the methodology by which rebates owed by manufacturers to the state and federal government for covered outpatient drugs under the Medicaid Drug Rebate Program are calculated; increased the minimum Medicaid rebates owed by most manufacturers under the Medicaid Drug Rebate Program; extended the Medicaid Drug Rebate program to utilization of prescriptions of individuals enrolled in Medicaid managed care organizations; implemented a new Medicare Part D coverage gap discount program; expanded the entities eligible for discounts under the Public Health Services pharmaceutical pricing program; created a new Patient Centered Outcomes Research Institute; and provided incentives to programs that increase the federal government's comparative effectiveness research.

In addition, other legislative changes have been proposed and adopted since the PPACA was enacted. In August 2011, President Obama signed into law the Budget Control Act of 2011, which, among other things, created the Joint Select Committee on Deficit Reduction to recommend to Congress proposals in spending reductions. The Joint Select Committee did not achieve a targeted deficit reduction of at least \$1.2 trillion for the years 2012 through 2021, triggering the legislation's automatic reduction to several government programs. This includes reductions to Medicare payments to providers of 2% per fiscal year, which went into effect in April 2013 and will remain in effect through 2025 unless additional Congressional action is taken. Additionally, in January 2013, President Obama signed into law the American Taxpayer Relief Act of 2012, which, among other things, reduced Medicare payments to several providers and increased the statute of limitations period for the government to recover overpayments to providers from three to five years.

With President Donald J. Trump currently in office, we expect that additional state and federal healthcare reform measures may be adopted in the future, including the possible repeal and replacement of PPACA and related legislation, regulations and programs. Any new state and federal healthcare reform measures could limit the amounts that federal and state governments will pay for healthcare products and services, which could result in reduced demand for our products or additional pricing pressure. We are unsure of the ways in which PPACA will continue to be challenged, repealed, amended or replaced in the months and years to come.

Review and Approval of Drug Products in the European Union

In order to market any product outside of the United States, a company must also comply with numerous and varying regulatory requirements of other countries and jurisdictions regarding quality, safety and efficacy and governing, among other things, clinical trials, marketing authorization, commercial sales and distribution of drug products. Whether or not it obtains FDA approval for a product, the company would need to obtain the necessary approvals by the comparable foreign regulatory authorities before it can commence clinical trials or marketing of the product in those countries or

jurisdictions. The approval process ultimately varies between countries and jurisdictions and can involve additional product testing and additional administrative review periods. The time required to obtain approval in other countries and jurisdictions might differ from and be longer than that required to obtain FDA approval. Regulatory approval in one country or jurisdiction does not ensure regulatory approval in another, but a failure or delay in obtaining regulatory approval in one country or jurisdiction may negatively impact the regulatory process in others.

Pursuant to the European Clinical Trials Directive, a system for the approval of clinical trials in the European Union has been implemented through national legislation of the member states. Under this system, an applicant must obtain approval from the competent national authority of a European Union member state in which the clinical trial is to be conducted. Furthermore, the applicant may only start a clinical trial after a competent ethics committee has issued a favorable opinion. Clinical trial application must be accompanied by an investigational medicinal product dossier with supporting information prescribed by the European Clinical Trials Directive and corresponding national laws of the member states and further detailed in applicable guidance documents.

To obtain marketing approval of a drug under European Union regulatory systems, an applicant must submit a marketing authorization application (MAA) either under a centralized or decentralized procedure.

The centralized procedure provides for the grant of a single marketing authorization by the European Commission that is valid for all European Union member states. The centralized procedure is compulsory for specific products, including for medicines produced by certain biotechnological processes, products designated as orphan medicinal products, advanced therapy products and products with a new active substance indicated for the treatment of certain diseases. For products with a new active substance indicated for the treatment of other diseases and products that are highly innovative or for which a centralized process is in the interest of patients, the centralized procedure may be optional.

Under the centralized procedure, the Committee for Medicinal Products for Human Use, or the CHMP, established at the European Medicines Agency (EMA) is responsible for conducting the initial assessment of a drug. The CHMP is also responsible for several post-authorization and maintenance activities, such as the assessment of modifications or extensions to an existing marketing authorization. Under the centralized procedure in the European Union, the maximum timeframe for the evaluation of an MAA is 210 days, excluding clock stops, when additional information or written or oral explanation is to be provided by the applicant in response to questions of the CHMP. Accelerated evaluation might be granted by the CHMP in exceptional cases, when a medicinal product is of major interest from the point of view of public health and in particular from the viewpoint of therapeutic innovation. In this circumstance, the EMA ensures that the opinion of the CHMP is given within 150 days.

The decentralized procedure is available to applicants who wish to market a product in various European Union member states where such product has not received marketing approval in any European Union member states before. The decentralized procedure provides for approval by one or more other, or concerned, member states of an assessment of an application performed by one member state designated by the applicant, known as the reference member state. Under this procedure, an applicant submits an application based on identical dossiers and related materials, including a draft summary of product characteristics, and draft labeling and package leaflet, to the reference member state and concerned member states. The reference member state prepares a draft assessment report and drafts of the related materials within 210 days after receipt of a valid application. Within 90 days of receiving the reference member state's assessment report and related materials, each concerned member state must decide whether to approve the assessment report and related materials.

If a member state cannot approve the assessment report and related materials on the grounds of potential serious risk to public health, the disputed points are subject to a dispute resolution mechanism and may eventually be referred to the European Commission, whose decision is binding on all member states.

Data and Market Exclusivity in the European Union

In the European Union, NCEs qualify for eight years of data exclusivity upon marketing authorization and an additional two years of market exclusivity. This data exclusivity, if granted, prevents regulatory authorities in the European Union from referencing the innovator's data to assess a generic (abbreviated) application for eight years, after which generic marketing authorization can be submitted, and the innovator's data may be referenced, but not approved for two years. The overall ten-year period will be extended to a maximum of eleven years if, during the first eight years of those ten years, the marketing authorization (MA) holder obtains an authorization for one or more new therapeutic indications

which, during the scientific evaluation prior to their authorization, are held to bring a significant clinical benefit in comparison with existing therapies. Even if a compound is considered to be a NCE and the sponsor is able to gain the prescribed period of data exclusivity, another company nevertheless could also market another version of the drug if such company can complete a full MAA with a complete database of pharmaceutical test, preclinical studies and clinical trials and obtain marketing approval of its product.

Data and Market Exclusivity in Japan

Japan has no established system for data exclusivity or marketing exclusivity. However, the Pharmaceuticals Act of Japan (PAA) provides for a re-examination system after drug approval. This system imposes an obligation on the MA holder to continue to collect clinical data after market approval during a study period. The MA holder must apply for reexamination to the Minister of Health Labor and Welfare within three months of the expiration of the study period. During the study and reexamination period no generic drug may be approved, effectively providing a form of market exclusivity. The study period is determined by the drug category. The study period for an orphan drug is 10 years from MA, the study period for an NCE is eight years from MA, and for an improvement (new indication, formulation, etc.) the study period is four to six years from MA.

Patent Term Extension in Japan

The term of a patent that covers the approved drug may be extended for the shorter of five years, or the period during which the patent could not be worked (exploited) due to obtaining regulatory approval. This period is calculated from the later of the patent registration date (grant date) or the clinical trial start date to the regulatory approval date.

Regulatory Exclusivity in China

China has a six-year regulatory exclusivity period for NCE and Orphan drugs, such as gemcabene, which begins at the date of market approval.

Foreign Regulation

In order to market any product outside of the United States, we would need to comply with numerous and varying regulatory requirements of other countries regarding safety and efficacy and governing, among other things, clinical trials, marketing authorization, commercial sales and distribution of our products. Whether or not we obtain FDA approval for a product, we would need to obtain the necessary approvals by the comparable regulatory authorities of foreign countries before we can commence clinical trials or marketing of the product in those countries. The approval process varies from country to country and can involve additional product testing and additional administrative review periods. The time required to obtain approval in other countries might differ from and be longer than that required to obtain FDA approval. Regulatory approval in one country does not ensure regulatory approval in another, but a failure or delay in obtaining regulatory approval in one country may negatively impact the regulatory process in others.

Pharmaceutical Coverage, Pricing and Reimbursement

Significant uncertainty exists as to the coverage and reimbursement status of any drug products for which we obtain regulatory approval. Sales of any of our product candidates, if approved, will depend, in part, on the extent to which the costs of the products will be covered by third-party payors, including government health programs such as Medicare and Medicaid, commercial health insurers and managed care 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 once coverage is approved. Third-party payors may limit coverage to specific drug products on an approved list, or formulary, which might not include all of the approved drugs for a particular indication.

In order to secure coverage and adequate reimbursement for any product that might be approved for sale, we may need to conduct expensive pharmacoeconomic studies in order to demonstrate the medical necessity and cost-effectiveness of the product, in addition to the costs required to obtain FDA or other comparable regulatory approvals. 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. Further, one payor's determination to provide coverage for a drug product does not assure that other payors will also provide coverage or adequate

reimbursement for the drug product. Third-party reimbursement may not be sufficient to enable us to maintain price levels high enough to realize an appropriate return on our investment in product development.

The containment of healthcare costs has become a priority of federal, state and foreign governments, and the prices of drugs have been a focus in this effort. Third-party payors are increasingly challenging the prices charged for medical products and services and examining the medical necessity and cost-effectiveness of medical products and services, in addition to their safety and efficacy. If these third-party payors do not consider our products to be cost-effective compared to other available therapies, they may not cover our products after approval as a benefit under their plans or, if they do, the level of payment may not be sufficient to allow us to sell our products at a profit. The U.S. government, state legislatures and foreign governments have shown significant interest in implementing cost containment programs to limit the growth of government-paid health care costs, including price controls, restrictions on reimbursement and requirements for substitution of generic products for branded prescription drugs. Adoption of such controls and measures and tightening of restrictive policies in jurisdictions with existing controls and measures, could limit payments for pharmaceuticals such as the product candidates that we are developing and could adversely affect our net revenue and results.

Pricing and reimbursement schemes vary widely from country to country. Some countries provide that drug products may be marketed only after a reimbursement price has been agreed. Some countries may require the completion of additional studies that compare the cost-effectiveness of a particular product candidate to currently available therapies. For example, the European Union provides options for its member states to restrict the range of drug products for which their national health insurance systems provide reimbursement and to control the prices of medicinal products for human use. European Union member states may approve a specific price for a drug product or may instead adopt a system of direct or indirect controls on the profitability of the company placing the drug product on the market. Other member states allow companies to fix their own prices for drug products but monitor and control company profits. The downward pressure on health care costs in general, particularly prescription drugs, has become 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 competitive pressure that may reduce pricing within a country. There can be no assurance that any country that has price controls or reimbursement limitations for drug products will allow favorable reimbursement and pricing arrangements for any of our products.

The marketability of any products for which we receive regulatory approval for commercial sale may suffer if the government and third-party payors fail to provide coverage and adequate reimbursement. In addition, the emphasis on managed care in the United States has increased and we expect will continue to increase the pressure on drug pricing. Coverage policies, third-party reimbursement rates and drug pricing regulation may change at any time. In particular, the PPACA contains provisions that may reduce the profitability of drug products, including, for example, increased rebates for drugs sold to Medicaid programs, extension of Medicaid rebates to Medicaid managed care plans, mandatory discounts for certain Medicare Part D beneficiaries and annual fees based on pharmaceutical companies' share of sales to federal health care programs. Even if favorable coverage status and adequate reimbursement level status are obtained for one or more products for which we receive regulatory approval, less favorable coverage policies and reimbursement rates may be implemented in the future.

Employees

In September 2018, our board of directors approved a workforce reduction to reduce costs and conserve cash resources in light of the delay in our Phase 3 trials resulting from the FDA's request for additional animal data in connection with the addressing the partial clinical hold on gemcabene. The workforce reduction included 5 employees, which represented approximately 33% of our workforce at such time, and was completed in the fourth quarter of 2018.

As of March 11, 2019, we had 9 employees, all of whom are full-time, four of whom hold Ph.D. or M.D. degrees, 5 of whom were engaged in research and development activities and 4 of whom were engaged in business development, finance, information systems, facilities, human resources or administrative support. None of our employees are represented by a labor union or subject to a collective bargaining agreement. We consider our relationship with our employees to be good.

Corporate Information

We were formed in Michigan as Michigan Life Therapeutics, LLC (MLT) in November 2008. In October 2014, we incorporated a new entity under the name Gemphire Therapeutics Inc. in Delaware. MLT then merged with and into

Gemphire, with Gemphire as the surviving entity. The purpose of the merger was to change the jurisdiction of our incorporation from Michigan to Delaware and to convert from a limited liability company to a corporation. Our principal executive offices are located at 17199 N. Laurel Park Dr., Suite 401, Livonia, MI 48152, and our telephone number is (734) 245-1700. Our corporate website address is www.gemphire.com. Information contained on or accessible through our website is not a part of this Report, and the inclusion of our website address in this Report is an inactive textual reference only.

ITEM 1A. RISK FACTORS

Our business, prospects, financial condition or results of operations could be materially adversely affected by any of the risks and uncertainties set forth below, as well as in any amendments or updates reflected in subsequent filings with the Securities and Exchange Commission (SEC). In assessing these risks, you should also refer to other information contained in this Report, including our financial statements and related notes.

Risks Related to the Development of Gemcabene or Any Future Product Candidate

We currently depend entirely on the success of gemcabene, our only product candidate. We may never receive marketing approval for, or successfully commercialize, gemcabene for any indication.

We currently have only one product candidate, gemcabene, in clinical development, and our business depends on its successful clinical development, regulatory approval and commercialization. The research, testing, manufacturing, labeling, approval, sale, marketing and distribution of a drug product are subject to extensive regulation by the FDA and other regulatory authorities in the United States and other countries, where regulations differ from country to country. We are not permitted to market gemcabene in the United States until we receive approval of a new drug application (NDA) from the FDA or in any foreign countries until we receive the requisite approval from such countries. We have not submitted an NDA to the FDA or comparable applications to other regulatory authorities or received marketing approval for gemcabene. Before obtaining regulatory approval for the commercial sale of gemcabene for a particular indication, we must demonstrate through preclinical testing and clinical trials that gemcabene is safe and effective for use in that target indication. This process can take many years and may be followed by post-marketing studies and surveillance, which will require the expenditure of substantial resources beyond our current cash and cash equivalents. Of the large number of drugs in development in the United States, only a small percentage of drugs successfully complete the FDA regulatory approval process and are commercialized. Accordingly, even if we are able to complete development of gemcabene, we cannot assure you that gemcabene will be approved or commercialized.

The FDA has imposed a partial clinical hold on the clinical development of gemcabene which limits human trials to 6 months of drug exposure, and this partial clinical hold has, and may continue to, significantly delay our expected initiation of Phase 3 trials, or, if never lifted, may prevent us from continuing the development of gemcabene.

As mentioned earlier, in August 2018 we announced that the FDA, following submission of our two-year carcinogenicity study, requested additional preclinical studies, including a 13 week PPAR-alpha knockout mouse study with gemcabene. The FDA stated that we cannot proceed to our EOP2 meeting or begin our Phase 3 trials, which require more than 6 months of drug exposure, until this partial clinical hold is lifted. This request has delayed the timeline for our EOP2 meeting and start of Phase 3 trials by more than one year. We are currently conducting all studies requested and will resubmit our application to the FDA to lift the clinical hold. We cannot assure you that the studies will be completed on time by third party vendors who are involved or that the results will prove satisfactory for the FDA to lift the hold. It is possible that the FDA may request additional studies and information prior to lifting the hold which would significantly delay the time and cost to initiating Phase 3 trials and future development of gemcabene. If the FDA decisions further delay our clinical plans, this could jeopardize our ability to commercialize gemcabene by April 2024, as required by the Pfizer Agreement. Finally, we cannot assure you that the partial clinical hold will ever be lifted in which case gemcabene will never receive NDA approval or be commercialized.

Obtaining approval of an NDA is an extensive, lengthy, expensive and uncertain process, and the FDA may delay, limit or deny approval of gemcabene for many reasons, including:

- the data collected from preclinical studies and clinical trials of gemcabene may not be sufficient to support the submission of an NDA or removal of the partial clinical hold;

- we may not be able to demonstrate to the satisfaction of the FDA that gemcabene is safe and effective for any indication;
- the results of clinical trials may not meet the level of statistical significance or clinical significance required by the FDA for approval;
- the FDA may disagree with the number, design, size, conduct or implementation of our clinical trials;
- the FDA may not find the data from preclinical studies and clinical trials sufficient to demonstrate that gemcabene's clinical and other benefits outweigh its safety risks;
- the FDA may disagree with our interpretation of data from preclinical studies or clinical trials;
- the FDA may not accept data generated at our clinical trial sites;
- the FDA may have difficulties scheduling an advisory committee meeting in a timely manner or the advisory committee may recommend against approval of our application or may recommend that the FDA require, as a condition of approval, additional preclinical studies or clinical trials, limitations on approved labeling or distribution and use restrictions;
- the FDA may require development of a risk evaluation and mitigation strategy (REMS) as a condition of approval;
- the FDA may identify deficiencies in the manufacturing processes or facilities of third party manufacturers with which we enter into agreements for clinical and commercial supplies; or
- the FDA may change its approval policies or adopt new regulations.

The results of previous clinical trials may not be predictive of future results, and the results of our current and planned clinical trials may not satisfy the requirements of the FDA or non-U.S. regulatory authorities.

The results from the prior preclinical studies and clinical trials for gemcabene discussed elsewhere in this report may not necessarily be predictive of the results of future preclinical studies or clinical trials. Even if we are able to complete our planned clinical trials of gemcabene according to our current development timeline, the results from our prior clinical trials of gemcabene may not be replicated in these future trials. Many companies in the pharmaceutical and biotechnology industries (including those with greater resources and experience than us) have suffered significant setbacks in late-stage clinical trials after achieving positive results in early stage development, and we cannot be certain that we will not face similar setbacks. These setbacks have been caused by, among other things, preclinical findings made while clinical trials were underway or safety or efficacy observations made in clinical trials, including previously unreported AEs. Moreover, preclinical and clinical data are often susceptible to varying interpretations and analyses, and many companies that believed their product candidates performed satisfactorily in preclinical studies and clinical trials nonetheless have failed to obtain FDA approval. If we fail to produce positive results in our clinical trials of gemcabene, the development timeline and regulatory approval and commercialization prospects for gemcabene and our business and financial prospects, would be adversely affected.

Further, gemcabene may not be approved even if it achieves its primary endpoint in Phase 3 registration trials. The FDA or non-U.S. regulatory authorities may disagree with our trial design and our interpretation of data from preclinical studies and clinical trials. In addition, any of these regulatory authorities may change requirements for the approval of a product candidate even after reviewing and providing comments or advice on a protocol for a pivotal clinical trial that has the potential to result in approval by the FDA or another regulatory authority. Furthermore, any of these regulatory authorities may also approve our product candidate for fewer or more limited indications than we request or may grant approval contingent on the performance of costly post-marketing clinical trials.

We reported top line data from our 8 patient trial for HoFH (COBALT-1) in the second quarter of 2017 and top line data from our 105 patient trial for hypercholesterolemia on high-intensity statin therapy including HeFH and ASCVD patients (ROYAL-1) in the third quarter of 2017, and we reported top line data from our 91 patient trial in SHTG patients (INDIGO-1) in the second quarter of 2018. We announced the initiation of an investigator-initiated Phase 2a clinical trial in the fourth quarter of 2017 to study gemcabene in adult FPL patients with top line data expected in the second quarter of 2019. We announced the initiation of an investigator-initiated Phase 2a clinical trial in the first quarter of 2018 to study gemcabene in pediatric NAFLD patients, which was terminated in August 2018 due to unanticipated problems.

If we are successful in the clinical development of gemcabene for one or more of our targeted indications, we plan to eventually seek regulatory approvals of gemcabene initially in the United States, Canada and Europe, and we may seek approvals in other geographies. Before obtaining regulatory approvals for the commercial sale of any product candidate for any target indication, we must demonstrate with substantial evidence gathered in preclinical studies and adequate and well-controlled clinical studies, and, with respect to approval in the United States, to the satisfaction of the FDA, that the

product candidate is safe and effective for use for that target indication. We cannot assure you that the FDA or non-U.S. regulatory authorities would consider our planned clinical trials to be sufficient to serve as the basis for approval of gemcabene for any indication. The FDA and non-U.S. regulatory authorities retain broad discretion in evaluating the results of our clinical trials and in determining whether the results demonstrate that gemcabene is safe and effective. If we are required to conduct clinical trials of gemcabene in addition to those we have planned prior to approval, such as a cardiovascular outcomes trial, we will need substantial additional funds, our development pathway will be delayed, and we cannot assure you that the results of any such outcomes trial or other clinical trials will be sufficient for approval.

If clinical trials of gemcabene or any future product candidate fail to demonstrate safety and efficacy to the satisfaction of regulatory authorities or do not otherwise produce positive results, we may incur additional costs or experience delays in completing, or ultimately be unable to complete, the development and commercialization of such product candidate.

Before obtaining marketing approval from regulatory authorities for the sale of gemcabene, we must complete preclinical development (including, but not limited to, a subchronic (13 week) study of gemcabene in PPAR α knock-out mice and a study of gemcabene in in vitro PPAR transactivation assays using monkey and canine PPAR isoforms), and supportive pharmacology studies and Phase 2 and Phase 3 clinical trials to demonstrate the safety and efficacy in humans.

Preclinical development and extensive clinical trials will also be required before obtaining marketing approval from regulatory authorities for any other product candidate we may pursue in the future. Clinical testing is expensive, difficult to design and implement, can take many years to complete and is uncertain as to outcome. A failure of one or more clinical trials can occur at any stage of development.

We, or our future collaborators, may experience numerous unforeseen events during, or as a result of, clinical trials that could result in increased development costs, delay, limit or prevent our ability to receive marketing approval or commercialize gemcabene or any other product candidate we may pursue in the future, including:

- regulators or institutional review boards (IRBs) may not authorize us or our investigators to commence a clinical trial or conduct a clinical trial at a prospective trial site;
- government or regulatory delays and changes in regulatory requirements, policy and guidelines may require us to perform additional clinical trials or use substantial additional resources to obtain regulatory approval;
- we may have delays in reaching or fail to reach agreement on acceptable clinical trial contracts or clinical trial protocols with prospective trial sites;
- clinical trials may produce negative or inconclusive results, and we may decide, or regulators may require us, to conduct additional clinical trials or abandon product development programs;
- the number of patients required for clinical trials may be larger than we anticipate, enrollment in these clinical trials may be slower than we anticipate or participants may drop out of these clinical trials at a higher rate than we anticipate;
- our third-party contractors may fail to comply with regulatory requirements or meet their contractual obligations to us in a timely manner, or at all;
- our patients or medical investigators may be unwilling to follow our clinical trial protocols;
- we might have to suspend or terminate clinical trials for various reasons, including a finding that the participants are being exposed to unacceptable health risks;
- the cost of clinical trials may be greater than we anticipate;
- the supply or quality of any product candidate or other materials necessary to conduct clinical trials may be insufficient or inadequate; and
- the product candidate may have undesirable side effects or other unexpected characteristics, causing us or our investigators, regulators or IRBs to suspend or terminate the trials.

If we experience delays or difficulties in the enrollment of patients in clinical trials, our receipt of necessary regulatory approvals could be delayed or prevented.

We or our future collaborators may not be able to initiate or continue clinical trials for gemcabene or any future product candidate if we are unable to locate and enroll a sufficient number of eligible patients to participate in these trials as required by the FDA or analogous regulatory authorities outside the United States. Orphan indications, in particular,

have small populations, and it may be difficult for us to locate and enroll sufficient patients in trials for orphan-designated indications. Patient enrollment can be affected by many factors, including:

- severity of the disease under investigation;
- availability and efficacy of medications already approved for the disease under investigation;
- eligibility criteria for the trial in question;
- competition for eligible patients with other companies conducting clinical trials for product candidates seeking to treat the same indication or patient population;
- our payments for conducting clinical trials;
- perceived risks and benefits of the product candidate under study;
- efforts to facilitate timely enrollment in clinical trials;
- patient referral practices of physicians;
- the ability to monitor patients adequately during and after treatment;
- proximity and availability of clinical trial sites for prospective patients; and
- events that impact our clinical trial sites

Two investigator-initiated Phase 2a clinical trials of gemcabene commenced in late 2017 or early 2018. The pediatric NAFLD trial was terminated prematurely in the third quarter of 2018 and treatments were stopped after only 6 patients had been enrolled due to “unanticipated problems” (see details below). The patients will continue to be followed by the investigator and final results are expected to become available in the second half of 2019 from the investigator. In the Phase 2a adult FPL trial, patient enrollment was completed in fourth quarter 2018 and topline data are expected to be available in the second quarter of 2019 from the principal investigator. Note, however, that for the FPL study we cannot assure you that our timing assumptions are correct given the above factors. Our inability to fully enroll and complete the pediatric NAFLD trial will likely have an impact on our future plans in this patient population including potentially abandoning additional trials altogether. If unforeseen events arise in the adult FPL trial this could cause significant delays or may require us to abandon future clinical trials in this indication altogether. Further delays in our clinical trials or modifications to any future trial plans may result in additional increased development costs for our product candidates and cause our stock price to decline.

We or others could discover that gemcabene or any product candidate we may pursue in the future lacks sufficient efficacy, or that it causes undesirable side effects that were not previously identified, which could delay or prevent regulatory approval or commercialization.

Because gemcabene has been tested in relatively small patient populations and for limited durations to date, it is possible that our clinical trials have or will indicate an apparent positive effect of gemcabene that is greater than the actual positive effect, if any, or that additional and unforeseen side effects may be observed as its development progresses. The discovery that gemcabene lacks sufficient efficacy, or that it causes undesirable side effects, including side effects not previously identified in our previously completed clinical trials, such as the unanticipated problems that occurred in connection with the pediatric NAFLD study, could cause us or regulatory authorities to interrupt, delay or discontinue clinical trials and could result in the denial of regulatory approval by the FDA or other non-U.S. regulatory authorities for any or all targeted indications. See “—Gemphire’s Phase 2a clinical trial of gemcabene in Pediatric NAFLD was terminated by the Data and Safety Monitoring Board (DSMB) of the principal investigator following the occurrence of unanticipated problems. This trial termination and the unanticipated problems could have negative impacts on the clinical development of gemcabene” below. Across all human trials conducted to date, the most common adverse events reported have been headache, weakness, nausea, dizziness, upset stomach, infection, abnormal bowel movements, myalgia and abnormal kidney function tests.

The discovery that gemcabene or any future product candidate lacks sufficient efficacy or that it causes undesirable side effects that were not previously identified could delay or prevent regulatory approval and prevent us from commercializing such product candidate and generating revenues from its sale. In addition, if we receive marketing approval for gemcabene and we or others later discover that it is less effective, or identify undesirable side effects caused by gemcabene:

- regulatory authorities may withdraw their approval of the product;
- we may be required to recall the product, change the way this product is administered, conduct additional clinical trials or change the labeling or distribution of the product (including REMS);

- additional restrictions may be imposed on the marketing of, or the manufacturing processes for, the product;
- we may be subject to fines, injunctions or the imposition of civil or criminal penalties;
- we could be sued and held liable for harm caused to patients;
- the product may be rendered less competitive and sales may decrease; or
- our reputation may suffer generally both among clinicians and patients.

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

Gemphire's Phase 2a clinical trial of gemcabene in Pediatric NAFLD was terminated by the Data and Safety Monitoring Board (DSMB) of the principal investigator following the occurrence of unanticipated problems. This trial termination and the unanticipated problems could have negative impacts on the clinical development of gemcabene.

We announced on August 10, 2018 that the DSMB at Emory University School of Medicine overseeing the investigator-led open label Phase 2a proof-of-concept trial evaluating gemcabene in pediatric patients with non-alcoholic fatty liver disease (NAFLD) recommended that the trial be terminated due to unanticipated problems. Data on the first three patients who underwent 12 weeks of treatment showed that all three experienced an increase in liver fat content, as measured by MRI-PDFF. Two of the three patients also demonstrated increases in ALT; however, their baseline ALT levels were elevated prior to receiving gemcabene. The increase in liver fat was deemed an unanticipated problem by the trial investigator because it was an unexpected consistent pattern of worsening of the disease, rather than improvement, creating risk to the patients, which the investigator believed was likely due to the drug. Additional data that has come to light subsequently showed that during the trial the patients were not fully compliant with taking gemcabene and their life styles could have potentially impacted the findings. In addition to the first three patients, another 3 patients enrolled in the trial were taken off gemcabene and early termination visits were conducted. The DSMB recommended additional follow-up of the study subjects to gather additional safety data and this activity remains underway. The DSMB will provide us with a written report of their findings in the future, likely the second half of 2019, once all the patient results have been collated and analyzed.

Gemphire intends to work closely with the physicians at the clinical trial site, and other KOLs to analyze all of the results and identify potential reasons for these unanticipated problems in the pediatric NAFLD study but cannot assure you that it will be able to determine the reasons for the unanticipated problems.

Following the termination of the pediatric NAFLD trial in August 2018, the investigator of the ongoing Phase 2a FPL study conducted interim analyses of the patients enrolled at that point in her trial including MRI-PDFF scans and looking for signs of undesirable side effects before continuing the study. In consultation with her DSMB the principal investigator decided to continue the FPL study and completed enrollment in fourth quarter of 2018. Top-line results are expected in the second quarter of 2019.

We cannot assure you that the unanticipated problems observed in the pediatric NAFLD trial will not be seen in the FPL or future trials or that serious adverse events (SAEs) will not occur in future trials. We also cannot assure you that the unanticipated problems observed in the pediatric NAFLD trial will not result in the FDA requesting additional analyses of our previously completed clinical trials, including the three Phase 2b trials in dyslipidemia completed in 2017 and 2018.

If gemcabene is associated with adverse effects or undesirable side effects in preclinical testing or clinical trials or has characteristics that are unexpected in preclinical testing or clinical trials, we may need to consider protocol amendments, petition the FDA for Special Protocol Assessment (SPA), a process in which sponsors ask to meet with FDA to reach agreement on the design and size of clinical studies, modify the scope of our Phase 3 programs to pursue more focused indications in which the undesirable side effects or other characteristics may be less prevalent, less severe or provide a better understanding from a risk benefit perspective, or abandon the development of the compound. In pharmaceutical development, many compounds that initially show promise in early-stage testing are later found to cause adverse effects that prevent further development of the compound.

If we fail to receive regulatory approval for any of our planned indications for gemcabene or fail to develop additional product candidates, our commercial opportunity will be limited.

We initially focused on the development of gemcabene for our target indications in cardiovascular diseases and expanded our program to include a clinical trial to support an indication for gemcabene in NASH and/or nonalcoholic fatty liver disease (NAFLD). However, in August 2018, the pediatric NAFLD trial was terminated due to unanticipated problems, and we cannot assure you that we will continue the development of gemcabene for this indication or that other unanticipated problems will not arise in pursuing certain indications. We cannot assure you that we will be able to obtain regulatory approval of gemcabene for any indication, or successfully commercialize gemcabene, if approved. If we do not receive regulatory approval for, or successfully commercialize, gemcabene for one or more of our targeted or other indications, our commercial opportunity will be limited.

We may pursue clinical development of additional product candidates, including product candidates that we acquire or in-license. Acquiring, in-licensing, developing, obtaining regulatory approval for and commercializing additional product candidates will require substantial additional funding and are prone to the risks of failure inherent in drug product development. We cannot assure you that we will be able to successfully advance any additional product candidates through the development process.

Even if we obtain FDA approval to market additional product candidates, we cannot assure you that any such product candidates will be successfully commercialized, widely accepted in the marketplace or more effective than other commercially available alternatives. If we are unable to successfully develop and commercialize additional product candidates, our commercial opportunity will be limited.

Changes in regulatory requirements or FDA guidance, or unanticipated events during our clinical trials, may result in changes to clinical trial protocols or additional clinical trial requirements, such as the initiation or completion of a cardiovascular outcomes trial, which could result in increased costs to us and could delay our development timeline.

Changes in regulatory requirements or FDA guidance, or unanticipated events during our clinical trials, may force us to amend clinical trial protocols or the FDA may impose additional clinical trial requirements. Amendments to our clinical trial protocols would require resubmission to the FDA and IRBs for review and approval, and may adversely impact the cost, timing or successful completion of a clinical trial. If we experience delays completing, or if we terminate, any of our Phase 2 or Phase 3 trials, or if we are required to conduct additional clinical trials, such as a cardiovascular outcomes trial prior to approval, the commercial prospects for gemcabene may be harmed and our ability to generate product revenue will be delayed.

For cardiovascular disease related indications, if the FDA requires us to conduct a cardiovascular outcomes trial sooner than planned, we may not be able to identify and enroll the requisite number of patients in that trial. Even if we are successful in enrolling patients in a cardiovascular outcomes trial, we may not ultimately be able to demonstrate that lowering LDL-C levels using gemcabene provides patients with an incremental lowering of cardiovascular disease risks, and our failure to do so may delay or prejudice our ability to obtain FDA approval for gemcabene. Although the validity of lipid-lowering effects (including LDL-C reduction) as a surrogate endpoint for cardiovascular benefit continues to be debated in the medical community, given historical precedent and recent FDA guidance, our current development timeline for gemcabene does not contemplate the completion of a cardiovascular outcomes trial prior to approval. Such trial would be costly and time-consuming and, regardless of the outcome, would adversely affect our development timeline and financial condition.

We cannot be certain what efficacy endpoints the FDA may require in a Phase 3 clinical trial of nonalcoholic steatohepatitis (NASH) related indications or for approval of gemcabene; we also cannot be certain if we will be able to gain accelerated approval based on surrogate endpoints. If we obtain accelerated approval of gemcabene based on a surrogate endpoint, we will likely be required to conduct a post-approval clinical outcomes trial to confirm the clinical benefit of gemcabene.

There can be no assurance that our review of strategic alternatives will result in any additional stockholder value, and speculation and uncertainty regarding the outcome of our review of strategic alternatives may adversely impact our business, financial condition and results of operations.

In December 2018, we announced that we had retained Ladenburg Thalmann & Co. as a financial advisor to assist us in our evaluation of a broad range of strategic alternatives focused on maximizing shareholder value. There can be no assurances that the strategic alternatives process will result in the announcement or consummation of any strategic

transaction, or that any resulting plans or transactions will yield additional value for stockholders. Any potential transaction would be dependent on a number of factors that may be beyond our control, including, among other things, market conditions, industry trends, the interest of third parties in a potential transaction and the availability of financing. If we fail to successfully complete a strategic transaction, we may not be able to otherwise source adequate liquidity to fund our operations, meet our obligations, and continue as a going concern.

The process of exploring strategic alternatives could adversely impact our business, financial condition and results of operations. We expect to incur substantial expenses associated with identifying and evaluating potential strategic alternatives, and may incur substantial expenses associated with consummating a strategic alternative, if any is consummated, including those related to equity compensation, severance pay, legal, accounting and financial advisory fees, the payment of potential liabilities related to early termination of pre-existing contracts (e.g., lease) and other fees and payments that may be payable in the event of a strategic transaction, such as the success fee under our Loan Agreement with SVB.

In addition, the process may be time consuming and disruptive to our business operations, could divert the attention of management and the Board from our business, could require that we make changes to our headcount, may negatively impact our ability to attract, retain and motivate key employees, and could expose us to potential litigation in connection with this process or any resulting transaction. Further, speculation regarding any developments related to the review of strategic alternatives and perceived uncertainties related to our future could cause our stock price to fluctuate significantly.

We may not be successful in arranging regional partnering opportunities to realize regulatory approval and commercialization of gemcabene outside of the U.S. Even if we are successful in out-licensing gemcabene, the regulatory approvals may not be obtained and the licensees or partners may not be effective at marketing gemcabene.

Our current strategy for addressing the need for expertise in obtaining foreign approvals and marketing in foreign markets is to out-license rights to our drugs in markets outside the United States. However, we may not be successful in finding partners who will be willing to invest in our drugs outside the United States or our partners may be unable to obtain the necessary regulatory approvals, which may cause us to delay or abandon our plan to out-license gemcabene.

Any such delay or abandonment, or any failure to receive one or more foreign approvals, may have an adverse effect on the benefits otherwise expected from marketing in foreign countries. Even if we are successful in obtaining one or more business partners to commercialize our products in foreign markets, we will be dependent upon their effectiveness in selling and marketing our products in those foreign markets. These partners may face stiff competition, government price regulations, generic versions of our drug products, violations of our intellectual property rights and other negative events or may otherwise be ineffective in commercializing our products, any of which could reduce the market potential for our products and our success in those markets.

We have not generated any revenue and may never be profitable.

Our ability to become profitable depends upon our ability to generate revenue. To date, we have not generated any revenue from our development stage product candidate, gemcabene, and we do not currently have any other products or product candidates. We do not know when, or if, we will generate any revenue. We do not expect to generate significant revenue unless or until we obtain marketing approval of, and commercialize, gemcabene. Our ability to generate revenue depends on a number of factors, including our ability to:

- successfully complete preclinical carcinogenicity studies to remove the partial clinical hold to allow us to complete longer term registration trials for marketing approval of gemcabene;
- obtain favorable results from and complete the clinical development of gemcabene for our planned indications, including successful completion of our Phase 2 and Phase 3 trials for these indications;
- submit an application to regulatory authorities for gemcabene and receive marketing approval in the United States and foreign countries;
- contract for the manufacture of commercial quantities of gemcabene, if approved, at acceptable cost levels;
- establish sales and marketing capabilities to effectively market and sell gemcabene, if approved, in the United States and the European Union, alone or with a pharmaceutical partner; and
- achieve market acceptance of gemcabene in the medical community and with third-party payors.

Even if gemcabene is approved for commercial sale in one or all of the initial indications that we are pursuing, it may not gain market acceptance or achieve commercial success. In addition, we anticipate incurring significant costs associated with commercializing gemcabene. Moreover, some of the indications we are targeting are small enough to be eligible for orphan drug designation, and our potential patient market is relatively smaller than other drugs, and therefore the price of gemcabene may need to be higher than other drugs. We may not achieve profitability soon after generating product revenue, if ever, and may be unable to continue operations without continued funding.

We depend on intellectual property licensed from Pfizer for gemcabene, and the termination of this license would harm our business.

Pfizer granted us a worldwide exclusive license to certain patent rights and a non-exclusive royalty bearing right and license to certain related data to make, use, develop, commercialize, import and otherwise exploit the clinical product candidate gemcabene. Under the license agreement, as amended and restated in August 2018, either party may terminate the license agreement for the other party's material breach following a cure period or immediately upon certain insolvency events relating to the other party. Pfizer may immediately terminate the license agreement in the event that (i) the Company or any of its affiliates or sublicensees contests or challenges, or supports or assists any third party to contest or challenge, Pfizer's ownership of or rights in, or the validity, enforceability or scope of, any of the patents licensed under the license agreement or (ii) the Company or any of its affiliates or sublicensees fails to achieve the first commercial sale in at least one country by April 16, 2024. Furthermore, upon termination of the license agreement by Pfizer for any of the foregoing reasons, we grant Pfizer, pursuant to the license agreement, a non-exclusive, fully paid-up, royalty free, worldwide, transferrable, perpetual and irrevocable license to use any intellectual property rights arising from the development or commercialization of gemcabene by the Company and any trademarks identifying gemcabene and agree to transfer regulatory filings and approvals to Pfizer or permit Pfizer to cross-reference and rely on such regulatory filings and approvals for gemcabene.

Disputes may arise between us and Pfizer regarding intellectual property subject to this license agreement, including with respect to:

- the scope of rights granted under the license agreement and other interpretation-related issues;
- whether and the extent to which our technology and processes infringe on intellectual property of Pfizer that is not subject to the licensing agreement;
- the amount and timing of milestone and royalty payments;
- the rights of Pfizer under the license agreement;
- our right to sublicense patent and other rights to third parties under collaborative development relationships; and
- the ownership of inventions and know-how resulting from the joint creation or use of intellectual property by Pfizer and us and our partners.

Any disputes with Pfizer may prevent or impair our ability to maintain our current licensing arrangement. We depend on the intellectual property and the historical preclinical and clinical data package licensed from Pfizer to develop and commercialize gemcabene. Termination of our license agreement could result in the loss of significant rights and would harm our ability to further develop and commercialize gemcabene. In addition, Pfizer retains the right to make, use and import gemcabene solely for internal research purposes.

The development of gemcabene or pursuit of any future product candidate for broad patient populations will be more costly and commercial pricing for any approved indication would likely be lower.

Recently we decided to pursue initially development of gemcabene for the treatment of patients with orphan disease indications including HoFH, FCS, and FPL. Trials for larger indications including SHTG, and potentially HeFH/ASCVD and NASH/NAFLD may be initiated subsequent to initiating one or more trials for an orphan indication. Expanding our development and commercialization of gemcabene or any future product candidate in these or other broader patient populations would be more costly and take longer to complete and would be subject to development and commercialization risks that may not be applicable to orphan indications such as HoFH, FCS, or FPL.

Specifically, these broader indications will likely involve clinical trials with larger numbers of patients possibly taking the drug for longer periods of time. In addition, we believe that the FDA and, in some cases, the European Medicines Agency (EMA) may require a clinical outcomes trial demonstrating a reduction in cardiovascular events either prior to

or after the submission of an application for marketing approval for the broader LDL-C indications such as HeFH/ASCVD. Clinical outcomes trials are particularly expensive and time consuming to conduct because of the larger number of patients required to establish that the drug being tested has the desired effect. It may also be more difficult for us to demonstrate the desired outcomes in these trials than to achieve validated surrogate endpoints. In addition, in considering approval of gemcabene for broader patient populations with less severely elevated lipid levels, the FDA and other regulatory authorities may place greater emphasis on the side effect and risk profile of the drug in comparison to the drug's efficacy and potential clinical benefit than in smaller, more severely afflicted patient populations. These factors may make it more difficult for us to achieve marketing approvals of gemcabene for these broader patient populations.

Moreover, if we pursue and are able to successfully develop and obtain marketing approval of gemcabene and any future product candidate in broader patient populations, we likely will not be able to obtain the same pricing level that we expect to obtain for orphan indications. The pricing of some drugs intended for orphan populations is often related to the size of the patient population, with smaller patient populations often justifying higher prices. If the pricing is lower in broader patient populations, we may not be able to maintain higher pricing in the population of more severely afflicted patients. This would lead to a decrease in revenue from sales to more severely afflicted patients and could make it more difficult for us to achieve or maintain profitability.

We do not have drug research or discovery capabilities and will need to acquire or license product candidates from third parties to expand our product candidate pipeline.

We currently have no drug research or discovery capabilities. Accordingly, if we are to expand our product candidate pipeline beyond gemcabene, we will need to acquire or license product candidates from third parties. We will face significant competition in seeking to acquire or license promising product candidates. Many of our competitors for such promising product candidates may have significantly greater financial resources and more extensive experience in preclinical testing and clinical trials, obtaining regulatory approvals and manufacturing and marketing pharmaceutical products, and thus, may be a more attractive option to a potential licensor than us. If we are unable to acquire or license additional promising product candidates, we will not be able to expand our product candidate pipeline.

If we are able to acquire or license other product candidates, such license agreements will likely impose various obligations upon us, and our licensors may have the right to terminate the license thereunder in the event of a material breach or, in some cases, at will. A termination of future licenses could result in our loss of the right to use the licensed intellectual property, which could adversely affect our ability to develop and commercialize a future product candidate, if approved, as well as harm our competitive business position and our business prospects.

We may expend our limited resources to pursue a particular indication and fail to capitalize on indications that may be more profitable or for which there is a greater likelihood of success.

Because we have limited financial and managerial resources, we are currently focusing only on development programs that we identify for specific indications for gemcabene. As a result, we may forego or delay pursuit of opportunities for other indications, or with other potential product candidates that later prove to have greater commercial potential. Our resource allocation decisions may cause us to fail to capitalize on viable commercial products or profitable market opportunities. Our spending on current and future research and development programs for specific indications or future product candidates may not yield any commercially viable product. If we do not accurately evaluate the commercial potential or target market for gemcabene, we may not gain approval or achieve market acceptance of that candidate, and our business and financial results will be harmed.

Risks Related to Our Financial Position and Need for Additional Capital

We have incurred only losses since inception. We expect to incur losses for the foreseeable future and may never achieve or maintain profitability.

Since inception, we have incurred only operating losses. Our net losses were \$23.6 million, \$33.4 million and \$14.6 million for the years ended December 31, 2018, 2017 and 2016, respectively. As of December 31, 2018, we had an accumulated deficit of \$84.1 million. We have financed our operations primarily through the issuance and sale of common stock and warrants in public offerings and a private placement, proceeds from our term loan facility with Silicon Valley Bank (SVB) (which was pre-paid and terminated in January 2019) and, prior to our IPO, the issuance of

preferred stock and convertible notes in private placements. We have devoted substantially all of our financial resources and efforts on research and development, including clinical development of gemcabene. We expect that it will be a number of years, if ever, before we have a product candidate ready for commercialization. We expect to continue to incur significant expenses and increased operating losses for the foreseeable future.

To become and remain profitable, we must develop and eventually commercialize a product with market potential. This will require us to be successful in a range of challenging activities, including completing preclinical testing and clinical trials, obtaining regulatory approval for a product candidate, manufacturing, marketing and selling any drug for which we may obtain regulatory approval and satisfying any post-marketing requirements. We are in the early stages of most of these activities. We may never succeed in these activities and, even if we do, we may never generate revenues that are significant or large enough to achieve profitability.

If we do achieve profitability, we may not be able to sustain or increase profitability on a quarterly or annual basis. Our failure to become and remain profitable would decrease the value of the company and could impair our ability to raise capital, maintain our research and development efforts, expand our business or continue our operations. A decline in the value of our company could also cause you to lose all or part of your investment.

Our recurring operating losses have raised substantial doubt regarding our ability to continue as a going concern.

Our recurring operating losses raise substantial doubt about our ability to continue as a going concern. As a result, for the fiscal year ended December 31, 2018, our independent registered public accounting firm has issued its report on our financial statements and has expressed substantial doubt about our ability to continue as a going concern. We have no current source of revenue to sustain our present activities, and we do not expect to generate revenue until and unless the FDA or other applicable regulatory authorities approve gemcabene and we successfully commercialize gemcabene. Accordingly, our ability to continue as a going concern will require us to obtain additional financing to fund our operations. Uncertainty surrounding our ability to continue as a going concern may make it more difficult for us to obtain financing for the continuation of our operations and could result in the loss of confidence by investors, suppliers, contractors and employees.

We will need substantial additional capital in the future. If additional capital is not available, we will have to delay, reduce or cease operations.

We believe that cash on hand will be sufficient to fund our operations into the third quarter of 2019, but we will need to raise additional capital to continue to fund the further development of gemcabene and our operations thereafter, including submission of the additional information requested by the FDA to lift the partial clinical hold. Our future capital requirements may be substantial and will depend on many factors including:

- the scope, size, rate of progress, results and costs of researching and developing gemcabene and initiating and completing our preclinical studies and clinical trials;
- the cost, timing and outcome of our efforts to obtain marketing approval for gemcabene in the United States and other countries, including to fund the preparation and filing of an NDA with the FDA for gemcabene and to satisfy related FDA requirements and regulatory requirements in other countries;
- the number and characteristics of any additional product candidates we develop or acquire, if any;
- our ability to establish and maintain collaborations on favorable terms, if at all;
- the timing and amount of milestone and royalty payments;
- the amount of revenue, if any, from commercial sales, should any product candidate receive marketing approval;
- the costs associated with commercializing gemcabene or any future product candidates, if we receive marketing approval, including the cost and timing of developing sales and marketing capabilities or entering into strategic collaborations to market and sell gemcabene or any future product candidates;
- the cost of manufacturing gemcabene or any future product candidates and any product we successfully commercialize; and
- the costs associated with general corporate activities, such as the cost of filing, prosecuting and enforcing patent claims and making regulatory filings.

Changing circumstances may cause us to consume capital significantly faster than we currently anticipate. Because the outcome of any clinical trial is highly uncertain, we cannot reasonably estimate the actual amounts necessary to

successfully complete the development, regulatory approval and commercialization of gemcabene and any future product candidates. Additional financing may not be available when we need it or may not be available on terms that are favorable to us. In addition, we may seek additional capital due to favorable market conditions or strategic considerations, even if we believe we have sufficient funds for our current or future operating plans. If adequate funds are unavailable to us on a timely basis, or at all, we may not be able to continue the development of gemcabene or any future product candidate, or commercialize gemcabene or any future product candidate, if approved.

Raising additional capital may cause dilution to our stockholders and restrict our operations or require us to relinquish rights to our technologies or product candidates.

Until such time, if ever, as we can generate substantial product revenues, we expect to finance our cash needs through a combination of equity and debt financings as well as potential strategic collaborations and licensing arrangements. We do not have any committed external sources of funds.

To the extent that we raise additional capital through the sale of equity or convertible debt securities, your ownership interest will be diluted, and the terms of these securities may include liquidation or other preferences that adversely affect your rights as a common stockholder. Debt financing or preferred equity financing, if available, may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures or declaring dividends.

If we raise funds through strategic collaborations or marketing, distribution, or licensing arrangements with third parties, we may have to relinquish valuable rights to our technologies, future revenue streams, research programs or product candidates or to grant licenses on terms that may not be favorable to us. If we are unable to raise additional funds when needed, we may be required to delay, limit, reduce or terminate our product development or future commercialization efforts or grant rights to develop and market product candidates that we would otherwise prefer to develop and market ourselves. This may reduce the value of our common stock.

To the extent outstanding options are ultimately exercised or the number of shares available for future grant under our equity incentive plans each year are increased, investors will sustain further dilution.

Consummating a strategic transaction may cause dilution to our stockholders, restrict our operations or require us to relinquish rights to our technologies or product candidates.

In December 2018, we announced that we engaged Ladenburg Thalmann & Co as a financial advisor to assist us in evaluating a broad range of strategic alternatives. A transaction committee of independent board members was formed to evaluate the various alternatives. There is no certainty that such a strategic event will occur. However, if something does occur, it will likely cause stockholder dilution and will likely require us to alter our strategic plans, potentially including changes to clinical and out-licensing plans for gemcabene. It may also lead to changes in management and personnel within the company, which could cause us to incur severance costs and other unplanned expenditures.

Risks Related to Government Regulation

Gemcabene is subject to a partial clinical hold with respect to clinical trials of longer than six months in duration until the FDA determines to release such hold, which may lead to a significant delay in the commencement of long-term clinical trials by us or the failure of gemcabene to obtain marketing approval.

In 2004, the FDA determined that gemcabene was a potential peroxisome proliferator-activated receptor (PPAR) agonist. As a result, the FDA imposed a partial clinical hold, which restricts us from conducting clinical trials for gemcabene beyond six months in duration and required us to conduct two-year rat and mouse carcinogenicity studies. The FDA has issued these notices to all sponsors of product candidates with PPAR properties based on preclinical studies. We submitted the results of our two-year rat and mouse carcinogenicity studies to the FDA, together with results from a short-term, 8 day study where, in PPAR- α knockout mice, gemcabene did not induce known markers of peroxisome proliferation, providing evidence that gemcabene works through PPAR- α . In response the FDA has requested that, as part of a complete response, we provide additional data including a subchronic (13 week) study in PPAR- α knock-out mice and PPAR transactivation assays using monkey and canine PPAR isoforms, to further understand the human relevance of the preclinical findings. We completed the *in vitro* PPAR- α transactivation study, and

we have initiated the CRO-related activities to conduct the PPAR- α knockout mouse study. We expect to submit the request to the FDA to lift the partial clinical hold in the fourth quarter of 2019.

The future clinical development of gemcabene may be delayed due to these clinical restrictions and additional oversight by the FDA, as occurred when the FDA requested the additional data beyond the results of our two-year rat and mouse carcinogenicity studies. If the results of the subchronic (13 week) study in PPAR- α knock-out mice and the PPAR transactivation assays using monkey and canine PPAR isoforms do not address FDA concerns related to the partial clinical hold, our Phase 3 long-term safety exposure registration trials of longer than six months could be further delayed or the FDA may never release the partial clinical hold. Also, the findings in our preclinical studies could impact the NDA review, and, if approved, labeling and use of gemcabene.

Even if we receive marketing approval for gemcabene or any product candidate we may pursue in the future in the United States, we may never receive regulatory approval to market such product candidate outside of the United States.

In addition to the United States, we intend to seek regulatory approval to market gemcabene in Canada and Europe and potentially other markets. If we pursue additional product candidates in the future, we may seek regulatory approval of such product candidates outside the United States. In order to market any product outside of the United States, however, we must establish and comply with the numerous and varying safety, efficacy and other regulatory requirements of these other countries. Approval procedures vary among countries and can involve additional product candidate testing and additional administrative review periods. The time required to obtain approvals in other countries might differ from that required to obtain FDA approval. The marketing approval processes in other countries may include all of the risks detailed above regarding FDA approval in the United States as well as other risks. In particular, in many countries outside of the United States, products must receive pricing and reimbursement approval before the product can be commercialized. Obtaining this approval can result in substantial delays in bringing products to market in such countries. Marketing approval in one country does not ensure marketing approval in another, but a failure or delay in obtaining marketing approval in one country may have a negative effect on the regulatory process in others. Failure to obtain marketing approval in other countries or any delay or other setback in obtaining such approval would impair our ability to market gemcabene or any future product candidate in such foreign markets. Any such impairment would reduce the size of our potential market, which could have an adverse impact on our business, results of operations and prospects.

Even if we obtain marketing approval for gemcabene or any product candidate we may pursue in the future, such product candidate could be subject to post-marketing restrictions or withdrawal from the market, and we may be subject to substantial penalties if we fail to comply with regulatory requirements or experience unanticipated problems with a product candidate following approval.

Any product candidate for which we, or our future collaborators, obtain marketing approval in the future, as well as the manufacturing processes, post-approval studies and measures, labeling, advertising and promotional activities for such drug, among other things, will be subject to continual requirements of and review by the FDA and other regulatory authorities. These requirements include submissions of safety and other post-marketing information and reports, registration and listing requirements, requirements relating to manufacturing, quality control, quality assurance and corresponding maintenance of records and documents, requirements regarding the distribution of samples to physicians and recordkeeping. Even if marketing approval of a product candidate is granted, the approval may be subject to limitations on the indicated uses for which the drug may be marketed or to the conditions of approval, including the requirement to implement a REMS, which could include requirements for a restricted distribution system.

The FDA may also impose requirements for costly post-marketing studies or clinical trials and surveillance to monitor the safety or efficacy of a product candidate. The FDA and other agencies, including the Department of Justice, closely regulate and monitor the post-approval marketing and promotion of drugs to ensure that they are manufactured, marketed and distributed only for the approved indications and in accordance with the provisions of the approved labeling. The FDA imposes stringent restrictions on manufacturers' communications regarding off-label use and if we, or our future collaborators, do not market a product candidate for which we, or they, receive marketing approval for only their approved indications, we, or they, may be subject to warnings or enforcement action for off-label promotion. Violation of the Federal Food, Drug, and Cosmetic Act (FDCA) and other statutes, including the False Claims Act, relating to the promotion and advertising of prescription drugs may lead to investigations or allegations of violations of federal and state health care fraud and abuse laws and state consumer protection laws.

In addition, later discovery of previously unknown AEs or other problems with our product candidate or its manufacturers or manufacturing processes, or failure to comply with regulatory requirements, may yield various results, including:

- litigation involving subjects taking our drug;
- restrictions on such drugs, manufacturers or manufacturing processes;
- restrictions on the labeling or marketing of a drug;
- restrictions on drug distribution or use;
- requirements to conduct post-marketing studies or clinical trials;
- warning letters or untitled letters;
- withdrawal of the drugs from the market;
- refusal to approve pending applications or supplements to approved applications that we submit;
- product recall or public notification or medical product safety alerts to healthcare professionals;
- fines, restitution or disgorgement of profits or revenues;
- suspension or withdrawal of marketing approvals;
- damage to relationships with any potential collaborators;
- unfavorable press coverage and damage to our reputation;
- refusal to permit the import or export of drugs;
- product seizure; or
- injunctions or the imposition of civil or criminal penalties.

We may seek to avail ourselves of mechanisms to expedite and/or reduce the cost for development or approval of gemcabene or any other product candidate we may pursue in the future, such as fast track designation or Orphan Drug designation, but such mechanisms may not actually lead to a faster or less expensive development or regulatory review or approval process.

We may seek fast track designation, priority review, Orphan Drug designation, or accelerated approval for gemcabene or any other product candidate we may pursue in the future. For example, if a drug is intended for the treatment of a serious or life-threatening condition and the drug demonstrates the potential to address unmet medical needs for this condition, the drug sponsor may apply for FDA fast track designation. However, the FDA has broad discretion with regard to these mechanisms, and even if we believe a particular product candidate is eligible for any such mechanism, we cannot assure you that the FDA would decide to grant it. Even if we do obtain fast track or priority review designation or pursue an accelerated approval pathway, we may not experience a faster and/or less costly development process, review or approval compared to conventional FDA procedures. The FDA may withdraw a particular designation if it believes that the designation is no longer supported by data from our clinical development program.

A breakthrough therapy designation by the FDA for a product candidate may not lead to a faster development or regulatory review or approval process, and it may not increase the likelihood that a product candidate will receive marketing approval.

Depending on the results of our clinical trials, we may seek a breakthrough therapy designation for gemcabene or any other product candidate we may pursue in the future. A breakthrough therapy is defined as a drug that is intended, alone or in combination with one or more other drugs, to treat a serious or life-threatening disease or condition, and preliminary clinical evidence indicates that the drug may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints. For drugs that are designated as breakthrough therapies, interaction and communication between the FDA and the sponsor can help to identify the most efficient path for clinical development while minimizing the number of patients placed in ineffective control regimens.

Designation as a breakthrough therapy is within the discretion of the FDA. Accordingly, even if we believe a product candidate meets the criteria for designation as a breakthrough therapy, the FDA may disagree and instead determine not to make such designation. We cannot be sure that our evaluation of a product candidate as qualifying for breakthrough therapy designation will meet the FDA's requirements. In any event, the receipt of a breakthrough therapy designation for a product candidate may not result in a faster development process, review or approval compared to conventional FDA procedures and does not assure ultimate approval by the FDA. In addition, even if one or more product candidate qualifies as a breakthrough therapy, the FDA may later decide that the product no longer meets the conditions for qualification or decide that the time period for FDA review or approval will not be shortened.

The uncertainty associated with pharmaceutical reimbursement and related matters may increase the difficulty and cost for us and our future collaborators to obtain marketing approval of our product candidate and affect its pricing.

In the United States and some foreign jurisdictions, there have been a number of legislative and regulatory changes and proposed changes regarding the healthcare system that could prevent or delay marketing approval of a product candidate, restrict or regulate post-approval activities and affect our ability, or the ability of our future collaborators, to profitably sell any drug for which we, or they, obtain marketing approval. We expect that current laws, as well as other healthcare reform measures that may be adopted in the future, may result in more rigorous coverage criteria and cause downward pressure on the price that we, or our future collaborators, may receive for any approved drug.

For example, in March 2010, President Obama signed into law the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act (collectively, the PPACA). This is a sweeping law intended to broaden access to health insurance, reduce or constrain the growth of healthcare spending, improve healthcare quality, enhance remedies against fraud and abuse, add new transparency requirements for certain components of the health care and health insurance industries, impose new taxes and fees on the health industry and impose additional health policy reforms. Among the provisions of the PPACA of importance to gemcabene and any future product candidates are:

- an annual, nondeductible fee on any entity that manufactures or imports specified branded prescription drugs and biologic agents, apportioned among these entities according to their market share in certain government healthcare programs;
- an increase in the statutory minimum rebates a manufacturer must pay under the Medicaid Drug Rebate Program to 23.1% and 13.0% of the average manufacturer price for branded and generic drugs, respectively;
- a new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for drugs that are inhaled, infused, instilled, implanted or injected;
- extension of a manufacturer's Medicaid rebate liability to covered drugs dispensed to individuals who are enrolled in Medicaid managed care organizations;
- expansion of eligibility criteria for Medicaid programs by, among other things, allowing states to offer Medicaid coverage to certain individuals with income at or below 133% of the federal poverty level, thereby potentially increasing a manufacturer's Medicaid rebate liability;
- a Medicare Part D coverage gap discount program, in which manufacturers 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 a manufacturer's outpatient drugs to be covered under Medicare Part D;
- expansion of the entities eligible for discounts under the Public Health Service pharmaceutical pricing program; and
- a new Patient-Centered Outcomes Research Institute to oversee, identify priorities in, and conduct comparative clinical effectiveness research, along with funding for such research.

There have been judicial and Congressional challenges and amendments to certain aspects of the PPACA, and we expect there will be additional challenges and amendments to, and attempts to repeal, the PPACA in the future. In addition, other legislative changes have been proposed and adopted since the PPACA was enacted. These new laws have resulted in additional reductions in Medicare and other healthcare funding and otherwise may affect the prices we may obtain for any product candidate for which marketing approval is obtained. Any reduction in reimbursement from Medicare or other government-funded programs may result in a similar reduction in payments from private payors. Moreover, recently there has been heightened governmental scrutiny over the manner in which manufacturers set prices for their marketed products. The implementation of cost containment measures or other healthcare reforms may prevent us from being able to generate revenue, attain profitability or commercialize our drugs.

Legislative and regulatory proposals have been made to expand post-approval requirements and restrict sales and promotional activities for pharmaceutical products. We cannot be sure whether additional legislative changes will be enacted, or whether the FDA regulations, guidance or interpretations will be changed, or what the impact of such changes on the marketing approvals of a product candidate, if any, may be. In addition, increased scrutiny by the U.S. Congress of the FDA's approval process may significantly delay or prevent marketing approval, as well as subject us and our future collaborators to more stringent drug labeling and post-marketing testing and other requirements.

Governments outside of the United States tend to impose strict price controls, which may adversely affect our revenues from the sales of a drug, if any.

In some countries, particularly the countries of the European Union, the pricing of prescription pharmaceuticals is subject to governmental control. In these countries, pricing negotiations with governmental authorities can take considerable time after the receipt of marketing approval for a drug. To obtain reimbursement or pricing approval in some countries, we, or our future collaborators, may be required to conduct a clinical trial that compares the cost-effectiveness of our drug to other available therapies. If reimbursement of our drug is unavailable or limited in scope or amount, or if pricing is set at unsatisfactory levels, our business could be harmed.

Our relationships with healthcare providers and third-party payors will be subject to applicable 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, among other penalties and consequences.

Healthcare providers and third-party payors will play a primary role in the recommendation and prescription of any product candidate for which we obtain marketing approval. Our current and 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 any product candidate for which we obtain marketing approval. Restrictions and obligations under applicable federal and state healthcare laws and regulations include the following:

- the federal Anti-Kickback Statute prohibits, among other things, persons and entities from knowingly and willfully soliciting, offering, receiving or providing remuneration, directly or indirectly, in cash or in kind, to induce or reward, or in return for, either the referral of an individual for, or the purchase, order or recommendation of, any good or service, for which payment may be made under a federal healthcare program such as Medicare and Medicaid;
- the federal false claims and civil monetary penalties laws, including the civil 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 (HIPAA) imposes criminal and civil liability for, among other things, executing a scheme to defraud any healthcare benefit program or making false statements relating to healthcare matters;
- HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act, and its implementing regulations, also imposes obligations, including mandatory contractual terms, on certain people and entities with respect to safeguarding the privacy, security and transmission of individually identifiable health information;
- the federal Physician Payments Sunshine Act under the PPACA requires certain manufacturers of drugs, devices, biologics and medical supplies for which payment is available under Medicare, Medicaid, or the Children's Health Insurance Program, with specific exceptions, to report annually to the Centers for Medicare & Medicaid Services within the U.S. Department of Health and Human Services information related to physician payments and other transfers of value and physician ownership and investment interests; and
- analogous state and foreign 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 health care providers or marketing expenditures. Certain state and foreign laws also govern the privacy and security of health information in ways that differ from each other and often are not preempted by HIPAA, thus complicating compliance efforts.

Efforts to ensure that our current and future 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, disgorgement, individual imprisonment, contractual damages, reputational harm, diminished profits and future earnings, and the curtailment or restructuring of our operations. If any of the physicians or other providers or entities with whom we expect to do business is found to not be in compliance with applicable laws, they may be subject to criminal, civil or administrative sanctions, including exclusions from government funded healthcare programs. Defending against any such actions can be costly, time-consuming and may require significant financial and personnel resources. Therefore, even if we are successful in defending against any such actions that may be brought against us, our business may be impaired.

We are subject to U.S. and certain foreign export and import controls, sanctions, embargoes, anti-corruption laws, and anti-money laundering laws and regulations. Compliance with these legal standards could impair our ability to compete in domestic and international markets. We can face criminal liability and other serious consequences for violations which can harm our business.

We are subject to export control and import laws and regulations, including the U.S. Export Administration Regulations, U.S. Customs regulations, various economic and trade sanctions regulations administered by the U.S. Treasury Department's Office of Foreign Assets Controls, the U.S. Foreign Corrupt Practices Act of 1977, as amended, the U.S. domestic bribery statute contained in 18 U.S.C. § 201, the U.S. Travel Act, the USA PATRIOT Act, and other state and national anti-bribery and anti-money laundering laws in the countries in which we conduct activities. Anti-corruption laws are interpreted broadly and prohibit companies and their employees, agents, contractors, and other partners from authorizing, promising, offering, or providing, directly or indirectly, improper payments or anything else of value to recipients in the public or private sector. We may engage third parties for clinical trials outside of the United States, to sell our products abroad once we enter a commercialization phase, and/or to obtain necessary permits, licenses, patent registrations, and other regulatory approvals. We have direct or indirect interactions with officials and employees of government agencies or government-affiliated hospitals, universities, and other organizations. We can be held liable for the corrupt or other illegal activities of our employees, agents, contractors, and other partners, even if we do not explicitly authorize or have actual knowledge of such activities. Our violations of the laws and regulations described above may result in substantial civil and criminal fines and penalties, imprisonment, the loss of export or import privileges, debarment, tax reassessments, breach of contract and fraud litigation, reputational harm, and other consequences.

Our employees may engage in misconduct or other improper activities, including violating applicable regulatory standards and requirements or engaging in insider trading, which could significantly harm our business.

We are exposed to the risk of employee fraud or other misconduct. Misconduct by employees could include intentional failures to comply with the regulations of the FDA and applicable non-U.S. regulators, provide accurate information to the FDA and applicable non-U.S. regulators, comply with healthcare fraud and abuse laws and regulations in the United States and abroad, report financial information or data accurately or disclose unauthorized activities to us. In particular, sales, marketing and business arrangements in the healthcare industry are subject to extensive laws and regulations intended to prevent fraud, misconduct, kickbacks, self-dealing and other abusive practices. These laws and regulations restrict or prohibit a wide range of pricing, discounting, marketing and promotion, sales commission, customer incentive programs and other business arrangements. Employee misconduct could also involve the improper use of, including trading on, information obtained in the course of clinical trials, which could result in regulatory sanctions and serious harm to our reputation. It is not always possible to identify and deter employee misconduct, and the precautions we take to detect and prevent this activity may be ineffective in controlling unknown or unmanaged risks or losses or in protecting us from governmental investigations or other actions or lawsuits stemming from a failure to comply with these laws or regulations. If any such actions are instituted against us, and we are not successful in defending ourselves or asserting our rights, those actions could have a significant impact on our business, including the imposition of significant civil, criminal and administrative penalties, damages, fines, exclusion from government funded healthcare programs such as Medicare and Medicaid, disgorgement, individual imprisonment, contractual damages, reputational harm, diminished profits and future earnings, and the curtailment or restructuring of our operations.

The FDA and other regulatory agencies actively enforce the laws and regulations prohibiting the promotion of off-label uses. If we are found to have improperly promoted off-label uses, we may become subject to significant liability.

The FDA and other regulatory agencies strictly regulate the promotional claims that may be made about prescription products, such as gemcabene, if approved. In particular, a product may not be promoted for uses that are not approved by the FDA or such other regulatory agencies as reflected in the product's approved labeling. If we receive marketing approval for gemcabene or any future product candidate for a certain indication, physicians may nevertheless prescribe gemcabene or such future product candidate to their patients in a manner that is inconsistent with the approved label. If we are found to have promoted such off-label uses, we may become subject to significant liability. The federal government has levied large civil and criminal fines against companies for alleged improper promotion and has enjoined several companies from engaging in off-label promotion. The FDA has also requested that companies enter into consent decrees or permanent injunctions under which specified promotional conduct is changed or curtailed. If we cannot successfully manage the promotion of gemcabene or any future product candidate, if approved, we could become subject to significant liability, which would adversely affect our business and financial condition.

Tax matters, including the changes in corporate tax rates, disagreements with taxing authorities and imposition of new taxes could impact our results of operations and financial condition.

We are subject to income and other taxes in the U.S. and our operations, plans and results are affected by tax and other initiatives. On December 22, 2017, the Tax Cuts and Jobs Act (H.R. 1) (the "TCJA") was signed into law by President Trump. The TCJA made significant changes to corporate income taxation, including reduction of the corporate income tax rate from a top marginal rate of 35% to a flat rate of 21%, limitation of the tax deduction for interest expense to 30% of earnings (except for certain small businesses), limitation of the deduction for net operating losses to 80% of current year taxable income and generally eliminating net operating loss carrybacks, allowing net operating losses to carryforward without expiration, one-time taxation of offshore earnings at reduced rates regardless of whether they are repatriated, elimination of U.S. tax on foreign earnings (subject to certain important exceptions), immediate deductions for certain new investments instead of deductions for depreciation expense over time, and modifying or repealing many business deductions and credits (including changes to the orphan drug tax credit and changes to the deductibility of research and experimental expenditures that will be effective in the future). Notwithstanding the reduction in the corporate income tax rate, the overall impact of any new federal tax law is uncertain and our business and financial condition could be adversely affected. The impact of any tax reform on holders of our common stock is likewise uncertain and could be adverse.

We are also subject to regular reviews, examinations, and audits by the Internal Revenue Service and other taxing authorities with respect to our taxes. Although we believe our tax estimates are reasonable, if a taxing authority disagrees with the positions we have taken, we could face additional tax liability, including interest and penalties. There can be no assurance that payment of such additional amounts upon final adjudication of any disputes will not have a material impact on our results of operations and financial position.

We also need to comply with new, evolving or revised tax laws and regulations. The enactment of or increases in tariffs, or other changes in the application or interpretation of the TCJA, or on specific products that we may ultimately sell or with which our products compete, may have an adverse effect on our business or on our results of operations.

Inadequate funding for the FDA, the SEC and other government agencies could hinder their ability to perform normal business functions on which the operation of our business may rely, which could negatively impact our business.

The ability of the FDA to review and approve new products can be affected by a variety of factors, including government budget and funding levels, ability to hire and retain key personnel and accept the payment of user fees, and statutory, regulatory, and policy changes. Average review times at the FDA have fluctuated in recent years as a result. Disruptions at the FDA and other agencies may also slow the time necessary for new drugs to be reviewed and/or approved by necessary government agencies, which would adversely affect our business.

In addition, government funding of the SEC and other government agencies on which our operations may rely is subject to the political process, which is inherently fluid and unpredictable. For example, over the last several years, including beginning on December 22, 2018, the U.S. government has shut down several times and certain regulatory agencies,

such as the FDA and the SEC, have had to furlough critical FDA, SEC and other government employees and stop critical activities. If a prolonged government shutdown occurs, it could significantly impact the ability of the FDA to timely review and process our regulatory submissions, which could have a material adverse effect on our business. Further, in our operations as a public company, future government shutdowns could impact our ability to access the public markets and obtain necessary capital in order to properly capitalize and continue our operations.

Risks Related to the Commercialization of Gemcabene or Any Future Product Candidate

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

The development and commercialization of new drug products is highly competitive. We expect to face competition with respect to gemcabene, if approved, and will face competition with respect to any product candidates that we may seek to develop or commercialize in the future from major pharmaceutical companies, specialty pharmaceutical companies, biotechnology companies, universities and other research institutions and government agencies worldwide.

The lipid-lowering therapies market is highly competitive and dynamic and dominated by the sale of statin treatments including the cheaper generic versions of statins. Our success will depend, in part, on our ability to obtain a share of the market for our planned indications. Other pharmaceutical companies may develop lipid-lowering therapies for the same indications that compete with gemcabene, if approved, that do not infringe the claims of our patents, pending patent applications or other proprietary rights which could adversely affect our business and results of operations. Lipid-lowering therapies currently on the market that would compete with gemcabene, if approved, include the following:

- statins, such as Crestor marketed by AstraZeneca, Livalo marketed by Kowa Pharmaceuticals America, Inc. (Kowa), Zocor marketed by Merck & Co., Inc. (Merck), Lipitor marketed by Pfizer, and their generic versions;
- cholesterol absorption inhibitors, such as Zetia, marketed by Merck;
- apoB antisense Kynamro marketed by Genzyme Corporation, a Sanofi company, and MTTP inhibitor Juxtapid marketed by Aegerion Pharmaceuticals, Inc.;
- combination therapies, such as Vytorin and Liptruzet, both marketed by Merck;
- other lipid-lowering monotherapies, including: fibrates, such as TriCor and Trilipix, both marketed by AbbVie Inc. (AbbVie), and Lipofen marketed by Kowa; niacin, such as Niaspan marketed by AbbVie; bile acid sequestrants, such as Welchol, marketed by Daiichi Sankyo Inc.; combination therapies, such as Advicor and Simcor, both of which are marketed by AbbVie; Pemaifibrate (PPARalpha agonist) being marketed by Kowa; and the generic versions of these drugs;
- prescription fish oils, such as Lovaza marketed by GlaxoSmithKline, Epanova marketed by AstraZeneca and Vascepa marketed by Amarin Corporation plc;
- PCSK9 inhibitors, such as Praluent, developed by Sanofi-Aventis U.S. LLC, and Regeneron Pharmaceuticals, Inc. and Repatha marketed by Amgen Inc;
- Anti-inflammatory agents such as canakinumab, developed by Novartis;

Several other pharmaceutical companies have other lipid-lowering therapies in development that may be approved for marketing in the United States or outside of the United States. Based on publicly available information, we believe the current therapies in development that would compete with gemcabene include:

- for HoFH, RGEN-1500 being developed by Regeneron Pharmaceuticals, Inc. MGL-3196 developed by Madrigal Pharmaceuticals (Madrigal) for HoFH, and ALN-PCSSc being developed by The Medicines Company and Alynlyam Pharmaceuticals, Inc.;
- for HeFH and ASCVD, drugs include: oral cholesteryl ester transfer protein inhibitors, such as anacetrapib being developed by Merck and TA-8995 being developed by Amgen/Dezima; ATP citrate lyase inhibitor, ETC-1002 developed by current Esperion; PCSK9 inhibitors, such as ALN-PCSSc (inclisiran) being developed by The Medicines Company and Alynlyam Pharmaceuticals, Inc.; apoA antisense agent AKCEA-APO(a)-LRx being developed by Akcea and Novartis; apabetalone (RVX-208) being developed by Resvelogix; and MGL-3196 developed by Madrigal (HeFH only);
- for SHTG, ISIS-APOCIII-LRX being developed by Ionis Pharmaceuticals, Inc. (formerly Isis Pharmaceuticals, Inc.); CaPre (long-chain omega-3 phospholipid) being developed by Acaci.; pemaifibrate being developed by KOWA.

This means that there is significant competition for investigational sites and patients to enroll in clinical studies. Additionally, since some drug candidates may be further along in development, approval of such drug candidates could lead to the FDA and other global health authorities to request and/or require changes to ongoing or future clinical trial designs that could impact timelines and cost.

The biomarkers and pathogenesis of NASH are less understood than the dyslipidemia market and for that reason there are many mechanisms of action under investigation to better understand how to effectively treat the disease. Currently accepted diagnosis of NASH is confirmed through a liver biopsy which is invasive, time consuming and costly. Future growth and evolution of the NASH market may rely on development of less invasive technologies to increase diagnoses rates to broaden the drug treated patient population. Several companies have late stage assets (Phase 3 or outcomes studies) well under way with projected market approval dates in NASH as soon as 2019/2020. For NASH, the market is currently evolving with no approved therapies for the indication across the globe. Current thought leader opinions are pointing to a multiple mechanistic approach to effectively treat NASH.

Several pharmaceutical companies have NASH therapies in development that may be approved for marketing in the United States or outside of the United States. Based on publicly available information, we believe the current therapies in development that would compete with gemcabene in NASH include but are not limited to:

- OCALIVA (Obeticholic Acid) (FXR Agonist) being developed by Intercept Pharmaceuticals, Inc.;
- Elafibranor (PPAR Agonist) being developed by Genfit SA;
- Selonsertib (formerly GS-4997) (ASK1 Inhibitor) being developed by Gilead Sciences, Inc.;
- GS-0976 (ACC Inhibitor) being developed by Gilead Sciences, Inc.;
- GS-9674 (FXR Agonist) being developed by Gilead;
- Cenicriviroc (CVC) (CCR2/CCR5 Inhibitor) being developed by Tobira Therapeutics, Inc. (a wholly-owned subsidiary of Allergan plc);
- Emricasan (Caspase Inhibitor) being developed by Conatus Pharmaceuticals Inc.
- Aramchol (Synthetic Fatty Acid/Bile Acid Conjugate) being developed by Galmed;
- MN-001 (5-lipoxygenase Inhibitor) being developed by MediciNova;
- VK2809 (THR-Beta Agonist) being developed by Viking;
- BMS-986036 (GFG21) being developed by BMS;
- Lanifibranor (PPAR Pan Agonist) being developed by Inventiva;
- GR-MD-02 (Galectin-3 Inhibitor) being developed by Galectin Therapeutics; and
- MGL-3196 (THR Agonist) being developed by Madrigal.

Our competitors may develop products that are more effective, safer, more convenient or less costly than any that we are developing or that would render our product candidates obsolete or non-competitive. Our competitors may also render our technologies obsolete by advances in existing technological approaches or the development of new or different approaches, potentially eliminating the advantages in our drug discovery process. Our competitors may also obtain marketing approval from the FDA or other regulatory authorities for their products more rapidly than we may obtain approval for ours, which could result in our competitors establishing a strong market position before we are able to enter the market.

Many of our competitors have significantly greater name recognition, financial resources and expertise in research and development, manufacturing, preclinical testing, conducting clinical trials, obtaining regulatory approvals and marketing approved products than we do. Mergers and acquisitions in the pharmaceutical and biotechnology industries may result in even more resources being concentrated among a smaller number of our competitors. Smaller and other early stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large and established companies. These third parties compete with us in recruiting and retaining qualified scientific and management personnel, establishing clinical trial sites and patient registration for clinical trials and entering into strategic transactions, as well as in acquiring technologies complementary to, or necessary for, our programs.

We lack experience commercializing products, which may have an adverse effect on our business.

If gemcabene or any product candidate we may pursue in the future receives marketing approval, we will need to transition from a company with a development focus to a company capable of supporting commercial activities, and we

may not be successful in making that transition. We have never filed an NDA, and have not yet demonstrated an ability to obtain marketing approval for, or to commercialize, any product candidate. As a result, our clinical development and regulatory approval process, and our ability to successfully commercialize any approved products, may involve more inherent risk, take longer, and cost more than it would if we were a company with experience obtaining marketing approval for and commercializing a product candidate.

If we are unable to establish sales and marketing capabilities or enter into agreements with third parties to sell and market gemcabene, if approved, or any other product candidate we may pursue, we may not be successful in commercializing such product candidate if and when approved.

We do not have a global sales or marketing infrastructure and have no capabilities in place at the present time for the sale, marketing or distribution of pharmaceutical products. To achieve commercial success for any approved product for which we retain sales and marketing responsibilities, we must either develop a sales and marketing organization or outsource part or all of these functions to other third parties.

There are risks involved with both establishing our own sales and marketing capabilities and entering into arrangements with third parties to perform these services. For example, recruiting and training a sales force is expensive and time consuming and could delay any product launch. If the commercial launch of a product candidate for which we recruit a sales force and establish marketing capabilities is delayed or does not occur for any reason, we would have prematurely or unnecessarily incurred these commercialization expenses. This may be costly, and our investment would be lost if we cannot retain or reposition our sales and marketing personnel.

Factors that may inhibit our efforts to commercialize gemcabene or any future product candidate on our own include:

- 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 our product candidate;
- 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;
- unforeseen costs and expenses associated with creating an independent sales and marketing organization; and
- inability to obtain sufficient coverage and reimbursement from third-party payors and governmental agencies.

If we enter into arrangements with third parties to perform sales, marketing and distribution services, our product revenues or the profitability of these product revenues to us are likely to be lower than if we were to market and sell a product that we develop ourselves. In addition, we may not be successful in entering into arrangements with third parties to sell and market any product candidate 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 them may fail to devote the necessary resources and attention to sell and market a drug effectively. If we do not establish sales and marketing capabilities successfully, either on our own or in collaboration with third parties, we will not be successful in commercializing gemcabene or any future product candidate.

Even if gemcabene or any future product candidate receives marketing approval, it may fail to achieve the degree of market acceptance by physicians, patients, healthcare payors and others in the medical community necessary for commercial success.

Even if gemcabene or any future product candidate receives marketing approval, it may nonetheless fail to gain sufficient market acceptance by physicians, patients, healthcare payors and others in the medical community. If such product candidate does not achieve an adequate level of acceptance, we may not generate significant product revenues and we may not become profitable. The degree of market acceptance of a product candidate, if approved for commercial sale, will depend on a number of factors, including:

- efficacy and potential advantages compared to alternative treatments;
- the ability to offer our product for sale at competitive prices;
- the willingness of the target patient population to try new therapies and of physicians to prescribe these therapies;
- any restrictions on the use of our product together with other medications;
- interactions of our product with other medicines patients are taking;

- inability of certain types of patients to take our product;
- demonstrated ability to treat patients and, if required by any applicable regulatory authority in connection with the approval for target indications, to provide patients with incremental cardiovascular disease benefits, as compared with other available therapies;
- the relative convenience and ease of administration of gemcabene, including as compared with other treatments available for approved indications;
- the prevalence and severity of any adverse side effects;
- limitations or warnings contained in the labeling approved by the FDA;
- availability of alternative treatments already approved or expected to be commercially launched in the near future;
- the effectiveness of our sales and marketing strategies;
- our ability to increase awareness through marketing efforts;
- guidelines and recommendations of organizations involved in research, treatment and prevention of various diseases that may advocate for alternative therapies;
- our ability to obtain sufficient third-party coverage and adequate reimbursement;
- the willingness of patients to pay out-of-pocket in the absence of third-party coverage; and
- physicians or patients may be reluctant to switch from existing therapies even if potentially more effective, safe or convenient

If the FDA or a comparable foreign regulatory authority approves generic versions of gemcabene or any future product candidates that receive marketing approval, or such authorities do not grant our product candidates appropriate periods of data exclusivity before approving generic versions of our products, the sales of our products could be adversely affected.

Once an NDA is approved, the product covered thereby becomes a “reference listed drug” in the FDA’s publication, “Approved Drug Products with Therapeutic Equivalence Evaluations.” Manufacturers may seek approval of generic versions of reference listed drugs through submission of abbreviated new drug applications (ANDAs) in the United States. In support of an ANDA, a generic manufacturer need not conduct clinical studies. Rather, the applicant generally must show that its product has the same active ingredient(s), dosage form, strength, route of administration and conditions of use or labeling as the reference listed drug and that the generic version is bioequivalent to the reference listed drug, meaning it is absorbed in the body at the same rate and to the same extent. Generic products may be significantly less costly to bring to market than the reference listed drug and companies that produce generic products are generally able to offer them at lower prices. Thus, following the introduction of a generic drug, a significant percentage of the sales of any branded product or reference listed drug may be typically lost to the generic product.

The FDA may not approve an ANDA for a generic product until any applicable period of non-patent exclusivity for the reference listed drug has expired. The FDC Act provides a period of five years of non-patent exclusivity for a new drug containing a new chemical entity (NCE). Specifically, in cases where such exclusivity has been granted, an ANDA may not be filed with the FDA until the expiration of five years unless the submission is accompanied by a Paragraph IV certification that a patent covering the reference listed drug is either invalid or will not be infringed by the generic product, in which case the applicant may submit its application four years following approval of the reference listed drug. It is unclear whether the FDA will treat the active ingredients in our product candidates as NCEs and, therefore, afford them five years of NCE data exclusivity if they are approved. If any product we develop does not receive five years of NCE exclusivity, it may nonetheless be eligible for three years of exclusivity, which means that the FDA may approve generic versions of such product three years after its date of approval. Manufacturers may seek to launch these generic products following the expiration of the applicable marketing exclusivity period, even if we still have patent protection for our product.

Competition that gemcabene or any future product candidates may face from generic versions of our products could materially and adversely impact our future revenue, profitability and cash flows and substantially limit our ability to obtain a return on the investments we have made in any such product candidate.

Even if we are able to commercialize gemcabene or any future product candidate, the profitability of such product candidate will likely depend in significant part on third-party reimbursement practices, which, if unfavorable, would harm our business.

Our ability to commercialize a drug successfully will depend in part on the extent to which coverage and adequate reimbursement 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. Government authorities and third-party payors have attempted to control costs by limiting coverage and the amount of reimbursement for particular medications. Increasingly, third-party payors are requiring that drug companies provide them with predetermined discounts from list prices and are challenging the prices charged for medical products. We cannot be sure that coverage will be available for any product candidate that we commercialize and, if coverage is available, whether the level of reimbursement will be adequate. Assuming we obtain coverage for gemcabene, if approved, by a third-party payor, the resulting reimbursement payment rates may not be adequate or may require co-payments that patients find unacceptably high. Patients who are prescribed medications for the treatment of their conditions, and their prescribing physicians, generally rely on third-party payors to reimburse all or part of the costs associated with their prescription drugs. Patients are unlikely to use a product candidate, if approved, unless coverage is provided and reimbursement is adequate to cover all or a significant portion of the cost of our products. Therefore, coverage and adequate reimbursement is critical to new product acceptance. If reimbursement is not available or is available only to limited levels, we may not be able to successfully commercialize any product candidate for which we obtain 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 a product candidate is approved by the FDA or similar regulatory authorities outside the United States. Moreover, eligibility for reimbursement does not imply that any product 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 a new product, if applicable, may also not be sufficient to cover our costs and may not be made permanent. Reimbursement rates may vary according to the use of the product and the clinical setting in which it is used, may be based on reimbursement levels already set for lower cost medicines and may be incorporated into existing payments for other services. Net prices for products 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 medicines 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. However, no uniform policy requirement for coverage and reimbursement for drug products exists among third-party payors in the United States. Therefore, coverage and reimbursement for drug products can differ significantly from payor to payor. As a result, the coverage determination process is often a time-consuming and costly process that will require us to provide scientific and clinical support for the use of our products to each payor separately, with no assurance that coverage and adequate reimbursement will be applied consistently or obtained in the first instance.

Our inability to promptly obtain coverage and profitable payment rates from both government-funded and private payors for any approved products that we develop could have an adverse effect on our operating results, our ability to raise capital needed to commercialize products and our overall financial condition.

Product liability lawsuits against us could cause us to incur substantial liabilities and could limit commercialization of any product candidate that we may develop.

We face an inherent risk of product liability exposure related to the testing of our product candidate in human clinical trials and will face an even greater risk if we commercially sell any products that we may develop. Product liability claims might be brought against us by patients, healthcare providers or others selling or otherwise coming into contact with gemcabene or any future product candidate during product testing, manufacturing, marketing or sale. For example, we may be sued on allegations that a product candidate caused injury or that the product is otherwise unsuitable. 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, including as a result of interactions with alcohol or other drugs, 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 claims that our product candidate caused injuries, we could incur substantial liabilities. Regardless of merit or eventual outcome, liability claims may result in:

- decreased demand for any product candidate that we are developing;
- injury to our reputation and significant negative media attention;
- withdrawal of clinical trial participants;
- increased FDA warnings on product labels;

- significant costs to defend the related litigation;
- substantial monetary awards to trial participants or patients;
- distraction of management's attention from our primary business;
- loss of revenue; and
- the inability to commercialize any product candidate that we may develop.

Any product liability or clinical trial insurance coverage that we do obtain may not be adequate to cover all liabilities that we may incur. We may need to increase our insurance coverage as we expand clinical trials and if we successfully commercialize gemcabene or any other product candidate we may pursue in the future. Insurance coverage is increasingly expensive, and we may not be able to obtain product liability insurance on commercially reasonable terms or in an amount adequate to satisfy any liability that may arise.

If we or our third-party manufacturers 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 an adverse effect on the success of our business.

Our research and development activities involve the controlled use of potentially hazardous substances, including chemical and biological materials, by ourselves and our third-party manufacturers. Our manufacturers are subject to federal, state and local laws and regulations in the United States and abroad governing laboratory procedures and the use, manufacture, storage, handling and disposal of medical and hazardous materials. Although we believe that our manufacturers' procedures for using, handling, storing and disposing of these materials comply with legally prescribed standards, we cannot completely eliminate the risk of contamination or injury resulting from medical or hazardous materials. As a result of any such contamination or injury, we may incur liability or local, city, state or federal authorities may curtail the use of these materials and interrupt our business operations. In the event of an accident, we could be held liable for damages or penalized with fines, and the liability could exceed our resources. We do not have any insurance for liabilities arising from medical or hazardous materials. Although 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. Compliance with applicable environmental, health and safety laws and regulations is expensive, and current or future environmental regulations may impair our research, development and production efforts, which could harm our business, prospects, financial condition or results of operations.

Federal legislation and actions by state and local governments may permit reimportation of drugs from foreign countries into the United States, including foreign countries where the drugs are sold at lower prices than in the United States, which could adversely affect our operating results.

We may face competition for gemcabene, if approved, from cheaper lipid-lowering therapies sourced from foreign countries that have placed price controls on pharmaceutical products. The Medicare Modernization Act contains provisions that may change U.S. importation laws and expand pharmacists' and wholesalers' ability to import cheaper versions of an approved drug and competing products from Canada, where there are government price controls. These changes to U.S. importation laws will not take effect unless and until the Secretary of Health and Human Services certifies that the changes will pose no additional risk to the public's health and safety and will result in a significant reduction in the cost of products to consumers. The Secretary of Health and Human Services has so far declined to approve a reimportation plan. Proponents of drug reimportation may attempt to pass legislation that would directly allow reimportation under certain circumstances. Legislation or regulations allowing the reimportation of drugs, if enacted, could decrease the price we receive for any product we may develop and adversely affect our future revenues and prospects for profitability.

Risks Related to our Dependence on Third Parties

We will be unable to directly control all aspects of our clinical trials due to our reliance on clinical research organizations (CROs) and other third parties that assist us in conducting clinical trials.

We will rely on CROs to conduct part or all of our preclinical studies and clinical trials for any product candidate, including our Phase 2 and Phase 3 trials for gemcabene. As a result, we will have limited control over the conduct, timing and completion of these clinical trials and the management of data developed through the clinical trials.

Communicating with outside parties can also be challenging, potentially leading to mistakes as well as difficulties in coordinating activities. Outside parties may:

- have staffing difficulties;
- fail to comply with contractual obligations;
- experience regulatory compliance issues;
- changes in priorities or become financially distressed; or
- form relationships with other entities, some of which may be our competitors.

These factors may adversely affect the willingness or ability of third parties to conduct our clinical trials and may subject us to unexpected cost increases that are beyond our control.

Moreover, the FDA and other global health authorities require us to comply with standards, commonly referred to as good clinical practices, for conducting, recording, and reporting the results of clinical trials to assure that data and reported results are credible and accurate and that the rights, integrity and confidentiality of clinical trial participants are protected. Our reliance on third parties that we do not control does not relieve us of these responsibilities and requirements.

Problems with the timeliness or quality of the work of any CRO may lead us to seek to terminate our relationship with any such CRO and use an alternative service provider. Making this change may be costly and may delay our clinical trials, and contractual restrictions may make such a change difficult or impossible to effect. If we must replace any CRO that is conducting our clinical trials, our clinical trials may have to be suspended until we find another CRO that offers comparable services. The time that it takes us to find alternative organizations may cause a delay in the commercialization of gemcabene or may cause us to incur significant expenses to replicate data that may be lost. Although we do not believe that any CRO on which we may rely will offer services that are not available elsewhere, it may be difficult to find a replacement organization that can conduct our clinical trials in an acceptable manner and at an acceptable cost. Any delay in or inability to complete our clinical trials could significantly compromise our ability to secure regulatory approval of gemcabene and preclude our ability to commercialize gemcabene, thereby limiting or preventing our ability to generate revenue from its sales.

We rely completely on third parties to supply and manufacture our preclinical and clinical drug supplies for gemcabene, and we intend to rely on third parties to produce commercial supplies of gemcabene and preclinical, clinical and commercial supplies of any future product candidate.

We do not currently have, nor do we plan to acquire, the infrastructure or capability to internally manufacture our clinical drug supply of gemcabene, or any future product candidates, for use in the conduct of our preclinical studies and clinical trials, and we lack the internal resources and the capability to manufacture any product candidates on a clinical or commercial scale. The process of manufacturing drug products is complex, highly regulated and subject to several risks. For example, the facilities used by our contract manufacturers to manufacture the active pharmaceutical ingredient (or drug substance) and final drug product for gemcabene, or any future product candidates, must be inspected by the FDA and other comparable foreign regulatory agencies in connection with our submission of an NDA or relevant foreign regulatory submission to the applicable regulatory agency. In addition, the manufacturing of drug substance or product is susceptible to product loss due to contamination, equipment failure, improper installation or operation of equipment, or vendor or operator error. Moreover, the manufacturing facilities in which gemcabene or any future product candidates are made could be adversely affected by equipment failures, labor shortages, natural disasters, power failures or other factors.

We do not control the manufacturing process of, and are completely dependent on, our contract manufacturers to comply with current good manufacturing practices (cGMP) for manufacture of both active drug substances and finished drug products. If our contract manufacturers cannot successfully manufacture material that conforms to our specifications and the strict regulatory requirements of the FDA or applicable foreign regulatory agencies, we will not be able to secure and/or maintain regulatory approval for our products. In addition, we have no direct control over our contract manufacturers' ability to maintain adequate quality control, quality assurance and qualified personnel. Failure to satisfy the regulatory requirements for the production of those materials and products may affect the regulatory clearance of our contract manufacturers' facilities generally. If the FDA or a comparable foreign regulatory agency does not approve these facilities for the manufacture of gemcabene or any future product candidates, or if it withdraws its approval in the future, we may need to find alternative manufacturing facilities, which would adversely impact our ability to develop,

obtain regulatory approval for or market gemcabene or such future product candidates. Furthermore, all of our contract manufacturers are engaged with other companies to supply and/or manufacture materials or products for such companies, which exposes our manufacturers to regulatory and sourcing risks for the production of such materials and products. To the extent practicable, we attempt to identify more than one supplier, but some raw materials are available only from a single source or only one supplier has been identified, even in instances where multiple sources exist.

We have relied upon third-party manufacturers for the manufacture of our product candidate for preclinical and clinical testing purposes and intend to continue to do so in the future, including for commercial purposes. If our third party manufacturers are unable to supply drug substance and/or drug product on a commercial basis, we may not be able to successfully produce and market gemcabene, if approved, or could be delayed in doing so. For instance, we rely on one supplier for the drug substance for gemcabene. The manufacturer of the drug substance for gemcabene will need to manufacture batches of the drug substance that will serve as the validation batches that will be reviewed by the FDA in connection with its review of the NDA for gemcabene and as the supply of gemcabene, if approved and successfully launched commercially. If there is any delay or problem with the manufacture of these batches of drug substance or if there is a delay in producing finished product from these batches, the approval of gemcabene may be delayed or any potential launch of gemcabene may be adversely affected. We will rely on comparison of product specifications (identity, strength, quality, potency) to demonstrate equivalence of the current drug substance and/or drug product to the drug substance and/or drug product used in previously completed preclinical and clinical testing. If we are unable to demonstrate such equivalence, we may be required to conduct additional preclinical and/or clinical testing of our product candidate.

These and other problems with any manufacturer may lead us to seek to terminate our relationship with any such manufacturer and use an alternative manufacturer. Making this change may be costly, time consuming and difficult to effectuate, and may delay our research and development activities. If we must replace any manufacturer, our research and development activities may have to be suspended until we find another manufacturer that offers comparable services. The time that it takes us to find alternative organizations may cause a delay in the development and commercialization of gemcabene or any future product candidate.

We may form or seek strategic alliances or enter into additional licensing arrangements in the future, and we may not realize the benefits of such alliances or licensing arrangements.

We may form or seek strategic alliances, create joint ventures or collaborations or enter into additional licensing arrangements with third parties that we believe will complement or augment our development and commercialization efforts with respect to gemcabene and any future product candidates that we may develop. Any of these relationships may require us to incur non-recurring and other charges, increase our near and long-term expenditures, issue securities that dilute our existing stockholders or disrupt our management and business. Our likely collaborators include large and mid-size pharmaceutical companies, regional and national pharmaceutical companies and biotechnology companies. If we enter into any such arrangements with any third parties, we will likely have limited control over the amount and timing of resources that our collaborators dedicate to the development or commercialization of gemcabene or any future product candidate. Our ability to generate revenues from these arrangements will depend on our collaborators' abilities to successfully perform the functions assigned to them in these arrangements. We cannot be certain that, following a strategic transaction or license, we will achieve the revenue or specific net income that justifies such transaction.

Collaborations involving gemcabene or any future product candidate pose the following risks to us:

- collaborators have significant discretion in determining the efforts and resources that they will apply to these collaborations;
- collaborators may not perform their obligations as expected;
- collaborators may not pursue development and commercialization or may elect not to continue or renew development or commercialization programs based on clinical trial results, changes in the collaborator's strategic focus or available funding or external factors such as an acquisition that diverts resources or creates competing priorities;
- collaborators may delay clinical trials, provide insufficient funding for a clinical trial program, stop a clinical trial or abandon a product candidate, repeat or conduct new clinical trials or require a new formulation of a product candidate for clinical testing;
- collaborators could independently develop, or develop with third parties, products that compete directly or indirectly with our product candidate if the collaborators believe that competitive products are more likely to

- be successfully developed or can be commercialized under terms that are more economically attractive than ours;
- a collaborator with marketing and distribution rights to one or more product candidates may not commit sufficient resources to the marketing and distribution of any such product candidate;
- collaborators may not properly maintain or defend our intellectual property rights or may use our proprietary information in such a way as to invite litigation that could jeopardize or invalidate our proprietary information or expose us to potential litigation;
- collaborators may infringe the intellectual property rights of third parties, which may expose us to litigation and potential liability;
- disputes may arise between the collaborators and us that result in the delay or termination of the research, development or commercialization of our product candidate or that result in costly litigation or arbitration that diverts management attention and resources;
- we may lose certain valuable rights under circumstances identified in our collaborations, including if we undergo a change of control;
- collaborations may be terminated and, if terminated, may result in a need for additional capital to pursue further development or commercialization of the applicable product candidates;
- collaborators may learn about our discoveries and use this knowledge to compete with us in the future;
- the results of collaborators' preclinical or clinical studies could harm or impair other development programs;
- there may be conflicts between different collaborators that could negatively affect those collaborations and potentially others;
- the number and type of our collaborations could adversely affect our attractiveness to future collaborators or acquirers;
- collaboration agreements may not lead to development or commercialization of our product candidate in the most efficient manner or at all. If a present or future collaborator of ours were to be involved in a business combination, the continued pursuit and emphasis on our product development or commercialization program under such collaboration could be delayed, diminished or terminated; and
- collaborators may be unable to obtain the necessary marketing approvals.

If future collaboration partners fail to develop or effectively commercialize gemcabene or any future product candidate for any of these reasons, such product candidate may not be approved for sale and our sales of such product candidate, if approved, may be limited, which would have an adverse effect on our operating results and financial condition.

If we are not able to establish new collaborations on commercially reasonable terms, we may have to alter our development and commercialization plans.

We face significant competition in attracting collaborators. Whether we reach a definitive agreement for collaboration will depend, among other things, upon our assessment of the collaborator's resources and expertise, the terms and conditions of the proposed collaboration and the proposed collaborator's evaluation of a number of factors related to the associated product candidate. Those factors may include the design or results of clinical trials, the likelihood of approval by the FDA or similar regulatory authorities outside the United States, the potential market for the product candidate, the costs and complexities of manufacturing and delivering such product candidate to patients, the potential of competing products, the existence of uncertainty with respect to our ownership of technology, which can exist if there is a challenge to such ownership without regard to the merits of the challenge and industry and market conditions generally. The collaborator may also consider alternative product candidates or technologies for similar indications that may be available to collaborate on and whether such a collaboration could be more attractive than the one with us.

Much of the potential revenue from future collaborations may consist of contingent payments, such as payments for achieving regulatory milestones or royalties payable on sales of our product candidate, if approved. The milestone and royalty revenue that we may receive under these collaborations will depend upon our collaborators' ability to successfully develop, introduce, market and sell new our product candidate, if approved. In addition, collaborators may decide to enter into arrangements with third parties to commercialize products developed under collaborations related to our product candidate, which could reduce the milestone and royalty revenue received, if any.

We may also be restricted under existing collaboration agreements from entering into future agreements on certain terms with potential collaborators. Collaborations are complex and time-consuming to negotiate and document. In addition, there have been a significant number of recent business combinations among large pharmaceutical companies that have resulted in a reduced number of potential future collaborators.

We may not be able to negotiate collaborations on a timely basis, on acceptable terms, or at all. If we are unable to do so, we may have to curtail the development of the product candidate for which we are seeking to collaborate, reduce or delay its development program or one or more of our other development programs, delay its potential commercialization or reduce the scope of any sales or marketing activities, or increase our expenditures and undertake development or commercialization activities at our own expense. If we elect to increase our expenditures to fund development or commercialization activities on our own, we may need to obtain additional capital, which may not be available to us on acceptable terms or at all. If we do not have sufficient funds, we may not be able to further develop our product candidate or bring it to market and generate product revenue.

Risks Related to our Intellectual Property

If we are unable to adequately protect our proprietary technology or maintain issued patents sufficient to protect gemcabene or any future product candidate, others could compete against us more directly, which would have an adverse impact on our business, results of operations, financial condition and prospects.

Our commercial success will depend in part on our success obtaining and maintaining issued patents and other intellectual property rights in the United States and elsewhere and protecting our proprietary technology. If we do not adequately protect our intellectual property and proprietary technology, competitors may be able to use our technologies and erode or negate any competitive advantage we may have, which could harm our business and ability to achieve profitability. We licensed patents relating to our current product candidate, gemcabene, from Pfizer. Pursuant to the license agreement, we are responsible for filing, prosecuting and maintaining the patent rights in Pfizer's name at our own cost and expense. In connection with this obligation, we are granted the first right to control the enforcement of the license patents against any third-party infringement actions. Risks related to our Pfizer license are discussed elsewhere in this "Risk Factors" section under "We depend on intellectual property licensed from Pfizer for gemcabene, and the termination of this license would harm our business." The termination of this license could result in the loss of significant rights, which would harm our business.

As of February 21, 2019 our patent estate, including patents we own or license from third parties, on a worldwide basis, included 6 issued U.S. patents, 11 pending U.S. patent applications, 40 issued patents in foreign jurisdictions including Canada, France, Germany, Great Britain, Ireland, Italy, Mexico and Spain and 85 pending patent applications in foreign jurisdictions including Australia, Canada, China, Europe, Hong Kong, Japan and Mexico. Our worldwide patents and pending applications all relate to our product candidate, gemcabene. Our patents that claimed the gemcabene composition of matter which were in-licensed from Pfizer, have all expired; however, our clinical formulation comprises a specific calcium salt crystal form of gemcabene, which form is claimed in U.S. Patent Number 6,861,555. This patent, which was in-licensed from Pfizer, is expected to expire in 2021, absent any patent term extension. Our current patent estate includes fourteen patent families that have claims directed to methods of treatment using gemcabene. These patent families include, for example, U.S. Patent Number 8,557,835, licensed from Pfizer that has claims directed to pharmaceutical compositions comprised of combinations of gemcabene with statins and methods of using a combination of gemcabene on top of a statin in a patient that does not reach sufficient LDL-C lowering on a statin alone, for treating several conditions including hyperlipidemia. U.S. Patent Number 8,557,835 is expected to expire in 2021, absent any patent term extension. All related foreign patents are now expired. Additionally, U.S. Patent Number 8,846,761 are owned by us. U.S. Patent Number 8,846,761 is directed to methods of decreasing a subject's risk for developing pancreatitis by administering gemcabene and is expected to expire in 2032, absent any patent term extension. Any foreign patent in this family that may issue, is expected to expire in 2031, absent any patent term extension. U.S. Patent No 10,028,926, is directed to methods of decreasing a patient's risk for developing coronary heart disease or preventing, delaying or reducing the severity of a secondary cardiovascular event by administering gemcabene with a statin. Related patent applications are pending in foreign jurisdictions including Australia, Canada, China, Europe, Japan and Mexico. Any patent that may issue in this family, absent any patent term adjustment or extension, is expected to expire in 2033. U.S. Patent No. 9,849,104 is directed to methods of stabilizing NAFLD or NAS of ≥ 2 or reducing hepatic fibrosis. U.S. Patent No. 9,849,104 is expected to expire in 2036 and the two pending U.S. patent applications, without any extensions will also expire in 2036. Any foreign patent in this family that may issue, is expected to expire in 2036, absent any patent term extension. In 2017, U.S. patent application 14/942,765 and 14 foreign non-provisional patent applications on methods of large-scale manufacturing for making dicarboxyalkyl ethers, any patent issuing from this patent family is expected to expire in 2035.

In 2017 we also filed two PCT applications one for methods of treating mixed dyslipidemia using gemcabene in combination with statins and treatment of NASH using gemcabene as a monotherapy (PCT/US2016/060837), and the other relating to fixed dose combinations and modified release formulations of gemcabene and statins (PCT/US2016/060849). Two U.S. Patent Applications were filed as continuations of PCT/US2016/060837, U.S. Patent Application Number 15/416,911, now U.S. 9,849,104, is directed to methods of treating NASH by administering gemcabene as a monotherapy, U.S. Patent Application Number 15/424,620, is directed methods for treating Mixed Dyslipidemia by administering gemcabene and a statin, and one divisional U.S. Patent Application Number 15/814,118 directed to other aspects of NASH. With the PCT application, 14 foreign non-provisional applications were filed. Any patent that may issue from these families, absent any patent term adjustment or extension, is expected to expire in 2037.

The patent prosecution process is expensive and time-consuming, and we and our current or future licensors, licensees or collaboration partners may not be able to prepare, file and prosecute all necessary or desirable patent applications at a reasonable cost or in a timely manner. It is also possible that we or our licensors will fail to identify patentable aspects of inventions made in the course of development and commercialization activities before it is too late to obtain patent protection on them. Our and our licensors' patent applications cannot be enforced against third parties practicing the technology claimed in such applications unless and until a patent issues from such applications, and then only to the extent the issued claims cover the technology.

We cannot assure you that any of our patents have, or that any of our pending patent applications will mature into issued patents that will include, claims with a scope sufficient to protect gemcabene or any future product candidate. Others have developed technologies that may be related or competitive to our approach, and may have filed or may file patent applications and may have received or may receive patents that overlap or conflict with our patent applications, either by claiming the same methods or formulations or by claiming subject matter that could dominate our patent position. The patent positions of biotechnology and pharmaceutical companies, including our patent position, involve complex legal and factual questions, and, therefore, the issuance, scope, validity and enforceability of any patent claims that we may obtain cannot be predicted with certainty. Patents, if issued, may be challenged, deemed unenforceable, invalidated, or circumvented. U.S. patents and patent applications may also be subject to interference proceedings, ex parte reexamination, or inter partes review proceedings, supplemental examination and challenges in district court. Patents may be subjected to opposition, post-grant review, or comparable proceedings lodged in various national and regional patent offices. These proceedings could result in either loss of the patent or denial of the patent application or loss or reduction in the scope of one or more of the claims of the patent or patent application. In addition, such interference, re-examination, opposition, post-grant review, inter partes review, supplemental examination or revocation proceedings may be costly. Thus, any patents that we may own or exclusively license may not provide any protection against competitors. Furthermore, an adverse decision in an interference proceeding can result in a third-party receiving the patent right sought by us, which in turn could affect our ability to develop, market or otherwise commercialize gemcabene.

Furthermore, the issuance of a patent, while presumed valid, is not conclusive as to its validity or its enforceability and it may not provide us with adequate proprietary protection or competitive advantages against competitors with similar products. Competitors may also be able to design around our patents. Other parties may develop and obtain patent protection for more effective technologies, designs or methods. We may not be able to prevent the unauthorized disclosure or use of any technical knowledge or trade secrets by consultants, vendors, former employees and current employees. The laws of some foreign countries do not protect our proprietary rights to the same extent as the laws of the United States, and we may encounter significant problems in protecting our proprietary rights in these countries. If these developments were to occur, they could have a material adverse effect on our sales.

Our ability to enforce our patent rights depends on our ability to detect infringement. It is difficult to detect infringers who do not advertise the components that are used in their products. Moreover, it may be difficult or impossible to obtain evidence of infringement in a competitor's or potential competitor's product. Any litigation to enforce or defend our patent rights, if any, even if we were to prevail, could be costly and time-consuming and would divert the attention of our management and key personnel from our business operations. We may not prevail in any lawsuits that we initiate and the damages or other remedies awarded if we were to prevail may not be commercially meaningful.

In addition, proceedings to enforce or defend our patents could put our patents at risk of being invalidated, held unenforceable, or interpreted narrowly. Such proceedings could also provoke third parties to assert claims against us, including that some or all of the claims in one or more of our patents are invalid or otherwise unenforceable. If, in any proceeding, a court invalidated or found unenforceable our patents covering gemcabene or any future product candidate,

our financial position and results of operations would be adversely impacted. In addition, if a court found that valid, enforceable patents held by third parties covered gemcabene or any future product candidate, our financial position and results of operations would also be adversely impacted.

The degree of future protection for our proprietary rights is uncertain, and we cannot ensure that:

- any of our patents, or any of our pending patent applications, if issued, will include claims having a scope sufficient to protect gemcabene;
- any of our pending patent applications will result in issued patents;
- we will be able to successfully commercialize gemcabene or any future product candidate, if approved, before our relevant patents expire;
- we were the first to make the inventions covered by each of our patents and pending patent applications;
- we were the first to file patent applications for these inventions;
- others will not develop similar or alternative technologies that do not infringe our patents;
- any of our patents will be valid and enforceable;
- any patents issued to us will provide a basis for an exclusive market for our commercially viable products, will provide us with any competitive advantages or will not be challenged by third parties;
- we will develop additional proprietary technologies or product candidates that are separately patentable; or
- that our commercial activities or products will not infringe upon the patents of others.

Patents have a limited lifespan. The natural expiration of a patent is generally 20 years after its effective filing date. Various extensions may be available; however, the life of a patent, and the protection it affords, is limited. Given the extensive period of time between patent filing and regulatory approval for a product candidate, the time during which we can market a product candidate under patent protection is limited, and our patent may expire before we obtain such approval. Without patent protection for gemcabene or any future product candidates, we may be open to competition from generic versions of our product candidates, which may affect the profitability of our product candidates.

If we do not obtain protection under the Hatch-Waxman Act and similar foreign legislation by extending the patent terms and obtaining data exclusivity for our product candidate, our business may be materially harmed.

Depending upon the timing, duration of regulatory review, and date of FDA marketing approval of gemcabene or any future product candidate, if any, one of our U.S. patents may be eligible for patent term restoration under the Drug Price Competition and Patent Term Restoration Act of 1984, referred to as the Hatch-Waxman Act. The Hatch-Waxman Act provides for a patent restoration term of up to five years as compensation for the time the product is under FDA regulatory review (patent term extension). The duration of patent term extension is calculated based on the time spent in the regulatory review process. Our basic U.S. composition of matter patent for gemcabene has expired. We plan to seek patent term extension for one of our patents related to gemcabene. However, we may not be granted an extension because of, for example, failing to apply within the applicable deadline, expiration of relevant patents prior to obtaining approval, or otherwise failing to satisfy applicable requirements. Moreover, the applicable time period or the scope of patent protection afforded could be less than we request. If we are unable to obtain patent term extension or the term of any such extension is less than we request, our revenue could be reduced, possibly materially.

In addition, we believe that gemcabene is a NCE in the United States and may be eligible for data exclusivity under the Hatch-Waxman Act. A single-ingredient drug can be classified as a NCE if the FDA has not previously approved any other new drug containing the same active ingredient. Under sections 505(c)(3)(E)(ii) and 505(j)(5)(F)(ii) of the FDC Act, as amended, a NCE that is granted marketing approval may, even in the absence of patent protections, be eligible for five years of data exclusivity in the United States following marketing approval. During the data exclusivity period, if granted, the FDA is precluded from approving 505(b)(2) applications or abbreviated new drug applications submitted by another company that references the FDA's findings of safety and efficacy for the approved NDA. In the European Union, NCEs qualify for eight years of data exclusivity upon marketing authorization and an additional two years of market exclusivity. This data exclusivity, if granted, prevents regulatory authorities in the European Union from reviewing a generic application for eight years, after which generic marketing authorization can be approved but the generic drug may not be marketed during the two-year marketing exclusivity period. However, gemcabene may not be considered to be a NCE for these purposes or be entitled to the period of data exclusivity. If we are not able to gain or exploit the period of data exclusivity, we may face significant competitive threats to our commercialization of gemcabene from other manufacturers, including the manufacturers of generic alternatives. Further, even if our compound is considered to be a NCE and we are able to gain the prescribed period of data exclusivity, another company

nevertheless could gain marketing approval for the same compound if they independently generate preclinical and clinical data and get market approval through the NDA process without benefit of our data.

If we fail to maintain orphan drug exclusivity for gemcabene for HoFH, we will have to rely on data and marketing exclusivity for HoFH that is not based on an orphan drug designation, if any, and on our intellectual property rights.

As part of our business strategy, in the United States we have obtained orphan drug designation for gemcabene for the treatment of HoFH. We may submit an application to the FDA for other orphan drug designations for gemcabene such as for the treatment of TG greater than approximately 750 mg/dL (F) or Familial Partial Lipodystrophy under the Orphan Drug Act, the FDA may designate a product as an orphan drug if it is a drug intended to treat a rare disease or condition, defined, in part, as a patient population of fewer than 200,000 in the United States.

In the United States, the company that first obtains FDA approval for a designated orphan drug for the specified rare disease or condition receives orphan drug marketing exclusivity for that drug for a period of seven years. This orphan drug exclusivity prevents the FDA from approving another application, including a full NDA, to market the same drug for the same orphan indication, except in very limited circumstances. For purposes of small molecule drugs, the FDA defines “same drug” as a drug that contains the same active pharmaceutical ingredient (API) and is intended for the same use as the drug in question. A designated orphan drug may not receive orphan drug exclusivity if it is approved for a use that is broader than the indication for which it received orphan designation. In addition, orphan drug exclusive marketing rights in the United States may be lost if the FDA later determines that the request for designation was materially defective or if the manufacturer is unable to assure sufficient quantity of the drug to meet the needs of patients with the rare disease or condition.

The EMA grants orphan drug designation to promote the development of products that may offer therapeutic benefits for life-threatening or chronically debilitating conditions affecting not more than five in 10,000 people in the European Union. Orphan drug designation from the EMA provides ten years of marketing exclusivity following drug approval, subject to reduction to six years if the designation criteria are no longer met.

Even if we are able to obtain and maintain orphan drug exclusivity for gemcabene for HoFH, the designation may not effectively protect it from competition for HoFH because different drugs can be approved for the same condition. Moreover, even with an orphan drug designation, the FDA can subsequently approve a different formulation of the same API for the same condition if the FDA concludes that the later formulation of the API is safer, more effective or makes a major contribution to patient care.

Changes in U.S. patent law could diminish the value of patents in general, thereby impairing our ability to protect gemcabene and any product candidate we may pursue in the future.

In 2011, the United States enacted wide-ranging patent reform legislation with the America Invents Act (AIA).

An important change introduced by the AIA is that, as of March 16, 2013, the United States transitioned to a “first-to-file” system for deciding which party should be granted a patent when two or more patent applications are filed by different parties claiming the same invention. A third party that files a patent application in the U.S. Patent and Trademark Office (USPTO) after that date but before us could therefore be awarded a patent covering an invention of ours even if we had made the invention before it was made by the third party. This will require us to be cognizant going forward of the time from invention to filing of a patent application, but circumstances could prevent us from promptly filing patent applications on our inventions.

Among some of the other changes introduced by the AIA are changes that limit where a patentee may file a patent infringement suit and providing opportunities for third parties to challenge any issued patent in the USPTO. This applies to all of our U.S. patents, even those issued before March 16, 2013. Because of a lower evidentiary standard in USPTO proceedings compared to the evidentiary standard in U.S. federal courts necessary to invalidate a patent claim, a third party could potentially provide evidence in a USPTO proceeding sufficient for the USPTO to hold a claim invalid even though the same evidence would be insufficient to invalidate the claim if first presented in a district court action. Accordingly, a third party may attempt to use the USPTO procedures to invalidate our patent claims that would not have been invalidated if first challenged by the third party as a defendant in a district court action. The AIA and its implementation could increase the uncertainties and costs surrounding the prosecution of our patent applications and the enforcement or defense of our issued patents.

Additionally, the U.S. Supreme Court has ruled on several patent cases in recent years, such as *Association for Molecular Pathology v. Myriad Genetics, Inc.* (Myriad I), *Mayo Collaborative Services v. Prometheus Laboratories, Inc.* and *Alice Corporation Pty. Ltd. v. CLS Bank International*, either narrowing the scope of patent protection available in certain circumstances or weakening the rights of patent owners in certain situations. 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 by the U.S. Congress, the federal courts, and the USPTO, the laws and regulations governing patents could change in unpredictable ways that would weaken our ability to obtain new patents or to enforce our existing patents and patents that we might obtain in the future.

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

In jurisdictions where we have not obtained patent protection, competitors may use our intellectual property to develop their own products and further, may export otherwise infringing products to territories where we have patent protection, but where it is more difficult to enforce a patent as compared to the U.S. Competitor products may compete with gemcabene, if approved, or any future product candidate in jurisdictions where we do not have issued or granted patents or where our issued or granted patent claims or other intellectual property rights are not sufficient to prevent competitor activities in these jurisdictions. The legal systems of certain countries, particularly certain developing countries, make it difficult to enforce patents and such countries may not recognize other types of intellectual property protection, particularly that relating to pharmaceuticals. This could make it difficult for us to prevent the infringement of our patents or marketing of competing products in violation of our proprietary rights generally in certain jurisdictions. Proceedings to enforce our patent rights in foreign jurisdictions could result in substantial cost and divert our efforts and attention from other aspects of our business.

The laws of some jurisdictions do not protect intellectual property rights to the same extent as the laws in the United States, and many companies have encountered significant difficulties in protecting and defending such rights in such jurisdictions. If we, or our licensors, encounter difficulties in protecting, or are otherwise precluded from effectively protecting, the intellectual property rights important for our business in such jurisdictions, the value of these rights may be diminished and we may face additional competition from others in those jurisdictions. Many countries have compulsory licensing laws under which a patent owner may be compelled to grant licenses to third parties. In addition, many countries limit the enforceability of patents against government agencies or government contractors. In these countries, the patent owner may have limited remedies, which could materially diminish the value of such patent. If we, or any of our licensors, are forced to grant a license to third parties with respect to any patents relevant to our business, our competitive position in the relevant jurisdiction may be impaired and our business and results of operations may be adversely affected.

We may become involved in lawsuits to protect or enforce our patents and other intellectual property rights, which could be expensive, time consuming and unsuccessful.

Competitors may infringe our patents and other intellectual property rights. To counter infringement or unauthorized use, we may be required to file infringement claims, which can be expensive and time consuming. In addition, in an infringement proceeding, a court may decide that a patent of ours is invalid or unenforceable, or may refuse to stop the other party from using the technology on the grounds that our patents do not cover the technology in question. An adverse result in any litigation proceeding could put one or more of our patents at risk of being invalidated or interpreted narrowly. Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation, there is a risk that some of our confidential information could be compromised by disclosure during this type of litigation. Moreover, there can be no assurance that we will have sufficient financial or other resources to file and pursue such infringement claims, which typically last for years before they are concluded.

Litigation proceedings may fail and, even if successful, may result in substantial costs and distraction of our management and other employees. We may not be able to prevent, alone or with our collaborators, misappropriation of our proprietary rights, particularly in countries where the laws may not protect those rights as fully as in the United States.

In addition, there could be public announcements of the results of hearings, motions or other interim proceedings or developments. If securities analysts or investors perceive these results to be negative, it could have a substantial adverse effect on the price of our common stock.

Third parties may initiate legal proceedings alleging that we are infringing their intellectual property rights, the outcome of which would be uncertain and could have an adverse effect on the success of our business.

Our commercial success depends upon our ability and the ability of our collaborators to develop, manufacture, market and sell gemcabene and any other product candidate we may pursue in the future and use our proprietary technologies without infringing the proprietary rights and intellectual property of third parties. The biotechnology and pharmaceutical industries are characterized by extensive litigation regarding patents and other intellectual property rights. We may in the future become party to, or threatened with, adversarial proceedings or litigation regarding intellectual property rights with respect to our medicines and technology, including interference or derivation proceedings, post-grant reviews, inter partes reviews, or other procedures before the USPTO or other similar procedures in foreign jurisdictions. Third parties may assert infringement claims against us based on existing patents or patents that may be granted in the future. If we are found to infringe a third party's intellectual property rights, we could be required to obtain a license from such third party to continue developing and marketing our medicines and technology. However, we may not be able to obtain any required license on commercially reasonable terms or at all. Even if we were able to obtain a license, it could be non-exclusive, thereby giving our competitors and other third parties access to the same technologies licensed to us. We could be forced, including by court order, to cease developing and commercializing the infringing technology or medicine. In addition, we could be found liable for substantial monetary damages, potentially including treble damages and attorneys' fees, if we are found to have willfully infringed. A finding of infringement could prevent us from commercializing a product candidate or force us to cease some of our business operations, which could harm our business. Alternatively, we may need to redesign our infringing products, which may be impossible or require substantial time and monetary expenditure. Claims that we have misappropriated the confidential information or trade secrets of third parties could have a similar negative impact on our business.

The cost to us of any litigation or other proceeding relating to patent or other proprietary rights, even if resolved in our favor, could be substantial and may result in substantial costs and distraction of our management and other employees. Some of our competitors may be able to sustain the costs of complex patent litigation more effectively than we can because they have substantially greater resources. Uncertainties resulting from the initiation and continuation of patent litigation or other proceedings could delay our research and development efforts and limit our ability to continue our operations.

We may be subject to damages resulting from claims that our employees or we have wrongfully used or disclosed alleged trade secrets of their former employers.

Our employees and consultants have been previously employed at other biotechnology or pharmaceutical companies, including our competitors or potential competitors. Although we are not aware of any claims currently pending against us, we may be subject to claims that these employees or we have inadvertently or otherwise used or disclosed trade secrets or other proprietary information or intellectual property of the former employers of our employees. Litigation may be necessary to defend against these claims. Even if we are successful in defending against these claims, litigation could result in substantial costs and be a distraction to management. If we fail in defending such claims, in addition to paying money claims, we may lose valuable intellectual property rights or personnel. A loss of key personnel or their work product could hamper or prevent our ability to commercialize gemcabene, which would adversely affect our commercial development efforts.

If we are not able to adequately prevent disclosure of trade secrets and other proprietary information, the value of any product we may pursue could be significantly diminished.

We may rely upon trade secrets, know-how and continuing technological innovation to develop and maintain our competitive position. However, trade secrets are difficult to protect. We rely in part on confidentiality agreements with our employees, consultants, outside scientific collaborators, sponsored researchers, contract manufacturers, vendors and other advisors to protect our trade secrets and other proprietary information. These agreements may not effectively prevent disclosure of confidential information and may not provide an adequate remedy in the event of unauthorized disclosure of confidential information. In addition, we cannot guarantee that we have executed these agreements with each party that may have or have had access to trade secrets.

Moreover, because we acquired certain rights to gemcabene from Pfizer, we must rely on Pfizer's practices, and those of its predecessors, with regard to parties that may have had access to trade secrets related thereto. Any party with whom

they or we have executed such an agreement may breach that agreement and disclose our proprietary information, including our trade secrets, and we may not be able to obtain adequate remedies for such breaches. Enforcing a claim that a party illegally disclosed or misappropriated a trade secret is difficult, expensive and time-consuming, and the outcome is unpredictable. In addition, some courts inside and outside the United States are less willing or unwilling to protect trade secrets. If any of our trade secrets were to be lawfully obtained or independently developed by a competitor, we would have no right to prevent them, or those to whom they disclose such trade secrets, from using that technology or information to compete with us. If any of our trade secrets were to be disclosed to or independently developed by a competitor or other third-party, our competitive position would be harmed.

We have registration for three United States trademarks and for one European Union trademark.

We have registrations for three United States trademarks, “Gemphire”, the Gemphire logo and “Advancing a class on top of statins”, and a registration of “Gemphire Therapeutics Inc.” in the European Union. If we do not secure and maintain registrations for our trademarks, we may encounter more difficulty in enforcing them against third parties than we otherwise would, which could affect our business. We have also not yet registered trademarks for any product candidate in any jurisdiction. When we file trademark applications for a product candidate, those applications may not be allowed for registration, and registered trademarks may not be obtained, maintained or enforced. During trademark registration proceedings in the United States and foreign jurisdictions, we may receive rejections. We are given an opportunity to respond to those rejections, but we may not be able to overcome such rejections. In addition, in the USPTO and in comparable agencies in many foreign jurisdictions, third parties are given an opportunity to oppose pending trademark applications and to seek to cancel registered trademarks. Opposition or cancellation proceedings may be filed against our trademarks, and our trademarks may not survive such proceedings.

In addition, any proprietary name we propose to use with gemcabene or any future product candidate in the United States must be approved by the FDA, regardless of whether we have registered it, or applied to register it, as a trademark. The FDA typically conducts a review of proposed drug names, including an evaluation of potential for confusion with other drug names. If the FDA objects to any proposed proprietary drug name for any product candidate, we may be required to expend significant additional resources in an effort to identify a suitable substitute proprietary drug name that would qualify under applicable trademark laws, not infringe the existing rights of third parties and be acceptable to the FDA.

If we register any of our trademarks, our trademarks or trade names may be challenged, infringed, circumvented or declared generic or determined to infringe on other marks. We may not be able to protect our rights to these trademarks and trade names or may be forced to stop using these names, which we need for name recognition by potential partners or customers in our markets of interest. If we are unable to establish name recognition based on our trademarks and trade names, we may not be able to compete effectively and our business may be adversely affected.

Obtaining and maintaining our patent protection depends on compliance with various procedural, document submission, fee payment and other requirements imposed by governmental patent agencies, and our patent protection could be reduced or eliminated for noncompliance with these requirements.

The USPTO and various foreign governmental patent agencies require compliance with a number of procedural, documentary, fee payment or other provisions during the patent application process. In addition, periodic maintenance and annuity fees on any issued patent are due to be paid to the USPTO and foreign patent agencies in several stages over the lifetime of the patent. While an inadvertent lapse can in many cases be cured by payment of a late fee or by other means in accordance with the applicable rules, there are situations in which noncompliance can result in abandonment or lapse of the patent or patent application, resulting in partial or complete loss of patent rights in the relevant jurisdiction. In such an event, our competitors might be able to enter the market, which would have an adverse effect on our business.

Risks Related to Our Operations, Employee Matters and Managing Growth

We are dependent on our key personnel, and if we are not successful in attracting and retaining highly qualified personnel, we may not be able to successfully implement our business strategy.

We are highly dependent on our management, scientific and medical personnel. We have entered into employment agreements with our executive officers, but any employee may terminate his or her employment with us. The loss of the services of any of our executive officers, other key employees or consultants and other scientific and medical advisors in

the foreseeable future, might impede the achievement of our research, development and commercialization objectives. We rely on consultants and advisors, including scientific and clinical advisors, to assist us in formulating our development and commercialization strategy. Our consultants and advisors may be employed by employers other than us and may have commitments under consulting or advisory contracts with other entities that may limit their availability to us. Recruiting and retaining qualified scientific personnel and business and commercial personnel will also be critical to our success. We may not be able to attract and retain these personnel on acceptable terms given the competition among numerous pharmaceutical and biotechnology companies for similar personnel. We also experience competition for the hiring of scientific personnel from universities and research institutions. Failure to succeed in clinical trials may also make it more challenging to recruit and retain qualified scientific personnel.

We recently implemented a reduction in force that may have an adverse impact on our drug development activities, and attrition that may occur following this reduction could disrupt our operations. In addition, we may not achieve anticipated benefits and savings from the reduction or be able to implement or benefit from any additional cost containment measures in the future.

In September 2018, our board of directors approved a workforce reduction to reduce costs and conserve cash resources in light of the delay in our Phase 3 trials resulting from the FDA's request for additional data following the completion of two year carcinogenicity studies conducted in connection with the partial clinical hold on gemcabene. The workforce reduction included 5 employees, which represented approximately 33% of our workforce at such time, and was completed in the fourth quarter of 2018.

The reduction in force, which included two of our executive officers, and any attrition that may occur following this reduction, has resulted in the loss of institutional knowledge and expertise and in the reallocation and combination of certain roles and responsibilities across the organization, all of which could adversely affect our operations and our drug development activities. Our efforts to improve our managerial, operational and financial systems and manage our operations may be made more challenging given the reduction in force. As a result, our management may need to divert a disproportionate amount of its attention away from our day-to-day strategic and operational activities, and devote a substantial amount of time to managing these organizational changes.

Further, the reduction in force may yield unintended consequences, such as reduced employee morale and attrition beyond our intended reduction in force, which may result in us seeking contract support at unplanned additional expense. We may not achieve anticipated benefits from the reduction in force. Due to our limited resources, we may not be able to effectively manage our operations or recruit and retain qualified personnel when and if needed, which may have an adverse impact on our drug development activities, result in weaknesses in our infrastructure and operations, risks that we may not be able to comply with legal and regulatory requirements, loss of business opportunities, loss of employees and reduced productivity among remaining employees. If our management is unable to effectively manage this transition and reduction in force or successfully implement any additional cost containment measures, our expenses may be more than expected, we may utilize cash more quickly than expected and we may not be able to implement our business strategy or continue the development of gemcabene.

We may need to develop and expand our company, and we may encounter difficulties in managing this development and expansion, which could disrupt our operations.

As of March 11, 2019, we had nine full-time employees and, if we secure additional funding and receive a favorable decision from the FDA regarding our partial clinical hold, we may need to increase our number of employees and the scope of our operations as we further the clinical development of gemcabene beyond Phase 2 trials and continue to operate as a public company. To manage any anticipated development and potential expansion, we must continue to implement and improve our managerial, operational and financial systems, maintain adequate facilities and continue to recruit and train qualified personnel. Also, our management may need to divert a disproportionate amount of its attention away from its day-to-day activities and devote a substantial amount of time to managing these development activities. Due to our limited resources, we may not be able to manage the expansion of our operations or hire additional personnel. This may result in weaknesses in our infrastructure, and give rise to operational mistakes, loss of business opportunities, loss of employees and reduced productivity among remaining employees. Any physical expansion of our operations may lead to significant costs and may divert financial resources from other projects, such as the development of gemcabene. If our management is unable to effectively manage our expected development and future expansion, our expenses may increase more than expected, our ability to generate or increase our revenue could be reduced and we may not be able to implement our business strategy. Our future financial performance and our ability to commercialize gemcabene or any

future product candidate, if approved, and compete effectively will depend, in part, on our ability to effectively manage the future development and expansion of our company.

A variety of risks associated with operating internationally for us and our collaborators could adversely affect our business.

In addition to our U.S. operations, we may pursue international operations in the future and would face risks associated with such global operations, including possible unfavorable regulatory, pricing and reimbursement, legal, political, tax and labor conditions, which could harm our business. We plan to conduct clinical trials outside of the United States. We are subject to numerous risks associated with international business activities, including:

- compliance with differing or unexpected regulatory requirements for gemcabene or any other product candidate;
- different medical practices and customs affecting acceptance of gemcabene, if approved, or any other approved product in the marketplace;
- language barriers;
- the interpretation of contractual provisions governed by foreign law in the event of a contract dispute;
- difficulties in staffing and managing foreign operations, and an inability to control commercial or other activities where we are relying on third parties;
- workforce uncertainty in countries where labor unrest is more common than in the United States;
- potential liability under the Foreign Corrupt Practice Act of 1977 or comparable foreign regulations;
- production shortages resulting from any events affecting raw material supply or manufacturing capability abroad;
- foreign government taxes, regulations and permit requirements;
- U.S. and foreign government tariffs, trade restrictions, price and exchange controls and other regulatory requirements;
- economic weakness, including inflation, natural disasters, war, events of terrorism or political instability in particular foreign countries;
- fluctuations in currency exchange rates, which could result in increased operating expenses and reduced revenues;
- compliance with tax, employment, immigration and labor laws, regulations and restrictions for employees living or traveling abroad;
- changes in diplomatic and trade relationships; and
- challenges in enforcing our contractual and intellectual property rights, especially in those foreign countries that do not respect and protect intellectual property rights to the same extent as the United States.

Our business and operations would suffer in the event of system failures or unplanned events.

Despite the implementation of security measures, our internal computer systems and those of our current and future contractors and consultants are vulnerable to damage from computer viruses, unauthorized access, natural disasters, terrorism, war and telecommunication and electrical failures. While we are not aware of any such material 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 development programs and our business operations. For example, the loss of clinical trial data from completed or future clinical trials could result in delays in our regulatory approval efforts and significantly increase our costs to recover or reproduce the data. To the extent that any disruption or security breach were to result in a loss of, or damage to, our data or applications, or inappropriate disclosure of confidential or proprietary information, we could incur liability and the further development and commercialization of our product candidates could be delayed.

Furthermore, any unplanned event, such as flood, fire, explosion, tornadoes, earthquake, extreme weather condition, medical epidemics, power shortage, telecommunication failure or other natural or manmade accidents or incidents that result in us being unable to fully utilize the facilities, may have an adverse effect on our ability to operate our business, particularly on a daily basis, and have significant negative consequences on our financial and operating conditions. Loss of access to these facilities may result in increased costs, delays in the development of our product candidates or interruption of our business operations.

Risks Related to our Common Stock

The price of our common stock may be volatile and fluctuate substantially, which could result in substantial losses of our common stock.

The trading price of our common stock is likely to be highly volatile and could be subject to wide fluctuations in response to various factors, some of which are beyond our control, including limited trading volume. In addition to the factors discussed in this “Risk Factors” section and elsewhere in this report, these factors include:

- adverse results or delays in preclinical studies, clinical trials, regulatory decisions or the development status of gemcabene or any product candidates we may pursue in the future;
- decisions to initiate a clinical trial, not initiate a clinical trial, or terminate an existing clinical trial;
- adverse regulatory decisions, including failure to receive regulatory approval for gemcabene;
- changes in applicable laws, rules or regulations;
- disputes with Pfizer regarding our licensed rights to gemcabene;
- adverse developments concerning our manufacturers, suppliers, collaborators and other third parties;
- our failure to commercialize gemcabene or any product candidates we may pursue in the future;
- the success of competitive drugs;
- additions or departures of key scientific or management personnel;
- unanticipated safety concerns related to the use of gemcabene or any product candidates we may pursue in the future;
- our announcements or our competitor’s announcements regarding new products, enhancements, significant contracts, acquisitions or strategic partnerships and investments;
- changes in the structure of healthcare payment systems;
- the size and growth of our target markets;
- our failure, or companies perceived to be similar to us, to meet external expectations or management guidance;
- fluctuations in our quarterly financial results or the quarterly financial results of companies perceived to be similar to us;
- publication of research reports about us or our industry, recommendations, earning results or estimates or withdrawal of research coverage by securities analysts;
- changes in the market valuations of similar companies;
- changes in general economic, political and market conditions in any of the regions in which we conduct our business;
- changes in our capital structure or dividend policy, future issuances of securities, sales of large blocks of common stock by our stockholders or our incurrence of additional debt;
- trading volume of our common stock;
- changes in accounting practices and ineffectiveness of our internal controls;
- disputes, litigation or developments relating to proprietary rights;
- timing of milestones and royalty payments; and
- other events or factors, many of which are beyond our control.

In addition, the stock market in general, Nasdaq, and the stock of biopharmaceutical companies in particular, have experienced extreme price and volume fluctuations that have often been unrelated or disproportionate to the operating performance of these companies. Broad market and industry factors may negatively affect the market price of our common stock, regardless of our actual operating performance. In the past, securities class action litigation has often been instituted against companies following periods of volatility in the market price of a company’s securities. This type of litigation, if instituted, could result in substantial costs and a diversion of management’s attention and resources, which would harm our business, operating results or financial condition.

Our common stock may be delisted from the Nasdaq Global Market if we are unable to maintain compliance with Nasdaq’s continued listing standards.

Nasdaq imposes, among other requirements, continued listing standards including minimum bid, public float and stockholders’ equity requirements. The price of our common stock must trade at or above \$1.00 to comply with the minimum bid requirement and we must maintain stockholders’ equity of \$10 million for continued listing on the Nasdaq Global Market. If our stock trades at closing bid prices of less than \$1.00 for a period in excess of 30 consecutive

business days or if our stockholders' equity falls below \$10 million, Nasdaq could send a deficiency notice to us for not remaining in compliance with the continued listing standards. Recently, our common stock has traded at closing bid prices below \$1.00. If the closing bid price of our common stock fails to meet Nasdaq's minimum closing bid price requirement for a period in excess of 30 consecutive days, if we fail to meet the shareholder equity requirement, or if we otherwise fail to meet any other applicable requirements of the Nasdaq Global Market and we are unable to regain compliance, Nasdaq may make a determination to delist our common stock. Any delisting of our common stock could adversely affect the market liquidity of our common stock and the market price of our common stock could decrease. Furthermore, if our common stock were delisted it could adversely affect our ability to obtain financing for the continuation of our operations and/or result in the loss of confidence by investors.

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 you might otherwise receive a premium for your 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 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;
- prohibit stockholders from calling special meetings;
- authorize our board of directors to issue preferred stock without stockholder approval, which preferred stock may include rights superior to the rights of the holders of common stock, and which could be used to institute a shareholder rights plan, or so-called "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 two-thirds 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 prohibits a person who owns in excess of 15% 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.

An active trading market for our common stock may not be maintained.

Our common stock is currently traded on the Nasdaq Global Market, but we can provide no assurance that we will be able to maintain an active trading market for our shares on the Nasdaq Global Market or any other exchange in the future. If there is no active market for our common stock, it may be difficult for our stockholders to sell shares without depressing the market price for the shares or at all.

If securities analysts do not publish research or reports about our business or if they publish negative evaluations of our stock, the price of our stock could decline.

If one or more of the analysts covering our business downgrade their evaluations of our stock or publish inaccurate or unfavorable research about our business, the price of our stock could decline. If one or more of these analysts cease to cover our stock, we could lose visibility in the market for our stock, which in turn could cause our stock price and trading volume to decline.

Our executive officers, directors, and their affiliates exercise significant control over our company, which will limit your ability to influence corporate matters and could delay or prevent a change in corporate control.

As of December 31, 2018, our officers, directors, and their respective affiliates had beneficial ownership, in the aggregate, of approximately 17% of our outstanding common stock.

These stockholders, if they act together, may be able to influence our management and affairs and control the outcome of matters submitted to our stockholders for approval, including the election of directors, amendments of our organizational documents, and any merger, consolidation, sale of all or substantially all of our assets or other major corporate transaction. Some of these stockholders acquired some or all of their shares of common stock for substantially less than the current trading price of our common stock, and these stockholders may have interests, with respect to their common stock, that are different from yours. In addition, this concentration of ownership might adversely affect the market price of our common stock, have the effect of delaying, deferring or preventing a change of control of our company, or discourage a potential acquirer from making a tender offer or otherwise attempting to obtain control of us.

We are an “emerging growth company” and a “smaller reporting company” and we cannot be certain if the reduced reporting requirements applicable to such companies could make our common stock less attractive to investors.

We are an “emerging growth company,” as defined in the JOBS Act. For as long as we continue to be an emerging growth company, we may take advantage of exemptions from various reporting requirements that are applicable to other public companies that are not “emerging growth companies,” including exemption from compliance with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act of 2002 (Sarbanes-Oxley Act), reduced disclosure obligations regarding executive compensation in our periodic reports and proxy statements, and exemptions from the requirements of holding a non-binding advisory vote on executive compensation and stockholder approval of any golden parachute payments not previously approved. Under the JOBS Act, emerging growth companies can also delay adopting new or revised accounting standards until such time as those standards apply to private companies. We have irrevocably elected not to avail ourselves of this exemption from new or revised accounting standards and, therefore, will be subject to the same new or revised accounting standards as other public companies that are not emerging growth companies.

We will remain an emerging growth company until the earlier of (1) the last day of the fiscal year (a) following the fifth anniversary of the closing of the IPO, (b) in which we have total annual gross revenue of at least \$1.07 billion, or (c) in which we are deemed to be a large accelerated filer, which means the market value of our common stock that is held by non-affiliates exceeds \$700 million as of the prior June 30th, and (2) the date on which we have issued more than \$1 billion in non-convertible debt during the prior three-year period.

Even after we no longer qualify as an emerging growth company, we may still qualify as a “smaller reporting company,” which would allow us to take advantage of many of the same exemptions from disclosure requirements, including reduced disclosure obligations regarding executive compensation in our periodic reports and proxy statements.

We cannot predict if investors will find our common stock less attractive because we may rely on these exemptions. If some investors find our common stock less attractive as a result, there may be a less active trading market for our common stock and our stock price may be more volatile.

We incur increased costs as a result of operating as a public company, and our management is required to devote substantial time to compliance initiatives.

As a public company, and particularly after we are no longer an “emerging growth company” or a “smaller reporting company,” we incur significant legal, accounting and other expenses that we did not incur as a private company. The Sarbanes-Oxley Act, the Dodd-Frank Wall Street Reform and Consumer Protection Act, the listing requirements of the stock exchange upon which our common stock is listed and other applicable securities rules and regulations impose various requirements on public companies, including establishment and maintenance of effective disclosure and financial controls and corporate governance practices. Our management and other personnel devote a substantial amount of time to these compliance initiatives. Moreover, these rules and regulations increase our legal and financial compliance costs and make some activities more time-consuming and costly. However, these rules and regulations are often subject to varying interpretations, in many cases due to their lack of specificity, and, as a result, their application in practice may evolve over time as new guidance is provided by regulatory and governing bodies. This could result in continuing uncertainty regarding compliance matters and higher costs necessitated by ongoing revisions to disclosure and

governance practices. Stockholder activism, the current political environment and the current high level of government intervention and regulatory reform may lead to substantial new regulations and disclosure obligations, which may lead to additional compliance costs and impact the manner in which we operate our business in ways we cannot currently anticipate.

We are subject to Section 404 of the Sarbanes-Oxley Act and the related rules of the SEC that generally require our management and independent registered public accounting firm to report on the effectiveness of our internal control over financial reporting. However, for so long as we remain an “emerging growth company” as defined in the JOBS Act or a “smaller reporting company”, we intend to take advantage of certain exemptions from various reporting requirements that are applicable to public companies that are not emerging growth companies and/or smaller reporting companies, including, but not limited to, for emerging growth companies, not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act. Once we are no longer an “emerging growth company” and if our public float is above \$75 million as of the last business day of our most recently completed second fiscal quarter or, if before such date, we opt to no longer take advantage of the applicable exemption, we will be required to include an opinion from our independent registered public accounting firm on the effectiveness of our internal control over financial reporting.

To achieve compliance with Section 404, we engaged in a process to document and evaluate our internal control over financial reporting, which is both costly and challenging. In this regard, we need to continue to dedicate internal resources, hire additional finance and accounting personnel, potentially engage outside consultants and adopt a detailed work plan to assess and document the adequacy of internal control over financial reporting, continue steps to improve control processes as appropriate, validate through testing that controls are functioning as documented and implement a continuous reporting and improvement process for internal control over financial reporting. During the course of our review and testing, we may identify deficiencies and be unable to remediate them before we must provide the required reports. We or our independent registered public accounting firm may not be able to conclude on an ongoing basis that we have effective internal control over financial reporting, which could harm our operating results, cause investors to lose confidence in our reported financial information and cause the trading price of our stock to fall. Furthermore, if we have a material weakness in our internal control over financial reporting, we may not detect errors on a timely basis and our financial statements may be materially misstated.

In addition, as a public company we are required to timely file accurate quarterly and annual reports with the SEC under the Exchange Act. In order to report our results of operations and financial statements on an accurate and timely basis, we will depend on CROs to provide timely and accurate notice of their costs to us. Any failure to report our financial results on an accurate and timely basis could result in sanctions, lawsuits, delisting of our shares from Nasdaq or other adverse consequences that would materially harm our business.

We do not anticipate declaring or paying, in the foreseeable future, any cash dividends on our capital stock and, consequently, your ability to achieve a return on your investment will depend on appreciation in the price of our common stock.

We have never declared or paid any cash dividend on our capital stock and do not currently intend to do so in the foreseeable future. We currently anticipate that we will retain future earnings for the development, operation and expansion of our business. Therefore, the success of an investment in shares of our common stock will depend upon any future appreciation in their value. There is no guarantee that shares of our common stock will appreciate in value or even maintain the price at which you purchased them.

Our issuance of the common stock in connection with the IPO may have resulted in an “ownership change” at the time of issuance, or has increased the risk that we could experience an ownership change in the future. Any ownership change would significantly limit our ability to utilize our net operating loss carryforwards and certain other tax attributes.

As of December 31, 2018, we had approximately \$20.0 million in U.S. federal and state net operating loss carryforwards that we can use in certain circumstances to offset any future taxable income and thus reduce any federal and state income tax liability. The federal net operating losses incurred prior to January 1, 2018 will begin to expire in 2034 if not utilized. Federal net operating losses incurred after December 31, 2017 will not expire. The state net operating losses will begin to expire in 2026. We also had net tax credit carryforwards of \$2.6 million and \$0.1 million available to reduce future tax liabilities, if any, for U.S. federal and state purposes, respectively. Our ability to utilize these net operating losses and

tax credit carryforwards to offset future taxable income and tax liability may be significantly limited if we have experienced or if we experience in the future an “ownership change,” as defined in Section 382 of the Internal Revenue Code of 1986, as amended, or the Code. In general, an ownership change will occur if there is a cumulative change in our ownership by “5-percent shareholders” (as defined in the Code) that exceeds 50 percentage points over a rolling three-year period. A corporation that experiences an ownership change will generally be subject to an annual limitation on the corporation’s subsequent use of net operating loss carryovers that arose from pre-ownership change periods and use of losses that are subsequently recognized with respect to assets that had a built-in-loss on the date of the ownership change. The amount of the annual limitation generally equals the value of the corporation immediately before the ownership change multiplied by the long-term tax-exempt interest rate (subject to certain adjustments). To the extent that the limitation in a post-ownership-change year is not fully utilized, the amount of the limitation for the succeeding year will be increased.

We do not expect to have experienced an ownership change as a result of our issuance of common stock in connection with the IPO. Nevertheless, the rules regarding the determination of whether an ownership change exists are complicated and are subject to differing interpretations, and it is possible that such issuances might be treated as having resulted in an ownership change. We have not completed a study to assess whether an ownership change for purposes of Section 382 has occurred, or whether there have been multiple ownership changes since our inception, due to the significant costs and complexities associated with such study. Even if there was no ownership change as a result of such issuance, the issuance of stock pursuant to the IPO will be taken into account in determining the cumulative change in our ownership for Section 382 purposes. As a result, the IPO has materially increased the risk that we could experience an ownership change in the future.

If we experience, or have experienced, an ownership change, we may not be able to fully utilize our net operating losses, resulting in additional income taxes and a reduction in our stockholders’ equity. As described below, tax reform legislation has significantly revised the rules applicable to the utilization of net operating losses for tax years either beginning or ending after January 1, 2018.

Our amended and restated bylaws designate the Court of Chancery of the State of Delaware as the sole and exclusive forum for certain types of actions and proceedings that may be initiated by our stockholders, which could limit our stockholders’ ability to obtain a favorable judicial forum for disputes with us or our directors, officers or employees.

Our amended and restated bylaws provide that, subject to limited exceptions, the Court of Chancery of the State of Delaware will be the sole and exclusive forum for any derivative action or proceeding brought on our behalf, any action asserting a claim of breach of a fiduciary duty owed by any of our directors, officers or other employees to us or our stockholders, any action asserting a claim against us arising pursuant to any provision of the Delaware General Corporation Law, as amended, our amended and restated certificate of incorporation or our amended and restated bylaws, any action to interpret, apply, enforce or determine the validity of our amended and restated certificate of incorporation or our amended and restated bylaws or any other action asserting a claim against us that is governed by the internal affairs doctrine. Any person or entity purchasing or otherwise acquiring any interest in shares of our capital stock shall be deemed to have notice of and to have consented to the provisions of our amended and restated certificate of incorporation described above. This choice of forum provision may limit a stockholder’s ability to bring a claim in a judicial forum that it finds favorable for disputes with us or our directors, officers or other employees, which may discourage such lawsuits against us and our directors, officers and employees. Alternatively, if a court were to find these provisions of our amended and restated certificate of incorporation inapplicable to, or unenforceable in respect of, one or more of the specified types of actions or proceedings, we may incur additional costs associated with resolving such matters in other jurisdictions, which could adversely affect our business and financial condition.

Unstable market and economic conditions may have serious adverse consequences on our business, financial condition and stock price.

The global credit and financial markets have experienced extreme volatility and disruptions in the past several years, including severely diminished liquidity and credit availability, declines in consumer confidence, declines in economic growth, increases in unemployment rates and uncertainty about economic stability. We cannot assure you that further deterioration in credit and financial markets and confidence in economic conditions will not occur. Our general business strategy may be adversely affected by any such economic downturn, volatile business environment or continued unpredictable and unstable market conditions. If the current equity and credit markets deteriorate, or do not improve, it may make any necessary debt or equity financing more difficult, more costly, and more dilutive. Failure to secure any

necessary financing in a timely manner and on favorable terms could have a material adverse effect on our growth strategy, financial performance and stock price and could require us to delay or abandon clinical development plans. In addition, there is a risk that one or more of our current service providers, manufacturers and other partners may not survive these difficult economic times, which could directly affect our ability to attain our operating goals on schedule and on budget.

ITEM 1B. UNRESOLVED STAFF COMMENTS

Not applicable

ITEM 2. PROPERTIES

We lease an approximately 5,300 square foot facility in Livonia, Michigan that is primarily used for our headquarters and our research and development activities under a 3 year non-cancellable facility lease that commenced in August 2016. We believe that these facilities are adequate to meet our current needs, and that suitable additional alternative spaces will be available in the future on commercially reasonable terms.

ITEM 3. LEGAL PROCEEDINGS

From time to time, we may be involved in various claims and legal proceedings relating to claims arising out of our operations. We are not currently a party to any legal proceedings that, in the opinion of our management, are likely to have a material adverse effect on our business. Regardless of outcome, litigation can have an adverse impact on us because of defense and settlement costs, diversion of management resources and other factors.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

PART II

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

Common Stock

Our common stock has been listed on the Nasdaq Global Market under the symbol "GEMP" since August 5, 2016. Prior to that date, there was no public trading market for our common stock.

Stockholders

On March 11, 2019, we had 14,265,411 shares of common stock outstanding and 49 holders of record of our common stock. A substantially greater number of holders are beneficial owners whose shares are held of record by banks, brokers and other nominees. The transfer agent and registrar for our common stock is Computershare, Inc.

Dividend Policy

We have never declared or paid any dividends on our common stock, and we do not currently intend to pay any dividends on our common stock for the foreseeable future. Any future determination to pay dividends on our common stock will be, subject to applicable law, at the discretion of our Board of Directors and will depend upon, among other factors, our results of operations, financial condition, capital requirements, and contractual restrictions in loan or other agreements.

ITEM 6. SELECTED FINANCIAL DATA

We have derived the following selected statement of operations data for the years ended December 31, 2018, 2017 and 2016 and the selected balance sheet data as of December 31, 2018 and 2017 from our audited financial statements included elsewhere in this Report. We have derived the following selected statement of operations data for the years

ended December 31, 2016, 2015 and 2014 and the selected balance sheet data as of December 31, 2016, 2015 and 2014 from audited financial statements that are not included in this Report.

Our historical results are not necessarily indicative of the results that may be expected in the future. You should read the selected financial data below in conjunction with “Part II, Item 7. “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and our financial statements and the related notes included in Part II, Item 8 “Financial Statements and Supplementary Data” in this Report.

Statements of Operations Data:

	Year Ended December 31,				
	2018	2017	2016	2015	2014
Operating expenses:					
General and administrative	\$ 8,493	\$ 10,438	\$ 5,956	\$ 3,177	\$ 214
Research and development	14,312	22,686	8,740	3,991	52
Acquired in-process research and development	—	—	—	908	—
Total operating expenses	22,805	33,124	14,696	8,076	266
Loss from operations	(22,805)	(33,124)	(14,696)	(8,076)	(266)
Interest (expense) income	(654)	(286)	114	(762)	(55)
Loss on convertible note extinguishment	—	—	—	(198)	—
Other (expense) income	(178)	(5)	(4)	7	1
Loss before income taxes	(23,637)	(33,415)	(14,586)	(9,029)	(320)
Provision (benefit) for income taxes	—	—	—	—	—
Net loss	(23,637)	(33,415)	(14,586)	(9,029)	(320)
Other comprehensive loss, net of tax	—	—	—	—	—
Comprehensive loss	\$ (23,637)	\$ (33,415)	\$ (14,586)	\$ (9,029)	\$ (320)
Net loss	\$ (23,637)	\$ (33,415)	\$ (14,586)	\$ (9,029)	\$ (320)
Adjustment to redemption value on Series A convertible preferred stock	—	—	(366)	(2,968)	—
Premium upon substantial modification of convertible notes with certain stockholders	—	—	—	(1,047)	—
Net loss attributable to common stockholders	\$ (23,637)	\$ (33,415)	\$ (14,952)	\$ (13,044)	\$ (320)
Net loss per share:					
Basic and diluted	\$ (1.71)	\$ (3.23)	\$ (2.57)	\$ (4.54)	\$ (0.21)
Number of shares used in per share calculations:					
Basic and diluted (1)	13,805,552	10,349,136	5,809,396	2,875,053	1,521,703

Balance Sheet Information:

	Year Ended December 31,				
	2018	2017	2016	2015	2014
Cash and cash equivalents	\$ 18,954	\$ 18,473	\$ 24,033	\$ 3,620	\$ 317
Total assets	19,694	19,017	24,754	4,490	330
Convertible notes (including premium conversion derivative)	—	—	—	6,769	810
Term loan (long-term portion)	—	8,683	—	—	—
Total liabilities	11,920	15,076	4,122	8,917	861
Series A convertible preferred stock	—	—	—	7,953	—
Accumulated deficit	(84,111)	(60,474)	(27,059)	(12,392)	(584)
Total stockholders’ equity (deficit)	7,774	3,941	20,632	(12,380)	(531)

- (1) Basic and diluted net loss per share attributable to common stockholders is computed based on the weighted-average number of shares of common stock outstanding during each period. In April 2016, our board of directors approved an amendment to our certificate of incorporation to effect a 1-for-3.119 reverse stock split (the Reverse Stock Split) for all common and Series A preferred stock, effective on April 27, 2016. All share and per share data in this table has been adjusted to reflect the Reverse Stock Split. For additional information, see Note 1 to our consolidated financial statements included elsewhere in this Report

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

The following discussion of our financial condition and results of operations should be read in conjunction with the financial statements and notes included in Part II, Item 8 "Financial Statements and Supplementary Data" of this Report.

Overview

We are a clinical-stage biopharmaceutical company focused on developing and commercializing therapies for the treatment of dyslipidemia, a serious medical condition that increases the risk of life threatening cardiovascular disease, including orphan indications, as well as nonalcoholic fatty liver disease (NAFLD/NASH). Our therapeutic compound, gemcabene, has been tested as monotherapy and in combination with statins and other drugs in over 1,100 subjects, which we define as healthy volunteers and patients, across 25 Phase 1 and Phase 2 clinical trials and has demonstrated promising evidence of efficacy, safety and tolerability.

Our Company was co-founded in November 2008 as a limited liability company under the name Michigan Life Therapeutics, LLC (MLT) by former Pfizer Inc. employees, including Dr. Charles Bisgaier, who were responsible for licensing exclusive worldwide rights to gemcabene from Pfizer in April 2011. In October 2014, we incorporated a new entity under the name Gemphire Therapeutics Inc. in Delaware. In November 2014, we entered into a merger agreement with Gemphire whereby MLT was merged with and into Gemphire, with Gemphire as the surviving entity and all outstanding units of membership interest in MLT were exchanged for shares of common stock of Gemphire. The purpose of the merger was to change the jurisdiction of our incorporation from Michigan to Delaware and to convert from a limited liability company to a corporation.

To date, our primary activities have been conducting research and development activities, planning and conducting clinical trials, performing business and financial planning, recruiting personnel and raising capital. We do not have any products approved for sale and have not generated any revenue. We do not expect to generate revenue until, and unless, the FDA or other regulatory authorities approve gemcabene and we successfully commercialize gemcabene. Until such time, if ever, as we can generate substantial product revenue, we expect to finance our cash needs through a combination of equity and debt financings as well as collaborations, strategic alliances and licensing arrangements. Our net losses were \$23.6 million, \$33.4 million and \$14.6 million during the years ended December 31, 2018, 2017 and 2016, respectively. As of December 31, 2018, we had an accumulated deficit of \$84.1 million. Our net losses may fluctuate significantly from quarter-to-quarter and year-to-year, depending on the timing of our preclinical studies, clinical trials and our expenditures on other research and development activities.

We have funded our operations to date primarily through the issuance and sale of common stock and warrants in public offerings and a private placement, the proceeds of our term loan facility with Silicon Valley Bank (the "Term Loan") which we prepaid in full on January 28, 2019, and, prior to our IPO, the issuance of preferred stock and convertible notes. As of December 31, 2018, we had cash and cash equivalents of \$19.0 million.

Key Developments

Clinical and Research Program Updates

During 2016 to 2018, we initiated and completed three Phase 2b clinical trials for gemcabene in HoFH, hypercholesterolemia, including HeFH and ASCVD patients on maximally tolerated statins, and SHTG. We reported top line data from our 8 patient trial for HoFH (COBALT-1) in the second quarter of 2017, top line data from our 105 patient trial for hypercholesterolemia on high-intensity statin therapy including HeFH and ASCVD patients (ROYAL-1) in the third quarter of 2017, and top line data from our 91 patient trial in SHTG patients (INDIGO-1) in the

second quarter of 2018. As previously announced, all three of these trials achieved statistical significance for their primary endpoints.

An investigator initiated pediatric NAFLD trial was begun in the fourth quarter of 2017 to study gemcabene in adolescents 12-17 years old. The study enrolled six patients and in August 2018, the Data Safety Monitoring Board (DSMB) halted the trial early due to “unanticipated problems” in the first three patients. Specifically, the primary efficacy endpoint of ALT increased beyond baseline levels in two of these three patients. In addition, all three patients had an increase in the secondary endpoint of liver fat fraction as measured by MRI-PDFF. All patients gained weight and had increased TGs during study treatment, in contrast to data in other gemcabene trials. Patient compliance was compromised as assessed by unused tablets and blood drug levels. Three observations were reported as AEs considered related to gemcabene. No events were reported as SAEs. The risk for increased liver fat with gemcabene treatment is unknown at this time. The patients will be monitored for 12 months post-final dose. We intend to work closely with the physicians and other KOLs to identify potential reasons for the unanticipated problems in the pediatric NAFLD study but cannot assure you that it will be possible to determine the reasons for the unexpected problems.

A Phase 2 proof-of-concept trial treating FPL patients for 24 weeks is being conducted in an investigator-initiated study at the University of Michigan and was initiated in early 2018. In the third quarter, the primary investigator and DSMB for this trial reviewed the data from the pediatric trial as well interim data from the FPL trial and decided to continue the FPL trial. The trial was fully enrolled in the fourth quarter of 2018 and top-line data, including MRI-PDFF, is expected in the second quarter of 2019.

As announced in the third quarter of 2018, we completed and submitted to the FDA the results from our two year rodent carcinogenicity studies. These studies were submitted as part of a request for the FDA to remove the partial clinical hold that prevents us from conducting human studies of gemcabene that are greater than six months in duration. In response to our submission, the FDA did not lift the hold and requested that we provide additional data, including two preclinical studies, namely, a subchronic (13 week) study of gemcabene in PPAR α knock-out mice and a study of gemcabene in *in vitro* PPAR transactivation assays using monkey and canine PPAR isoforms. We are working to complete studies requested by the FDA and expect to submit this additional data to the FDA in the fourth quarter of 2019. In addition, the FDA informed us that an End of Phase 2 (EOP2) meeting to reach an agreement on the design of Phase 3 registration and long term safety exposure trials for our target indications in dyslipidemia would not take place until the partial clinical hold is lifted.

Pfizer License Agreement

In the third quarter of 2018, we announced that our gemcabene in-licensing agreement with Pfizer was renegotiated providing three additional years to for us to achieve our first commercial sale, by April 2024. See “—Contractual Obligations and Commitments—Pfizer Agreement” below.

Workforce Reduction

In September 2018, our board of directors approved a workforce reduction to reduce costs and conserve cash resources in light of the FDA’s request for additional data described above and the resulting delay in our Phase 3 trials. The workforce reduction includes 5 employees, which represented approximately 33% of our workforce at such time, and was completed in the fourth quarter of 2018. We recorded severance related charges totaling approximately \$1.6 million, which includes cash severance payments of approximately \$0.5 million, a non-cash charge of approximately \$1.1 million related to the accelerated vesting of outstanding stock options for certain affected employees, and \$30,000 for continued health insurance coverage. We may incur additional costs not currently contemplated due to events associated with or resulting from the workforce reduction.

Review of Strategic Alternatives

In December 2018, we announced that our Board of Directors established a committee to oversee a review of strategic alternatives focused on maximizing stockholder value and that we had engaged Ladenburg Thalmann & Co. Inc. to act as our strategic financial advisor in this process. Despite undertaking this process, we may not be successful in completing a transaction, and, even if a strategic transaction is completed, it ultimately may not deliver the anticipated benefits or enhance stockholder value.

SVB Loan Repayment

In January 2019, we prepaid in full all outstanding indebtedness under our Loan Agreement with SVB. See “—Contractual Obligations and Commitments—Term Loan” below.

Financial Operations Overview

Revenue

To date, we have not generated any revenue. We do not expect to generate revenue unless or until we obtain regulatory approval of and commercialize gemcabene. If we fail to complete the development of gemcabene, or any other product candidate we may pursue in the future, in a timely manner, or fail to obtain regulatory approval, our ability to generate future revenue would be compromised.

Operating Expenses

Our operating expenses are classified into three categories: general and administrative, research and development and acquired in-process research and development.

General and Administrative

General and administrative expenses consist primarily of personnel-related costs, including salaries and share-based compensation costs, for personnel in functions not directly associated with research and administrative activities. Other significant costs include legal fees relating to intellectual property and corporate matters and professional fees for accounting and other services. We anticipate our general and administrative expenses will continue to trend below comparable prior period levels in the near future as a result of reduced research and development activities, as we work to resolve the six-month clinical hold by the FDA.

Research and Development

To date, our research and development expenses have related primarily to the clinical stage development of gemcabene. Research and development expenses consist of costs incurred in performing research and development activities, including compensation for research and development employees, costs associated with preclinical studies and trials, regulatory activities, manufacturing activities to support clinical activities, license fees, nonlegal patent costs, fees paid to external service providers that conduct certain research and development, clinical costs and an allocation of overhead expenses. Research and development costs are expensed as incurred and costs incurred by third parties are expensed as the contracted work is performed. We accrue for costs incurred as the services are being provided by monitoring the status of the study or project, and the invoices received from our external service providers. We adjust our accrual as actual costs become known. Research and development activities are central to our business model.

We anticipate our research and development expenses will continue to trend below comparable prior period levels in the near future as a result of reduced research and development activities, as we work to resolve the six-month clinical hold by the FDA. We expect that gemcabene will have higher development costs during its later stages of clinical development, as compared to costs incurred during its earlier stages of development, primarily due to the increased size and duration of the later-stage clinical trials, so we expect our research and development expenses to continue to trend significantly above comparable prior period levels in the future as we continue to conduct preclinical studies and clinical trials for gemcabene and potentially develop other product candidates. However, it is difficult to determine with certainty the duration, costs and timing to complete our current or future preclinical programs and clinical trials of gemcabene. The duration, costs and timing of clinical trials and development of gemcabene will depend on a variety of factors that include, but are not limited to, the following:

- per patient trial costs;
- the number of patients that participate in the trials;
- the number of sites included in the trials;

- the countries in which the trials are conducted;
- the length of time required to enroll eligible patients;
- the number of doses that patients receive;
- the drop-out or discontinuation rates of patients;
- potential additional safety monitoring or other studies requested by regulatory agencies;
- the duration of patient follow-up;
- the phase of development of the product candidate;
- arrangements with contract research organizations and other service providers; and
- the efficacy and safety profile of the product candidates.

Interest (Expense) Income

In 2018 and 2017, Interest (expense) income consists of cash and non-cash interest expense attributed to our Term Loan based on the prime rate in effect, as well as cash interest income from our cash and cash equivalents. In 2016, interest (expense) income largely consists of non-cash activity related to certain convertible notes issued by us prior to the IPO and the underlying conversion derivative related to such notes, and cash interest earnings from cash and cash equivalents. The notes we issued had an annual interest rate of 8%, with some notes compounding interest daily and others compounding annually. The principal and accrued and unpaid interest on the convertible notes converted into common stock immediately prior to the closing of the IPO.

We continued to incur cash and non-cash interest expense related to our Term Loan through the prepayment of the Term Loan on January 28, 2019. We also expect to earn interest income from the investment of our cash and cash equivalents in future periods.

Other (Expense) Income

Other (expense) income relates to non-operating transaction costs associated with our previously-announced review of strategic alternatives and to foreign currency exchange gains and losses. Foreign currency exchange gains and losses relate to transactions and monetary asset and liability balances denominated in currencies other than the U.S. dollar. Foreign currency gains and losses may continue to fluctuate in the future due to changes in foreign currency exchange rates.

Provision for Income Taxes

Provision for income taxes consists of federal and state income taxes in the United States, as well as deferred income taxes and changes in related valuation allowance reflecting the net tax effects of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for income tax purposes. Currently, there is no provision for income taxes, as we have incurred operating losses to date, and a full valuation allowance has been provided on the net deferred tax assets as of December 31, 2018 and December 31, 2017.

Results of Operations**Comparison of Years Ended December 31, 2018 and 2017**

The following table summarizes our operating results for the periods indicated:

	For the Year Ended December 31,		
	2018	2017	Change
	(in thousands)		
Operating expenses:			
General and administrative	\$ 8,493	\$ 10,438	\$ (1,945)
Research and development	14,312	22,686	(8,374)
Total operating expenses	22,805	33,124	(10,319)
Loss from operations	(22,805)	(33,124)	10,319
Interest (expense) income	(654)	(286)	(368)
Other expense	(178)	(5)	(173)
Loss before income taxes	(23,637)	(33,415)	9,778
Provision (benefit) for income taxes	—	—	—
Net loss	\$ (23,637)	\$ (33,415)	\$ 9,778

General and Administrative

General and administrative expenses for the year ended December 31, 2018 were \$8.5 million compared to \$10.4 million for the year ended December 31, 2017. The \$1.9 million decrease in expenses from the comparable year in 2017 was largely the result of higher separation costs in the 2017 period when compared to 2018. We incurred separation costs during the year ended December 31, 2017 for our former chief executive officer totaling \$0.5 million of cash compensation and \$2.1 million of non-cash share-based compensation expense resulting from the acceleration of stock option vesting. In the 2018 period, general and administrative costs in connection with a reduction-in-force totaled \$0.2 million of cash compensation and \$0.4 million of non-cash share-based compensation expense resulting from the acceleration of stock option vesting, partially offsetting the overall expense decrease period over period. General and administrative expenses included \$2.4 million and \$4.1 million in share-based compensation expense during the year ended December 31, 2018 and 2017, respectively. Timing of costs related to infrastructure supporting our ongoing clinical trials and public company requirements, focused primarily on personnel costs and professional services, were the other primary drivers of the activity during both annual periods in 2018 and 2017.

Research and Development

Research and development expenses for the year ended December 31, 2018 were \$14.3 million compared to \$22.7 million for the year ended December 31, 2017. The \$8.4 million decrease was primarily attributable to reduced clinical trial activities in 2018 compared to 2017. The overall decrease period over period was partially offset by separation costs recorded as research and development expenses in connection with the September 2018 reduction-in-workforce, that was completed in the fourth quarter 2018, totaling \$0.3 million of cash compensation and \$0.7 million of non-cash share-based compensation expense resulting from the acceleration of stock option vesting with no comparable separation costs recorded as research and development expenses in the prior year period. Research and development expenses included \$1.8 million and \$1.2 million in share-based compensation expense during the year ended December 31, 2018 and 2017, respectively.

Interest (Expense) Income

Interest (expense) income for the year ended December 31, 2018 was \$(0.7) million compared to \$(0.3) million for the year ended December 31, 2017. Interest (expense) income during the year ended December 31, 2018 included interest expense in connection with our Term Loan, offset in part by interest income of \$0.2 million earned from proceeds received from the IPO, Private Placement and Term Loan that were held in short term, highly liquid money market accounts. Interest (expense) income during the year ended December 31, 2017 included interest expense in connection with our Term Loan, offset in part by interest income of \$42,000 earned from proceeds received from the IPO, Private Placement and Term Loan that were held in short term, highly liquid money market accounts.

Other (Expense) Income

Other (expense) income for the year ended December 31, 2018 comprises non-operating transaction costs associated with our previously announced review of strategic alternatives in the amount of \$0.2 million, and \$1,000 related to foreign currency exchange net losses. Other (expense) income for the year ended December 31, 2017 comprised of foreign currency exchange net losses.

Provision for Income Taxes

Provision for income taxes consists of federal and state income taxes in the United States, as well as deferred income taxes and changes in related valuation allowance reflecting the net tax effects of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for income tax purposes. Currently, there is no provision for income taxes, as we have incurred operating losses to date, and a full valuation allowance has been provided on the net deferred tax assets as of December 31, 2018 and December 31, 2017.

Comparison of the Years Ended December 31, 2017 and 2016

The following table summarizes our operating results for the periods indicated:

	For the Year Ended December 31,		
	2017	2016	Change
	(in thousands)		
Operating expenses:			
General and administrative	\$ 10,438	\$ 5,956	\$ 4,482
Research and development	22,686	8,740	13,946
Total operating expenses	33,124	14,696	18,428
Loss from operations	(33,124)	(14,696)	(18,428)
Interest income (expense)	(286)	114	(400)
Other (expense) income	(5)	(4)	(1)
Loss before income taxes	(33,415)	(14,586)	(18,829)
Provision (benefit) for income taxes	—	—	—
Net loss	<u>\$ (33,415)</u>	<u>\$ (14,586)</u>	<u>\$ (18,829)</u>

General and Administrative

General and administrative expenses for the year ended December 31, 2017 were \$10.4 million compared to \$6.0 million for the year ended December 31, 2016. The \$4.5 million increase was primarily attributable to an increase in staffing and professional services associated largely with supporting our clinical trials and becoming a public company in August 2016 as well as separation costs for our former chief executive officer totaling \$0.5 million of cash compensation and \$2.1 million of non-cash share-based compensation expense resulting from the acceleration of stock option vesting. General and administrative expenses included \$4.1 million and \$1.2 million in share-based compensation expense during the year ended December 31, 2017 and 2016, respectively.

Research and Development

Research and development expenses for the year ended December 31, 2017 were \$22.7 million compared to \$8.7 million for the year ended December 31, 2016. The \$13.9 million increase was primarily attributable to increased staffing and fees paid to external service providers for clinical trial development, regulatory consulting, preclinical studies and manufacturing activities to support clinical advancement of gemcabene. Research and development expenses included \$1.2 million and \$0.6 million in share-based compensation expense during the year ended December 31, 2017 and 2016, respectively.

Interest Income (Expense)

Interest (expense) income for the year ended December 31, 2017 was \$(0.3) million compared to \$0.1 million for the year ended December 31, 2016. Interest (expense) income during the year ended December 31, 2017 included interest expense in connection with our Term Loan, offset in part by interest income of \$42,000 earned from proceeds received from the IPO, Private Placement and Term Loan that were held in short term, highly liquid money market accounts. Interest (expense) income during the year ended December 31, 2016, on a net basis, represented non-cash interest income from the amortization of the note premium associated with certain convertible notes coupled with the bifurcation of the conversion premium liability and subsequent fair value adjustments associated with such notes, which were largely offset by interest on principal and discount amortization related to the such notes, which were converted to common stock immediately prior to the closing of the IPO. In addition, interest earnings of \$23,000 from cash and cash equivalents were recorded during the year ended December 31, 2016.

Provision for Income Taxes

Provision for income taxes consists of federal and state income taxes in the United States, as well as deferred income taxes and changes in related valuation allowance reflecting the net tax effects of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for income tax purposes. Currently, there is no provision for income taxes, as we have incurred operating losses to date, and a full valuation allowance has been provided on the net deferred tax assets as of December 31, 2017 and December 31, 2016.

Liquidity and Capital Resources

Capital Resources

As of December 31, 2018, our principal sources of liquidity consisted of cash and cash equivalents of approximately \$19.0 million. Our cash and cash equivalents are invested in cash deposits and money market accounts. See "Contractual Obligations and Commitments—Term Loan" below regarding our prepayment of all outstanding indebtedness under the Term Loan subsequent to year end.

We have not generated any revenue, and we anticipate that we will continue to incur losses for the foreseeable future. We have funded our operations to date primarily through the issuance and sale of common stock and warrants in public offerings and a private placement, proceeds from our term loan facility with Silicon Valley Bank, which we prepaid in full on January 28, 2019, and, prior to our IPO, the issuance of preferred stock and convertible notes in private placements.

- In the first quarter of 2018, we completed an underwritten public offering of 3,592,858 shares of our common stock, including 450,000 shares of our common stock purchased by the underwriters upon the partial exercise of their overallotment option, at the public offering price of \$7.00 per share. We received net proceeds of approximately \$23.0 million after deducting underwriting discounts and commissions and offering expenses.
- On July 24, 2017, we entered into a Loan and Security Agreement (the Loan Agreement) with Silicon Valley Bank (SVB). The Loan Agreement established a term loan facility in the aggregate principal amount of up to \$15.0 million (the Term Loan) to be funded in several tranches. We drew \$10.0 million under the Loan Agreement on July 24, 2017. The Term loan was repaid effective January 28, 2019. See "—Contractual Obligations and Commitments—Term Loan" below for a description of the repayment terms and certain other material terms of the Loan Agreement.

- On March 15, 2017, we completed a private placement of 1,324,256 units at a price of \$9.47 per unit for net proceeds of approximately \$11.3 million after deducting offering expenses. Each unit consisted of one share of our common stock and a warrant to purchase 0.75 shares of common stock. The warrants have an exercise price of \$10.40 per share and are exercisable for a period of five years from the date of issuance. On April 20, 2017, the registration statement on Form S-1 (File No 333-217296) for the resale of the shares of common stock issued in the private placement and the shares of common stock to be issued upon exercise of the warrants issued in the private placement was declared effective by the SEC.
- In August 2016, we closed our IPO. We sold an aggregate of 3,027,755 shares of our common stock, including 27,755 shares of our common stock purchased by the underwriters upon the partial exercise of their overallotment option, at a public offering price of \$10.00 per share. We received net proceeds of approximately \$26.1 million after deducting underwriting discounts and commissions and offering expenses. All of our outstanding preferred stock and convertible notes outstanding prior to our IPO converted into shares of our common stock immediately prior to the closing of the IPO.

Cash Flows

The following table summarizes our cash flows for the periods indicated:

	For the Year Ended		
	December 31,		
	2018	2017	2016
	(in thousands)		
Net cash used in operating activities	\$ (21,911)	\$ (26,901)	\$ (11,043)
Net cash provided by (used in) investing activities	—	—	—
Net cash provided by financing activities	22,392	21,341	31,456
Net increase (decrease) in cash	\$ 481	\$ (5,560)	\$ 20,413

Cash Flow from Operating Activities

For the year ended December 31, 2018, cash used in operating activities of \$21.9 million was attributable to a net loss of \$23.6 million adjusted by \$4.1 million in share-based compensation, non-cash interest expense of \$0.3 million, and a net change of \$2.8 million in our net operating assets and liabilities. The change in operating assets and liabilities was primarily attributable to a decrease in our accounts payable and accrued liabilities and by an increase in prepaid expenses associated with fluctuations in our operating activities.

For the year ended December 31, 2017, cash used in operating activities of \$26.9 million was attributable to a net loss of \$33.4 million offset by \$5.3 million in share-based compensation, non-cash interest expense of \$0.1 million and a net change of \$1.1 million in our net operating assets and liabilities. The change in operating assets and liabilities was primarily attributable to a net increase in our accounts payable and accrued liabilities and by a net decrease in prepaid expenses associated with fluctuations in our operating activities.

For the year ended December 31, 2016, cash used in operating activities of \$11.0 million was attributable to a net loss of \$14.6 million which included \$1.6 million in non-cash expenses and a net change of \$1.9 million in our net operating assets and liabilities. The non-cash (income) expenses consisted of \$1.7 million of share-based compensation offset by net non-cash interest income of \$(0.1) million related to both certain convertible notes and the premium conversion derivative. The net change in operating assets and liabilities was primarily attributable to increases in our accounts payable and accrued liabilities associated with our increased operating expenses.

Cash Flow from Investing Activities

There were no sources or uses of funds from investing activities for all periods presented.

Cash Flow from Financing Activities

Net cash provided by financing activities during the year ended December 31, 2018 of \$22.4 million related primarily to proceeds received from our Follow-On Offering in the first quarter of 2018 of \$23.1 million, net of discounts,

commissions and other costs totaling \$2.1 million, and to repayment of Term Loan principal in the amount of \$0.7 million.

Net cash provided by financing activities during the year ended December 31, 2017 of \$21.3 million included \$11.3 million related to the proceeds from our March 2017 private placement, net of discounts, commissions and other costs totaling \$1.3 million paid through December 31, 2017 as well as \$9.9 million in proceeds from the issuance of our Term Loan, net of issue costs paid through December 31, 2017 of \$89,000. In addition, \$21,000 in offering costs were paid in 2017 related to the public offering of common stock that was completed in the first quarter of 2018.

Net cash provided by financing activities during the year ended December 31, 2016 was \$31.5 million consisting of \$26.3 million in IPO proceeds, net of discounts, commissions and other offering costs of \$4.0 million paid through December 31, 2016, and \$5.1 million in proceeds from the issuance of convertible notes in February 2016 and April 2016 net of issuance costs in the amount of \$10,000.

Liquidity and Capital Resource Requirements

We had \$9.3 million of principal outstanding under our Term Loan with SVB on December 31, 2018. See “—Contractual Obligations and Commitments—Term Loan” below for a description of certain material terms of the Loan Agreement and our prepayment of the Term Loan subsequent to year end.

We have no current source of revenue to sustain our present activities, and we do not expect to generate revenue until, and unless, the FDA or other regulatory authorities approve gemcabene and we successfully commercialize gemcabene. Until such time, if ever, as we can generate substantial product revenue, we expect to finance our cash needs through a combination of equity and debt financings as well as collaborations, strategic alliances and licensing arrangements. We do not have any committed external source of funds.

To the extent that we raise additional capital through the sale of equity or convertible debt securities, the ownership interest of our stockholders will be diluted, and the terms of these securities may include liquidation or other preferences that adversely affect your rights as a common stockholder. Similar to the restrictions described below under our Loan Agreement, additional debt financing, if available, may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures or declaring dividends. If we raise additional funds through collaborations, strategic alliances or licensing arrangements with pharmaceutical partners, we may have to relinquish valuable rights to our technologies, future revenue streams or grant licenses on terms that may not be favorable to us. If we are unable to raise additional funds through equity or debt financings or through collaborations, strategic alliances or licensing arrangements when needed, we may be required to delay, limit, reduce or terminate our product development, future commercialization efforts, or grant rights to develop and market gemcabene that we would otherwise prefer to develop and market ourselves.

We believe our cash on hand will be sufficient to fund operations into the third quarter of 2019, but we will need to raise additional capital to continue to fund the further development of gemcabene and our operations thereafter, including submission of the additional information requested by the FDA to lift the partial clinical hold. Our business and the development of gemcabene is subject to numerous uncertainties, and we have based these estimates on assumptions that may prove to be substantially different than we currently anticipate and could use our cash resources sooner than we expect. Additionally, the process of advancing early-stage product candidates and testing product candidates in clinical trials is costly, and the timing of progress in these clinical trials is uncertain. Our ability to successfully transition to profitability will be dependent upon achieving a level of product sales adequate to support our cost structure. We cannot assure that we will ever be profitable or generate positive cash flow from operating activities.

Failure to secure any necessary financing in a timely manner and on favorable terms could have a material adverse effect on our growth strategy, financial performance and stock price and could require us to delay or abandon clinical development plans.

We anticipate that our near-term expenses will continue to be below comparable period levels as we work to have the six-month clinical hold by the FDA removed, then if successful, expect our expenses will increase substantially as we:

- continue clinical trials for gemcabene and for any other product candidate in our future pipeline;

- seek regulatory approvals for any product candidates that successfully complete clinical trials;
- contract to manufacture our product candidates;
- establish on our own or with partners, a sales, marketing and distribution infrastructure to commercialize any products for which we may obtain regulatory approval;
- maintain, expand and protect our intellectual property portfolio;
- hire additional staff, including clinical, scientific, operational and financial personnel, to execute our business plan;
- add operational, financial and management information systems and personnel, including personnel to support our product development and potential future commercialization efforts;
- continue to pursue strategic alternatives to maximize stockholder value; and
- continue to operate as a public company.

Contractual Obligations and Commitments

The following table summarizes our contractual obligations as of December 31, 2018, which represent material expected or contractually committed future obligations. Please see “—Term Loan” below regarding our prepayment of the Term Loan subsequent to year end.

	Payments Due by Period				Total
	Less than 1 year	1–3 Years	3–5 Years (in thousands)	More than 5 years	
Term loan	\$ 4,826	\$ 5,949	\$ —	\$ —	\$ 10,775
Facility lease	71	—	—	—	71
Total	\$ 4,897	\$ 5,949	\$ —	\$ —	\$ 10,846

Term Loan

On July 24, 2017, the Company entered into a Loan and Security Agreement with Silicon Valley Bank (“SVB”) for a term loan of up to \$15.0 million (the “Term Loan”), subject to funding in several tranches. Certain provisions of the Loan Agreement were conditioned on a pre-clinical event occurring by July 31, 2018. “Pre-clinical event” meant the receipt by SVB of a written electronic communication from our chief executive officer or chief financial officer, together with supporting documentation from the FDA, that the FDA lifted the partial clinical hold with respect to clinical trials of longer than six months in duration for gemcabene. A pre-clinical event had not occurred as of July 31, 2018 and, on such date, the Company and SVB amended the Loan Agreement (as amended, the “Loan Agreement”).

The Company drew the initial tranche of \$10.0 million on July 24, 2017. Following the amendment, a third tranche of \$5.0 million was available through November 30, 2018 conditioned on the occurrence of certain events and was not drawn by the Company.

Under the Loan Agreement, if a pre-clinical event did not occur on or prior to September 30, 2019 or, if at any time prior to a pre-clinical event, the Company’s unrestricted cash balance at SVB was less than \$18.0 million, the Company was required to either (i) provide cash security and maintain a cash balance in a restricted account at SVB in an amount not less than 100% of the amounts owed by the Company to SVB or (ii) prepay the Term Loan, including certain fees, in its entirety.

All amounts advanced under the Term Loan were scheduled to mature on February 1, 2021 and had an interest-only monthly payment period through November 1, 2018, which could have been extended to February 1, 2019 upon the occurrence of both a positive clinical trial event and a pre-clinical event. A pre-clinical event did not occur prior to November 1, 2018 and, accordingly, we began making monthly payments of principal and interest on such date. Interest accrued on the unpaid principal balance at a floating per annum rate equal to the prime rate, except that, following an event

of default, interest would accrue at a rate up to 5% above the rate that is otherwise applicable. Our obligations under the Loan Agreement could be accelerated by SVB upon the occurrence of an event of default, including customary events for a financing arrangement of this type, including, without limitation, payment defaults, defaults in the performance of affirmative or negative covenants, bankruptcy or related defaults, defaults on certain other indebtedness, defaults under certain other agreements, the imposition of judgments or penalties, the material inaccuracy of representations or warranties, material adverse changes and revocations of government approvals.

Subject to certain exceptions, the Loan Agreement contained certain covenants prohibiting us from, among other things: (a) disposing of our properties or assets; (b) liquidating or dissolving; (c) engaging in any business other than the business currently engaged in by us or reasonably related thereto; (d) engaging in business combinations or acquisitions or permitting or suffering any change in control; (e) incurring any additional indebtedness; (f) allowing any lien or encumbrance on any of our property; (g) paying any dividends or distributions; (h) entering into transactions with affiliates; and (i) making payment on subordinated debt.

In addition, we issued a warrant to purchase 36,000 shares of our common stock at an exercise price of \$7.47 per share to SVB on July 31, 2018 in connection with the first amendment under the Loan Agreement. The warrant is immediately exercisable and has a term of ten years. The exercise price and number and type of shares underlying the warrant are subject to adjustment upon specified events, including any stock dividends and splits, reverse stock split, recapitalization, reorganization or similar transaction, as described therein. The warrant contains a "cashless exercise" feature that allows SVB to exercise the warrant without a cash payment to the Company, on a net issuance basis, based upon the fair market value of the Company's common stock.

The Loan Agreement required us to pay the following fees: (i) upon the maturity, acceleration or prepayment of the Term Loan, a final payment fee of 10% of the funded principal amount of the Term Loan, (ii) a success fee of 3.5% of the funded principal amount of the Term Loan upon the occurrence of certain contingent events as defined in the Loan Agreement (described below), and (iii) upon termination of the Loan Agreement prior to the maturity date for any reason, a prepayment fee equal to 2% (if such prepayment occurs prior to July 31, 2019) or 1% (if such prepayment occurs thereafter) of the funded principal amount of the Term Loan.

We were in compliance with the Loan Agreement covenants as of December 31, 2018.

On January 25, 2019, we agreed to prepay in full all outstanding indebtedness under Loan Agreement which prepayment was effective January 28, 2019. Upon payoff, any unfunded commitments to make credit extensions or financial accommodations to us terminated, and all security interests and other liens granted to or held by SVB as security for the obligations were terminated and automatically released, except those that were specified as surviving termination.

As of the date of payment, we had approximately \$8.9 million in outstanding borrowings and approximately \$1.0 million in outstanding interest and fees under the Loan Agreement, including the final payment fee equal to 10% of the original aggregate principal amount of the Term Loan funded by SVB and drawn by us, which were repaid in full at the time of payment. The obligations, liabilities, covenants, and terms that are expressly specified in the Loan Agreement and any other related loan and collateral security documents issued by us to SVB in connection with the transaction evidenced by the Loan Agreement as surviving termination shall continue to survive notwithstanding the payment, including without limitation, our indemnity obligations and our obligation to pay to SVB a success fee of 3.5% of the funded principal amount of the Term Loan in the event any of the following occur on or before 5:00 PM, Eastern time, on July 24, 2024: (a) we receive FDA approval for any new drug application for gemcabene, (b) a sale or other transfer of all or substantially all of our assets occurs, (c) a merger or consolidation of the Company with or into another person or entity occurs where the holders of the Company's outstanding voting equity securities immediately prior to such merger or consolidation hold less than a majority of the issued and outstanding voting equity securities of the successor immediately following such transaction or (d) any sale by the holders of our outstanding voting equity securities where such holders do not continue to hold at least a majority of our issued and outstanding voting equity securities immediately following the consummation of such transaction. In addition, the warrant to purchase 36,000 shares (subject to adjustment) our common stock dated as of July 31, 2018 between us and SVB will remain outstanding and exercisable in accordance with its terms.

Facility Lease

In May 2016, we entered into a non-cancellable facility lease commencing August 1, 2016. The term of the agreement is three years with an initial monthly base rent of approximately \$8,400 and increasing to approximately \$8,900 during the last year of the lease agreement.

Pfizer Agreement

We entered into an exclusive license agreement for the clinical product candidate gemcabene with Pfizer Inc. (Pfizer) in April 2011, which was subsequently amended and restated in August 2018 (as so amended, the "Pfizer Agreement"). The Pfizer Agreement grants us certain patent rights and a non-exclusive royalty bearing right and license to certain related data to make, use, develop, commercialize, import and otherwise exploit the clinical product candidate gemcabene. Pfizer retains the right to make, use and import gemcabene solely for internal research purposes.

In partial exchange for the rights granted by Pfizer, we agreed to issue shares of our common stock to Pfizer representing 15% of our fully diluted capital at the close of its first arms-length Series A financing, which occurred on March 31, 2015.

We also agreed to make milestone payments totaling up to \$37 million upon the achievement of certain milestones, including the first new drug application (or its foreign equivalent) in any country, regulatory approval in each of the United States, Europe and Japan, the first anniversary of the first regulatory approval in any country, and upon achieving certain aggregate sales levels of gemcabene. Future milestone payments under the Pfizer Agreement, if any, are not expected to begin for at least several years and extend over a number of subsequent years.

In addition, we agreed to pay Pfizer tiered royalties on a country-by-country basis based upon the annual amount of net sales, as specified in the Pfizer Agreement, until the later of: (a) five (5) years after the first commercial sale in such country; (b) the expiration of all regulatory or data exclusivity for gemcabene in such country; and (c) the expiration or abandonment of the last valid claim of the licensed patents, including any patent term extensions or supplemental protection certificates in such country (collectively, the Royalty Term). Under the Pfizer Agreement, we are obligated to use commercially reasonable efforts to develop and commercialize gemcabene.

The Pfizer Agreement will expire upon expiration of the last Royalty Term. On expiration (but not earlier termination), we will have a perpetual, exclusive, fully paid-up, royalty-free license under the licensed patent rights and related data to make, use, develop, commercialize, import and otherwise exploit the clinical product candidate gemcabene. Either party may terminate the Pfizer Agreement for the other party's material breach following a cure period or immediately upon certain insolvency events relating to the other party. Pfizer may immediately terminate the Pfizer Agreement in the event that (i) we or any of our affiliates or sublicensees contest or challenge, or support or assist any third party to contest or challenge, Pfizer's ownership of or rights in, or the validity, enforceability or scope of any of the patents licensed under the Pfizer Agreement or (ii) we or any of our affiliates or sublicensees fail to achieve the first commercial sale in at least one country by April 16, 2024. Furthermore, upon termination of the Pfizer Agreement by Pfizer for any of the foregoing reasons, we grant Pfizer a non-exclusive, fully paid-up, royalty free, worldwide, transferrable, perpetual and irrevocable license to use any intellectual property rights arising from the development or commercialization of gemcabene by us and any trademarks identifying gemcabene and agree to transfer regulatory filings and approvals to Pfizer or permit Pfizer to cross-reference and rely on such regulatory filings and approvals for gemcabene. We may terminate the License Agreement for convenience upon 90 days' written notice and payment of an early termination fee.

Other Commitments

In the course of our normal operations, we have entered into cancellable purchase commitments with our suppliers for various key research and clinical services and raw materials. The purchase commitments covered by these arrangements are subject to change based on our research and development efforts.

Critical Accounting Policies and Estimates

Our financial statements are prepared in accordance with GAAP. These accounting principles require us to make estimates and judgments that can affect the reported amounts of assets and liabilities as of the date of the financial statements as well as the reported amounts of revenue and expense during the periods presented. We believe that the

estimates and judgments upon which we rely are reasonably based upon information available to us at the time that we make these estimates and judgments. To the extent that there are material differences between these estimates and actual results, our financial results will be affected. The accounting policies that reflect our more significant estimates and judgments and which we believe are the most critical to aid in fully understanding and evaluating our reported financial results are described below.

The following is not intended to be a comprehensive list of all of our accounting policies or estimates. Our accounting policies are more fully described in Note 2 — *Summary of Significant Accounting Policies*, included in “Item 8 — Financial Statements and Supplementary Data” in this Report.

Income Taxes

We utilize the liability method of accounting for income taxes as required by Accounting Standards Codification (ASC) 740, *Income Taxes*. Under this method, deferred tax assets and liabilities are determined based on differences between financial reporting and the tax basis of assets and liabilities and are measured using enacted tax rates and laws that will be in effect when the differences are expected to reverse. Currently, there is no provision for income taxes, as we have incurred operating losses to date, and a full valuation allowance has been provided on the net deferred tax assets.

Since incorporation, we have filed U.S. federal and Michigan state income tax returns. Our deferred tax assets were primarily comprised of federal and state tax net operating loss carryforwards, acquired intangibles and tax credit carryforwards and were recorded using enacted tax rates expected to be in effect in the years in which these temporary differences are expected to be utilized. As of December 31, 2018, the tax effect of our federal and state net operating loss carryforwards was approximately \$4.2 million and \$0.9 million, respectively, and our federal and state research and development credit carryforwards were \$2.6 million and \$0.1 million, respectively. As of December 31, 2017, the tax effect of our federal and state net operating loss carryforwards was approximately \$2.8 million and \$0.6 million, respectively, and our federal and state research and development credit carryforward were \$1.9 million and \$45,000, respectively. The federal net operating loss incurred prior to January 1, 2018 and tax credit carryforwards will begin to expire in 2034 if not utilized. Federal net operating losses incurred after December 31, 2017 will not expire. The state net operating loss carryforwards will begin to expire in 2026, if not utilized, and the state research credit carryforwards will begin to expire in 2023 if not utilized. Recent tax reform legislation has significantly revised the rules applicable to the utilization of net operating losses for tax years either beginning or ending after January 1, 2018.

Utilization of the net operating loss and tax credit carryforwards may be subject to an annual limitation due to historical or future ownership percentage change rules provided by the Internal Revenue Code of 1986, as amended, and similar state provisions. The annual limitation may result in the expiration of certain net operating loss and tax credit carryforwards before their utilization. However, due to uncertainties surrounding our ability to generate future taxable income to realize these tax assets, a full valuation allowance has been established to offset our deferred tax assets.

Contingencies

From time to time, we may be subject to legal proceedings and claims, including contractual allegations, patent infringement, employment-related matters and other claims that arise in the normal course of business. We routinely assess the likelihood of any adverse judgments or outcomes to these matters, as well as ranges of probable losses, by consulting with internal personnel principally involved with such matters and with our outside legal counsel handling such matters. We accrue for estimated losses when it is probable that a liability or loss has been incurred and the amount can be reasonably estimated. Contingencies by their nature relate to uncertainties that require the exercise of judgment both in assessing whether or not a liability or loss has been incurred and estimating that amount of probable loss. The liabilities may change in the future due to new developments or changes in circumstances. The inherent uncertainty related to the outcome of these matters can result in amounts materially different from any provisions made with respect to their resolution.

Share-Based Compensation

Our share-based compensation for share-based awards is accounted for in accordance with authoritative guidance and is estimated at the grant date based on the fair value of the award and recognized as expense ratably over the requisite vesting period of the award. Determining the appropriate fair value of share-based awards requires judgment. We

calculate the fair value of each award to employees on the date of grant based on the fair value of our common stock. See “— Common Stock Valuation” below.

We calculate the fair value of each stock option award to employees on the date of grant under the Black-Scholes option-pricing model using certain assumptions related to the fair value of our common stock, the option’s expected term, our expected stock price volatility, risk free interest rates and our expected dividend rate.

For options to purchase common stock issued to non-employees, including consultants, we record share-based compensation based on the fair value of the options. We calculate the fair value of each share-based award to non-employees on each measurement date based on the fair value of our common stock. The fair value of options granted to non-employees is remeasured as the options vest and is recognized in the statements of operations during the period the related services are rendered.

The fair value of each stock option grant was determined using the methods and assumptions discussed below. Each of these inputs is subjective and generally requires significant judgment and estimation by management.

- *Fair Value of Common Stock.* As discussed below in “— Common Stock Valuation,” because there was no public market for our common stock prior to our IPO, our board of directors has determined the fair value of the common stock by considering a number of objective and subjective factors, including based on contemporaneous valuations of our common stock performed by an unrelated valuation specialist. Currently, the fair value of our common stock is based on the quoted market price.
- *Expected Term.* The expected term represents the period that share-based awards are expected to be outstanding. The expected term for option grants is determined using the simplified method. The simplified method deems the term to be the average of the time-to-vesting and the contractual life of the share-based awards. The expected term for options issued to nonemployees is the contractual term.
- *Expected Volatility.* Since we do not have a trading history of our common stock, the expected volatility was derived from the historical stock volatilities of comparable peer public companies within our industry that we consider to be comparable to our business over a period equivalent to the expected term of the share-based awards.
- *Risk-Free Interest Rate.* The risk-free interest rate is based on the U.S. Treasury yield curve in effect at the date of grant for zero-coupon U.S. Treasury notes with maturities approximately equal to the share-based awards’ expected term.
- *Expected Dividend Rate.* The expected dividend is zero as we have not paid and do not anticipate paying any dividends on our common stock for the foreseeable future.

The estimated grant-date fair value of our share-based awards was calculated using Black-Scholes option-pricing model, based on the following assumptions for the following periods presented:

	Year Ended December 31,		
	2018	2017	2016
Expected stock price volatility	66.3 %	65.8 %	71.447 %
Expected life of options (years)	5.8	5.9	6.02
Expected dividend yield	0 %	0 %	0 %
Risk free interest rate	2.7 %	2.0 %	1.2 %

If any of the assumptions used in the Black-Scholes option-pricing model change significantly, share-based compensation for future awards may differ materially compared with the awards granted previously.

For 2018, 2017 and 2016, share-based compensation was \$4.1 million, \$5.3 million and \$1.7 million, respectively. As of December 31, 2018, we had unrecognized share-based compensation expense totaling \$3.9 million.

Common Stock Valuation

During periods when there was an absence of a public trading market for our common stock prior to the IPO, on each grant date, we developed an estimate of the fair value of our common stock in order to determine an exercise price for each share-based award. We determined the fair value of our common stock using methodologies, approaches and assumptions consistent with the *American Institute of Certified Public Accountants Practice Aid, Valuation of Privately-Held-Company Equity Securities Issued as Compensation*. Our board of directors exercised reasonable judgment and considered a number of objective and subjective factors to determine the best estimate of the fair value of our common stock, including having contemporaneous and retrospective valuations of our common stock performed by an unrelated valuation specialist, valuations of comparable securities transactions, sales of our convertible preferred stock to unrelated third parties, the rights, preferences and privileges of our common stock versus our preferred stock, our operating and financial performance, our stage of development, current business conditions, our projections, business developments, the lack of liquidity of our capital stock and general and industry specific economic outlook.

Beginning in the fourth quarter of 2015 and up until the closing of the IPO, the fair value of our common stock was estimated using a hybrid of two market approaches, specifically the value of a potential Series B convertible preferred stock financing utilizing a *Proposed Securities Transaction — Backsolve* method and a pre-money IPO value for an IPO exit. Lastly, the completed Series A preferred stock *Recent Securities Transaction — Backsolve* method was considered in the event that a Series B convertible preferred stock financing or an IPO could not be achieved.

We considered the various methods for allocating the enterprise value across our classes and series of capital stock to determine the fair value of our common stock at each valuation date. The methods we used consisted of the following:

- *Option pricing method (OPM)*. Under the option pricing method, shares are valued by creating a series of call options with exercise prices based on the liquidation preferences and conversion terms of each equity class. The values of the preferred and common stock are inferred by analyzing these options.
- *Probability-weighted expected return method (PWERM)*. The PWERM is a scenario-based analysis that estimates the value per share based on the probability-weighted present value of expected future investment returns, considering each of the possible outcomes available to us, as well as the economic and control rights of each share class.

Our per share common stock value was estimated by allocating the equity value using a hybrid combination of OPM and PWERM. We used either PWERM or a combination of the OPM and the PWERM as described above to allocate the equity value to each element of our capital structure, including our common stock. For both approaches, we applied a discount to the valuations due to the lack of marketability of the ordinary shares. We calculated the discount for lack of marketability using a Finnerty model and applied it as appropriate to each allocation.

The dates of our valuations did not always coincide with the dates of our option grants. In such instances, management's estimates were based on the most recent valuation of shares of our common stock. For grants occurring between valuation dates, for financial reporting purposes, we considered the preceding valuations and our assessment of additional objective and subjective factors we believed were relevant as of the grant date to determine the fair value of our common stock.

Related Party Transactions

See Note 14 — “*Related Party Transactions*” included in “Item 8 — Financial Statements and Supplementary Data” in this Report regarding the impact of certain related party transactions with respect to facility rent and financing activity.

Off-Balance Sheet Arrangements

We did not have during the periods presented, and we do not currently have, any off-balance sheet arrangements as defined under the rules and regulations of the SEC.

Recent Accounting Pronouncements

See Note 2 — “*Summary of Significant Accounting Policies*” included in “Item 8 — Financial Statements and Supplementary Data” in this Report regarding the impact of certain recent accounting pronouncements on our financial statements.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Not applicable.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

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Report of Independent Registered Public Accounting Firm

To the Board of Directors and Shareholders
Gemphire Therapeutics Inc.

Opinion on the Financial Statements

We have audited the accompanying balance sheets of Gemphire Therapeutics Inc. (the Company) as of December 31, 2018 and 2017, the related statements of comprehensive loss, changes in convertible preferred stock and stockholders' equity (deficit) and cash flows for each of the three years in the period ended December 31, 2018, and the related notes and the financial statement schedule listed in the Index at Item 15(a) (collectively referred to as the "financial statements"). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2018 and 2017, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2018, in conformity with U.S. generally accepted accounting principles.

The Company's Ability to Continue as a Going Concern

The accompanying financial statements have been prepared assuming that the Company will continue as a going concern. As discussed in Note 1 to the financial statements, the Company has suffered recurring losses from operations, negative cash flows from operations, and has stated that substantial doubt exists about the Company's ability to continue as a going concern. Management's evaluation of the events and conditions and management's plans regarding these matters are also described in Note 1. The financial statements do not include any adjustments that might result from the outcome of this uncertainty.

Basis for Opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audits. We are a public accounting firm registered with the 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 audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion.

Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ Ernst & Young LLP

We have served as the Company's auditor since 2015.
Detroit, Michigan
March 15, 2019

Gemphire Therapeutics Inc.
Balance Sheets
(in thousands, except share amounts and par value)

	December 31, 2018	December 31, 2017
Assets		
Current assets:		
Cash and cash equivalents	\$ 18,954	\$ 18,473
Prepaid expenses	715	490
Deferred offering costs	—	21
Other assets	17	25
Total current assets	19,686	19,009
Deposits	8	8
Total assets	\$ 19,694	\$ 19,017
Liabilities and stockholders' equity		
Current liabilities:		
Accounts payable	\$ 2,044	\$ 4,025
Accrued liabilities	438	1,010
Term loan - current portion	9,437	1,355
Total current liabilities	11,919	6,390
Long-term liabilities:		
Term loan	—	8,683
Other liabilities	1	3
Total liabilities	11,920	15,076
Commitments and contingencies (Note 5)		
Stockholders' equity:		
Preferred stock, \$0.001 par value; 10,000,000 shares authorized as of December 31, 2018 and 2017, no shares issued or outstanding as of December 31, 2018 and 2017.	—	—
Common stock, \$0.001 par value; 100,000,000 shares authorized as of December 31, 2018 and 2017, 14,265,411 and 10,633,042 shares issued and outstanding at December 31, 2018 and 2017, respectively.	22	18
Additional paid-in capital	91,863	64,397
Accumulated deficit	(84,111)	(60,474)
Total stockholders' equity	7,774	3,941
Total liabilities and stockholders' equity	\$ 19,694	\$ 19,017

See accompanying notes.

Gemphire Therapeutics Inc.
Statements of Comprehensive Loss
(in thousands, except share and per share amounts)

	Year Ended December 31,		
	2018	2017	2016
Operating expenses:			
General and administrative	\$ 8,493	\$ 10,438	\$ 5,956
Research and development	14,312	22,686	8,740
Total operating expenses	22,805	33,124	14,696
Loss from operations	(22,805)	(33,124)	(14,696)
Interest (expense) income	(654)	(286)	114
Other expense	(178)	(5)	(4)
Loss before income taxes	(23,637)	(33,415)	(14,586)
Provision (benefit) for income taxes	—	—	—
Net loss	(23,637)	(33,415)	(14,586)
Other comprehensive loss, net of tax	—	—	—
Comprehensive loss	\$ (23,637)	\$ (33,415)	\$ (14,586)
Net loss	\$ (23,637)	\$ (33,415)	\$ (14,586)
Adjustment to redemption value on Series A convertible preferred stock	—	—	(366)
Net loss attributable to common stockholders	\$ (23,637)	\$ (33,415)	\$ (14,952)
Net loss per share:			
Basic and diluted (Note 10)	\$ (1.71)	\$ (3.23)	\$ (2.57)
Number of shares used in per share calculations:			
Basic and diluted	13,805,552	10,349,136	5,809,396

See accompanying notes.

Gemphire Therapeutics Inc.
Statements of Changes in Convertible Preferred Stock and Stockholders' Equity (Deficit)
(in thousands, except share amounts)

	Series A Convertible Preferred Stock		Common Stock		Additional Paid-In Capital	Accumulated Deficit	Total Equity (Deficit)
	Shares	Amount	Shares	Amount			
Balance January 1, 2016	745,637	\$ 7,953	3,758,488	\$ 12	\$ —	\$ (12,392)	\$ (12,380)
Redemption value adjustment — Series A preferred stock	—	366	—	—	(285)	(81)	(366)
Conversion of Series A preferred stock to common stock	(745,637)	(8,319)	827,205	1	8,318	—	8,319
Separation of convertible note beneficial conversion feature upon contingency resolution	—	—	—	—	372	—	372
Conversion of convertible notes to common stock	—	—	1,656,807	1	11,444	—	11,445
Issuance of common stock from offering	—	—	3,027,755	3	30,275	—	30,278
Issuance costs of offering	—	—	—	—	(4,168)	—	(4,168)
Share-based compensation — employee	—	—	—	—	1,498	—	1,498
Share-based compensation — non-employee	—	—	—	—	220	—	220
Net loss	—	—	—	—	—	(14,586)	(14,586)
Balance at December 31, 2016	—	\$ —	9,270,255	\$ 17	\$ 47,674	\$ (27,059)	\$ 20,632
Issuance of common stock from private placement	—	—	1,324,256	1	8,978	—	8,979
Issuance of detachable stock warrants in connection with private placement	—	—	—	—	3,562	—	3,562
Issuance costs of private placement	—	—	—	—	(1,287)	—	(1,287)
Exercise of stock options	—	—	23,531	—	41	—	41
Exercise of warrants	—	—	15,000	—	156	—	156
Share-based compensation — employee	—	—	—	—	5,244	—	5,244
Share-based compensation — non-employee	—	—	—	—	29	—	29
Net loss	—	—	—	—	—	(33,415)	(33,415)
Balance at December 31, 2017	—	\$ —	10,633,042	\$ 18	\$ 64,397	\$ (60,474)	\$ 3,941
Issuance of common stock from follow-on public offering	—	—	3,592,858	4	25,146	—	25,150
Issuance costs of follow-on public offering	—	—	—	—	(2,091)	—	(2,091)
Warrant issuance	—	—	—	—	196	—	196
Exercise of stock options	—	—	39,511	—	84	—	84
Share-based compensation — employee	—	—	—	—	4,128	—	4,128
Share-based compensation — non-employee	—	—	—	—	3	—	3
Net loss	—	—	—	—	—	(23,637)	(23,637)
Balance at December 31, 2018	—	\$ —	14,265,411	\$ 22	\$ 91,863	\$ (84,111)	\$ 7,774

See accompanying notes.

Gemphire Therapeutics Inc.
Statements of Cash Flows
(in thousands)

	For the Year Ended		
	2018	2017	2016
Operating activities			
Net loss	\$ (23,637)	\$ (33,415)	\$ (14,586)
Adjustments to reconcile net loss to net cash used in operating activities:			
Share-based compensation	4,131	5,273	1,718
Non-cash interest on convertible notes to related parties	—	—	145
Non-cash interest on convertible notes	—	—	256
Non-cash discount amortization on convertible notes to related parties	—	—	(17)
Non-cash discount amortization on term loan and convertible notes	346	137	(276)
Revaluation of premium conversion derivative	—	—	(850)
Non-cash interest upon conversion of convertible notes	—	—	649
Change in assets and liabilities:			
Prepaid expenses and other assets	(196)	198	(55)
Accounts payable	(1,981)	2,007	1,477
Accrued and other liabilities	(574)	(1,101)	496
Net cash used in operating activities	<u>(21,911)</u>	<u>(26,901)</u>	<u>(11,043)</u>
Investing activities			
Net cash provided by (used in) investing activities	—	—	—
Financing activities			
Proceeds from issuance of term loan and convertible notes	—	10,000	2,651
Proceeds from issuance of convertible notes to related parties	—	—	2,500
Issuance costs related to term loan and convertible notes	(10)	(89)	(10)
Repayment of principal	(741)	—	—
Exercise of stock options	84	41	—
Exercise of warrants	—	156	—
Proceeds from sale of common stock and warrants	25,150	12,541	30,278
Offering costs	(2,091)	(1,287)	(3,963)
Deferred offering costs	—	(21)	—
Net cash provided by financing activities	<u>22,392</u>	<u>21,341</u>	<u>31,456</u>
Net increase (decrease) in cash and cash equivalents	481	(5,560)	20,413
Cash and cash equivalents at beginning of period	18,473	24,033	3,620
Cash and cash equivalents at end of period	<u>\$ 18,954</u>	<u>\$ 18,473</u>	<u>\$ 24,033</u>
<i>Supplemental disclosure of cash flow information:</i>			
Cash paid for income taxes	\$ —	\$ —	\$ —
Cash paid for interest	\$ 488	\$ 291	\$ —
<i>Supplemental non-cash financing transactions:</i>			
Conversion of Series A preferred stock to common stock	\$ —	\$ —	\$ 8,319
Conversion of convertible notes to common stock	\$ —	\$ —	\$ 11,445
Issuance of warrants in connection with term loan	\$ 196	\$ —	\$ —
Redemption value change of Series A preferred stock	\$ —	\$ —	\$ 366
Bifurcation of premium conversion derivative related to convertible notes	\$ —	\$ —	\$ 505
Separation of beneficial conversion feature associated with convertible notes	\$ —	\$ —	\$ 372
Offering costs in other assets paid in prior year	\$ —	\$ —	\$ 205
Issuance costs in accounts payable and accrued liabilities	\$ —	\$ 10	\$ —

See accompanying notes.

**Gemphire Therapeutics Inc.
Notes to Financial Statements**

1. The Company and Basis of Presentation

The Company, headquartered in Livonia, Michigan, is a clinical-stage biopharmaceutical entity focused on developing and commercializing therapies for the treatment of dyslipidemias as well as NAFLD/NASH with an initial focus on orphan indications including HoFH, FCS, and FPL. The Company's primary activities to date have been conducting research and development activities, planning and conducting clinical trials, performing business and financial planning, recruiting personnel and raising capital. The Company is subject to certain risks, which include the need to research, develop, and clinically test potentially therapeutic products, initially one product candidate gemcabene (also known as CI-1027); obtain regulatory approval for its products and commercialize them around the world, if approved; expand its management scientific staff; finance its operations; and find collaboration partners to further advance development and commercial efforts.

Initial Public Offering

On August 4, 2016, the Company's Registration Statement on Form S-1 (File No 333-210815) relating to its initial public offering (IPO) of its common stock was declared effective by the Securities and Exchange Commission (SEC). Pursuant to such Registration Statement, on August 10, 2016, the Company closed its IPO whereby 3,000,000 shares of its common stock were issued and sold at a public offering price of \$10.00 per share. On September 8, 2016, the Company closed the sale of 27,755 shares of its common stock at the public offering price of \$10.00 per share, representing a partial exercise of the underwriters' over-allotment option, following which, the IPO terminated. The Company received net proceeds of approximately \$26.1 million after deducting underwriting discounts and commissions of \$2.1 million and other offering expenses of \$2.1 million.

Immediately prior to the IPO, the Company amended and restated its certificate of incorporation and bylaws to, among other things, change its authorized capital stock to consist of (i) 100,000,000 shares of common stock and (ii) 10,000,000 shares of undesignated preferred stock. Both the common stock and the preferred stock have a par value of \$0.001 per share.

Private Placement Offering

On March 10, 2017, the Company entered into a securities purchase agreement for a private placement (the Private Placement) with a select group of accredited investors whereby, on March 15, 2017 the Company issued and sold 1,324,256 units at a price of \$9.47 per unit for gross proceeds of approximately \$12.5 million. Each unit consists of one share of the Company's common stock and a warrant to purchase 0.75 shares of common stock. The warrants have an exercise price of \$10.40 per share and are exercisable for a period of five years from the date of issuance. On April 20, 2017, the registration statement on Form S-1 (File No 333-217296) for the resale of the shares of common stock issued in the Private Placement and the shares of common stock to be issued upon exercise of the warrants issued in the Private Placement was declared effective by the SEC.

Follow-On Public Offering

On February 12, 2018, the Company completed an underwritten public offering (the Follow-On Offering) of 3,142,858 shares of common stock at the public offering price of \$7.00 per share. As part of such offering, the Company issued 450,000 additional shares of common stock representing partial exercise of the underwriters' over-allotment option. The Company received net proceeds of approximately \$23.1 million after deducting underwriting discounts and commissions and offering expenses.

Reverse Stock Split

In April 2016, the board of directors approved an amendment to the Company's certificate of incorporation to effect a 1-for-3.119 reverse stock split (the Reverse Stock Split) for all common and Series A preferred stock. The Reverse Stock Split became effective on April 27, 2016 upon the filing of the amendment to the certificate of incorporation. The authorized shares and par value of the common stock and Series A preferred stock were not adjusted as a result of the Reverse Stock Split. All issued and outstanding common and Series A preferred stock, options for common stock and

Gemphire Therapeutics Inc.
Notes to Financial Statements - continued

per share amounts contained in the financial statements were retroactively adjusted to reflect the Reverse Stock Split for all periods presented.

Going Concern

The accompanying financial statements have been prepared assuming that the Company will continue as a going concern, which contemplates the realization of assets and the satisfaction of liabilities in the normal course of business. The Company adopted Financial Accounting Standards Board (FASB) issued Accounting Standards Update (ASU) No. 2014-15, Presentation of Financial Statements - Going Concern (Subtopic 205-40) effective December 31, 2016, which requires the Company to make certain disclosures if it concludes that there is substantial doubt about the entity's ability to continue as a going concern within one year from the date of the issuance of these financial statements.

In the course of its activities, the Company has incurred losses and negative cash flows from operations since its inception. As of December 31, 2018, the Company had an accumulated deficit of \$84.1 million. The Company expects to incur losses for the foreseeable future. The Company believes that its cash and cash equivalents of \$19.0 million at December 31, 2018 are not sufficient to fund the Company's current operating plan for at least twelve months after the date the consolidated financial statements are issued. See "Contractual Obligations and Commitments—Term Loan" below regarding our prepayment of all outstanding indebtedness under the Term Loan subsequent to year end. We have no current source of revenue to sustain our present activities, and we do not expect to generate revenue until, and unless, the Food and Drug Administration (FDA) or other regulatory authorities approve gemcabene and we successfully commercialize gemcabene. Until such time, if ever, we expect to finance our cash needs through a combination of equity and debt financings as well as collaborations, strategic alliances and licensing arrangements. We do not have any committed external source of funds and there can be no assurance that the Company will be successful in acquiring additional funding at levels sufficient to fund its operations.

These conditions raise substantial doubt about the Company's ability to continue as a going concern. If the Company is unable to raise additional capital in sufficient amounts or on terms acceptable to it, the Company may have to significantly reduce its operations or delay, scale back or discontinue the development of gemcabene. The financial statements do not include any adjustments that might result from the outcome of this uncertainty.

2. Summary of Significant Accounting Policies

Use of Estimates

The preparation of financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the amounts reported in the financial statements and accompanying notes. Actual results could differ from those estimates.

Cash and Cash Equivalents

The Company considers all highly liquid investments with an original maturity of 90 days or less at the time of deposit to be cash equivalents. The Company invests excess cash in readily available checking and savings accounts and highly liquid investments in money market accounts.

Fair Value of Financial Instruments

The Company's financial instruments include principally cash and cash equivalents, other current assets, accounts payable, accrued liabilities and debt. The carrying amounts for these financial instruments reported in the balance sheets approximate their fair values. See Note 11 — Fair Value Measurements, for further discussion of fair value.

General and Administrative Expenses

General and administrative expenses consist primarily of personnel-related costs, including salaries and share-based compensation costs, for personnel in functions not directly associated with research and development activities. Other

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Notes to Financial Statements - continued

significant costs include legal fees related to intellectual property and corporate matters and professional fees for accounting and other services.

Research and Development Expenses

Research and development expenses consist of costs incurred in performing research and development activities, including compensation for research and development employees, costs associated with preclinical studies and trials, regulatory activities, manufacturing activities to support clinical activities, license fees, non-legal patent costs, fees paid to external service providers that conduct certain research and development, clinical costs and an allocation of overhead expenses. Research and development costs are expensed as incurred.

Acquired In-Process Research and Development Expenses

The Company includes costs to acquire or in-license product candidates in acquired in-process research and development expenses. The Company has acquired the right to develop and commercialize its product candidate gemcabene. These costs are immediately expensed provided that the payments do not also represent processes or activities that would constitute a "business" as defined under GAAP or provided that the product candidate has not achieved regulatory approval for marketing and absent obtaining such approval, has no alternative future use. Royalties owed on future sales of any licensed product will be expensed in the period the related revenues are recognized.

Income Taxes

The Company utilizes the liability method of accounting for income taxes as required by Accounting Standards Codification (ASC) 740, *Income Taxes*. Under this method, deferred tax assets and liabilities are determined based on differences between financial reporting and the tax basis of assets and liabilities and are measured using enacted tax rates and laws that will be in effect when the differences are expected to reverse. Currently, there is no provision for income taxes, as the Company has incurred operating losses to date, and a full valuation allowance has been provided on the net deferred tax assets.

Share-Based Compensation

The Company accounts for share-based compensation in accordance with the provisions of ASC 718, *Compensation — Stock Compensation* (ASC 718). Accordingly, compensation costs related to equity instruments granted are recognized at the grant-date fair value. The Company records forfeitures when they occur. Share-based compensation arrangements to non-employees are accounted for in accordance with the applicable provisions of ASC 718 and ASC 505, *Equity*, using a fair value approach. The compensation costs of these arrangements are subject to re-measurement as the equity instruments vest and are recognized as expense over the related service period (typically the vesting period of the awards).

Common Stock Valuation

Due to the absence of an active market for the Company's common stock prior to the close of the IPO, the Company utilized methodologies in accordance with the framework of the American Institute of Certified Public Accountants' Technical Practice Aid, *Valuation of Privately-Held Company Equity Securities Issued as Compensation*, to estimate the fair value of its common stock. The valuation methodology included estimates and assumptions that required the Company's judgment. These estimates and assumptions included a number of objective and subjective factors, including external market conditions affecting the biopharmaceutical industry sector, and the likelihood of achieving a liquidity event, such as an initial public offering or sale. Significant changes to the key assumptions used in the valuations could have resulted in different fair values of common stock at each valuation date.

Convertible Preferred Stock

On March 31, 2015, the Company issued 745,637 shares of Series A convertible preferred stock (the Series A preferred stock). On August 10, 2016, immediately prior to the closing of the IPO, the Company's Series A preferred stock,

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together with accrued dividends thereon, converted into 827,205 shares of common stock. The Series A preferred stock prior to conversion was classified outside of permanent equity, in mezzanine equity, on the Company's balance sheet. The Company initially records preferred stock that may be redeemed at the option of the holder, or based on the occurrence of events outside of the Company's control, at the value of the proceeds received. Subsequently, if it is probable that the preferred stock will become redeemable, the Company recognizes changes in the redemption value immediately as they occur and adjusts the carrying amount of the instrument to equal the redemption value at the end of each reporting period. If it is not probable that the preferred stock will become redeemable, the Company does not adjust the carrying value. In the absence of retained earnings, these charges are recorded against additional paid-in-capital, if any, and then to accumulated deficit. As a result of their conversion to common stock on August 10, 2016 as described above, no shares of Series A preferred stock were outstanding as of December 31, 2018 and 2017.

Segment Information

Operating segments are components of an enterprise for which separate financial information is available and is evaluated regularly by the Company's chief operating decision maker in deciding how to allocate resources and assessing performance. The Company's chief operating decision maker is its Chief Executive Officer. The Company's Chief Executive Officer views the Company's operations and manages its business in one operating segment, which is the business of development and commercialization of therapeutics for the treatment of dyslipidemia, a serious medical condition that increases the risk of life threatening cardiovascular disease and NAFLD/NASH. Accordingly, the Company has a single reporting segment.

Jumpstart Our Business Startups Act Accounting Election

As an emerging growth company under the Jumpstart Our Business Startups Act (JOBS Act), the Company is eligible to take advantage of certain exemptions from various reporting requirements that are applicable to other public companies that are not emerging growth companies. The Company has irrevocably elected not to avail itself of this exemption and, therefore, will be subject to the same new or revised accounting standards as other public companies that are not emerging growth companies.

Recent Accounting Pronouncements**Recently Adopted Accounting Pronouncements**

In May 2014, the FASB issued ASU 2014-09, *Revenue from Contracts with Customers (Topic 606)*, which supersedes the revenue recognition requirements in FASB ASC 605. The new guidance primarily states that an entity should recognize revenue to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods and services. In January 2017 and September 2017, the FASB issued several amendments to ASU 2014-09, including updates stemming from SEC Accounting Staff Announcement in July 2017. The amendments and updates included clarification on accounting for principal versus agent considerations (i.e., reporting gross versus net), licenses of intellectual property and identification of performance obligations. These amendments and updates do not change the core principle of the standard but provide clarity and implementation guidance. The Company has adopted this standard on January 1, 2018 and selected the modified retrospective transition method. The Company modified its accounting policies to reflect the requirements of this standard; however, the planned adoption will not affect the Company's financial statements and related disclosures for these periods or future periods until the Company generates revenues.

In November 2016, the FASB issued ASU No. 2016-18, *Statement of Cash Flows (Topic 230): Restricted Cash*. The objective of this ASU is to eliminate the diversity in practice related to the classification of restricted cash or restricted cash equivalents in the statement of cash flows. For public business entities, this ASU is effective for annual and interim reporting periods beginning after December 15, 2017, with early adoption permitted. The amendments in this update should be applied retrospectively to all periods presented. The Company adopted this standard on January 1, 2018 and it did not have a material impact on the Company's financial statements.

In May 2017, the FASB issued ASU 2017-09, *Compensation - Stock Compensation (Topic 718): Scope of Modification Accounting* (ASU 2016-09), which provides guidance about which changes to the terms or conditions of a share-based

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payment awards require an entity to apply modification accounting in Topic 718. This pronouncement is effective for annual reporting periods beginning after December 15, 2017, with early adoption permitted. The Company has adopted this standard on January 1, 2018 and it did not have a material impact on the Company's financial statements.

In March 2018, the FASB issued ASU 2018-05, *Income Taxes (Topic 740)*, that codified the SEC Staff Accounting Bulletin 118 (SAB 118) issued on December 22, 2017, which provides guidance on accounting for the tax effects of the Tax Cuts and Jobs Act (the TCJA). SAB 118 provides a measurement period that should not extend beyond one year from the enactment date for companies to complete the accounting under ASC 740. In accordance with SAB 118, a company must reflect the income tax effects of those aspects of the TCJA for which the accounting under ASC 740 is complete. To the extent that a company's accounting for certain income tax effects of the TCJA is incomplete, but for which they are able to determine a reasonable estimate, it must record a provisional amount in the financial statements. Provisional treatment is proper in light of anticipated additional guidance from various taxing authorities, the SEC, the FASB, and even the Joint Committee on Taxation. If a company cannot determine a provisional amount to be included in the financial statements, it should continue to apply ASC 740 on the basis of the provisions of the tax laws that were in effect immediately before the enactment of the TCJA. The Company has applied this guidance to its financial statements and it did not have an impact on the Company's financial statements.

Recent Accounting Pronouncements Not Yet Adopted

In January 2016, the FASB issued ASU No. 2016-01, *Financial Instruments — Overall: Recognition and Measurement of Financial Assets and Financial Liabilities*. The guidance affects the accounting for equity investments, financial liabilities under the fair value option and the presentation and disclosure requirements of financial instruments. The guidance is effective in the first quarter of fiscal 2019. Early adoption is permitted for the accounting guidance on financial liabilities under the fair value option. The Company is currently evaluating the impact of the new guidance on its financial statements.

In February 2016, the FASB issued ASU 2016-02, *Leases (Topic 842)* and subsequently amended the guidance relating largely to transition considerations under the standard in January 2017 and July 2018. The objective of this update is to increase transparency and comparability among organizations by recognizing lease assets and lease liabilities on the balance sheet and disclosing key information about leasing arrangements. This ASU is effective for fiscal years beginning after December 15, 2018, including interim periods within those annual periods. The Company plans to adopt the standard on January 1, 2019, and will apply the modified retrospective approach to each lease in existence at the adoption date. As such, the Company would not restate comparative periods and would recognize any cumulative adjustment to retained earnings on the date of the adoption. The Company plans to elect the package of practical expedients provided under the standard. The Company is in the process of completing an impact analysis over the application of the standard as of the planned adoption date. The Company expects to recognize a range of approximately \$0.1 million to \$0.2 million of lease assets and liabilities on the balance sheet as of January 1, 2019. The new standard is not expected to have a material impact on the Company's statements of comprehensive loss or statements of cash flows. The finalization of our assessment may result in significant changes to our estimates.

In July 2017, the FASB issued ASU No. 2017-11, *Earnings Per Share, Distinguishing Liabilities from Equity and Derivatives and Hedging*, which changes the accounting and earnings per share for certain instruments with down round features. The amendments in this ASU should be applied using a cumulative-effect adjustment as of the beginning of the fiscal year or retrospective adjustment to each period presented and is effective for annual periods beginning after December 15, 2018, and interim periods within those periods. The Company is currently evaluating the requirements of this new guidance and has not yet determined its impact on the Company's financial statements.

In June 2018, the FASB issued ASU 2018-07, *Compensation - Stock Compensation (Topic 718): Improvements to Nonemployee Share-Based Payment Accounting (ASU 2018-07)*, which expands the scope of Topic 718 to include share-based payment transactions for acquiring goods and services from nonemployees. An entity should generally apply the requirements of Topic 718 to nonemployee awards except in circumstances where there is specific guidance on inputs to an option pricing model and the attribution of cost. ASU 2018-07 specifies that Topic 718 applies to all share-based payment transactions in which a grantor acquires goods or services to be used or consumed in a grantor's own operations by issuing share-based payment awards. The guidance also clarifies that Topic 718 does not apply to share-based

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payments used to effectively provide (1) financing to the issuer or (2) awards granted in conjunction with selling goods or services to customers as part of a contract accounted for under Topic 606. This guidance is effective for annual reporting periods beginning after December 15, 2018, with early adoption permitted, but no earlier than an entity's adoption date of Topic 606. The Company is currently evaluating the impact of the new guidance on its financial statements.

In August 2018, the FASB issued ASU 2018-13, *Fair Value Measurement (Topic 820): Disclosure Framework - Changes to the Disclosure Requirements for Fair Value Measurement (ASU 2018-13)*. The new guidance modifies the disclosure requirements in Topic 820 as follows:

- **Removals:** the amount of and reasons for transfers between Level 1 and Level 2 of the fair value hierarchy; the policy for timing of transfers between levels; and the valuation processes for Level 3 fair value measurements.
- **Modifications:** for investments in certain entities that calculate net asset value, an entity is required to disclose the timing of liquidation of an investee's assets and the date when restrictions from redemption might lapse only if the investee has communicated the timing to the entity or announced the timing publicly; and the amendments clarify that the measurement uncertainty disclosure is to communicate information about the uncertainty in measurement as of the reporting date.
- **Additions:** the changes in unrealized gains and losses for the period included in other comprehensive income for recurring Level 3 fair value measurements held at the end of the reporting period; and the range and weighted average of significant unobservable inputs used to develop Level 3 fair value measurements.

This guidance is effective for all entities for fiscal years, and interim periods within those fiscal years, beginning after December 15, 2019. The amendments on changes in unrealized gains and losses, the range and weighted average of significant unobservable inputs used to develop Level 3 fair value measurements, and the narrative description of measurement uncertainty should all be applied prospectively for only the most recent interim or annual period presented in the initial year of adoption. All other amendments should be applied retrospectively to all periods presented upon their effective date. Early adoption is permitted. An entity is permitted to early adopt any removed or modified disclosures upon issuance of ASU 2018-13 and delay adoption of the additional disclosures until their effective date. The Company is currently evaluating the impact of the new guidance on its financial statements.

3. Accrued Liabilities

Accrued liabilities consist of the following (in thousands):

	<u>As of December 31,</u>	
	<u>2018</u>	<u>2017</u>
Accrued compensation and other payroll liabilities	\$ 137	\$ 306
Legal costs	106	91
Accrued interest	43	38
Other research and development expenses	135	522
Other general and administrative expenses	17	53
Total	<u>\$ 438</u>	<u>\$ 1,010</u>

On September 18, 2018, the Company's Board of Directors approved a workforce reduction involving 5 employees (or 33% of the workforce at that time) to lower costs and conserve cash resources in light of the previously announced request by the FDA for additional pre-clinical data. \$0.1 million of unpaid severance costs related to the workforce reduction remained in accrued liabilities as of December 31, 2018 and is included in accrued compensation and other payroll liabilities.

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4. Debt**Term Loan**

On January 25, 2019, the Company agreed to prepay in full all outstanding indebtedness under the Loan and Security Agreement (the Original Loan Agreement) with Silicon Valley Bank (SVB) dated July 24, 2017 (the "Initial Effective Date"), as amended by the First Amendment, dated July 31, 2018 (the First Amendment and, the Original Loan Agreement, as amended by the First Amendment to Loan and Security Agreement, the Loan Agreement), which prepayment was effective January 28, 2019. Upon payoff, any unfunded commitments to make credit extensions or financial accommodations to the Company terminated, and all security interests and other liens granted to or held by SVB as security for the obligations were terminated and automatically released, except those that were specified as surviving termination (see Note 16 – *Subsequent Events*). This note describes the terms of the Loan Agreement in effect on December 31, 2018 prior to the prepayment.

The Loan Agreement established a term loan facility (the Term Loan) in the aggregate principal amount of up to \$15,000,000 to be funded in up to three tranches. Of such amount, \$10,000,000 was funded on the Initial Effective Date. A third tranche of \$5,000,000 was available through November 30, 2018 conditioned on the occurrence of certain events and was not drawn by the Company. Under the Loan Agreement, if a Pre-Clinical Event did not occur on or prior to September 30, 2019 or, if at any time prior to a Pre-Clinical Event, the Company's unrestricted cash balance at SVB was less than \$18,000,000, the Company was required to either (i) provide cash security and maintain a cash balance in a restricted account at SVB in an amount not less than 100% of the amounts owed by the Company to SVB or (ii) prepay the Term Loan, including certain fees, in its entirety. All amounts advanced under the Term Loan would have matured on February 1, 2021.

In connection with the First Amendment, the Company issued a warrant to SVB (the Warrant) to purchase 36,000 shares of the Company's common stock at an exercise price of \$7.47 per share on July 31, 2018. The Warrant is immediately exercisable and has a term of ten years. The exercise price and number and type of shares underlying the Warrant are subject to adjustment upon specified events, including any stock dividends and splits, reverse stock split, recapitalization, reorganization or similar transaction, as described therein. The Warrant contains a "cashless exercise" feature that allows SVB to exercise the Warrant without a cash payment to the Company, on a net issuance basis, based upon the fair market value of the Company's common stock at the time of exercise, upon the terms set forth therein. The Warrant was deemed to be a free-standing instrument and was accounted for as equity given that there were no variable terms. The Company recorded \$0.2 million to additional paid-in capital upon issuance with an offset to a discount to the Term Loan. A Black-Scholes pricing model was used to estimate the aggregate fair value of the Warrant on the issuance date. Input assumptions used were as follows: risk-free interest rate of 2.96 percent; expected volatility of 66 percent; expected life of 10 years; and expected dividend yield of 0 percent. The discount to the Term Loan associated with the Warrant is being amortized as interest expense over the term of the Loan Agreement and amounted to \$33,000 for the year ended December 31, 2018.

As of the date of payment on January 28, 2019, the Company had approximately \$8.9 million in outstanding borrowings and approximately \$1.0 million in outstanding interest and fees under the Loan Agreement, including the final payment fee equal to 10% of the original aggregate principal amount of the Term Loan funded by SVB and drawn by the Company, which were repaid in full at the time of payment. The obligations, liabilities, covenants, and terms that are expressly specified in the Loan Agreement and any other related loan and collateral security documents issued by the Company to SVB in connection with the transaction evidenced by the Loan Agreement as surviving termination shall continue to survive notwithstanding the payment, including without limitation, the Company's indemnity obligations and the Company's obligation to pay to SVB a success fee of 3.5% of the funded principal amount of the Term Loan in the event any of the following occur on or before 5:00 PM, Eastern time, on July 24, 2024: (a) the Company receives FDA approval for any new drug application for gemcabene, (b) a sale or other transfer of all or substantially all of the assets of the Company occurs, (c) a merger or consolidation of the Company with or into another person or entity occurs where the holders of the Company's outstanding voting equity securities immediately prior to such merger or consolidation hold less than a majority of the issued and outstanding voting equity securities of the successor immediately following such transaction or (d) any sale by the holders of the Company's outstanding voting equity securities where such holders do not continue to hold at least a majority of the Company's issued and outstanding voting equity securities immediately following the consummation of such transaction. No event requiring payment of the success fee has occurred through the

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issuance date of these audited financial statements. Lastly, the Warrant to purchase 36,000 shares (subject to adjustment) of the Company's common stock dated as of July 31, 2018 between the Company and SVB will remain outstanding and exercisable in accordance with its terms.

In connection with the First Amendment, the Company was charged \$10,000 by SVB and the fee was recorded as a discount to the Term Loan; the discount is being amortized as interest expense over the term of the Loan Agreement and amounted to \$2,000 for the year ended December 31, 2018. In addition, the Company incurred \$20,000 in third-party legal fees which were recorded to general and administrative expense in the accompanying statements of comprehensive loss during the year ended December 31, 2018.

The Company was in compliance with the Loan Agreement covenants as of December 31, 2018 and through the repayment of the Term Loan on January 28, 2019.

Interest accrued on the unpaid principal balance at a floating per annum rate equal to the prime rate, except that, following an event of default, interest would have accrued at a rate up to 5% above the rate that is otherwise applicable. The prime rate in effect for the year ended December 31, 2018 ranged from 4.5% to 5.5% and the prime rate in effect for the year ended December 31, 2017 ranged from 4.25% to 4.5%. Lastly, debt issue costs that were incurred upon the July 2017 issuance of the Term Loan in the amount of \$0.1 million were recorded as a discount to the Term Loan and were amortized ratably to interest expense over the term of the loan.

The Company recorded in aggregate \$0.5 million and \$0.3 million interest expense related to the Term Loan for the years ended December 31, 2018 and 2017, respectively.

As of December 31, 2018, minimum aggregate future payments under the Term Loan were as follows (in thousands) prior to repayment in January 2019:

	<u>December 31,</u>
2019	\$ 4,826
2020	4,579
2021	1,370
Total minimum payments	10,775
Amount representing interest and discounts	<u>(1,338)</u>
Present value of minimum payments	9,437
Current portion	<u>(9,437)</u>
Long-term portion	<u>\$ -</u>

Future minimum interest payments under the Term Loan reflect the 5.5% per annum rate in effect at December 31, 2018 and on the date of repayment in January 2019. Given the intent of the Company to pay-off the Term Loan in January 2019 as of the December 31, 2018 balance sheet date, the Company classified the otherwise long-term portion of the Term Loan obligation as a current liability consistent with ASC 210 and other related accounting guidance. See Note 16 – *Subsequent Events*.

Interim Notes

On July 31, 2015, the Company entered into a convertible interim note financing (collectively with the notes issued in December 2015, February 2016 and April 2016, the Interim Notes), pursuant to which certain investors agreed to loan the Company approximately \$2.8 million. On August 10, 2016, immediately prior to the closing of the IPO, the Company's Interim Notes, together with accrued interest thereon, converted into 1,656,807 shares of common stock.

The Interim Notes accrued interest at a rate of 8% per annum, compounded annually, and would automatically convert into shares issued to investors in the Company's next equity financing round that results in gross proceeds of at least \$5.0 million (a Qualified Financing). The conversion would be equal to unpaid principal at 115% plus any unpaid accrued interest. The investors would be paid out principal at 200% if a change of control occurred before the next

Gemphire Therapeutics Inc.
Notes to Financial Statements - continued

financing round. In the event that a Qualified Financing, change of control, or an IPO did not occur before July 31, 2016, the parties would then negotiate a price for conversion into a new round of stock.

In December 2015, the Company amended the Interim Notes and certain investors agreed to loan the Company an additional \$2.7 million for a revised financing total of \$5.5 million. The Interim Notes continued to accrue interest at an 8% rate per annum compounded annually, but were amended to automatically convert into shares of the same class of the Company's next convertible preferred stock financing round (the Preferred Stock Financing). The conversion into shares issued in the Preferred Stock Financing would be equal to unpaid principal at 115% plus unpaid accrued interest. In the event that either a change of control occurs or the Company completes a public transaction which results in the Company's stockholders holding securities listed on a national securities exchange, including an IPO, before the Preferred Stock Financing, the Interim Notes, as amended, would automatically convert into shares of the Company's common stock at a conversion price of \$6.70585 per share (which represents the original issue price of the Series A preferred stock) based on 100% of outstanding principal and unpaid accrued interest. Lastly, if a Preferred Stock Financing, change of control, or public transaction did not occur before December 31, 2016, the parties agreed to then negotiate a conversion price into a new round of stock.

In February 2016, certain investors agreed to loan the Company an additional \$0.2 million for a revised financing total of \$5.6 million. The Interim Notes continued to accrue interest at an 8% rate per annum compounded annually, but were amended to automatically convert into shares of the same class of the Company's next Preferred Stock Financing. The conversion into shares issued in the Preferred Stock Financing would be equal to unpaid principal at 115% plus unpaid accrued interest. In the event that either a change of control occurs or the Company completes a public transaction which results in the Company's stockholders holding securities listed on a national securities exchange, including an IPO, before the Preferred Stock Financing, the Interim Notes, as amended, would automatically convert into shares of the Company's common stock at a conversion price of \$6.70585 per share (which represents the original issue price of the Series A preferred stock as adjusted for the Reverse Stock Split) based on 100% of outstanding principal and unpaid accrued interest. Lastly, if a Preferred Stock Financing, change of control, or public transaction did not occur before December 31, 2016, the parties agreed to then negotiate a conversion price into a new round of stock.

In April 2016, the Company amended the Interim Notes and certain investors agreed to loan the Company an additional \$5.0 million for a revised financing total, including Interim Notes previously issued, of \$10.6 million. The Interim Notes continued to accrue interest at an 8% rate per annum compounded annually, but were amended so that 125% of the unpaid principal and accrued interest, would automatically convert into shares of the same class of the Company's next convertible preferred stock financing round of at least \$5.0 million (the Qualified Financing). In the event that either a change of control occurs or the Company completes a public transaction which results in the Company's stockholders holding securities listed on a national securities exchange, including an IPO, before the Qualified Financing, 100% of outstanding principal and unpaid accrued interest on the Interim Notes, as amended, would automatically convert into shares of the Company's common stock at a conversion price of \$6.70585 per share, as adjusted for the Reverse Stock Split. Lastly, if a Qualified Financing, change of control, or public transaction did not occur, the Interim Notes would become payable on demand any time after December 31, 2016. The Company incurred issuance costs related to the April 2016 financing in the amount of \$10,000. The Interim Notes were discounted for the issuance costs, and the discount was amortized to interest expense over their remaining term using the straight-line method.

On August 10, 2016, immediately prior to the closing of the IPO, the Company's Interim Notes, together with accrued interest thereon, converted into 1,656,807 shares of common stock. At the time of their issuance, the Interim Notes contained a conversion premium with regard to the conversion into shares at the time of the next Qualified Financing. The Company determined that the redemption feature under the Interim Notes qualified as an embedded derivative and was separated from its debt host. The bifurcation of the embedded derivative from its debt host resulted in a discount to the Interim Notes. The discount was amortized to interest expense over the term of the Interim Notes using the straight-line method. The embedded derivative was accounted for separately on a fair market value basis. The Company recorded the fair value changes of the premium conversion derivative associated with the Interim Notes to interest income (expense) that amounted to \$0.2 million for the year ended December 31, 2016. As a result of the conversion of the Interim Notes, together with accrued interest thereon, into common stock immediately prior to the closing of the IPO on August 10, 2016, there were no Interim Notes or premium conversion derivatives outstanding as of December 31, 2018, 2017 or 2016.

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5. Commitments and Contingencies***Pfizer License Agreement***

In April 2011, the Company and Pfizer Inc. (Pfizer) entered into an exclusive license agreement (the Pfizer Agreement) for the clinical product candidate gemcabene. In exchange for this worldwide exclusive right and license to certain patent rights to make, use, sell, offer for sale and import the clinical product gemcabene, the Company agreed to certain milestone and royalty payments on future sales (See Note 6 — *License Agreement*). As of December 31, 2018, there was sufficient uncertainty with regard to both the outcome of the clinical trials and the ability to obtain sufficient funding to support any of the cash milestone payments under the license agreement, and as such, no liabilities were recorded related to the license agreement.

Series A Preferred Stock Dividends

Holders of the Series A preferred stock were entitled to cumulative accruing dividends at a simple rate of 8% per year on the original issue price of the preferred stock of \$6.70585 per share, as adjusted for the Reverse Stock Split. The dividends effectively accrued daily on each share of preferred stock. The dividends were payable upon the earliest to occur of (1) the date determined by the Board, (2) the liquidation of the Company (including a deemed liquidation event) or (3) the conversion or redemption of at least a majority of the outstanding shares of Series A preferred stock. If the board reasonably believed that the Company was not legally able to pay the dividends in cash at the payment date, or if elected by the majority of the Series A preferred stockholders or if issued in connection with an IPO, the dividends were to be paid in shares of common stock at the conversion price for the Series A preferred stock in effect at that time, which was the original issue price of the Series A preferred stock as adjusted from time to time for any stock dividends, combinations, splits or recapitalizations. Since the dividends were payable upon a contingent event, the Company did not record them in the accompanying financial statements while outstanding. On August 10, 2016, immediately prior to the closing of the IPO, the Company's Series A preferred stock, together with accrued dividends thereon, converted into 827,205 shares of common stock, and as such, there were no cumulative unpaid dividends for the Series A preferred stock as of December 31, 2018 and 2017.

Other Agreements

Both cancellable and non-cancellable facility agreements were in place that provided for fixed monthly rent for the years ended December 31, 2018, 2017 and 2016. The total rent expense was \$0.1 million, \$0.1 million and \$58,000 for the years ended December 31, 2018, 2017 and 2016, respectively. In May 2016, the Company entered into a new lease agreement for its headquarters location, commencing in August 2016. The initial term of the agreement is 3 years with an initial monthly base rent of approximately \$8,400 and increasing to approximately \$8,900 during the last year of the lease term. In conjunction with entering into the new lease agreement, the Company cancelled its original Northville, Michigan lease agreement, as amended, effective August 31, 2016 and renegotiated a new cancellable lease agreement for limited use of office space in the Northville location that expired in September 2017 that had nominal rent.

Future minimum lease payments under fixed non-cancellable operating leases that expire on various dates through August 2019 consist of the following (in thousands):

	<u>December 31,</u>
2019	<u>\$ 71</u>
Total	<u>\$ 71</u>

Other Commitments and Contingencies

In the ordinary course of business, from time to time, the Company may be subject to a broad range of claims and legal proceedings that relate to contractual allegations, patent infringement, employment-related matters and other claims. The Company establishes accruals for matters which it believes that losses are probable and can be reasonably estimated. Although it is not possible to predict with certainty the outcome of these matters, the Company is of the opinion that the ultimate resolution of these matters will not have a material adverse effect on its results of operations or financial position.

6. License Agreement

The Company is party to the Pfizer Agreement, as amended on August 2, 2018, for a worldwide exclusive license to certain patent rights and a non-exclusive royalty bearing right and license to certain related data to make, use, develop, commercialize, import and otherwise exploit the clinical product candidate gemcabene. Pfizer retains the right to make, use and import gemcabene solely for internal research purposes.

In partial exchange for the rights granted by Pfizer, the Company agreed to issue shares of its common stock to Pfizer representing 15% of the Company's fully diluted capital at the close of its first arms-length Series A financing, which occurred on March 31, 2015.

The Company agreed to make milestone payments totaling up to \$37 million upon the achievement of certain milestones, including the first new drug application (or its foreign equivalent) in any country, regulatory approval in each of the United States, Europe and Japan, the first anniversary of the first regulatory approval in any country, and upon achieving certain aggregate sales levels of gemcabene. Future milestone payments under the Pfizer Agreement, if any, are not expected to begin for at least several years and extend over a number of subsequent years.

The Company also agreed to pay Pfizer tiered royalties on a country-by-country basis based upon the annual amount of net sales, as specified in the Pfizer Agreement, until the later of: (a) five (5) years after the first commercial sale in such country; (b) the expiration of all regulatory or data exclusivity for gemcabene in such country; and (c) the expiration or abandonment of the last valid claim of the licensed patents, including any patent term extensions or supplemental protection certificates in such country (collectively, the Royalty Term). Under the Pfizer Agreement, the Company is obligated to use commercially reasonable efforts to develop and commercialize gemcabene.

On March 31, 2015, upon the closing of the Series A preferred stock financing, the Company issued 675,250 shares of its common stock, at a fair market value of \$0.9 million, to Pfizer in connection with the first equity payment, pursuant to which Pfizer became the owner of more than 5% of the Company's capital stock. The transaction was recorded as acquired in-process research and development expenses based on the fair value of the common shares issued since no processes or activities that would constitute a "business" were acquired and none of the rights and underlying assets acquired had alternative future uses or reached a stage of technological feasibility. None of the other milestone or royalty payments were triggered as of December 31, 2018.

The Pfizer Agreement will expire upon expiration of the last Royalty Term. On expiration (but not earlier termination), the Company will have a perpetual, exclusive, fully paid-up, royalty-free license under the licensed patent rights and related data to make, use, develop, commercialize, import and otherwise exploit the clinical product candidate gemcabene. Either party may terminate the Pfizer Agreement for the other party's material breach following a cure period or immediately upon certain insolvency events relating to the other party. Pfizer may immediately terminate the Pfizer Agreement in the event that (i) the Company or any of its affiliates or sublicensees contests or challenges, or supports or assists any third party to contest or challenge, Pfizer's ownership of or rights in, or the validity, enforceability or scope of any of the patents licensed under the Pfizer Agreement or (ii) the Company or any of its affiliates or sublicensees fails to achieve the first commercial sale in at least one country by April 16, 2024. Furthermore, upon termination of the Pfizer Agreement by Pfizer for any of the foregoing reasons, the Company grants Pfizer a non-exclusive, fully paid-up, royalty free, worldwide, transferrable, perpetual and irrevocable license to use any intellectual property rights arising from the development or commercialization of gemcabene by the Company and any trademarks identifying gemcabene and agrees to transfer regulatory filings and approvals to Pfizer or permit Pfizer to cross-

Gemphire Therapeutics Inc.
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reference and rely on such regulatory filings and approvals for gemcabene. The Company may terminate the License Agreement for convenience upon 90 days' written notice and payment of an early termination fee.

7. Convertible Series A Preferred Stock

On March 31, 2015, the Company issued 745,637 shares of Series A preferred stock at a per share price of \$6.70585, as adjusted for the Reverse Stock Split, or \$5.0 million in the aggregate, consisting of \$1.5 million in cash and \$3.5 million representing 125% of the principal and accrued and unpaid interest on previously issued convertible notes, all of which converted into shares of Series A preferred stock. On August 10, 2016, immediately prior to the closing of the IPO, the Company's Series A preferred stock, together with accrued dividends thereon, converted into 827,205 shares of common stock.

Prior to their conversion into shares of common stock, the Series A preferred stock had the following rights and preferences:

Dividend Rights

Dividends effectively accrued on a daily basis at a simple rate of 8% per annum on the sum of the original per share issue price. Dividends were effectively deemed declared daily and were payable upon the occurrence of certain events. In addition, the holders of the Series A preferred stock had rights to participate in common stock dividends, entitling holders of Series A preferred stock to a dividend payable at the same time as the dividend paid on common stock based on the number of shares of common stock each share of Series A preferred stock would convert into if such shares had converted on the record date.

There were no dividends deemed payable and accrued as of December 31, 2018 or 2017 due to the conversion of the Series A preferred stock, together with accrued dividends thereon, on August 10, 2016 immediately prior to the closing of the IPO.

Voting Rights

Each share of Series A preferred stock was entitled to vote together with the common stock on all actions to be taken by the stockholders of the Company, based on the number of shares of common stock into which each share of Series A preferred stock could be converted. A separate vote of a majority of the outstanding shares of Series A preferred stock was required to (1) issue or authorize any class or series of equity securities or equivalents, (2) effect any transaction that results in a change in control, (3) change the principal business of the Company, enter new lines of business, or exit the current line of business, (4) issue of convertible debt above a certain threshold, or (5) materially sell, transfer, license, pledge or encumber technology or intellectual property. A management stock option plan approved by the board of directors, however, was not subject to a separate vote of the Series A preferred stockholders, but any subsequent increases to the authorized option pool were subject to approval by the Series A preferred stock holders via a separate vote.

Liquidation Rights

In the event of any liquidation, dissolution, or winding-up of the Company, whether voluntary or involuntary, merger, consolidation or transaction in which over 50% of the Company's voting power was transferred, or a sale, lease, transfer, exclusive license or disposition of all or substantially all of the assets of the Company, the Series A preferred stock holders were entitled to the assets of the Company legally available for distribution before any distribution or payment was made to the holders of common stock. The distribution amount would have been equal the original issue price of the Series A preferred stock (as adjusted for any stock dividends, combinations, splits or other recapitalizations since issuance), plus any accrued or declared but unpaid dividends thereon. After payment of the full liquidation preference to the Series A preferred stock holders, the remaining assets legally available for distribution would have been distributed to the holders of common stock and holders of the Series A preferred stock pro rata based on the number of shares of common stock each share of Series A preferred stock would convert into if such shares had converted immediately prior to such liquidation, dissolution, or winding-up.

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Conversion Rights

Shares of Series A preferred stock, at the option of the holder, could have been converted at any time into shares of common stock. The conversion rate would have been obtained by dividing the Series A preferred stock original issue price of \$6.70585 per share, as adjusted for the Reverse Stock Split, by the conversion price per share in effect at the time of conversion. The Series A conversion price was initially equal to the original issue price, but could be adjusted on a broad-based weighted average basis in connection with certain dilutive events. The Series A holder was also entitled to receive additional shares of common stock for any unpaid Series A dividends (whether or not declared).

Shares of Series A preferred stock would have automatically converted into common stock based upon the then-effective Series A conversion price upon the affirmative vote or consent of the holders of at least a majority of the outstanding shares of the Series A preferred stock, or at the closing of a firmly underwritten public offering.

The conversion price for the Series A preferred stock was \$6.70585 per share (as adjusted for the Reverse Stock Split) at the time of the conversion of the Series A preferred stock, together with accrued dividends thereon, immediately prior to the closing of the IPO on August 10, 2016.

Redemption Rights

The holders of at least 80% of the outstanding shares of Series A preferred stock could have required the Company to redeem all outstanding shares of Series A preferred stock at any time on or after December 31, 2020 at a redemption price equal to the greater of 150% of the liquidation preference of the Series A preferred stock or the fair market value per share plus any unpaid declared dividends. The liquidation preference of the Series A preferred stock was defined as an amount per share equal to \$6.70585, as adjusted from time to time for any stock dividends, combinations, splits or recapitalizations, plus any accrued or declared but unpaid dividends thereon.

The redemption value for redeemable preferred stock could have at times been based on fair market value. The assumptions used in calculating the estimated fair market value at each reporting period represented the Company's best estimate, however, inherent uncertainties were involved. As a result, if factors or assumptions changed, the estimated fair value could have been materially different.

The Company recognized changes in the redemption value immediately as they occurred and adjusted the carrying amount of the instrument to equal the redemption value at the end of each reporting period since it was probable that the instruments would have become redeemable. In the absence of retained earnings, these charges were recorded against additional paid-in-capital, if any, and then to accumulated deficit.

The Company evaluated the Series A preferred stock and determined that it was considered an equity host under ASC 815, *Derivatives and Hedging*. In making this determination, the Company's analysis followed the whole instrument approach that compared an individual feature against the entire Series A preferred stock instrument that included that feature. The Company's analysis was based on a consideration of the economic characteristics and risks of the Series A preferred stock. More specifically, the Company evaluated all of the stated and implied substantive terms and features of the Series A preferred stock, including: (1) redemption features and their underlying exercisability, (2) existence of any protective covenants, (3) nature of dividends rights, (4) nature of voting rights, and (5) the existence and nature of any conversion rights. As a result of the above, the Company concluded that the Series A preferred stock represented an equity host, and as such, the redemption and/or conversion features of the Series A preferred stock were considered to be clearly and closely related to the associated Series A preferred stock host instrument. Accordingly, the redemption and/or conversion features of the Series A preferred stock were not considered an embedded derivative that required bifurcation.

8. Stockholders' Equity (Deficit)

Common Stock

The Company had 14,265,411 and 10,633,042 shares of its common stock issued and outstanding as of December 31, 2018 and December 31, 2017, respectively. Voting, dividend and liquidation rights of the holders of the common stock are subject to the Company's articles of incorporation, corporate bylaws and underlying shareholder agreements.

In the first quarter of 2018, the Company completed the Follow-On Offering of 3,592,858 shares of common stock which includes 450,000 shares of common stock purchased by the underwriters upon the partial exercise of their overallotment option, at the public offering price of \$7.00 per share. The Company received net proceeds of approximately \$23.1 million after deducting underwriting discounts and commissions and offering expenses. The costs incurred related to the Follow-On Offering were \$2.1 million through December 31, 2018.

On March 15, 2017, the Company issued and sold 1,324,256 units at a price of \$9.47 per unit for gross proceeds of approximately \$12.5 million in connection with the Private Placement. Each unit consisted of one share of the Company's common stock and a warrant to purchase 0.75 shares of common stock. The Company received net proceeds of approximately \$11.3 million after deducting underwriting discounts and commissions and offering expenses. Offering costs incurred related to the 2017 Private Placement were \$1.3 million.

Warrants

In connection with the Private Placement, the Company issued warrants to the investors participating in the financing to purchase an additional 993,204 shares of common stock. The warrants have a term of five years and were exercisable immediately upon issuance with an exercise price equal to \$10.40 per share. The warrants were classified as additional paid-in capital and recorded based on their relative fair value to the underlying common shares issued in the Private Placement. The fair market value of the warrants was approximately \$4.9 million. The warrants were valued using the Black-Scholes pricing model with the following assumptions: a risk-free interest rate of 2.0%, a contractual term of five years, zero dividend yield and a volatility factor of 65.1%.

In connection with the First Amendment, the Company issued a warrant to SVB to purchase an additional 36,000 shares of common stock on July 31, 2018 (See Note 4 – *Debt*).

During the years ended December 31, 2018 and 2017, zero and 15,000 warrants were exercised, respectively. As of December 31, 2018 and December 31, 2017, warrants to purchase 1,014,204 and 978,204 shares of common stock were outstanding, respectively.

Dividend Rights

Common stock holders are entitled to receive dividends at the sole discretion of the board of directors of the Company. There have been no dividends declared on common stock as of December 31, 2018.

Voting Rights

The holders of common stock are entitled to one vote for each share of common stock along with all other classes and series of stock of the Company on all actions to be taken by the stockholders of the Company, including actions that would amend the certificate of incorporation of the Company to increase the number of authorized shares of the common stock.

Liquidation Rights

In the event of any liquidation, dissolution, or winding-up of the Company, the holders of common stock shall be entitled to share in the remaining assets of the Company available for distribution post preferential distributions made to holders of the Company's preferred stock. There was no preferred stock outstanding as of December 31, 2018 and 2017.

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Notes to Financial Statements - continued

Deferred Offering Costs

There were \$21,000 of deferred offering costs capitalized at December 31, 2017 related to the Private Placement. There were no deferred offering costs capitalized as of December 31, 2018.

9. Share-Based Compensation

Share-based compensation expense was included in general and administrative and research and development costs as follows in the accompanying statements of comprehensive loss (in thousands):

	Year Ended December 31,		
	2018	2017	2016
General and administrative	\$ 2,378	\$ 4,091	\$ 1,166
Research and development	1,753	1,182	552
Total share-based compensation	\$ 4,131	\$ 5,273	\$ 1,718

Restricted Stock Awards

During the years ended December 31, 2018, 2017 and 2016, the Company did not grant any restricted stock awards (RSAs). Previously granted RSAs were subject to various vesting schedules and generally vested ratably over a six to twenty four month period coinciding with their respective service periods. During the years ended December 31, 2018, 2017 and 2016, no RSAs were forfeited.

A summary of RSA grant activity is as follows:

	Number of Shares	Weighted-Average Fair Value (per share)
Non-vested at December 31, 2015	348,093	\$ 0.09
Granted	—	\$ —
Vested	(344,084)	\$ 0.09
Non-vested at December 31, 2016	4,009	\$ 0.21
Granted	—	\$ —
Vested	(4,009)	\$ 0.21
Non-vested at December 31, 2017	—	\$ —
Granted	—	\$ —
Vested	—	\$ —
Non-vested at December 31, 2018	—	\$ —

Grant date fair market value for the RSAs issued prior to the IPO was based on traditional valuation techniques and methods in determining the fair value of the Company's equity as a private company including market, income, and cost valuation approaches. A number of objective and subjective factors were considered including contemporaneous and retrospective valuations of its common stock performed by an unrelated valuation specialist, sales of the Company's convertible preferred stock to unrelated third parties, valuations of comparable peer public companies, the lack of liquidity of the Company's capital stock and general and industry-specific economic outlook. The fair value of the Company's common stock was determined by the Company's board of directors prior to the IPO.

Stock Options

In April 2015, the Company adopted a 2015 Equity Incentive Plan (the 2015 Plan) under which 320,615 shares of the Company's common stock were reserved for issuance to employees, directors and consultants. The 2015 Plan permits the grant of incentive and non-statutory stock options, appreciation rights, restricted stock, restricted stock units, performance stock and cash awards, and other stock-based awards.

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Amendment and Restatement of 2015 Equity Incentive Plan

In April 2016 the Company's board of directors approved the Company's amended and restated 2015 Plan (the A&R 2015 Plan). The A&R 2015 Plan became effective immediately upon the execution and delivery of the underwriting agreement related to the IPO. The A&R 2015 Plan provides for the grant of stock options, stock appreciation rights, restricted stock awards, restricted stock unit awards, performance-based stock awards and other forms of equity awards, as well as performance cash awards. The Company initially reserved 2,400,000 shares of common stock for issuance under the A&R 2015 Plan.

During the years ended December 31, 2018, 2017 and 2016, the Company granted an aggregate of 772,000, 150,500 and 1,825,700, respectively, of stock options under the A&R 2015 Plan or the 2015 Plan to its officers, directors, employees and consultants, generally vesting over a three or four-year period.

Inducement Plan

In September 2016 the Company's board of directors approved the Company's Inducement Plan (the Inducement Plan). The Company initially reserved 300,000 shares of its common stock to be used exclusively for grants of awards to individuals who were not previously employees or directors of the Company, as an inducement material to the individual's entry into employment with the Company within the meaning of Rule 5635(c)(4) of the Nasdaq Listing Rules. The Plan was approved by the Company's board of directors without stockholder approval pursuant to Rule 5635(c)(4), and the terms and conditions of the Plan are substantially similar to the Company's stockholder-approved A&R 2015 Plan. During the years ended December 31, 2018, 2017 and 2016 was 50,000, 98,000 and 198,000 stock options to newly-hired officers and employees were granted, respectively, under the Inducement Plan, generally vesting over a four-year period.

The following table summarizes the Company's stock option plan activity for the years ended December 31, 2018, 2017 and 2016 as follows:

	Number of Options	Weighted Average Exercise Price	Weighted- Average Remaining Contractual Term (years)	Aggregate Intrinsic Value(1)
Outstanding at December 31, 2015	302,842	\$ 2.43	9.60	\$ 1,031,000
Granted	2,023,700	\$ 10.07	—	—
Exercised	—	\$ —	—	—
Forfeited/Cancelled	(83,742)	\$ 9.12	—	—
Outstanding at December 31, 2016	2,242,800	\$ 9.07	9.48	\$ (2,759,000)
Granted	248,500	\$ 12.24	—	—
Exercised	(23,910)	\$ 1.92	—	—
Forfeited/Cancelled	(3,250)	\$ 1.34	—	—
Outstanding at December 31, 2017	2,464,140	\$ 9.46	8.58	\$ (3,715,000)
Granted	822,000	\$ 8.24	—	—
Exercised	(40,398)	\$ 2.25	—	—
Forfeited/Cancelled	(444,968)	\$ 10.61	—	—
Outstanding at December 31, 2018	2,800,774	\$ 9.02	7.96	\$ (22,994,287)
Vested and exercisable at December 31, 2018	1,812,181	\$ 9.15	7.72	\$ (15,120,294)
Vested and expected to vest at December 31, 2018	2,800,774	\$ 9.02	7.96	\$ (22,994,287)

(1) The aggregate intrinsic value is calculated as the difference between the exercise price of the underlying options and the fair value of our common stock as of December 31, 2018, 2017 and 2016 of \$0.81, \$7.95 and \$7.84 per share, respectively.

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The weighted average fair value per share of options granted during the years ended December 31, 2018, 2017 and 2016 was \$5.07, \$7.35 and \$6.37, respectively.

The Company measures the fair value of stock options with service-based and performance-based vesting criteria to employees, consultants and directors on the date of grant using the Black-Scholes option pricing model. The fair value of equity instruments issued to non-employees is re-measured as the award vests. The Company does not have history to support a calculation of volatility and expected term. As such, the Company has used a weighted-average volatility considering the volatilities of several guideline companies.

For purposes of identifying similar entities, the Company considered characteristics such as industry, length of trading history, and stage of life cycle. The assumed dividend yield was based on the Company's expectation of not paying dividends in the foreseeable future. The average expected life of the options was determined based on the mid-point between the vesting date and the end of the contractual term according to the "simplified method" as described in Staff Accounting Bulletin 110. The risk-free interest rate is determined by reference to implied yields available from U.S. Treasury securities with a remaining term equal to the expected life assumed at the date of grant. The Company records forfeitures when they occur.

The weighted-average assumptions used in the Black-Scholes option-pricing model are as follows:

	Year Ended December 31,		
	2018	2017	2016
Expected stock price volatility	66.3 %	65.8 %	71.447 %
Expected life of options (years)	5.8	5.9	6.02
Expected dividend yield	0 %	0 %	0 %
Risk free interest rate	2.7 %	2.0 %	1.2 %

During the years ended December 31, 2018, 2017 and 2016, 709,521, 861,645 and 276,248 stock options vested, respectively. The weighted average fair value per share of options vesting during the years ended December 31, 2018, 2017 and 2016 was \$6.15, \$5.99 and \$4.59, respectively. During the years ended December 31, 2018, 2017 and 2016, 444,968, 3,250, and 83,742 stock options were forfeited, respectively. As of December 31, 2018, 701,261 shares were available for future issuance under the A&R 2015 and Inducement Plans.

Under the A&R 2015 Plan, common shares reserved automatically increase on January 1st of each year, for a period of 10 years commencing on January 1, 2017 and ending on (and including) January 1, 2026, to an amount equal to 20% of the Company's fully-diluted shares as of December 31st of the preceding calendar year. Notwithstanding the foregoing, the Company's board of directors may act prior to January 1st of a given year to provide that there will be no January 1st increase in the shares reserved for such year, or that the increase in shares reserved for such year will be a lesser number of shares than what would have otherwise been allowed to occur under the provision. Effective January 1, 2018, 415,077 shares were added to the A&R 2015 Plan under the share reserve provision. There were no shares added to the A&R 2015 Plan under the share reserve provision during fiscal year 2017 or 2016. Effective January 1, 2019, 501,001 shares were added to the A&R 2015 Plan under the share reserve provision. See Note 16 – *Subsequent Events*.

Unrecognized share-based compensation cost for the RSAs and stock options issued under the Company's 2014 Shareholders Agreement, A&R 2015 Plan and Inducement Plan was \$3.9 million as of December 31, 2018. All of the unrecognized compensation cost was related to the stock options. The non-employee portion of the unrecognized compensation cost was estimated utilizing the Company's fair market value for its common stock as of December 31, 2018. The unrecognized share-based expense is expected to be recognized over a weighted average period of 1.5 years.

Adoption of 2016 Employee Stock Purchase Plan

In April 2016 the Company's board of directors approved the 2016 Employee Stock Purchase Plan (the ESPP) in order to enable eligible employees to purchase shares of the Company's common stock at a discount following the effective date

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of the IPO. The Company's stockholders also approved the ESPP in April 2016 and the ESPP became effective immediately upon the execution and delivery of the underwriting agreement related to the IPO. The Company initially reserved 150,000 shares of common stock for issuance under the ESPP. As of December 31, 2018, no shares were purchased under the ESPP.

10. Net Loss Per Common Share

Basic earnings or loss per share of common stock is computed by dividing net loss by the weighted average number of shares of common stock outstanding during the period. The holders of the Series A preferred stock had rights to participate in common stock dividends, entitling the holders of Series A preferred stock to a dividend payable at the same time and rate per share as the dividend paid on common stock based on the number of shares of common stock each share of Series A preferred stock would have converted into if such shares had converted on the record date. The Series A preferred stock, however, did not have a contractual obligation to share in the losses of the Company, and as such, no losses were allocated to the Series A preferred stock for the purposes of the basic loss per share calculation while they were outstanding.

Diluted earnings or loss per share of common stock is computed similarly to basic earnings or loss per share except the weighted average shares outstanding are increased to include additional shares from the assumed exercise of any common stock equivalents, if dilutive. The Company's RSAs, stock options, warrants, shares of Series A preferred stock, and convertible notes are considered common stock equivalents while outstanding for this purpose. Diluted earnings is computed utilizing the treasury stock method for the RSAs, stock options and warrants, and in the case of the Series A preferred stock, either the two-class method or the if-converted method, whichever was more dilutive. No incremental common stock equivalents were included in calculating diluted loss per share because such inclusion would be anti-dilutive given the net loss reported for the years ended December 31, 2018, 2017 and 2016. The following table sets forth the computation of basic and diluted loss per share as of December 31, 2018, 2017 and 2016 (in thousands, except share and per share amounts):

	Year Ended		
	2018	2017	2016
Numerator:			
Net loss	\$ (23,637)	\$ (33,415)	\$ (14,586)
Adjustment to redemption value on Series A convertible preferred stock	—	—	(366)
Net loss attributed to common stock holders	<u>\$ (23,637)</u>	<u>\$ (33,415)</u>	<u>\$ (14,952)</u>
Denominator:			
Basic and diluted weighted average common shares outstanding	13,805,552	10,349,136	5,809,396
Basic and diluted net loss per share	<u>\$ (1.71)</u>	<u>\$ (3.23)</u>	<u>\$ (2.57)</u>

The following potential common shares were not considered in the computation of diluted net loss per share as their effect would have been anti-dilutive:

	Year Ended		
	2018	2017	2016
Stock options	2,800,774	2,464,140	2,242,800
Restricted stock awards	—	—	4,009
Warrants	1,014,204	978,204	—
Series A	—	—	—
Convertible notes	—	—	—

11. Fair Value Measurements

The Company follows accounting guidance that emphasizes that fair value is a market-based measurement, not an entity specific measurement. Fair value is defined as "the price that would be received to sell an asset or paid to transfer a

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liability in an orderly transaction between market participants at the measurement date.” Fair value measurements are defined on a three level hierarchy:

Level 1 inputs: Unadjusted quoted prices for identical assets or liabilities in active markets;

Level 2 inputs: Quoted prices for similar assets and liabilities in active markets, quoted prices in markets that are not active, or inputs which are observable, weather directly or indirectly, for substantially the full term of the asset or liability;

Level 3 inputs: Unobservable inputs that reflect the Company’s own assumptions about the assumptions market participants would use in pricing the asset or liability in which there is little, if any, market activity for the asset or liability at the measurement date.

As of December 31, 2018 and 2017, the fair values of cash and cash equivalents, prepaids, other assets, accounts payable and accrued liabilities approximated their carrying values because of the short-term nature of these assets or liabilities. The estimated fair value of the Company’s Interim Notes prior to conversion upon the close of the IPO, and Term Loan was based on amortized cost which was deemed to approximate fair value. The derivative liability associated with the conversion premium on the Interim Notes while outstanding was based on cash flow models discounted at current implied market rates evidenced in recent arms-length transactions representing expected returns by market participants for similar instruments which were based on Level 3 inputs.

The following table provides a roll-forward of the Company’s premium conversion derivative liabilities measured at fair value on a recurring basis using unobservable level 3 inputs (in thousands):

	For the Year Ended December 31,		
	2018	2017	2016
Balance as of beginning of period	\$ —	\$ —	\$ 345
Issuance of underlying convertible notes	—	—	505
Change in fair value of premium conversion derivative	—	—	(850)
Reversal of premium conversion derivative associated with note extinguishment	—	—	—
Redemption of underlying convertible notes	—	—	—
Balance as of end of period	<u>\$ —</u>	<u>\$ —</u>	<u>\$ —</u>

There were no financial instruments measured on a recurring basis as of December 31, 2018 and 2017 and on a non-recurring basis for any of the periods presented.

12. Income Taxes

On December 22, 2017, the Tax Cuts and Jobs Act (the TCJA), which significantly modified U.S. corporate income tax law, was signed into law by President Trump. The TCJA contains significant changes to corporate income taxation, including but not limited to the reduction of the corporate income tax rate from a top marginal rate of 35% to a flat rate of 21%, limitation of the tax deduction for interest expense to 30% of earnings (except for certain small businesses), limitation of the deduction for net operating losses to 80% of current year taxable income and generally eliminating net operating loss carrybacks, allowing net operating losses to carryforward without expiration, one-time taxation of offshore earnings at reduced rates regardless of whether they are repatriated, elimination of U.S. tax on foreign earnings (subject to certain important exceptions), immediate deductions for certain new investments instead of deductions for depreciation expense over time, and modifying or repealing many business deductions and credits (including changes to the orphan drug tax credit and changes to the deductibility of research and experimental expenditures that will be effective in the future). This revaluation resulted in a reduction to the Company’s deferred tax asset of \$6.8 million as of December 31, 2017. This amount was offset by a corresponding reduction to the Company’s valuation allowance. The other provisions of the TCJA did not have a material impact on the December 31, 2017 financial statements. The Company’s final determination of the TCJA impact and the remeasurement of its deferred assets and liabilities was completed prior to the deadline of one year from the enactment of the TCJA. For the year ended December 31, 2018, there were no material changes to the analysis originally performed as of December 31, 2017.

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Notes to Financial Statements - continued

The effective tax rate for the years ended December 31, 2018, 2017 and 2016 was zero percent. A reconciliation of income tax computed at the statutory federal income tax rate to the provision (benefit) for income taxes included in the accompanying statements of comprehensive loss is as follows:

	For the Year Ended December 31,		
	2018	2017	2016
Income tax (benefit) provision at federal statutory rate	(21.0)%	(34.0)%	(34.0)%
Valuation allowance	28.2	21.0	40.2
U.S. tax reform	-	20.2	-
State income tax, net of federal benefit	(4.8)	(4.1)	(4.7)
Convertible notes	-	-	1.1
Research credits	(3.0)	(3.6)	(4.0)
Other	0.6	0.5	1.4
Effective tax rate	—%	—%	—%

Significant components of the Company's deferred tax assets and liabilities are summarized in the tables below as of (in thousands):

	Year Ended December 31,	
	2018	2017
Deferred tax assets:		
Federal and state operating loss carryforwards	\$ 5,073	\$ 3,349
Research and development costs deferral election	12,264	8,881
Acquired intangibles	235	235
Term loan	-	33
Charitable contributions	21	14
Stock-based compensation	2,618	1,722
Research and development credit carryforwards	2,655	1,947
	22,866	16,181
Valuation allowance	(22,866)	(16,181)
Total deferred tax assets, net of valuation allowance	-	-
Deferred tax liabilities:		
Total deferred tax liabilities	-	-
Net deferred tax assets	\$ -	\$ -

As of December 31, 2018 and 2017, the Company had gross deferred tax assets of approximately \$22.9 million and \$16.2 million, respectively. Realization of the deferred assets is primarily dependent upon future taxable income, if any, the amount and timing of which are uncertain. The Company has had significant pre-tax losses since its inception. The Company has not yet generated revenues and faces significant challenges to becoming profitable. Accordingly, the net deferred tax assets have been fully offset by a valuation allowance of \$22.9 million and \$16.2 million as of December 31, 2018 and 2017, respectively. U.S. net deferred tax assets will continue to require a valuation allowance until the Company can demonstrate their realizability through sustained profitability or another source of income.

As of December 31, 2018 and 2017, the tax effect of the Company's federal net operating loss carryforwards was approximately \$4.2 million and \$2.8 million, respectively. The Company had federal research credit carryforwards as of December 31, 2018 and 2017 of approximately \$2.6 million and \$1.9 million, respectively. The federal net operating loss incurred prior to January 1, 2018 and tax credit carryforwards will begin to expire in 2034 if not utilized. Federal net operating losses incurred after December 31, 2017 will not expire. As of December 31, 2018 and 2017, the Company had state net operating loss carryforwards with a tax effect of approximately \$0.9 million and \$0.6 million, respectively. The Company had state research credit carryforwards of \$0.1 million and \$45,000 as of December 31, 2018 and 2017, respectively. The state net operating loss carryforwards will begin to expire in 2026, if not utilized, and the state research credit carryforwards will begin to expire in 2023 if not utilized. Recent tax reform legislation has significantly revised the rules applicable to the utilization of net operating losses for tax years either beginning or ending after January 1, 2018.

Utilization of the net operating loss carryforwards and credits may be subject to a substantial annual limitation due to the ownership change limitations provided by Section 382 of the Internal Revenue Code of 1986, as amended, and similar

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state provisions. Generally, in addition to certain entity reorganizations, the limitation applies when one or more “5-percent shareholders” increase their ownership, in the aggregate, by more than 50 percentage points over a 36-month time period testing period, or beginning the day after the most recent ownership change, if shorter. The annual limitation may result in the expiration of net operating losses and credits before utilization.

The Company recognizes interest and/or penalties related to uncertain tax positions in income tax expense. There were no uncertain tax positions as of December 31, 2018 and 2017, and as such, no interest or penalties were recorded to income tax expense.

The Company’s corporate returns are subject to examination beginning with the 2015 tax year for federal and in various state jurisdictions.

13. Supplementary Data — Quarterly Financial Data (unaudited)

The following table presents certain unaudited quarterly financial information for each of the eight fiscal quarters in the period ended December 31, 2018. This quarterly information has been prepared on the same basis as the audited financial statements and includes all adjustments, consisting only of normal recurring adjustments, necessary for a fair presentation of the information for the periods presented. The results for these quarterly periods are not necessarily indicative of the operating results for a full year or any future period.

	Three Months Ended			
	December 31, 2018 (B)	September 30, 2018 (B)	June 30, 2018	March 31, 2018
	(in thousands, except per share amounts)			
Operating expenses:				
General and administrative	\$ 1,468	\$ 2,364	\$ 2,574	\$ 2,087
Research and development	1,833	3,542	3,960	4,977
Total operating expenses	3,301	5,906	6,534	7,064
Loss from operations	(3,301)	(5,906)	(6,534)	(7,064)
Interest expense	(178)	(172)	(144)	(160)
Other expense	(177)	(1)	—	—
Loss before income taxes	(3,656)	(6,079)	(6,678)	(7,224)
Provision (benefit) for income taxes	—	—	—	—
Net loss	(3,656)	(6,079)	(6,678)	(7,224)
Other comprehensive loss, net of tax	—	—	—	—
Comprehensive loss	\$ (3,656)	\$ (6,079)	\$ (6,678)	\$ (7,224)
Net loss per share:				
Basic and diluted (A)	\$ (0.26)	\$ (0.43)	\$ (0.47)	\$ (0.58)

	Three Months Ended			
	December 31, 2017	September 30, 2017	June 30, 2017	March 31, 2017
	(in thousands, except per share amounts)			
Operating expenses:				
General and administrative	\$ 1,487	\$ 2,050	\$ 4,678	\$ 2,223
Research and development	5,080	6,489	5,837	5,280
Total operating expenses	6,567	8,539	10,515	7,503
Loss from operations	(6,567)	(8,539)	(10,515)	(7,503)
Interest (expense) income	(179)	(132)	13	12
Other expense	—	—	—	(6)
Loss before income taxes	(6,746)	(8,671)	(10,502)	(7,496)
Provision (benefit) for income taxes	—	—	—	—
Net loss	(6,746)	(8,671)	(10,502)	(7,496)
Other comprehensive loss, net of tax	—	—	—	—
Comprehensive loss	\$ (6,746)	\$ (8,671)	\$ (10,502)	\$ (7,496)
Net loss per share:				
Basic and diluted (A)	\$ (0.63)	\$ (0.82)	\$ (0.99)	\$ (0.79)

(A) Net loss per share for the year may not equal the sum of the four historical quarters loss per share due to changes in weighted-average shares outstanding.

(B) On September 18, 2018, the Company’s Board of Directors approved a workforce reduction involving 5 employees (or 33% of the workforce at that time) to lower costs and conserve cash resources in light of the previously announced request by the FDA for additional pre-clinical data required in order to schedule an End of Phase 2 (EOP2) meeting for gemcabene in the Company’s target indications. Related expenses recognized during the year ended December 31, 2018 totaled approximately \$1.6 million, largely in the third quarter, of

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Notes to Financial Statements - continued

which approximately \$0.6 million was recorded as general and administrative expense and \$1.0 million was recorded as research and development expense.

14. Related Party Transactions

The Company rented an office in Northville, Michigan from an LLC owned by two officers under short-term agreements during the years ended December 31, 2017, 2016 and 2015. The original facility lease, as amended, was cancelled and replaced with a cancellable lease agreement in August 2016 for limited use of office space in the same Northville location. The new lease agreement became effective in August 2016 and expired in September 2017. Rent expense under the related party agreements was nominal during the year ended December 31, 2017 and was \$21,000 and \$23,000 during the years ended December 31, 2016 and 2015, respectively. There was no rent expense under the related party agreements during the year ended December 31, 2018.

In February 2016, the Company issued an additional \$0.2 million of Interim Notes, which included two notes issued to two board members (or entities they control) in the amount of \$81,000. The February 2016 Interim Note issuances also included a \$20,000 note to an investor who is related to an officer of the Company. The Interim Note were converted upon the close of the IPO.

In April 2016, the Company issued an additional \$5.0 million of Interim Notes, which included two notes to investors who were related to two of the Company's officers in the aggregate amount of \$0.2 million. The April 2016 Interim Notes issuances also included three notes to investors who were related to three of the Company's directors in the aggregate amount of \$2.3 million. The Interim Note were converted upon the close of the IPO.

The IPO included 154,450 shares sold to 5 officers and 3 board members, totaling \$1.5 million. In addition, 500,000 shares were sold to 1 investor who is related to 1 of the Company's directors, totaling \$5.0 million, and 47,000 shares totaling \$0.5 million were sold to 14 investors who are related to 5 officers of the Company.

The Private Placement included 56,678 units sold to three board members, for aggregate proceeds totaling approximately \$0.5 million, and 52,798 units sold to one investor who was related to one board member, for proceeds totaling approximately \$0.5 million.

In the first quarter of 2018, in connection with the Follow-On Offering of 3,592,858 shares of common stock, the offering included 14,286 shares sold to 1 officer, for aggregate proceeds totaling approximately \$0.1 million and 71,429 shares sold to 1 investor who is an affiliate of 1 officer and board member, for proceeds totaling approximately \$0.5 million.

15. Defined Contribution Plan

The Company adopted a 401(k) defined contribution plan on September 5, 2017, effective as of January 1, 2017, for all employees over age 21. Employees can defer up to 100% of their compensation through payroll withholdings into the plan subject to federal law limits. Effective January 1, 2018, the Company began matching contributions on deferrals at 100% of deferrals up to 3% of one's contributions and 50% on deferrals over 3%, but not exceeding 5% of one's contributions in order to satisfy certain non-discrimination tests required by the Internal Revenue Code. Employee contributions and any employer matching contributions made to satisfy certain non-discrimination tests required by the Internal Revenue Code are 100% vested upon contribution. Discretionary employer matches vest over a six-year period beginning on the second anniversary of an employee's date of hire. The amount of matching contributions made during the years ended December 31, 2018 and 2017 was \$0.1 million and zero, respectively.

16. Subsequent Events**Term Loan**

Effective January 28, 2019, the Company prepaid in full all outstanding indebtedness under the Term Loan. As of the date of repayment, the Company had approximately \$8.9 million in principal and interest outstanding as well as a final payment fee due of \$1.0 million. Upon repayment, approximately \$0.8 million of unamortized note discounts were recognized as interest expense. See Note 4 – *Debt* for further information relating to the Term Loan.

A&R 2015 Plan

Effective January 1, 2019, 501,001 shares were added to the A&R 2015 Plan under the share reserve provision. See Note 9 – *Share-Based Compensation*.

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

None

ITEM 9A. CONTROLS AND PROCEDURES

Evaluation of Disclosure Controls and Procedures

We maintain disclosure controls and procedures that are designed to ensure that information we are required to disclose in our Exchange Act reports is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms, and that such information is accumulated and communicated to our management, including our Chief Executive Officer and principal financial officer, as appropriate, to allow timely decisions regarding required disclosure.

We design and evaluate our disclosure controls and procedures recognizing that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance and not absolute assurance of achieving the desired control objectives. Also, the design of a control system must reflect the fact that there are resource constraints and the benefits of controls must be considered relative to their costs. Because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that misstatements due to error or fraud will not occur or that all control issues and instances of fraud, if any, have been detected. These inherent limitations include the realities that judgments in decision-making can be faulty and that breakdowns can occur because of simple error or mistake. The design of any system of controls is based, in part, upon certain assumptions about the likelihood of future events and there can be no assurance that any design will succeed in achieving its stated goals under all potential future conditions.

Under the supervision of and with the participation of our management, including our Chief Executive Officer and principal financial officer, we evaluated the effectiveness of our disclosure controls and procedures, as such term is defined in Rules 13a-15(e) and 15(d)- 15(e) promulgated under the Securities Exchange Act of 1934, as amended (the "Exchange Act") as of December 31, 2018. Based on this evaluation, our Chief Executive Officer and principal financial officer concluded that our disclosure controls and procedures were effective as of December 31, 2018.

Management's Annual Report on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting to provide reasonable assurance regarding the reliability of our financial reporting and the preparation of financial statements for external purposes in accordance with U.S. generally accepted accounting principles. Internal control over financial reporting includes those policies and procedures that: (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of our assets; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with U.S. generally accepted accounting principles, and that our receipts and expenditures are being made only in accordance with authorizations of our management and Board; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of our assets that could have a material effect on the financial statements.

Our management, including our Chief Executive Officer and principal financial officer (the "Certifying Officer"), recognizes that our internal control over financial reporting cannot prevent or detect all error and all fraud. A control system, no matter how well designed and operated, can provide only reasonable, not absolute, assurance that the control system's objectives will be met. The design of a control system must reflect the fact that there are resource constraints, and the benefits of controls must be considered relative to their costs. Further, because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that misstatements due to error or fraud will not occur or that all control issues and instances of fraud, if any, have been detected. The design of any system of controls is based in part on certain assumptions about the likelihood of future events, and there can be no assurance that any design will succeed in achieving its stated goals under all potential future conditions.

Management, with the participation of the Certifying Officer, assessed our internal control over financial reporting as of December 31, 2018, the end of our fiscal year. Management based its assessment on criteria established in *Internal Control—Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on this assessment, management has concluded that our internal control over financial reporting was effective as of December 31, 2018.

This Report does not include an attestation report of our independent registered public accounting firm regarding internal control over financial reporting. Management's report was not subject to attestation by our independent registered public accounting firm pursuant to rules of the SEC that permit us to provide only management's report in this Report on Form 10-K.

Changes in Internal Control Over Financial Reporting

There were no changes in our internal control over financial reporting (as defined in Rule 13a-15(f) under the Exchange Act) during the quarter ended December 31, 2018, that have materially affected, or are reasonably likely to materially affect, the Company's internal control over financial reporting.

ITEM 9B. OTHER INFORMATION

None

PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

The Board is divided into three classes. Members of each class serve staggered three-year terms. The following table provides information as to each person who is, as of the filing hereof, a director and/or executive officer of the Company:

NAME	AGE	POSITION(S)
Dr. Steven Gullans	66	President, Chief Executive Officer and Director
Dr. Charles L. Bisgaier	65	Chief Scientific Officer and Chairman of the Board
Seth Reno	52	Chief Commercial Officer
Pedro Lichtinger	64	Director
Andrew Sassine	55	Director
Kenneth Kousky	64	Director

Business Experience and Background of Directors and Executive Officers

Dr. Steven Gullans has been our President and Chief Executive Officer since May 2018 and has served as a member of our Board since April 2016. Prior to his appointment as CEO, he served as the Company's Interim President and Chief Executive Officer from May 2017 until May 2018. As CEO, Dr. Gullans oversees the daily operations of the Company and manages the executive team including the CFO, CSO, CMO, CCO, and VP of Manufacturing who report to him. His responsibilities include oversight of activities related to clinical trials, manufacturing, finances, business development, R&D and intellectual property. He communicates regularly with the Board of Directors about the status of the Company and future plans. He previously served as Managing Director at Excel Venture Management, LLC (Excel), a Boston-based venture capital firm which he co-founded and where he was employed from February 2008 through May 2018. At Excel, he focused on investing in life science technology companies with a particular interest in disruptive platforms that can impact multiple industries. Prior to Excel, Dr. Gullans co-founded RxGen, Inc., a pharmaceutical services company where he served as chief executive officer from January 2004 to February 2008. Dr. Gullans is currently a director at Orionis Biosciences, a drug development company. He was previously a board member of Activate Networks, Inc. which was acquired by Decision Resource Group, BioTrove, Inc. which was acquired by Life Technologies

Corporation, Biocius Life Sciences, Inc. which was acquired by Agilent Technologies Inc., Cleveland HeartLab, Inc., which was acquired by Quest Diagnostics, N-of-One, Inc. which was acquired by Oigen, Inc., nanoMR Inc. which was acquired by DNA Electronics Ltd, Tetrphase Pharmaceuticals, Inc. which went public in 2013, and Molecular Templates, Inc. which was merged into a public entity in 2017. Dr. Gullans was a faculty member at Harvard Medical School and Brigham and Women's Hospital for almost 20 years. Dr. Gullans holds a B.S. from Union College and a Ph.D. from Duke University. Our Board believes Dr. Gullans should serve as a director based on his extensive experience in the life sciences industry and his board and CEO experience.

Dr. Charles Bisgaier, one of our co-founders, has served as our Chief Scientific Officer and Chairman of our Board since November 2014. He also currently serves as an Adjunct Associate Professor of Pharmacology at the University of Michigan. Prior to our founding, he served from September 2008 to November 2014 as the Chief Executive Manager for our predecessor, Michigan Life Therapeutics, LLC. In addition, he co-founded Michigan Life Ventures, LLC, a venture capital firm investing primarily in Michigan-based life sciences companies, where since 2008 he has served as the Chief Executive Manager. He also served as the Interim President and Chief Executive Officer of ProNA1 Therapeutics, Inc., currently known as Sierra Oncology, a clinical-stage oncology company, from September 2010 to April 2012, and as a member of its board of directors from 2009 to March 2014. In 1998, Dr. Bisgaier co-founded the original Esperion, which was acquired by Pfizer in 2003. After the acquisition, he served as the Senior Director of Pharmacology for the Esperion Division of Pfizer Global Research and Development from 2004 to 2006. From 2006 to 2008, Dr. Bisgaier also served as a director, board member and president of Pipex Pharmaceuticals, Inc., currently known as Synthetic Biologics, Inc., a specialty pharmaceutical company. From 1990 to 1998, Dr. Bisgaier was an Associate Research Fellow in the Department of Cardiovascular Diseases in the Parke-Davis division of Warner-Lambert Co. Currently he is a board member at Hygieia, Inc., a privately held health service company, at BioSavita Inc., a privately held life sciences company, and at Diapin Therapeutics LLC, a privately held life sciences company and an advisor to Imagine Pharma, LLC, a privately held healthcare pharmaceutical company. He received a B.A. in biology from the State University of New York at Oneonta and an M.S. and Ph.D. in biochemistry from George Washington University. After receiving his Ph.D., he studied lipoprotein metabolism within the Specialized Center of Research for atherosclerosis at Columbia University College of Physicians and Surgeons. Our Board believes Dr. Bisgaier should serve as a director based on his depth of experience in founding and developing biopharmaceutical companies as well as his knowledge of our product candidate gemcabene.

Seth Reno has served as our Chief Commercial Officer since August 2015. Prior to joining us, he served in several commercial roles including Head of Commercial Operations for Medimmune, LLC, a biologics company, from June 2010 to April 2015. From April 2001 to June 2010, Mr. Reno worked at AstraZeneca, a public biopharmaceutical company, in a number of roles, including in the sales, commercial operations, managed markets and brand team spaces. Prior to joining AstraZeneca in 2001, Mr. Reno spent 11 years at Wyeth Pharmaceuticals, Inc., a pharmaceutical company, in commercial operations and sales account management. Mr. Reno holds a B.S. in human resources from the University of Delaware and an M.B.A. from Strayer University.

Pedro Lichtinger has served as a member of our Board since December 2015. Mr. Lichtinger is currently Chairman, Chief Executive Officer, and Director of ChemioCare Inc., a private biotechnology company focused on the CIMV (Chemotherapy Induced Nausea and Emesis) therapeutic area. He was previously the President, Chief Executive Officer, and Director of Asterias Biotherapeutics, a publicly traded company with a focus on neurology and oncology from June 2014 to February 2016. Mr. Lichtinger served as President, Chief Executive Officer, and a director of Optimer Pharmaceuticals, Inc., from May 2010 to February 2013. Mr. Lichtinger previously served as an executive of Pfizer, Inc. from 1995 to 2009, including as President of Pfizer's Global Primary Care Unit from 2008 to 2009, Area President, Europe from 2006 to 2008, President, Global Animal Health from 1999 to 2006, and Regional President Europe Animal Health from 1995 to 1999. Before joining Pfizer, Mr. Lichtinger was an executive of Smith Kline Beecham Plc, last serving as Senior Vice-President Europe Animal Health from 1987 to 1995. Mr. Lichtinger serves as a director of Sanfer de Mexico, a leading Mexican pharmaceutical company and is on the advisory board of Zero Gravity Solutions, Inc., an agricultural company. Mr. Lichtinger previously served as a director of BioTime, Inc. Mr. Lichtinger holds an MBA degree from the Wharton School of Business and an engineering degree from the National University of Mexico. Our Board believes Mr. Lichtinger should serve as director based on his extensive pharmaceutical industry and public company leadership experience.

Andrew Sassine has served as a member of our Board since May 2015. Mr. Sassine began serving as Chief Financial Officer of Arcturus Therapeutics Ltd. in 2018. Mr. Sassine served in various positions at Fidelity Investments from 1999 to 2012, including as a Portfolio Manager for various funds from 2005 to December 2011. Mr. Sassine has also served on several boards of life science companies. Mr. Sassine currently serves on the board of directors of iCAD, Inc., a public cancer detection and radiation therapy solutions company and previously served on the boards of directors of FluoroPharma Medical, Inc., a public biopharmaceutical company, Acorn Energy, Inc., a public holding company focused on technology solutions for energy infrastructure asset management and CNS Response, Inc., a public psychiatric clinical decision support company. Mr. Sassine also serves on the board of directors of Freedom Meditech, Inc., a private medical device company, and Comhear Inc., a private digital audio software and device company, where he is also the chairman of the board of directors. Mr. Sassine serves on the Strategic Advisory Board of MD Revolution Inc., a private digital health service company. Mr. Sassine has been a member of the Henry B. Tippie College of Business, University of Iowa Board of Advisors since 2009 and served on the board of trustees at the Clarke Schools for Hearing and Speech from 2009 through 2014. Mr. Sassine holds a B.A. from the University of Iowa and an M.B.A. from the Wharton School at the University of Pennsylvania. Our Board believes Mr. Sassine should serve as a director based on his extensive experience in the public markets as well as his financial expertise.

Kenneth Kousky has served as a member of our Board since March 2015. Mr. Kousky has also served as the Chief Executive Officer of the Mid-Michigan Innovation Center, a privately funded, non-profit business incubator, since 2010. He has also served as the President and Chief Executive Officer of IP3, Inc., an information security consulting firm, since 2002. Also, Mr. Kousky is a founding member and has served as Executive Director of the Blue Water Angels Investment Network, a Michigan-based funding network that assists in private equity investments in early-stage tech startups, since 2008. In 1988, Mr. Kousky founded an IT services company, Wave Technologies International Inc., which he led through an initial public offering in 1994. In 1989, he established Washington University's graduate program in Telecommunication Management, and he has lectured at Saginaw Valley State University, Washington University and at the Wharton School of Business at the University of Pennsylvania. Mr. Kousky is a member of several corporate boards, including Michigan Sugar Company, RetroSense Therapeutics LLC and Foodjunky LLC. Mr. Kousky holds a B.A. in economics and urban studies from Washington University, and an M.S. in economics from University of Pennsylvania. Our Board believes Mr. Kousky should serve as a director based on his extensive financial and strategic business planning experience.

There are no familial relationships among any of our directors and executive officers.

Section 16(a) Beneficial Ownership Reporting Compliance

Section 16 of the Exchange Act requires our directors, executive officers and any persons who own more than 10% of our common stock to file initial reports of ownership and reports of changes in ownership with the SEC. Such persons are required by SEC regulation to furnish us with copies of all Section 16(a) forms that they file. Based solely on our review of the copies of such forms furnished to us and written representations from our directors and executive officers, we are not aware of any person who, at any time during 2018, was subject to Section 16 of the Exchange Act with respect to our common stock and failed to file, on a timely basis, reports required by Section 16(a) of the Exchange Act during 2018.

Code of Business Conduct and Ethics

Our Board has adopted a code of business conduct and ethics that applies to all of our employees, officers and directors, including our principal executive officer, principal financial officer, principal accounting officer and other executive officers. We intend to disclose future amendments to certain provisions of our code of business conduct and ethics, or waivers of these provisions, on our website. The full text of our code of conduct is posted on the investor relations section of our website at <http://ir.gemphire.com> under "Corporate Governance—Highlights".

Audit Committee Information

Our audit committee is comprised of Mr. Kousky, Mr. Lichtinger and Mr. Sassine, and Mr. Sassine is currently the chairman. Each member of our audit committee meets the requirements for independence under the current Nasdaq

and SEC rules and regulations and is financially literate. In addition, our Board has determined that each of Messrs. Kousky, Lichtinger and Sassine is an "audit committee financial expert" as defined in Item 407(d)(5)(ii) of Regulation S-K promulgated under the Securities Act of 1933, as amended (the "Securities Act"). This designation does not impose any duties, obligations or liabilities that are greater than are generally imposed on members of our audit committee and our Board. Our audit committee is directly responsible for, among other things:

- our accounting and financial reporting processes, including our financial statement audits and the integrity of our financial statements;
- our compliance with legal and regulatory requirements;
- the qualifications, independence and performance of our independent auditors; and
- the preparation of the audit committee report to be included in our annual proxy statement.

The responsibilities and activities of the audit committee are described further in its charter.

ITEM 11. EXECUTIVE COMPENSATION

Executive Officer Compensation

The following tables and accompanying narrative disclosure discuss the compensation awarded to, earned by, or paid to:

- Steven Gullans, Ph.D., our President and Chief Executive Officer;
- Charles L. Bisgaier, Ph.D., our Chief Scientific Officer and Chairman of our Board of Directors;
- Lee Golden, Ph.D, our former Chief Medical Officer;
- Jeffrey Mathiesen, our former Chief Financial Officer; and
- Seth Reno, our Chief Commercial Officer.

We refer to these five current or former executive officers as the "named executive officers."

Summary Compensation Table for 2018

The following table presents summary information regarding the total compensation for services rendered in all capacities that was earned by our named executive officers during the fiscal years ended December 31, 2018 and 2017.

NAME AND PRINCIPAL POSITION	YEAR	SALARY (\$)	BONUS (\$)	OPTION AWARDS (\$) ⁽¹⁾	NON-EQUITY INCENTIVE PLAN COMPENSATION	ALL OTHER COMPENSATION ⁽²⁾	TOTAL (\$)
Steven Gullans, Ph.D. ⁽³⁾ <i>President and Chief Executive Officer</i>	2018	346,932	250,000	1,299,138	—	6,751	1,902,821
	2017	30,376	—	353,264	—	23,575	407,215
Charles L. Bisgaier, Ph.D. <i>Chief Scientific Officer</i>	2018	330,000	—	298,240	—	11,183	639,423
	2017	330,000	30,000	—	—	258	360,258
Lee Golden, Ph.D. ⁽⁴⁾ <i>Former Chief Medical Officer</i>	2018	264,625	—	919,572	—	193,278	1,377,476
	2017	365,000	39,000	133,870	—	258	538,128
Jeffrey Mathiesen ⁽⁵⁾ <i>Former Chief Financial Officer</i>	2018	242,875	—	298,240	—	183,560	724,675
	2017	335,000	—	—	—	738	335,738
Seth Reno <i>Chief Commercial Officer</i>	2018	275,000	—	298,240	—	10,566	583,805
	2017	275,000	20,000	—	—	581	295,581

⁽¹⁾ The amounts reported reflect the aggregate grant date fair value of the stock options granted to our named executive officers during 2017 and 2018, as computed in accordance with FASB Accounting Standards Codification Topic 718 (ASC 718). Assumptions used in the calculation of these amounts are included in Note 9 to the financial statements included in this Annual Report. As required by SEC rules, the amounts shown exclude the impact of estimated forfeitures related to service-based vesting conditions.

⁽²⁾ Unless otherwise noted, amounts reflect the dollar value of group life insurance premiums paid during 2017 and 2018 with respect to life insurance for the named executive officer and Company 401(k) matching contributions, which were \$6,667, \$11,000, \$10,585, \$11,000 and \$9,972 for Dr. Gullans, Dr. Bisgaier, Dr. Golden, Mr. Mathiesen and Mr. Reno, respectively, for 2018. No matching contributions were made in 2017.

⁽³⁾ Amounts reported reflect that Dr. Gullans was employed as President and Chief Executive Officer of the Company commencing May 1, 2018 and prior to that time as Interim President and Chief Executive Officer of the Company commencing May 23, 2017. Prior to his appointment as Interim President and Chief Executive Officer, Dr. Gullans was a non-employee director. Dr. Gullans's cash compensation did not change as a result of his appointment as our Interim President and Chief Executive Officer until his employment agreement was executed in connection with his appointment as President and Chief Executive Officer in May 2018.

For 2017, "Salary" reflects the amount paid to Dr. Gullans following his appointment as Interim President and Chief Executive Officer and "All Other Compensation" includes \$23,575 paid to Dr. Gullans prior to his appointment as Interim President and Chief Executive Officer, as cash fees for his service as a non-employee director. For 2018, "Bonus" reflects a signing bonus Dr. Gullans received in connection with his appointment as President and Chief Executive Officer in May 2018. As a named executive officer of the Company, compensation paid to Dr. Gullans for the entire 2018 and 2017 fiscal years is fully reflected in this table.

- ⁽⁴⁾ Amounts reported for 2018 reflect that Dr. Golden's employment with the Company ended as of September 21, 2018. In addition to group life insurance premiums and 401(k) matching contributions described in footnote 2, "All Other Compensation" for 2018 includes a one-time, lump sum of \$182,500, which was equal to 6 months of his annual base salary, paid to Dr. Golden in connection with his separation from the Company.
- ⁽⁵⁾ Amounts reported for 2018 reflect that Mr. Mathiesen's employment with the Company ended as of September 21, 2018. In addition to group life insurance premiums and 401(k) matching contributions described in footnote 2, "All Other Compensation" for 2018 includes (i) a one-time, lump sum of \$167,500, which was equal to 6 months of his annual base salary, and (ii) \$4,507 for continued health insurance coverage paid to Mr. Mathiesen in connection with his separation from the Company.

Narrative Disclosure to Summary Compensation Table

The compensation program for our named executive officers for 2018 had three components: base salary, annual cash bonus and stock option grants. The below disclosure and tables explain each component of compensation in further detail.

Base Salary. There was no base salary increase for any of our named executive officers for 2018, as compared to 2017, except that Dr. Gullans's base salary was set at \$500,000 pursuant to his employment agreement entered into in connection with his appointment as President and Chief Executive Officer in May 2018. Prior to such time, he served as Interim President and Chief Executive Officer of the Company commencing May 23, 2017 and, in that role, continued to receive the compensation he received as a non-employee director.

Cash Bonus. In 2018, each of our named executive officers had a target bonus, set forth as a percentage of annual base salary. The compensation committee did not make any changes to the target bonuses of the named executive officers, as a percentage of base salary, for 2018. In 2018, target bonuses for the named executive officers other than Dr. Gullans were 40% of base salary. Dr. Gullans's target bonus was set at 50% of base salary pursuant to his employment agreement entered into in connection with his appointment as President and Chief Executive Officer in May 2018. The payment of bonuses is in the compensation committee's discretion, and no bonuses were earned or paid for 2018.

Equity Grants. On January 28, 2018, considering the recommendations of Haigh & Company, the compensation committee granted to each of Dr. Bisgaier, Mr. Mathiesen and Mr. Reno an option to purchase up to 48,000 shares of our common stock and to Dr. Golden an option to purchase up to 148,000 shares of our common stock, in each case, vesting in a series of 48 equal monthly installments on the last day of each month commencing on the grant date, subject to such executive's continuous service, and subject to acceleration upon a change in control.

In connection with his service as Interim President and Chief Executive Officer, on January 29, 2018, the Board granted Dr. Gullans an option to purchase up to 60,000 shares of our common stock (the "January Options"), with a grant date fair value of \$364,604, vesting in a series of 12 equal monthly installments on the last day of each month commencing on the grant date, subject to Dr. Gullans's continuous service, and subject to acceleration upon either (i) a change in control or (ii) the appointment of a replacement President and Chief Executive Officer.

Upon the appointment of Dr. Gullans as President and Chief Executive Officer on May 1, 2018, the terms of the January Options were amended so that they vest in a series of 48 equal monthly installments on the last day of each month commencing on the grant date, subject to Dr. Gullans's continuous service. Following the amendment, the grant date fair value of the January Options was determined to be \$378,816. Additionally, pursuant to the employment agreement entered into with Dr. Gullans described below, on May 1, 2018, Dr. Gullans was also granted:

- an option to purchase up to 150,000 shares of our common stock with a grant date fair value of \$514,846, vesting in a series of 48 equal monthly installments on the last day of each month commencing on the grant date, subject to Dr. Gullans's continuous service;

- an option to purchase up to 50,000 shares of our common stock with a grant date fair value of \$191,010, vesting in a series of 48 equal monthly installments on the last day of each month commencing on the grant date, subject to Dr. Gullans's continuous service; and
- an option to purchase up to 100,000 shares of our common stock with a grant date fair value of \$214,466. 50,000 of these shares shall vest on the date that the first patient in the first Phase 3 clinical trial of gemcabene in a non-orphan indication receives the first dose of gemcabene and the other 50,000 shall vest on the date when the Company's common stock achieves a certain target, in each case, if such event occurs on or before December 31, 2019, subject to Dr. Gullans's continuous service.

All Other Compensation. The Company maintains, and the named executive officers participate in, a 401(k) defined contribution plan. Each participant may contribute to the plan through payroll deductions, up to 100% of his or her compensation limited to the maximum allowed by the Internal Revenue Service regulations. The Company provides employer "safe harbor" matching contributions to all participants, including the named executive officers, equal to 100% of salary deferrals up to 3% of a participant's contributions and 50% of salary deferrals thereafter up to 5% of a participant's contributions.

Agreements with Our Named Executive Officers

We have entered into written employment agreements with each of our executive officers. For a discussion of the severance pay and other benefits to be provided in connection with a termination of employment and/or a change in control under the arrangements with our named executive officers, please see "— Potential Payments Upon Termination or Change in Control" below.

Each of our named executive officers has also executed our standard form of confidential information and invention assignment agreement.

Offer Letter with Dr. Gullans. On June 8, 2017, we entered into an offer letter with Dr. Gullans as Interim President and Chief Executive Officer, effective May 23, 2017. On May 30, 2017, our compensation committee granted Dr. Gullans an option to purchase 60,000 shares of our common stock vesting monthly in equal increments over a 12 month period, subject to acceleration upon the appointment of a replacement Chief Executive Officer or upon a change in control, under the Amended and Restated 2015 Equity Incentive Plan ("2015 Plan"). The offer letter provided that Dr. Gullans will continue to receive the compensation he receives as a director of the Company and was able to participate in the benefit programs and arrangements to the extent available to Company employees. Dr. Gullans also executed our employee proprietary information, inventions assignment and non-competition agreement, which provides for confidentiality and non-compete and non-solicitation provisions, the latter for one year after termination of employment.

Employment Agreement with Dr. Gullans. On May 1, 2018, we entered into an employment agreement with Dr. Gullans. His employment agreement has an initial term of three years beginning on May 1, 2018 and automatically renews for an additional one year period at the end of the initial term and each anniversary thereafter provided that at least 90 days prior to the expiration of the initial term or any renewal term the board does not notify Dr. Gullans of its intention not to renew.

His employment agreement entitles Dr. Gullans to, among other benefits, the following compensation: (i) an annual base salary of at least \$500,000, reviewed at least annually commencing with the review of compensation for the year ended December 31, 2020; (ii) a signing bonus of \$250,000; (iii) an annual cash bonus in an amount of up to fifty percent (50%) of his annual base salary; (iv) participation in equity-based long-term incentive compensation plans generally available to senior executive officers of the Company (beginning in 2019); and (v) participation in welfare benefit plans, practices, policies and programs (including, without limitation, medical, prescription, dental, disability, employee life, group life, accidental death and travel accident insurance plans and programs) made available to other senior executive officers of the Company.

Additionally, pursuant to the employment agreement, Dr. Gullans was granted certain options to purchase the Company's common stock as set forth under "—Equity Grants" above. Also as described above, pursuant to his employment agreement, Dr. Gullans consented to an extension of the vesting term of an option he was previously

granted for 60,000 shares from 12 months to 48 months. Notwithstanding the vesting schedules set forth above, he may exercise all or a part of any such option, including the unvested portion, during his employment and within the term of such option; provided he enters into an early exercise purchase agreement with the Company with a vesting schedule that will result in the same vesting as if no early exercise had occurred and any unvested shares purchased will be subject to the Company's purchase option.

Employment Agreements with Mr. Mathiesen and Dr. Bisgaier. We entered into an employment agreement with each of Mr. Mathiesen and Dr. Bisgaier, effective as of the pricing our initial public offering. The initial term of each employment agreement is from the effective date, August 4, 2016, through the third anniversary of the effective date and automatically renews for an additional one year period at the end of his initial term and each anniversary thereafter, provided that at least 90 days prior to the expiration of his initial term or any renewal term the board does not notify such officer of its intention not to renew the employment period.

Each officer's employment agreement also entitles him to, among other benefits, the following compensation: (i) eligibility to receive an annual cash bonus of up to a percentage of his annual base salary as specified in his employment agreement at the sole discretion of the board and as determined by the compensation committee commensurate with the policies and practices applicable to other senior executive officers of the Company; (ii) an opportunity to participate in any equity based long-term incentive compensation plan commensurate with the terms and conditions applicable to other senior executive officers; and (iii) participation in welfare benefit plans, practices, policies and programs provided by the Company and its affiliated companies (including, without limitation, medical, prescription, dental, disability, employee life, group life, accidental death and travel accident insurance plans and programs) to the extent available to our other senior executive officers.

Separation and Release Agreement with Mr. Mathiesen. On September 21, 2018, the Company entered into a separation and release agreement with Mr. Mathiesen. In connection with his departure from the Company, Mr. Mathiesen received certain benefits that he was entitled to receive under his employment agreement described above in connection with a termination without cause. Accordingly, under the separation and release agreement, the Company agreed (1) to pay Mr. Mathiesen a lump sum equal to \$167,500, (2) that all of Mr. Mathiesen's outstanding stock options will (a) vest as if Mr. Mathiesen was employed by the Company through August 4, 2019 and (b) remain exercisable until the final termination date of such option awards under the applicable award agreement, (3) to pay the monthly cost of premiums for continued health insurance coverage during the twelve-month period following Mr. Mathiesen's separation from the Company, provided Mr. Mathiesen does not qualify for health care coverage from another employer during that period; and (4) to reimburse Mr. Mathiesen for reasonable expenses incurred through the separation date that are reviewed and approved according to Company policy.

Employment Agreement with Dr. Golden. We entered into an employment agreement with Dr. Golden in October 2016. The initial term of his employment agreement is from the effective date through the third anniversary of the effective date and automatically renews for an additional one year period at the end of the initial term and each anniversary thereafter, provided that at least 90 days prior to the expiration of the initial term or any renewal term the board does not notify Dr. Golden of its intention not to renew the employment period.

Dr. Golden's employment agreement entitled him to, among other benefits, the following compensation: (i) eligibility to receive an annual cash bonus of up to 40% of his annual base salary as determined by the compensation committee commensurate with the policies and practices applicable to other senior executive officers of the Company; (ii) an opportunity to participate in any equity based long-term incentive compensation plan commensurate with the terms and conditions applicable to other senior executive officers; and (iii) participation in welfare benefit plans, practices, policies and programs provided by the Company and its affiliated companies (including, without limitation, medical, prescription, dental, disability, employee life, group life, accidental death and travel accident insurance plans and programs) to the extent available to our other senior executive officers. In connection with his hiring at Chief Medical Officer, on October 5, 2016, our compensation committee granted Dr. Golden an option to purchase 126,000 shares of our common stock vesting as follows: 12,000 shares underlying the option vested immediately on October 5, 2016, one-fourth of the remaining shares vested on October 31, 2017 and the balance of the shares vest in a series of 36 successive equal monthly installments measured from October 31, 2017, subject to acceleration upon a change in control.

Separation and Release Agreement with Dr. Golden. On September 23, 2018, the Company entered into a separation and release agreement with Dr. Golden effective as of September 21, 2018. In connection with his departure from the Company, Dr. Golden received certain benefits that he was entitled to receive under his employment agreement described above in connection with a termination without cause. Accordingly, under the separation and release agreement, the Company agreed (1) to pay Dr. Golden a lump sum equal to \$182,500, (2) that all of Dr. Golden's outstanding stock options will (a) vest as if Dr. Golden was employed by the Company through October 5, 2019 and (b) remain exercisable until the final termination date of such option awards under the applicable award agreement, and (3) to reimburse Dr. Golden for reasonable expenses incurred through the separation date that are reviewed and approved according to Company policy.

Employment Agreement with Mr. Reno. We entered into an employment agreement with Mr. Reno, effective August 15, 2016. The initial term of the employment agreement is from the effective date through the first anniversary of the effective date and automatically renews for an additional one year period at the end of his initial term and each anniversary thereafter, provided that at least 90 days prior to the expiration of his initial term or any renewal term the board does not notify Mr. Reno of its intention not to renew the employment period.

Mr. Reno's employment agreement also entitles him to, among other benefits, the following compensation: (i) eligibility to receive an annual cash bonus of up to a percentage of his annual base salary as specified in his employment agreement at the sole discretion of the board and as determined by the compensation committee commensurate with the policies and practices applicable to other senior executive officers of the Company; (ii) an opportunity to participate in any stock option, performance share, performance unit or other equity based long-term incentive compensation plan commensurate with the terms and conditions applicable to other senior executive officers (the Plans); and (iii) participation in welfare benefit plans, practices, policies and programs provided by the Company and its affiliated companies (including, without limitation, medical, prescription, dental, disability, employee life, group life, accidental death and travel accident insurance plans and programs) to the extent available to our other senior executive officers.

Outstanding Equity Awards at Fiscal Year-End 2018

The following table sets forth information regarding restricted stock awards and outstanding stock options held by our named executive officers as of December 31, 2018:

NAME	GRANT DATE	VESTING COMMENCEMENT DATE	OPTION AWARDS ⁽¹⁾			
			NUMBER OF SECURITIES UNDERLYING UNEXERCISED OPTIONS EXERCISABLE (#)	NUMBER OF SECURITIES UNDERLYING UNEXERCISED OPTIONS UNEXERCISABLE (#)	OPTION EXERCISE PRICE (\$)	OPTION EXPIRATION DATE
Steven Gullans, Ph.D.	August 4, 2016	August 4, 2016 ⁽²⁾	35,000	25,000	10.00	August 3, 2026
	May 30, 2017	May 30, 2017 ⁽³⁾	60,000	—	10.26	May 29, 2027
	January 29, 2018	January 29, 2018 ⁽⁴⁾	15,000	45,000	10.44	January 28, 2028
	May 1, 2018	May 1, 2018 ⁽⁵⁾	50,000	—	5.56	April 30, 2028
	May 1, 2018	May 1, 2018 ⁽⁵⁾	150,000	—	5.56	April 30, 2028
	May 1, 2018	May 1, 2018 ⁽⁶⁾	100,000	—	5.56	April 30, 2028
Charles L. Bisgaier, Ph.D.	August 4, 2016	August 4, 2016 ⁽²⁾	87,500	62,500	10.00	August 3, 2026
	January 28, 2018	January 28, 2018 ⁽⁴⁾	12,000	36,000	10.10	January 27, 2028
Lee Golden, Ph.D.	October 5, 2016	October 5, 2016 ⁽⁶⁾	95,125	—	10.80	October 4, 2026
	March 28, 2017	March 28, 2017 ⁽⁶⁾	12,917	—	11.15	March 27, 2027
	January 28, 2018	January 28, 2018 ⁽⁶⁾	64,750	—	10.10	January 27, 2028
Jeffrey Mathiesen	September 25, 2015	September 25, 2015 ⁽⁶⁾	45,093	—	3.59	September 24, 2025
	August 4, 2016	August 4, 2016 ⁽⁶⁾	157,500	—	10.00	August 3, 2026
	January 28, 2018	January 28, 2018 ⁽⁶⁾	19,000	—	10.10	January 27, 2028
Seth Reno	August 17, 2015	August 17, 2015 ⁽⁶⁾	51,299	—	2.12	August 16, 2025
	August 4, 2016	August 4, 2016 ⁽⁶⁾	87,500	62,500	10.00	August 3, 2026
	January 28, 2018	January 28, 2018 ⁽⁴⁾	12,000	36,000	10.10	January 27, 2028

⁽¹⁾ All of the outstanding stock option awards were granted under our 2015 Plan unless otherwise noted.

⁽²⁾ The shares underlying the option vest monthly in equal increments over a 48 month period beginning on August 4, 2016.

⁽³⁾ The shares underlying the option vest monthly in equal increments over a 12 month period beginning on May 30, 2017.

⁽⁴⁾ The shares underlying the option vest monthly in equal increments over a 48 month period beginning on January 31, 2018. Dr. Gullans is permitted to exercise unvested portions of this option, however, these shares will be subject to the same vesting schedule, and the Company will have a repurchase option for such unvested shares.

⁽⁵⁾ The shares underlying the option vest monthly in equal increments over a 48 month period on the last day of the month beginning on May 31, 2018. Dr. Gullans is permitted to exercise unvested portions of this option, however, these shares will be subject to the same vesting schedule, and the Company will have a repurchase option for such unvested shares.

- ⁽⁶⁾ The shares underlying the option vest (i) with respect to 50,000 shares, on the date that the first patient in the first Phase 3 clinical trial of gemcabene in a non-orphan indication receives the first dose of gemcabene and (ii) with respect to the other 50,000 shares, on the date when the consecutive day volume weighted average closing price of the Company's common stock achieves a certain target, in each case, if such event occurs on or before December 31, 2019. Dr. Gullans is permitted to exercise unvested portions of this option, however, these shares will be subject to the same vesting schedule, and the Company will have a repurchase option for such unvested shares.
- ⁽⁷⁾ These options were granted under the Inducement Plan.
- ⁽⁸⁾ Under the separation and release agreement with Dr. Golden, the Company agreed that all of Dr. Golden's outstanding stock options vested as if Dr. Golden was employed by the Company through October 5, 2019. All remaining options were forfeited.
- ⁽⁹⁾ Under the separation and release agreement with Mr. Mathiesen, the Company agreed that all of Mr. Mathiesen's outstanding stock options vested as if Mr. Mathiesen was employed by the Company through August 4, 2019. All remaining options were forfeited.
- ⁽¹⁰⁾ 10,000 shares underlying the option vested immediately on August 17, 2015; the balance of the shares vested in 36 monthly increments beginning on August 31, 2015.

Potential Payments Upon Termination or Change in Control

Steven Gullans

Pursuant to his employment agreement, regardless of the manner in which Dr. Gullans service terminates, he is entitled to receive amounts earned during his term of service, including salary and other benefits. The Company is permitted to terminate the employment of Dr. Gullans for the following reasons: (1) death or disability, (2) Termination for Cause (as defined below) or (3) for any other reason or no reason.

Dr. Gullans is permitted Termination for Good Reason (as defined below) of his employment. In addition, he may terminate his employment upon written notice to the Company 30 days prior to the effective date of such termination. In the event of his death during the employment period or a termination due to his disability, Dr. Gullans or his beneficiaries or legal representatives shall be provided the sum of (a) any annual base salary earned, but unpaid, for services rendered to the Company on or prior to the date on which the employment period ends and (b) the bonus that would have been payable to him subject to any performance conditions and (c) certain other benefits provided for in his employment agreement (the "Gullans Unconditional Entitlements").

In the event of Dr. Gullans's Termination for Cause by the Company or the termination of his employment as a result of his resignation other than a Termination for Good Reason, Dr. Gullans shall be provided the Gullans Unconditional Entitlements. In the event of (i) a Termination for Good Reason by Dr. Gullans, (ii) expiration of his employment period as a result of the Company's decision not to extend his employment beyond the initial term or (iii) the exercise by the Company of its termination rights to terminate him other than by Termination for Cause, death or disability, Dr. Gullans shall be provided the Gullans Unconditional Entitlements and, subject to Dr. Gullans signing and delivering to the Company and not revoking a general release of claims in favor of the Company and certain related parties, the Company shall provide him a severance amount equal to (i) 1 times his annual base salary as of the termination date less the Non-Compete Amount (if applicable) (as defined in his employment agreement) and (ii) a prorated cash bonus for the year as well as continued medical coverage for 12 months following such termination, immediate vesting of all stock options, which become immediately exercisable in accordance with the stock option award documents, subject to the same conditions that would be applicable to Dr. Gullans if he remained employed through the 18 month anniversary of the termination date and continued vesting of equity awards in accordance with the terms of the award agreements (the "Gullans Conditional Benefits").

In the event that the Company consummates a transaction that constitutes a change in control and the options described above in Executive Compensation – Agreements with Our Named Executive Officers – Steven Gullans are not

assumed, continued or substituted, then all of the unvested shares underlying such options shall fully vest and become exercisable upon the effectiveness of such change in control.

In the event of Dr. Gullans's Termination for Good Reason, the exercise by the Company of its right to terminate Dr. Gullans other than a Termination for Cause, Mr. Gullans's death or disability or the Company's election not to extend the employment period upon expiration of the initial term or any renewal term, in each case, within eighteen (18) months following a change in control, Dr. Gullans shall receive (i) the Gullans Unconditional Entitlements, (ii) 1.5 times the sum of Dr. Gullans's annual base salary and cash bonus (calculated based on the greater of Dr. Gullans's target bonus for such year or the average bonus paid to Dr. Gullans in the prior two fiscal years), (iii) accelerated vesting of all equity awards that were assumed, continued or substituted by the surviving or acquiring corporation in the change in control and remain subject to time-based vesting conditions, if any, and (iv) the Conditional Benefits except the Severance Amount.

Under Dr. Gullans's employment agreement, "Termination for Cause" means a termination of Dr. Gullans's employment by the Company due to (A) an intentional act or acts of dishonesty undertaken by him and intended to result in substantial gain or personal enrichment to Dr. Gullans at the expense of the Company, (B) unlawful conduct or gross misconduct that is willful and deliberate on his part in the performance of his employment duties and that, in either event, is materially injurious to the Company, (C) his conviction of, or Dr. Gullans's entry of a no contest or nolo contendere plea to, a felony, (D) material breach by the Dr. Gullans of his fiduciary obligations as an officer or director of the Company, (E) a persistent failure by Dr. Gullans to perform the duties and responsibilities of his employment, which failure is willful and deliberate on Dr. Gullans's part and is not remedied within 30 days after his receipt of written notice from the Company of such failure; or (F) material breach of any terms and conditions of his employment agreement, which breach has not been cured by him within ten days after written notice thereof to Dr. Gullans from the Company. No act or failure to act on Dr. Gullans's part shall be considered "dishonest," "willful" or "deliberate" unless intentionally done or omitted to be done in bad faith and without reasonable belief that Dr. Gullans's action or omission was in the best interests of the Company. Any act, or failure to act, based upon authority given pursuant to a resolution duly adopted by the Board shall be conclusively presumed to be done, or omitted to be done, by Dr. Gullans in good faith and in the best interests of the Company.

Under Dr. Gullans's employment agreement, "Termination for Good Reason" means Dr. Gullans's termination of his employment within 30 days of the Company's failure to cure, in accordance with the procedures set forth below, any of the following events: (A) a reduction in his annual base salary as in effect immediately prior to such reduction without his written consent, unless such reduction is made pursuant to an across the board reduction applicable to all senior executives of the Company; (B) the removal of Dr. Gullans by the Company from the position of President and Chief Executive Officer; (C) a material reduction in his duties and responsibilities as in effect immediately prior to such reduction; (D) a change in his reporting relationships; or (E) a material breach of any material provision of his employment agreement by the Company to which Dr. Gullans shall have delivered a written notice to the board within 45 days of Dr. Gullans's having actual knowledge of the occurrence of one of such events stating that he intends to terminate his employment by Termination for Good Reason and specifying the factual basis for such termination, and such event, if capable of being cured, shall not have been cured within 21 days of the receipt of such notice. Notwithstanding the foregoing, a termination shall not be treated as a Termination for Good Reason if he has consented in writing to the occurrence of the event giving rise to the claim of Termination for Good Reason.

Charles L. Bisgaier and Seth Reno

Pursuant to Mr. Bisgaier's and Mr. Reno's employment agreements, regardless of the manner in which their service terminates, such named executive officer is entitled to receive amounts earned during his term of service, including salary and other benefits. In addition, each of our named executive officers is eligible to receive certain benefits pursuant to his or her agreement with us described above under "—Agreements with our Named Executive Officers."

The Company is permitted to terminate the employment of Dr. Bisgaier or Mr. Reno for the following reasons: (1) death or disability, (2) Termination for Cause (as defined below) or (3) for any other reason or no reason. Each such officer is permitted Termination for Good Reason (as defined below) of such officer's employment. In

addition, each such officer may terminate his or her employment upon written notice to the Company 30 days prior to the effective date of such termination.

In the event of such officer's death during the employment period or a termination due to such officer's disability, such officer or his or her beneficiaries or legal representatives shall be provided the sum of (a) any annual base salary earned, but unpaid, for services rendered to the Company on or prior to the date on which the employment period ends and (b) the bonus that would have been payable to such officer subject to any performance conditions and (c) certain other benefits provided for in the employment agreement (the "Unconditional Entitlements").

In the event of such officer's Termination for Cause by the Company or the termination of such officer's employment as a result of such officer's resignation other than a Termination for Good Reason, such officer shall be provided the Unconditional Entitlements.

In the event of a Termination for Good Reason by such officer or the exercise by the Company of its termination rights to terminate such officer other than by Termination for Cause, death or disability, such officer shall be provided the Unconditional Entitlements and, subject to such officer signing and delivering to the Company and not revoking a general release of claims in favor of the Company and certain related parties, the Company shall provide such officer a severance amount equal to (i) 0.5-1.0 (which ratio varies based on the negotiated terms in the agreement of such officer) times such officer's annual base salary as of the termination date less the Non-Compete Amount (if applicable) (as defined in his or her employment agreement) and (ii) a prorated cash bonus for the year as well as continued medical coverage for 12 months following such termination, immediate vesting of all stock options, which become immediately exercisable in accordance with the stock option award documents, subject to the same conditions that would be applicable to such officer if he or she remained employed through the end of the employment period and continued vesting of equity awards in accordance with the terms of the award agreements (the "Conditional Benefits").

If, within two years after a change in control, the Company terminates such officer other than due to such officer's death or disability or a Termination for Cause, or such officer effects a Termination for Good Reason, the Company will pay to such officer, in a lump sum in cash within 30 days after the termination date, the aggregate of: (i) the Unconditional Entitlements; and (ii) the amount equal to the product of 1.0-1.5 (which ratio varies based on the negotiated terms in the agreement of such officer) times the sum of (y) such officer's annual base salary, and (z) the greater of the target bonus for the then current fiscal year under the Plans or any successor annual bonus plan and the average annual bonus paid to or for the benefit of such officer for the prior three full years (or any shorter period during which such officer had been employed by the Company). In addition, the Company shall provide such officer the Conditional Benefits minus such officer's severance amount. The award agreements for the options granted to our executive officers, including Dr. Bisgaier and Dr. Golden, also contain terms providing for accelerated vesting of stock options upon a change in control.

Under the employment agreements, "Termination for Cause" means a termination of the officer's employment by the Company due to (A) an intentional act or acts of dishonesty undertaken by the officer and intended to result in substantial gain or personal enrichment to the officer at the expense of the Company, (B) unlawful conduct or gross misconduct that is willful and deliberate on the officer's part and that, in either event, is materially injurious to the Company, (C) the conviction of the officer of, or the officer's entry of a no contest or nolo contendere plea to, a felony, (D) material breach by the officer of the officer's fiduciary obligations as an officer or director of the Company, (E) a persistent failure by the officer to perform the duties and responsibilities of the officer's employment hereunder, which failure is willful and deliberate on the officer's part and is not remedied by the officer within 30 days after the officer's receipt of written notice from the Company of such failure; or (F) material breach of any terms and conditions of the respective employment agreement by the officer, which breach has not been cured by the officer within ten days after written notice thereof to the officer from the Company. No act or failure to act on the officer's part shall be considered "dishonest," "willful" or "deliberate" unless intentionally done or omitted to be done by the officer in bad faith and without reasonable belief that the officer's action or omission was in the best interests of the Company. Any act, or failure to act, based upon authority given pursuant to a resolution duly adopted by the Board shall be conclusively presumed to be done, or omitted to be done, by the officer in good faith and in the best interests of the Company.

Under the employment agreements, "Termination for Good Reason" means a termination of the officer's employment by such officer within 30 days of the Company's failure to cure, in accordance with the procedures set forth below, any of the following events: (A) a reduction in the officer's annual base salary as in effect immediately prior to such reduction by more than 10% without the officer's written consent, unless such reduction is made pursuant to an across the board reduction applicable to all senior executives of the Company; (B) the removal of the officer by the Company from the executive officer position held; (C) a material reduction in the officer's duties and responsibilities as in effect immediately prior to such reduction; or (D) a material breach of any material provision of the employment agreement by the Company to which the officer shall have delivered a written notice to the board within 45 days of the officer's having actual knowledge of the occurrence of one of such events stating that the officer intends to terminate the officer's employment by Termination for Good Reason and specifying the factual basis for such termination, and such event, if capable of being cured, shall not have been cured within 21 days of the receipt of such notice. Notwithstanding the foregoing, a termination shall not be treated as a Termination for Good Reason if the officer shall have consented in writing to the occurrence of the event giving rise to the claim of Termination for Good Reason.

Pursuant to his employment agreement, to the extent Mr. Reno remains employed as of the closing date of a change in control, any stock options he held as of the effective date of his employment agreement will fully vest, effective as of the closing date of the change in control.

Dr. Golden. In connection with Dr. Golden's termination in September 2018, the Board approved a separation and release agreement, under which Dr. Golden received a severance payment. Dr. Golden's separation and release agreement is described above under "—Employment Agreements with Named Executive Officers—Separation and Release Agreement with Dr. Golden".

Mr. Mathiesen. In connection with Mr. Mathiesen's termination in September 2018, the Board approved a separation and release agreement, under which Mr. Mathiesen received a severance payment. Mr. Mathiesen's separation and release agreement is described above under "—Employment Agreements with Named Executive Officers—Separation and Release Agreement with Mr. Mathiesen".

Amended and Restated 2015 Equity Incentive Plan and Inducement Plan

Our board of directors initially adopted the 2015 Plan in April 2015, and our stockholders approved the 2015 Plan in April 2015. In April 2016, our board of directors and stockholders approved the amendment and restatement of the 2015 Plan in order to increase the share reserve under the 2015 Plan, include an "evergreen" provision, allow limited delegation of award authority to an executive officer and include certain annual limits on equity awards, which amendments became effective on August 4, 2016. In May 2018, our board of directors and stockholders approved an amendment to the amended and restated 2015 Plan to increase the number of shares of common stock reserved for issuance under the 2015 Plan by 300,000 shares without any change to the "evergreen" provision. We refer to such amended and restated plan, as amended in 2018, as the 2015 Plan.

Our board of directors adopted the Inducement Plan in September 2016, and amended the Inducement Plan in April 2018 to increase the aggregate number of shares of common stock that may be issued under the Inducement Plan. Pursuant to the Inducement Plan, as amended, we have reserved 450,000 shares of common stock to be used exclusively for grants of awards to individuals who were not previously employees or directors of the Company, as an inducement material to the individual's entry into employment with the Company within the meaning of Rule 5635(c)(4) of the Nasdaq Listing Rules. The Inducement Plan was approved, amended and can be further amended to increase the number of shares reserved thereunder at any time by our board of directors without stockholder approval pursuant to Rule 5635(c)(4) of the Nasdaq Listing Rules. The terms and conditions of the Inducement Plan are substantially similar to our 2015 Plan, which was approved by our stockholders.

Under the 2015 Plan and the Inducement Plan, the compensation committee may provide, in individual award agreements or in any other written agreement between a participant and us, that the stock award will be subject to additional acceleration of vesting and exercisability in the event of a change of control. Under the 2015 Plan, a change of control is generally (1) the acquisition by a person or entity of more than 50% of our combined voting power other than by merger, consolidation or similar transaction; (2) a consummated merger, consolidation or similar transaction immediately after which our stockholders cease to own more than 50% of the combined voting power of the surviving

entity; (3) a consummated sale, lease or exclusive license or other disposition of all or substantially of our assets; or (4) the replacement of a majority of the directors who were on the board of directors at the time the 2015 Plan became effective, or the Incumbent Board, by directors who were not elected to the board by a majority of the directors who were sitting on the Incumbent Board. Accordingly, the compensation committee, pursuant to the individual award agreements and/or individual employment agreements, for all unvested options held by our named executive officers, except the option awards granted to Dr. Gullans in 2018 (the treatment upon a change of control of which is described in “– Potential Payment Upon a Termination or Change in Control – Steven Gullans” above) provided for accelerated vesting of such options upon a change in control.

Chief Executive Officer Pay Ratio

As an “emerging growth company” and a “smaller reporting company”, we are not required to provide information relating to the ratio of total compensation of our Chief Executive Officer to the median of the annual total compensation of all of our employees, as required by the Investor Protection and Securities Reform Act of 2010, which is part of the Dodd-Frank Wall Street Reform and Consumer Protection Act.

Non-Employee Director Compensation

Our non-employee directors receive a mix of cash and share-based compensation intended to encourage non-employee directors to continue to serve on our board of directors, further align the interests of the directors and stockholders, and attract new non-employee directors with outstanding qualifications. Directors who are employees or officers of the Company do not receive any additional compensation for Board service.

Our non-employee director compensation policy became effective following the completion of our initial public offering in August 2016. Pursuant to this policy, each of our non-employee directors receives an annual retainer of \$50,000. Additionally, the Chairmen of our Audit, Compensation and Nominating and Corporate Governance Committees receive an additional annual payment of \$15,000, \$7,500 and \$5,000, respectively; and the members of each of our committees receive an additional annual payment of \$5,000.

On January 29, 2018, each non-employee director was granted an option to purchase 10,800 shares of common stock, which options vest in a series of 12 equal monthly installments, subject to the director’s continued service, and will vest in full upon a change in control (as defined in the 2015 Plan).

The following table provides compensation information for the fiscal year ended December 31, 2018 for each non-employee member of our Board.

Name	Fees Earned or Paid in Cash (\$)	Option Awards \$(1)	Total (\$)
P. Kent Hawryluk(2)	62,500	65,629	128,129
Kenneth Kousky	55,000	65,629	120,629
Pedro Lichtinger	60,000	65,629	125,629
Andrew Sassine	70,000	65,629	135,629

(1) Stock option awards were granted under the 2015 Plan. The amounts reported reflect the aggregate grant date fair value of each equity award granted to our non-employee directors during the fiscal year ended December 31, 2018, as computed in accordance with ASC 718. Assumptions used in the calculation of these amounts are included in Note 9 to the financial statements included in this Annual Report. As required by SEC rules, the amounts shown exclude the impact of estimated forfeitures related to service-based vesting conditions.

(2) Mr. Hawryluk resigned from the Board effective as of February 28, 2019.

As of December 31, 2018, each of the following non-employee directors had shares underlying outstanding stock options as follows: Mr. Hawryluk, 70,800; Mr. Kousky, 78,816; Mr. Lichtinger, 102,862; and Mr. Sassine, 102,862.

As named executive officers of the Company, compensation paid to Dr. Gullans and Dr. Bisgaier for the 2017 and 2018 fiscal years is fully reflected under “Named Executive Officer Compensation Tables—Summary Compensation Table for 2018”.

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

Security Ownership of Certain Beneficial Owners and Management

The following table sets forth certain information regarding beneficial ownership of our capital stock as of March 11, 2019, by:

- each person, or group of affiliated persons, known by us to beneficially own more than 5% of our common stock;
- each of our named executive officers;
- each of our directors; and
- all of our current executive officers and directors as a group.

The table lists applicable percentage ownership based on 14,265,411 shares of common stock outstanding as of March 11, 2019. In addition, the rules include shares of our common stock issuable pursuant to the exercise of stock options and warrants that are either immediately exercisable or exercisable within 60 days of March 11, 2019. These shares are deemed to be outstanding and beneficially owned by the person holding those options for the purpose of computing the percentage ownership of that person, but they are not treated as outstanding for the purpose of computing the percentage ownership of any other person.

We have determined beneficial ownership in accordance with the rules of the SEC. These rules generally attribute beneficial ownership of securities to persons who possess sole or shared voting power or investment power with respect to those securities. Unless otherwise indicated, the persons or entities identified in this table have sole voting and investment power with respect to all shares shown as beneficially owned by them, subject to applicable community

property laws. Except as otherwise noted below, the address for each person or entity listed in the table is c/o Gemphire Therapeutics Inc., 17199 N. Laurel Park Drive, Suite 401, Livonia, Michigan 48152.

NAME AND ADDRESS OF BENEFICIAL OWNER	SHARES BENEFICIALLY OWNED	
	NUMBER	PERCENT
Greater than 5% stockholders		
Excel Ventures II GP, LLC ⁽¹⁾	969,851	6.8
Venrock Healthcare Capital Partners II, L.P. ⁽²⁾	1,383,290	9.7
Mina Sooch ⁽³⁾	1,188,383	8.1
Directors and Named Executive Officers		
Charles L. Bisgaier, Ph.D. ⁽⁴⁾	1,469,487	10.2
Andrew Sassine ⁽⁵⁾	236,216	1.6
Jeffrey Mathiesen ⁽⁶⁾	235,727	1.6
Seth Reno ⁽⁷⁾	188,710	1.3
P. Kent Hawryluk ⁽⁸⁾	184,751	1.3
Lee Golden, Ph.D. ⁽⁹⁾	172,792	1.2
Steven Gullans, Ph.D. ⁽¹⁰⁾	171,250	1.2
Pedro Lichtinger ⁽¹¹⁾	151,865	1.1
Kenneth Kousky ⁽¹²⁾	72,001	*
All current executive officers and directors as a group (7 persons)	2,474,280	16.4

* Represents beneficial ownership of less than one percent.

- (1) Represents (i) 930,252 shares of common stock beneficially owned by Excel Ventures II GP, LLC (“Excel”) and certain of its affiliates and (ii) warrants to purchase 39,599 shares of common stock, as reported on the Schedule 13G/A filed with the SEC on February 6, 2019, and the Form 4 filed by Dr. Gullans on February 12, 2018. The address for Excel is 200 Clarendon Street, 17th floor, Boston, MA 02116.
- (2) Represents 1,383,290 shares held by Venrock Healthcare Capital Partners II, L.P. (“Venrock”) and certain of its affiliates as reported on the Schedule 13G filed with the SEC on August 20, 2018. The address for Venrock is 7 Bryant Park, 23rd Floor, New York, NY 10018. Venrock and each of its affiliates reported on the Schedule 13G have shared voting power and investment power over these shares.
- (3) Ms. Sooch’s employment with the Company terminated as of May 23, 2017. Represents (a) 668,732 shares of common stock held by Ms. Sooch, (b) 455,220 shares underlying options to purchase common stock that are exercisable within 60 days of March 11, 2019, (c) 39,431 shares of common stock held by the Arvinder S. Sooch Trust dated September 20, 2006, of which Ms. Sooch’s spouse is the trustee and (d) 25,000 shares of common stock held in a grantor retained annuity trust. Ms. Sooch’s beneficial ownership presented herein is based on Company records as of May 2017.

- (4) Represents (a) 1,248,914 shares of common stock held by Dr. Bisgaier, (b) 119,125 shares underlying options to purchase common stock that are exercisable within 60 days of March 11, 2019, (c) 82,220 shares of common stock held by The Charles L. Bisgaier Trust dated November 8, 2000, of which Dr. Bisgaier is the trustee, and (d) 19,228 shares of common stock held by Bisgaier Family, LLC, of which Dr. Bisgaier is a manager.
- (5) Represents (a) 136,264 shares of common stock held by Mr. Sassine, (b) 84,112 shares underlying options to purchase common stock that are exercisable within 60 days of March 11, 2019 and (c) 15,840 shares underlying warrants to purchase common stock that are exercisable within 60 days of March 11, 2019.
- (6) Represents (a) 14,134 shares of common stock held by Mr. Mathiesen and (b) 221,593 shares underlying options to purchase common stock that are exercisable within 60 days of March 11, 2019.
- (7) Represents (a) 18,286 shares of common stock held by Mr. Reno and (b) 170,424 shares underlying options to purchase common stock that are exercisable within 60 days of March 11, 2019.
- (8) Represents (a) 32,062 shares of common stock held by P. Kent Hawryluk, (b) 52,050 shares underlying options to purchase common stock that are exercisable within 60 days of March 11, 2019, (c) 81,889 shares of common stock held by the P. Kent Hawryluk Revocable Trust, of which Mr. Hawryluk is the trustee and (d) 18,750 shares underlying warrants to purchase common stock that are exercisable within 60 days of March 11, 2019 held by the P. Kent Hawryluk Revocable Trust, of which Mr. Hawryluk is the trustee.
- (9) Represents 172,792 shares underlying options to purchase common stock that are exercisable within 60 days of March 11, 2019.
- (10) Represents 171,250 shares underlying options to purchase common stock that are exercisable within 60 days of March 11, 2019.
- (11) Represents (a) 59,833 shares of common stock held by Mr. Lichtinger, (b) 84,112 shares underlying options to purchase common stock that are exercisable within 60 days of March 11, 2019 and (c) 7,920 shares underlying warrants to purchase common stock that are exercisable within 60 days of March 11, 2019.
- (12) Represents (a) 11,935 shares of common stock held by Mr. Kousky, and (b) 60,066 shares underlying options to purchase common stock exercisable within 60 days of March 11, 2019.

Securities Authorized for Issuance Under Equity Compensation Plan

The following table presents information as of December 31, 2018 with respect to compensation plans under which shares of our common stock may be issued.

Plan Category	Number of securities to be issued upon exercise of outstanding options, warrants and rights (#)	Weighted-average exercise price of outstanding options, warrants and rights (\$)	Number of securities remaining available for future issuance under equity compensation plans (#)
Equity compensation plans approved by security holders	2,595,003	8.96	757,032 ⁽¹⁾
Equity compensation plans not approved by security holders	205,771	9.81	244,229 ⁽²⁾
Total	2,800,774		1,001,261

- (1) Includes 300,000 shares of common stock that remained available for purchase under the ESPP and 457,032 shares of common stock that remained available for issuance under our 2015 Plan. The number of shares of our common stock reserved under the ESPP will automatically increase on January 1 of each calendar year through January 1, 2026 by the least of (1) 1.0% of the total number of shares of our common stock outstanding on December 31 of the preceding calendar year and (2) 75,000 shares. The number of shares of our common stock reserved under our 2015 Plan will automatically increase on January 1 of each

year, continuing through and including January 1, 2026, to an amount equal to 20% of the fully diluted shares as of December 31 of the preceding calendar year, or a lesser number of shares determined by our board of directors.

(2) Includes 244,229 shares of common stock that remained available for issuance under our Inducement Plan.

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS AND DIRECTOR INDEPENDENCE

The following includes a summary of transactions since January 1, 2017 to which we have been a party, in which the amount involved in the transaction exceeded the lesser of \$120,000 or 1% of the average of the Company's total assets at year end for the last two completed fiscal years, and in which any of our directors, executive officers or, to our knowledge, beneficial owners of more than 5% of our capital stock or any member of the immediate family of any of the foregoing persons had or will have a direct or indirect material interest, other than equity and other compensation, termination, change of control and other arrangements, which are described under Part III, Item 11 "Executive Compensation" in this Report.

Investor Agreements

In connection with our Series A convertible preferred stock financing, we entered into an investor rights agreement and right of first refusal and co-sale agreement containing voting rights, information rights, rights of first refusal and co-sale and registration rights, among other things, with each of the holders of our Series A convertible preferred stock. On April 14, 2016, we amended the investor rights agreement to provide registration rights to certain holders of our convertible notes. As detailed above, certain members of our board of directors, executive officers and related parties were holders of our Series A convertible preferred stock prior to the closing of our initial public offering. These rights terminated upon the closing of our initial public offering, except for the registration rights described below. These registration rights will terminate as to a given holder of registrable securities upon the earlier of (i) five years following the closing of our initial public offering, (ii) after the consummation of a liquidation event and (iii) when freely tradeable under Rule 144 of the Securities Act.

Demand Registration Rights

At any time beginning six months after our initial public offering date, upon the written request of certain of the holders of the registrable securities then outstanding that we file a registration statement under the Securities Act covering the registration of the registrable securities having an aggregate offering price to the public of not less than \$5 million, we will be obligated to notify all holders of registrable securities of such request and to use our reasonable best efforts to register the sale of all registrable securities that holders may request to be registered. We are not required to effect more than two registration statements which are declared or ordered effective. We may postpone the filing or effectiveness of a registration statement for up to 90 days once in any twelve month period if our Board determines in its good faith judgment that such registration and offering would materially and adversely affect us. As of March 11, 2019, the holders of 1,230,625 shares were entitled to these demand registration rights.

"Piggyback" Registration Rights

If we register any securities for public sale, holders of registration rights will have the right to include their shares in the registration statement. These piggyback registration rights are subject to specified conditions and limitations, including the right of the underwriters of any underwritten offering to limit the number of shares having registration rights to be included in the registration statement, but not below 30% of the total number of shares included in the registration statement. As of March 11, 2019, the holders of 1,230,625 shares were entitled to these piggyback registration rights.

Form S-3 Registration Rights

If we are eligible to file a registration statement on Form S-3, holders of at least 20% of the outstanding registrable securities will have the right to demand that we file a registration statement on Form S-3 so long as the aggregate price to the public of the securities to be sold under the registration statement on Form S-3 is at least \$5 million. We are not required to effect more than two registrations on Form S-3 in any 12-month period. The right to have such shares registered on Form S-3 is further subject to other specified conditions and limitations. Upon such a request, we will be required to use our reasonable best efforts to file the registration as soon as practicable. As of March 11, 2019, the holders of 1,230,625 shares were entitled to these Form S-3 registration rights.

Indemnification Agreements

We have entered, and intend to continue to enter, into separate indemnification agreements with our directors and executive officers, in addition to the indemnification provided for in our amended and restated certificate of incorporation and amended and restated bylaws. These agreements, among other things, require us to indemnify our directors and officers for certain expenses, including attorneys' fees, judgments, fines and settlement amounts incurred by a director or officer in any action or proceeding arising out of their services as one of our directors or officers or any other company or enterprise to which the person provides services at our request. We believe that these provisions and indemnification agreements are necessary to attract and retain qualified persons as directors and officers.

Our amended and restated certificate of incorporation and amended and restated bylaws limit our directors' liability to the fullest extent permitted under Delaware corporate law. Delaware corporate law provides that directors of a corporation will not be personally liable for monetary damages for breach of their fiduciary duties as directors, except for liability:

- for any transaction from which the director derives an improper personal benefit;
- for any act or omission not in good faith or that involves intentional misconduct or a knowing violation of law;
- under Section 174 of the Delaware General Corporation Law (unlawful payment of dividends or redemption of shares); or
- for any breach of a director's duty of loyalty to the corporation or its stockholders.

If the Delaware General Corporation Law is amended to authorize corporate action further eliminating or limiting the personal liability of directors, then the liability of our directors shall be eliminated or limited to the fullest extent permitted by the Delaware General Corporation Law, as so amended.

Delaware law and our amended and restated certificate of incorporation and our amended and restated bylaws provide that we will, in certain situations, indemnify our directors and officers and may indemnify other employees and other agents, to the fullest extent permitted by law. Any indemnified person is also entitled, subject to certain limitations, to payment or reimbursement of reasonable expenses (including attorneys' fees and disbursements) in advance of the final disposition of the proceeding.

Insofar as indemnification for liabilities arising under the Securities Act may be permitted to directors, officers or control persons, in the opinion of the SEC, such indemnification is against public policy as expressed in the Securities Act and is therefore unenforceable.

Insider Participation in Private Placement

Certain of our directors and 5% holders participated in our March 2017 private placement wherein we issued and sold units at a price of \$9.47 per unit, with each unit consisting of one share of our common stock and a warrant to purchase 0.75 shares of common stock. The warrants have an exercise price of \$10.40 per share and are exercisable for a

period of five years from the date of issuance. The following table summarizes units purchased in the private placement by our directors and entities who held more than 5% of our outstanding capital stock at the time of the purchase.

Name	Number of Units Purchased	Aggregate Purchase Price (\$)
Greater than 5% stockholders		
Cormorant Asset Management, LLC	52,798	499,997.06
Excel Venture Fund II, LLC(1)	52,798	499,997.06
Directors		
Pedro Lichtinger	10,559	99,993.73
Andrew Sassine	21,119	199,996.93
P. Kent Hawryluk(2)	25,000	236,750.00
(1) Our director, Dr. Gullans, was previously a Manager of Excel.		
(2) Purchased by the P. Kent Hawryluk Revocable Trust, of which Mr. Hawryluk is the trustee.		

Private Placement Registration Rights Agreement

On March 10, 2017, the Company entered into a Securities Purchase Agreement with certain accredited investors (the "Purchasers") pursuant to which the Company, in a private placement (the "Private Placement"), agreed to issue and sell to the Purchasers units, each of which consisted of one share of the Company's common stock, and a warrant to purchase 0.75 shares of common stock (the "Warrants"). In connection with the Private Placement, the Company entered into a Registration Rights Agreement with the Purchasers, dated as of March 10, 2017 (the "Registration Rights Agreement"), pursuant to which the Company agreed to file a registration statement with the SEC covering the resale of the shares of common stock sold in the Private Placement and the shares of common stock issuable upon exercise of the Warrants, within 30 days of the closing of the Private Placement. The Registration Rights Agreement includes customary indemnification rights in connection with the registration statement.

Insider Participation in the Follow-On Public Offering

Excel, one of our principal stockholders and a former affiliate of our President and Chief Executive Officer, purchased 71,429 shares for an aggregate purchase price of \$500,003 in our underwritten public offering that closed on February 12, 2018.

Policies and Procedures for Transactions with Related Parties

To assist the Company in complying with its disclosure obligations and to enhance the Company's disclosure controls, the Board approved a formal policy in June 2016 regarding related person transactions. A "related person" is a director, officer, nominee for director or a more than 5% stockholder (of any class of the Company's voting stock) since the beginning of the Company's last completed fiscal year, and their immediate family members. A related person transaction is any transaction or any series of transactions in which the Company was or is to be a participant, the amount involved exceeds \$120,000, and in which any related person had or will have a direct or indirect material interest.

Specifically, the policy establishes a process for identifying related persons and procedures for reviewing and approving such related person transactions. In addition, directors and executive officers are required to complete an annual questionnaire in connection with the Company's proxy statement for its annual meeting of stockholders, which includes questions regarding related person transactions, and such persons also are required to provide written notice to the Company or outside legal counsel of any updates to such information prior to the annual meeting. Further, the Company's legal, financial and other departments have established additional procedures to assist the Company in identifying existing and potential related person transactions and other potential conflict of interest transactions, including policies and procedures designed to comply with Auditing Standard No. 18 issued by the Public Company Accounting Oversight Board.

The audit committee and/or the independent directors of the Board review such proposed business transactions to ensure that the Company's involvement in such transactions is on terms comparable to those that could be obtained in arm's length dealings with an unrelated third party and is in the best interests of the Company and its stockholders.

In addition, under the Code of Business Conduct and Ethics, the Company's employees, officers and directors are discouraged from entering into any transaction that may cause a conflict of interest for the Company. In addition, they must report any potential conflict of interest, including related person transactions, to their supervisor or the compliance officer, as defined in the Code of Business Conduct and Ethics.

Director Independence

Our common stock is listed on the Nasdaq Global Market ("Nasdaq"). Under the rules of Nasdaq, independent directors must comprise a majority of a listed company's Board. In addition, the rules of Nasdaq require that, subject to specified exceptions, each member of a listed company's audit, compensation and nominating and corporate governance committees be independent. Under the rules of Nasdaq, a director will only qualify as an "independent director" if, in the opinion of that company's board of directors, that person does not have a relationship that would interfere with the exercise of independent judgment in carrying out the responsibilities of a director. Additionally, compensation committee members must not have a relationship with us that is material to the director's ability to be independent from management in connection with the duties of a compensation committee member.

Audit committee members must also satisfy the independence criteria set forth in Rule 10A-3 under the Securities Exchange Act of 1934, as amended (the "Exchange Act"). In order to be considered independent for purposes of Rule 10A-3, a member of an audit committee of a listed company may not, other than in his or her capacity as a member of the audit committee, the board of directors or any other board of directors committee: (i) accept, directly or indirectly, any consulting, advisory or other compensatory fee from the listed company or any of its subsidiaries; or (ii) be an affiliated person of the listed company or any of its subsidiaries.

Our Board has undertaken a review of the independence of each director and considered whether each director has a material relationship with us that could compromise his or her ability to exercise independent judgment in carrying out his or her responsibilities. As a result of this review, our Board determined that persons who served as members of our Board during 2018 were, and all current members of our Board are, "independent directors" as defined under the applicable rules and regulations of the SEC and the listing requirements and rules of Nasdaq, except Dr. Gullans, our President and Chief Executive Officer, and Dr. Bisgaier, our Chairman and Chief Scientific Officer. Each member who served on our audit committee, compensation committee and nominating and corporate governance committee in 2018 met, and each current member of our audit committee, compensation committee and nominating and corporate governance committee meets, the requirements for independence under the current Nasdaq and SEC rules and regulations.

ITEM 14. PRINCIPAL ACCOUNTING FEES AND SERVICES

The audit committee has considered the scope and fee arrangements for all services provided by Ernst & Young, taking into account whether the provision of non-audit-related services is compatible with maintaining Ernst & Young's independence. We retained Ernst & Young to provide services in the following categories and amounts, and the following table presents fees for professional audit services rendered by Ernst & Young for the audit of our annual financial statements for the years ended December 31, 2018 and 2017.

FEE CATEGORY	FISCAL YEAR 2018	FISCAL YEAR 2017
Audit fees(1)	\$270,315	\$362,560
Audit-related fees(2)	—	—
Tax fees(3)	—	\$4,000
All other fees(4)	—	—
Total fees	\$270,315	\$366,560

- (1) Audit fees include fees for professional services provided by Ernst & Young in connection with the audit of our financial statements, review of our quarterly financial statements, and related services that are typically provided in connection with registration statements.
- (2) Audit-related fees include fees billed for assurance and related services reasonably related to the performance of the audit of our financial statements. There were no audit related fees billed by Ernst & Young in 2018 or 2017.
- (3) Tax fees relate to permissible services for technical tax advice related to federal and state income tax matters.
- (4) There were no other fees billed by Ernst & Young for any other services in 2018 or 2017.

Policy on Audit Committee Pre-Approval of Audit and Permissible Non-Audit Services of Independent Registered Public Accounting Firm

Our audit committee generally pre-approves all audit and permitted non-audit and tax services provided by the independent registered public accounting firm. Pre-approval is detailed as to the particular service or category of services and is generally subject to a specific budget. The independent registered public accounting firm and management are required to periodically report to the audit committee regarding the extent of services provided by the independent registered public accounting firm in accordance with this pre-approval, and the fees for the services performed to date. Our audit committee may also pre-approve particular services on a case-by-case basis. All of the services relating to the fees described in the table above were approved by our audit committee.

PART IV

ITEM 15. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES

(a) The following documents are filed as part of this report:

1. Financial Statements

See Index to Financial Statements at Item 8 herein.

2. Financial Statement Schedules

**SCHEDULE II
VALUATION AND QUALIFYING ACCOUNTS**

Description	Beginning Balance of Period	Additions		Releases	Ending Balance of Period
		Charged to Costs and Expenses	Charged to Paid in Capital		
(in thousands)					
For the Year Ended December 31, 2016					
Valuation allowance for deferred taxes	\$ 3,657	\$ 5,937	\$ (274)	\$ —	\$ 9,320
For the Year Ended December 31, 2017					
Valuation allowance for deferred taxes	\$ 9,320	\$ 6,861	\$ —	\$ —	\$ 16,181
For the Year Ended December 31, 2018					
Valuation allowance for deferred taxes	\$ 16,181	\$ 6,685	\$ —	\$ —	\$ 22,866

No other financial statement schedules are provided because the information called for is not required or is shown either in the financial statements or notes thereto.

3. Exhibits:

EXHIBIT NUMBER	DESCRIPTION OF DOCUMENT
1.1	Equity Distribution Agreement, dated September 1, 2017, by and between the Registrant and Piper Jaffray & Co. (incorporated by reference to Exhibit 1.2 to the Registrant's Registration Statement on Form S-3, File No. 333-220315, filed on September 1, 2017).
1.2	Underwriting Agreement, by and between Gemphire and Piper Jaffray & Co. dated February 8, 2018 (incorporated by reference to Exhibit 1.1 to the Registrant's Current Report on Form 8-K, File No. 001-37809, filed on February 12, 2018).
3.1	Third Amended and Restated Certificate of Incorporation of Gemphire Therapeutics Inc. (incorporated by reference to Exhibit 3.1 to the Registrant's Current Report on Form 8-K, File No. 001-37809, filed on August 10, 2016).
3.2	Amended and Restated Bylaws of Gemphire Therapeutics Inc. (incorporated by reference to Exhibit 3.2 to the Registrant's Current Report on Form 8-K, File No. 001-37809, filed on August 10, 2016).
4.1	Form of Common Stock Certificate of the Registrant (incorporated by reference to Exhibit 4.1 to the Registrant's Amendment No. 1 to the Registration Statement on Form S-1, File No. 333-210815, filed on June 13, 2016).
4.2	Investor Rights Agreement, dated as of March 31, 2015, by and among the Registrant and the Investors listed therein as amended by First Amendment to Investor Rights Agreement, dated as of April 14, 2016 (incorporated by reference to Exhibit 4.2 to the Registrant's Registration Statement on Form S-1, File No. 333-210815, filed on April 18, 2016).
4.3	Form of Warrant to Purchase Common Stock (incorporated by reference to Exhibit 4.1 to the Registrant's Current Report on Form 8-K, File No. 001-37809, filed on March 13, 2017).
4.4	Warrant to Purchase Stock, dated July 31, 2018, by and between Gemphire Therapeutics Inc. and Silicon Valley Bank (incorporated by reference to Exhibit 4.1 to the Registrant's Current Report on Form 8-K, File No. 001-37809, filed on August 6, 2018).
10.1*	Form of Indemnification Agreement (incorporated by reference to Exhibit 10.1 to the Registrant's Registration Statement on Form S-1, File No. 333-210815, filed on April 18, 2016).
10.2*	Form of Amended and Restated 2015 Equity Incentive Plan (incorporated by reference to Exhibit 10.3 to the Registrant's Amendment No. 1 to the Registration Statement on Form S-1, File No. 333-210815, filed on June 13, 2016).
10.3*	Form of 2016 Employee Stock Purchase Plan (incorporated by reference to Exhibit 10.4 to the Registrant's Amendment No. 1 to the Registration Statement on Form S-1, File No. 333-210815, filed on June 13, 2016).
10.4*	Employment Agreement by and between the Registrant and Mina Sooch (incorporated by reference to Exhibit 10.5 to the Registrant's Registration Statement on Form S-1, File No. 333-210815, filed on April 18, 2016).
10.5*	Employment Agreement by and between the Registrant and Jeffrey S. Mathiesen (incorporated by reference to Exhibit 10.6 to the Registrant's Amendment No. 1 to the Registration Statement on Form S-1, File No. 333-210815, filed on June 13, 2016).
10.6*	Employment Agreement by and between the Registrant and Charles L. Bisgaier (incorporated by reference to Exhibit 10.7 to the Registrant's Registration Statement on Form S-1, File No. 333-210815, filed on April 18, 2016).
10.7*	Form of Executive Officer Employment Agreement (incorporated by reference to Exhibit 10.8 to the Registrant's Amendment No. 1 to the Registration Statement on Form S-1, File No. 333-210815, filed on June 13, 2016).

10.8+	License Agreement, dated April 16, 2011, by and between the Registrant and Pfizer Inc. (incorporated by reference to Exhibit 10.9 to the Registrant's Amendment No. 1 to the Registration Statement on Form S-1, File No. 333-210815, filed on June 13, 2016).
10.9	Lease Agreement, dated as of May 18, 2016 and commencing on August 1, 2016, by and between the Registrant and North Laurel Project, LLC (incorporated by reference to Exhibit 10.11 to the Registrant's Amendment No. 1 to the Registration Statement on Form S-1, File No. 333-210815, filed on June 13, 2016).
10.10	Form of Note Purchase Agreement dated July 31, 2015 as amended on December 10, 2015, March 27, 2016 and April 14, 2016 (incorporated by reference to Exhibit 10.11 to the Registrant's Registration Statement on Form S-1, File No. 333-210815, filed on April 18, 2016).
10.11	Form of Joinder Agreement to Note Purchase Agreement (incorporated by reference to Exhibit 10.12 to the Registrant's Registration Statement on Form S-1, File No. 333-210815, filed on April 18, 2016).
10.12	Fourth Amendment to Note Purchase Agreement and Convertible Promissory Notes dated April 26, 2016 (incorporated by reference to Exhibit 10.14 to the Registrant's Amendment No. 1 to the Registration Statement on Form S-1, File No. 333-210815, filed on June 13, 2016).
10.13*	Non-Employee Director Compensation Policy (incorporated by reference to Exhibit 10.15 to the Registrant's Amendment No. 1 to the Registration Statement on Form S-1, File No. 333-210815, filed on June 13, 2016).
10.14*	Gemphire Therapeutics Inc. Inducement Plan (incorporated by reference to Exhibit 10.1 to the Registrant's Current Report on Form 8-K, File No. 001-37809, filed on October 3, 2016).
10.15*	Form of Stock Option Grant Notice, Option Agreement and Notice of Exercise under the Gemphire Therapeutics Inc. Inducement Plan (incorporated by reference to Exhibit 10.2 to the Registrant's Current Report on Form 8-K, File No. 001-37809, filed on October 3, 2016).
10.16	Form of Securities Purchase Agreement, dated March 10, 2017 (incorporated by reference to Exhibit 10.1 to the Registrant's Current Report on Form 8-K, File No. 001-37809, filed on March 13, 2017).
10.17	Form of Registration Rights Agreement, dated March 10, 2017 (incorporated by reference to Exhibit 10.2 to the Registrant's Current Report on Form 8-K, File No. 001-37809, filed on March 13, 2017).
10.18	Loan and Security Agreement dated as of July 24, 2017 by and between Gemphire Therapeutics Inc. and Silicon Valley Bank (incorporated by reference to Exhibit 10.1 to the Registrant's Current Report on Form 8-K, File No. 001-37809, filed on July 25, 2017).
10.19*	Separation and Release Agreement between Gemphire Therapeutics Inc. and Mina Sooch dated May 30, 2017 (incorporated by reference to Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q, File No. 001-37809, filed on August 14, 2017).
10.20*	Offer Letter between Gemphire Therapeutics Inc. and Dr. Steve Gullans dated June 8, 2017 (incorporated by reference to Exhibit 10.2 to the Registrant's Quarterly Report on Form 10-Q, File No. 001-37809, filed on August 14, 2017).
10.21*	Amendment to Inducement Plan (incorporated by reference to Exhibit 10.1 to the Registrant's Current Report on Form 8-K, File No. 001-37809, filed on April 12, 2018).
10.22*	Employment Agreement between Gemphire Therapeutics Inc. and Dr. Steve Gullans dated May 1, 2018 (incorporated by reference to Exhibit 10.1 to the Registrant's Current Report on Form 8-K, File No. 001-37809, filed on May 3, 2018).
10.23*	Amendment to the Gemphire Therapeutics Inc. Amended and Restated 2015 Equity Incentive Plan (incorporated by reference to Exhibit 10.2 to the Registrant's Current Report on Form 8-K, File No. 001-37809, filed on May 24, 2018).
10.24+	Amended and Restated License Agreement effective August 2, 2018 by and between Gemphire Therapeutics Inc. and Pfizer Inc. (incorporated by reference to Exhibit 10.1 to the Registrant's Current Report on Form 8-K, File No. 001-37809, filed on August 6, 2018).
10.25	First Amendment to Loan and Security Agreement, dated as of July 31, 2018, by and between Gemphire Therapeutics Inc. and Silicon Valley Bank (incorporated by reference to Exhibit 10.1 to the Registrant's Current Report on Form 8-K, File No. 001-37809, filed on August 6, 2018).

10.26*	Employment Agreement by and between the Registrant and Seth Reno.
10.27*	Separation and Release Agreement with Jeffrey S. Mathiesen dated as of September 21, 2018, (incorporated by reference to Exhibit 10.3 to the Registrant's Current Report on Form 10-Q, File No. 001-37809, filed on November 8, 2018).
10.28*	Separation and Release Agreement with Dr. Lee Golden dated as of September 21, 2018. (incorporated by reference to Exhibit 10.4 to the Registrant's Current Report on Form 10-Q, File No. 001-37809, filed on November 8, 2018).
23.1	Consent of Ernst & Young LLP
31.1	Certification of Principal Executive Officer and Principal Financial Officer Pursuant to Exchange Act Rule 13a-14(a) or 15d-14(a), as Adopted Pursuant to Section 302 of The Sarbanes Oxley Act of 2002
32.1	Certification of Principal Executive Officer and Principal Financial Officer Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
101.INS	XBRL Instance Document
101.SCH	XBRL Taxonomy Extension Schema Document
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document
101.LAB	XBRL Taxonomy Extension Label Linkbase Document
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document

* Indicates management contract or compensatory plan.

+ Registrant has omitted and filed separately with the SEC portions of the exhibit pursuant to a confidential treatment request under Rule 406 promulgated under the Securities Act.

SIGNATURES

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

Date: March 15, 2019

GEMPHIRE THERAPEUTICS INC.

By: /s/ STEVEN GULLANS
Steven Gullans, Ph.D.
President and 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 registrant and in the capacities and on the dates indicated.

<u>SIGNATURE</u>	<u>TITLE</u>	<u>DATE</u>
<u>/s/ STEVEN GULLANS</u> Steven Gullans, Ph.D.	President and Chief Executive Officer (Principal Executive Officer and Principal Financial Officer)	March 15, 2019
<u>/s/ CHARLES L. BISGAIER, Ph.D.</u> Charles L. Bisgaier, Ph.D.	Chief Scientific Officer and Chairman of the Board of Directors	March 15, 2019
<u>/s/ KENNETH KOUSKY</u> Kenneth Kousky	Member of the Board of Directors	March 15, 2019
<u>/s/ PEDRO LICHTINGER</u> Pedro Lichtinger	Member of the Board of Directors	March 15, 2019
<u>/s/ ANDREW SASSINE</u> Andrew Sassine	Member of the Board of Directors	March 15, 2019

EMPLOYMENT AGREEMENT

THIS EMPLOYMENT AGREEMENT (this "**Agreement**") by and between GEMPHIRE THERAPEUTICS INC., a Delaware corporation (the "**Company**") and SETH C. RENO (the "**Executive**") is signed by the Company and the Executive on August 15, 2016 (the "**Effective Date**").

BACKGROUND

The board of directors of the Company (the "**Board**") has determined that it is in the best interests of the Company and its stockholders to employ the Executive. The Executive is currently employed as its Chief Commercial Officer subject to an offer letter dated August 6, 2015 and effective August 10, 2015, (the "**Prior Agreement**"). The Company and the Executive desire to enter into this Agreement to embody the terms of those continued relationships and to amend, restate and supersede the terms and conditions of the Prior Agreement in their entirety. This Agreement shall represent the entire understanding and agreement between the parties with respect to the Executive's employment with the Company.

NOW, THEREFORE, in consideration of the foregoing and the terms and conditions set forth herein, the parties agree as follows:

TERMS AND CONDITIONS

1. **EMPLOYMENT PERIOD.** The Company hereby agrees to continue the Executive in its employ, and the Executive hereby agrees to remain in the employ of the Company, subject to the terms and conditions of this Agreement, for the period commencing on the Effective Date and ending on the first anniversary of the Effective Date (the "**Initial Term**"). The term of this Agreement will automatically be renewed for a term of one (1) year (each, a "**Renewal Term**") at the end of the Initial Term and at the end of each Renewal Term thereafter, provided that the Board does not provide written notice to the Executive of its intention not to renew this Agreement ninety (90) days prior to the expiration of the Initial Term or any Renewal Term. For purposes of this Agreement, "**Employment Period**" includes the Initial Term and any Renewal Term(s) thereafter. Notwithstanding the foregoing, in the event of a Change in Control, the date the Change in Control occurs shall become the Effective Date for all purposes thereafter, and each Change in Control thereafter shall result in a new Effective Date on the date of the latest Change in Control. This Agreement, on the Effective Date, amends, restates and supersedes the Prior Agreement.

2. **TERMS OF EMPLOYMENT.**

(a) **Position and Duties.**

(i) During the Employment Period, the Executive shall serve as the Chief Commercial Officer of the Company, and in such other position or positions with the

Company and its subsidiaries as are consistent with the Executive's position as Chief Commercial Officer of the Company, and shall have such duties and responsibilities as are assigned to the Executive by the Board consistent with the Executive's position as Chief Commercial Officer of the Company.

(ii) During the Employment Period, and excluding any periods of vacation and sick leave to which the Executive is entitled, the Executive agrees to devote reasonable attention and time during normal business hours and on a full time basis to the business and affairs of the Company, to discharge the responsibilities assigned to the Executive hereunder, and to use the Executive's reasonable best efforts to perform faithfully and efficiently such responsibilities. During the Employment Period it shall not be a violation of this Agreement for the Executive to (A) be employed by the Company or any of its subsidiaries or Affiliates, (B) serve on corporate, civic or charitable boards, committees, or advisory boards, (C) deliver lectures, fulfill speaking engagements or teach at educational institutions, and (D) manage personal investments, so long as such activities do not significantly interfere with the performance of the Executive's responsibilities as an employee of the Company in accordance with this Agreement.

(b) **Compensation.**

(i) **Base Salary.** During the Employment Period, the Executive shall receive an annual base salary (the "**Annual Base Salary**") at least equal to \$250,000, subject to applicable withholding taxes, which shall be paid in accordance with the Company's normal payroll practices for senior executive officers of the Company as in effect from time to time. During the Employment Period, the Annual Base Salary shall be reviewed at least annually by the Board or the Compensation Committee of the Board (the "**Compensation Committee**"). Any increase in the Annual Base Salary shall not serve to limit or reduce any other obligation to the Executive under this Agreement. The Annual Base Salary shall not be reduced after any such increase (unless otherwise agreed to by the Executive) and the term "Annual Base Salary" as utilized in this Agreement shall refer to the Annual Base Salary as so increased or adjusted.

(ii) **Annual Bonus.** In addition to the Annual Base Salary, for each fiscal year ending during the Employment Period, the Executive shall be eligible for an annual cash bonus (the "**Annual Bonus**"), as determined by the Compensation Committee, which value shall be up to forty (40) percent of the Annual Base Salary and as determined in accordance with the policies and practices generally applicable to other senior executive officers of the Company. Each such Annual Bonus awarded to the Executive shall be paid sometime during the first seventy-five (75) days of the fiscal year next following the fiscal year for which the Annual Bonus is awarded, unless the Executive shall elect, in compliance with Treasury Regulation 1.409A-2(a), to defer the receipt of such Annual Bonus.

(iii) **Long-Term Incentive Compensation.** During the Employment Period, the Executive shall be entitled to participate in any stock option, performance share, performance unit or other equity based long-term incentive compensation plan, program or arrangement (the "**Plans**") generally made available to senior executive officers of the Company, on substantially the same terms and conditions as generally apply to such other

officers, except that the size of the awards made to the Executive shall reflect the Executive's position with the Company and the Compensation Committee's views.

(iv) **Welfare Benefit Plans.** During the Employment Period, the Executive and/or the Executive's family, as the case may be, shall be eligible for participation in and shall receive all benefits under welfare benefit plans, practices, policies and programs provided by the Company and its Affiliated companies (including, without limitation, medical, prescription, dental, disability, employee life, group life, accidental death and travel accident insurance plans and programs) made available to other senior executive officers of the Company.

(v) **Shares and Stock Options.** As of the Effective Date, the Executive shall be entitled to retain all shares of the Company's common stock (the "**Common Stock**") and stock options held by the Executive as of the Effective Date (the "**Executive's Current Equity**"); provided, however, to the extent that the Executive remains employed by the Company as of the closing date of a Change in Control, the Executive's Current Equity shall fully vest effective as of the closing date of a Change in Control.

(vi) **Expenses.** During the Employment Period, the Executive shall be entitled to receive prompt reimbursement for all reasonable expenses incurred by the Executive in accordance with the plans, practices, policies and programs of the Company.

(vii) **Vacation.** During the Employment Period, the Executive shall be entitled to paid vacation in accordance with the plans, practices, policies and programs of the Company consistent with the treatment of other senior executive officers of the Company.

3. **TERMINATION OF EMPLOYMENT.**

(a) Notwithstanding Section 1, the Employment Period shall end upon the earliest to occur of (i) the Executive's death, (ii) a Termination due to Disability, (iii) a Termination for Cause, (iv) the Termination Date specified in connection with any exercise by the Company of its Termination Right, (v) a Termination for Good Reason, or (vi) the termination of this Agreement by Executive pursuant to Section 3(b). If the Employment Period terminates as of a date specified under this Section 3, the Executive agrees that, upon written request from the Company, the Executive shall resign from any and all positions the Executive holds with the Company and any of its subsidiaries and Affiliates, effective immediately following receipt of such request from the Company (or at such later date as the Company may specify).

(b) This Agreement may be terminated by the Executive at any time upon thirty (30) days prior written notice to the Company or upon such shorter period as may be agreed upon between the Executive and the Board. In the event of a termination by the Executive, the Company shall be obligated only to continue to pay the Executive's salary and provide other benefits provided by this Agreement up to the date of the termination.

(c) **Benefits Payable Under Termination.**

(i) In the event of the Executive's death during the Employment Period or a Termination due to Disability, the Executive or the Executive's beneficiaries or legal

representatives shall be provided the Unconditional Entitlements (as defined below), including, but not limited to, any such Unconditional Entitlements that are or become payable under any Company plan, policy, practice or program or any contract or agreement with the Company by reason of the Executive's death or Termination due to Disability.

(ii) In the event of the Executive's Termination for Cause or termination by the Executive other than a Termination for Good Reason, the Executive shall be provided the Unconditional Entitlements.

(iii) In the event of (1) a Termination for Good Reason, (2) the exercise by the Company of its Termination Rights or (3) the Executive's termination as a result of the Board's decision to provide the Executive with written notice of the Company's intention not to renew this Agreement ninety (90) days prior to the expiration of the Initial Term or any Renewal Term, the Executive shall be provided the Unconditional Entitlements and, subject to the Executive signing and delivering to the Company and not revoking before the sixtieth (60th) day following the Termination Date, a general release of claims in favor of the Company and certain related parties in a form reasonably satisfactory to the Company and the Executive, which the Company shall provide to the Executive within seven (7) days following the Termination Date (the "**Release**"), the Company shall provide the Executive the Conditional Benefits. Any and all amounts payable and benefits or additional rights provided to the Executive upon a termination of the Executive's employment pursuant to this Section 3(c) (other than the Unconditional Entitlements) shall only be payable or provided if the Executive signs and delivers the Release and if the Release becomes irrevocable prior to the sixtieth (60th) day following the Termination Date. In no event shall the Executive be obligated to seek other employment or take any other action by way of mitigation of the amounts payable to the Executive under any of the provisions of this Agreement, nor shall the amount of any payment hereunder be reduced by any compensation earned by the Executive as a result of employment by a subsequent employer.

(d) **Unconditional Entitlements.** For purposes of this Agreement, the "**Unconditional Entitlements**" to which the Executive may become entitled under Section 3(c) are as follows:

(i) **Earned Amounts.** The Earned Compensation shall be paid within thirty (30) days following the termination of the Executive's employment hereunder, or if any part thereof constitutes a bonus which is subject to or conditioned upon any performance conditions, within thirty (30) days following the determination that such conditions have been met, provided that in no event shall the bonus be paid later than ninety (90) days following the Executive's termination of employment.

(ii) **Benefits.** All benefits payable to the Executive under any employee benefit plans (including, without limitation any pension plans or 401(k) plans) of the Company or any of its Affiliates applicable to the Executive at the time of termination of the Executive's employment with the Company and all amounts and benefits (other than the Conditional Benefits) which are vested or which the Executive is otherwise entitled to receive under the terms of or in accordance with any plan, policy, practice or program of, or any contract or agreement with, the Company, at or subsequent to the date of the Executive's termination without regard to the performance by the Executive of further services or the resolution of a

contingency, shall be paid or provided in accordance with and subject to the terms and provisions of such plans, it being understood that all such benefits shall be determined on the basis of the actual date of termination of the Executive's employment with the Company.

(iii) **Indemnities.** Any right which the Executive may have to claim a defense and/or indemnity for liabilities to or claims asserted by third parties in connection with the Executive's activities as an officer, director or employee of the Company shall be unaffected by the Executive's termination of employment and shall remain in effect in accordance with its terms.

(iv) **Medical Coverage.** The Executive shall be entitled to such continuation of health care coverage as is required under, and in accordance with, applicable law or otherwise provided in accordance with the Company's policies. The Executive shall be notified in writing of the Executive's rights to continue such coverage after the termination of the Executive's employment pursuant to this Section 3(d)(iv), provided that the Executive timely complies with the conditions to continue such coverage. The Executive understands and acknowledges that the Executive is responsible to make all payments required for any such continued health care coverage that the Executive may choose to receive.

(v) **Business Expenses.** The Executive shall be entitled to reimbursement, in accordance with the Company's policies regarding expense reimbursement as in effect from time to time, for all business expenses incurred by the Executive prior to the termination of the Executive's employment.

(vi) **Stock Options/Equity Awards.** Except to the extent additional rights are provided upon the Executive's qualifying to receive the Conditional Benefits, the Executive's rights with respect to any stock options and/or other equity awards granted to the Executive by the Company shall be governed by the terms and provisions of the Plans and Plan rules, provided that the Executive shall have ninety (90) days from the Termination Date to exercise vested options, and award agreements pursuant to which such stock options and equity awards were awarded, as in effect at the Termination Date.

(e) **Conditional Benefits.** For purposes of this Agreement, the "**Conditional Benefits**" to which the Executive may become entitled are as follows:

(i) **Severance Amount.** The Company shall pay the Executive a lump sum amount equal to the Severance Amount. Subject to Section 3(c)(iii) above, the Severance Amount shall be paid on the date that is sixty (60) days after the Termination Date (or upon the Executive's death, if earlier).

(ii) **COBRA.** Provided that the Executive timely elects continued health insurance coverage under the federal COBRA law, the Company will pay one-hundred percent of the cost of premiums for such health insurance continuation coverage during the twelve (12) months following the Termination Date. Notwithstanding anything to the contrary in this Agreement, the Executive's entitlement to any benefits or payments under this Section 3(e)(ii) shall cease on such date that the Executive becomes eligible to receive health insurance

coverage from another employer group health plan due to Executive's employment with a future employer.

(iii) **Stock Options.** All of the Executive's stock options shall vest and become immediately exercisable in accordance with the applicable Original Stock Option Award Documents, subject to the same conditions as if the Executive had remained employed under this Agreement through the end of the Employment Period. Once exercisable, all stock options shall remain exercisable until the stock option termination date. All of the Executive's stock options that were vested and exercisable at the Termination Date shall remain exercisable until the expiration date of such stock options. Except as otherwise expressly provided herein, all stock options shall continue to be subject to the Original Stock Option Award Documents.

(iv) **Equity Awards.** Any restricted stock or other equity award subject to vesting shall continue to vest in accordance with the terms of the Original Award Documents, regardless of the Executive's termination of employment. Except as otherwise expressly provided herein, all such restricted stock or other equity awards shall be subject to, and administered in accordance with, the Original Award Documents.

(v) **Additional Distribution Rules.** Notwithstanding any other payment date or schedule provided in this Agreement to the contrary, if the Executive is deemed on the Termination Date of the Executive's employment to be a "specified employee" within the meaning of that term under Section 409A of the Code and the regulations thereunder ("**Section 409A**"), then each of the following shall apply:

(A) With regard to any payment that is considered "nonqualified deferred compensation" under Section 409A and payable on account of a "separation from service" (within the meaning of Section 409A and as provided in Section 3(g) of this Agreement), such payment shall not be made prior to the date which is the earlier of (1) the expiration of the six (6)-month period measured from the date of the Executive's "separation from service," and (2) the date of the Executive's death (the "**Delay Period**") to the extent required under Section 409A. Upon the expiration of the Delay Period, all payments delayed pursuant to this Section 3(e)(v)(A) (whether they would have otherwise been payable in a single sum or in installments in the absence of such delay) shall be paid to the Executive in a lump sum, and all remaining payments due under this Agreement shall be paid or provided in accordance with the normal payment dates specified for them herein; and

(B) To the extent that benefits to be provided during the Delay Period are considered "nonqualified deferred compensation" under Section 409A provided on account of a "separation from service," the Executive shall pay the cost of such benefits during the Delay Period, and the Company shall reimburse the Executive, to the extent that such costs would otherwise have been paid or reimbursed by the Company or to the extent that such benefits would otherwise have been provided by the Company at no cost to the Executive, for the Company's share of the cost of such benefits upon expiration of the Delay Period, and any remaining benefits shall be paid, reimbursed or provided by the Company in accordance with the procedures specified herein.

The foregoing provisions of this Section 3(e)(v)(A) shall not apply to any payments or benefits that are excluded from the definition of “nonqualified deferred compensation” under Section 409A, including, without limitation, payments excluded from the definition of “nonqualified deferred compensation” on account of being separation pay due to an involuntary separation from service under Treasury Regulation 1.409A-1(b)(9)(iii) or on account of being a “short-term deferral” under Treasury Regulation 1.409A-1(b)(4).

(f) **Definitions.** For purposes of this Agreement, the following terms shall have the meanings ascribed to them below:

(i) **“Affiliate”** means any corporation, partnership, limited liability company, trust or other entity which directly, or indirectly through one or more intermediaries, controls, is under common control with, or is controlled by, the Company.

(ii) **“Change in Control”** means the occurrence, in a single transaction or in a series of related transactions, of any one or more of the following events:

(A) any Exchange Act Person becomes the Owner, directly or indirectly, of securities of the Company representing more than 50% of the combined Voting Power of the Company’s then outstanding securities other than by virtue of a merger, consolidation or similar transaction. Notwithstanding the foregoing, a Change in Control will not be deemed to occur (1) in connection with the issuance of securities of the Company as part of a joint venture or strategic partnership to which the Company is party, (2) on account of the acquisition of securities of the Company directly from the Company, (3) on account of the acquisition of securities of the Company by an investor, any affiliate thereof or any other Exchange Act Person that acquires the Company’s securities in a transaction or series of related transactions the primary purpose of which is to obtain financing for the Company through the issuance of equity securities, (4) on account of the acquisition of securities of the Company by any individual who is, on the IPO Date, either an executive officer or a member of the Board (either, an **“IPO Investor”**) and/or any entity in which an IPO Investor has a direct or indirect interest (whether in the form of voting rights or participation in profits or capital contributions) of more than 50% (collectively, the **“IPO Entities”**), (5) on account of the IPO Entities continuing to hold shares that come to represent more than 50% of the combined Voting Power of the Company’s then outstanding securities as a result of the conversion of any class of the Company’s securities into another class of the Company’s securities having a different number of votes per share pursuant to the conversion provisions set forth in the Company’s Amended and Restated Certificate of Incorporation, or (6) solely because the level of Ownership held by any Exchange Act Person (the **“Subject Person”**) exceeds the designated percentage threshold of the outstanding Voting Securities as a result of a repurchase or other acquisition of Voting Securities by the Company reducing the number of shares outstanding, provided that if a Change in Control would occur (but for the operation of this sentence) as a result of the acquisition of Voting Securities by the Company, and after such share acquisition, the Subject Person becomes the Owner of any additional Voting Securities that, assuming the repurchase or other acquisition had not occurred, increases the percentage of the then outstanding Voting Securities Owned by the Subject Person over the designated percentage threshold, then a Change in Control will be deemed to have occurred;

(B) a merger, consolidation or similar transaction involving (directly or indirectly) the Company is consummated and, immediately after the consummation of such merger, consolidation or similar transaction, the stockholders of the Company immediately prior thereto do not Own, directly or indirectly, either (1) outstanding voting securities representing more than 50% of the combined outstanding voting power of the surviving entity in such merger, consolidation or similar transaction or (2) more than 50% of the combined outstanding voting power of the parent of the surviving entity in such merger, consolidation or similar transaction, in each case in substantially the same proportions as their Ownership of the outstanding voting securities of the Company immediately prior to such transaction; *provided, however*, that a merger, consolidation or similar transaction will not constitute a Change in Control under this prong of the definition if the outstanding voting securities representing more than 50% of the combined voting power of the surviving entity or its parent are owned by the IPO Entities;

(C) a sale, lease, exclusive license or other disposition of all or substantially all of the consolidated assets of the Company and its subsidiaries is consummated, other than a sale, lease, license or other disposition of all or substantially all of the consolidated assets of the Company and its subsidiaries to an entity, more than 50% of the combined voting power of the voting securities of which are Owned by stockholders of the Company in substantially the same proportions as their Ownership of the outstanding voting securities of the Company immediately prior to such sale, lease, license or other disposition; *provided, however*, that a sale, lease, exclusive license or other disposition of all or substantially all of the consolidated assets of the Company and its subsidiaries will not constitute a Change in Control under this prong of the definition if the outstanding voting securities representing more than 50% of the combined voting power of the acquiring entity or its parent are owned by the IPO Entities; or

(D) individuals who, on the Effective Date, are members of the Board (the “*Incumbent Board*”) cease for any reason to constitute at least a majority of the members of the Board; *provided, however*, that if the appointment or election (or nomination for election) of any new Board member was approved or recommended by a majority vote of the members of the Incumbent Board then still in office, such new member will, for purposes of this Agreement, be considered as a member of the Incumbent Board.

Notwithstanding the foregoing definition, in the case of any payment or benefit that constitutes nonqualified deferred compensation under Section 409A of the Code, if necessary in order to ensure that the Executive does not incur liability for additional tax under Section 409A of the Code, a transaction (or series of related transactions) shall constitute a Change in Control only if, in addition to satisfying the foregoing definition, such transaction (or series of related transactions) also satisfies the definition of a “change in control event” under Treas. Reg. Section 1.409A-3(i)(5).

(iii) “*Code*” means the Internal Revenue Code of 1986, as amended and the rules and regulations promulgated thereunder.

(iv) “*Earned Compensation*” means any Annual Base Salary earned, but unpaid, for services rendered to the Company on or prior to the date on which the Employment Period ends pursuant to Section 3(a) (but excluding any salary and interest accrued thereon payment of which has been deferred).

(v) **“Exchange Act”** means the Securities Exchange Act of 1934, as amended, and the rules and regulations promulgated thereunder.

(vi) **“Exchange Act Person”** means any natural person, entity or “group” (within the meaning of Section 13(d) or 14(d) of the Exchange Act), except that “Exchange Act Person” will not include (A) the Company or any subsidiary of the Company, (B) any employee benefit plan of the Company or any subsidiary of the Company or any trustee or other fiduciary holding securities under an employee benefit plan of the Company or any subsidiary of the Company, (C) an underwriter temporarily holding securities pursuant to a registered public offering of such securities, (D) an entity Owned, directly or indirectly, by the stockholders of the Company in substantially the same proportions as their Ownership of stock of the Company, or (E) any natural person, entity or “group” (within the meaning of Section 13(d) or 14(d) of the Exchange Act) that, as of the IPO Date, is the Owner, directly or indirectly, of securities of the Company representing more than 50% of the combined voting power of the Company’s then outstanding securities.

(vii) **“IPO Date”** means the date of the underwriting agreement between the Company and the underwriter(s) managing the initial public offering of the Common Stock, pursuant to which the Common Stock is priced for the initial public offering.

(viii) **“Non-Compete Amount”** means, if the Executive is an officer or employee of the Company, if a Change in Control occurs and if during the 24 month period following the Change in Control the Executive is terminated without Cause (other than because of the Executive’s death or Disability) or the Executive terminates the Executive’s employment for Good Reason, the amount mutually agreed upon by the Company and the Executive in exchange for the Executive’s covenant not to engage in or otherwise compete against the business engaged in by the Company, directly or indirectly, whether as an employee, consultant, independent contractor, partner, shareholder, investor or in any other capacity, for a one-year period following termination of the Executive’s employment with the Company.

(ix) **“Original Stock Option Award Documents”** means, with respect to any stock option, the terms and provisions of the award agreement and Plan pursuant to which such stock option was granted, each as in effect on the Termination Date.

(x) **“Original Award Documents”** means, with respect to any restricted stock or other equity award, the terms and provisions of the award agreement related to and the Plan governing such restricted stock or other equity award, each as in effect on the Termination Date.

(xi) **“Own,” “Owned,” “Owner,” “Ownership”** means a person or entity will be deemed to “Own,” to have “Owned,” to be the “Owner” of, or to have acquired “Ownership” of securities if such person or entity, directly or indirectly, through any contract, arrangement, understanding, relationship or otherwise, has or shares voting power, which includes the power to vote or to direct the voting, with respect to such securities.

(xii) **“Person”** shall have the same meaning as ascribed to such term in Section 3(a)(9) of the Exchange Act, as supplemented by Section 13(d)(3) of the Exchange Act,

and shall include any group (within the meaning of Rule 13d-5(b) under the Exchange Act); provided that Person shall not include (A) the Company or any of its Affiliates, or (B) any employee benefit plan (including an employee stock ownership plan or employee stock purchase plan) sponsored by the Company or any of its Affiliates.

(xiii) **“Severance Amount”** means an amount equal to 0.5 times the sum of (A) the Annual Base Salary as in effect as of the Termination Date less the Non-Compete Amount (if applicable) and (B) an amount equal to a prorated portion of the Executive’s cash bonus for the year in which the Termination Date occurs, with such prorated amount determined by multiplying the Executive’s cash bonus for the year in which the Termination Date occurs by a fraction, the numerator of which is the number of full months during such year in which the Executive was employed and the denominator of which is twelve (12).

(xiv) **“Termination for Cause”** means a termination of the Executive’s employment by the Company due to (A) an intentional act or acts of dishonesty undertaken by the Executive and intended to result in substantial gain or personal enrichment to the Executive at the expense of the Company, (B) unlawful conduct or gross misconduct that is willful and deliberate on the Executive’s part and that, in either event, is materially injurious to the Company, (C) the conviction of the Executive of, or the Executive’s entry of a no contest or *nolo contendere* plea to, a felony, (D) material breach by the Executive of the Executive’s fiduciary obligations as an officer or director of the Company, (E) a persistent failure by the Executive to perform the duties and responsibilities of the Executive’s employment hereunder, which failure is willful and deliberate on the Executive’s part and is not remedied by the Executive within 30 days after the Executive’s receipt of written notice from the Company of such failure, or (F) material breach of any terms and conditions of this Agreement by Executive, which breach has not been cured by the Executive within ten days after written notice thereof to Executive from the Company. For the purposes of this Section 3(f)(xiv), no act or failure to act on the Executive’s part shall be considered “dishonest,” “willful” or “deliberate” unless intentionally done or omitted to be done by the Executive in bad faith and without reasonable belief that the Executive’s action or omission was in the best interests of the Company. Any act, or failure to act, based upon authority given pursuant to a resolution duly adopted by the Board shall be conclusively presumed to be done, or omitted to be done, by the Executive in good faith and in the best interests of the Company.

(xv) **“Termination Date”** means the earlier to occur of (A) the date the Company specifies in writing to the Executive in connection with the exercise of its Termination Right or (B) the date the Executive specifies in writing to the Company in connection with any notice to effect a Termination for Good Reason. Notwithstanding the foregoing, a termination of employment will not be deemed to have occurred for purposes of any provision of this Agreement providing for the payment of any amounts or benefits subject to Section 409A upon or following a termination of employment unless such termination is also a “separation from service” (within the meaning of Section 409A), and notwithstanding anything contained herein to the contrary, the date on which such separation from service takes place will be the Termination Date.

(xvi) **“Termination due to Disability”** means a termination of the Executive’s employment by the Company because the Executive has been incapable, after

reasonable accommodation, of substantially fulfilling the positions, duties, responsibilities and obligations set forth in this Agreement because of physical, mental or emotional incapacity resulting from injury, sickness or disease for a period of (A) six (6) consecutive months or (B) an aggregate of nine (9) months (whether or not consecutive) in any twelve (12) month period. Any question as to the existence, extent or potentiality of the Executive's disability shall be determined by a qualified physician selected by the Company with the consent of the Executive, which consent shall not be unreasonably withheld. The Executive or the Executive's legal representatives or any adult member of the Executive's immediate family shall have the right to present to such physician such information and arguments as to the Executive's disability as he, she or they deem appropriate, including the opinion of the Executive's personal physician.

(xvii) **"Termination for Good Reason"** means a termination of the Executive's employment by the Executive within thirty (30) days of the Company's failure to cure, in accordance with the procedures set forth below, any of the following events: (A) a reduction in Executive's Annual Base Salary as in effect immediately prior to such reduction by more than ten percent (10%) without Executive's written consent, unless such reduction is made pursuant to an across the board reduction applicable to all senior executives of the Company; (B) the removal of the Executive by the Company from the position of Chief Commercial Officer of the Company; (C) a material reduction in the Executive's duties and responsibilities as in effect immediately prior to such reduction; or (D) a material breach of any material provision of this Agreement by the Company to which the Executive shall have delivered a written notice to the Board within forty-five (45) days of the Executive's having actual knowledge of the occurrence of one of such events stating that the Executive intends to terminate the Executive's employment for Good Reason and specifying the factual basis for such termination, and such event, if capable of being cured, shall not have been cured within twenty-one (21) days of the receipt of such notice. Notwithstanding the foregoing, a termination shall not be treated as a Termination for Good Reason if the Executive shall have consented in writing to the occurrence of the event giving rise to the claim of Termination for Good Reason.

(xviii) **"Termination Right"** means the right of the Company, in its sole, absolute and unfettered discretion, to terminate the Executive's employment under this Agreement for any reason or no reason whatsoever. For the avoidance of doubt, any Termination for Cause effected by the Company shall not constitute the exercise of its Termination Right.

(xix) **"Voting Power"** means such number of Voting Securities as shall enable the holders thereof to cast all the votes which could be cast in an annual election of directors of a company.

(xx) **"Voting Securities"** means all securities entitling the holders thereof to vote in an annual election of directors of a company.

(g) **Conflict with Plans.** As permitted under the terms of the applicable Plans, the Company and the Executive agree that the definitions of Termination for Cause or Termination for Good Reason set forth in this Section 3 shall apply in place of any similar definition or comparable concept applicable under either of the Plans (or any similar definition in any successor plan).

(h) Section 409A. It is intended that payments and benefits under this Agreement either be excluded from or comply with the requirements of Section 409A and the guidance issued thereunder and, accordingly, to the maximum extent permitted, this Agreement shall be interpreted consistent with such intent. In the event that any provision of this Agreement is subject to but fails to comply with Section 409A, the Company may revise the terms of the provision to correct such noncompliance to the extent permitted under any guidance, procedure or other method promulgated by the Internal Revenue Service now or in the future or otherwise available that provides for such correction as a means to avoid or mitigate any taxes, interest or penalties that would otherwise be incurred by the Executive on account of such noncompliance. Provided, however, that in no event whatsoever shall the Company be liable for any additional tax, interest or penalty imposed upon or other detriment suffered by the Executive under Section 409A or damages for failing to comply with Section 409A. Solely for purposes of determining the time and form of payments due the Executive under this Agreement (including any payments due under Sections 3(c) or 5) or otherwise in connection with the Executive's termination of employment with the Company, the Executive shall not be deemed to have incurred a termination of employment unless and until the Executive shall incur a "separation from service" within the meaning of Section 409A. The parties agree, as permitted in accordance with the final regulations thereunder, a "separation from service" shall occur when the Executive and the Company reasonably anticipate that the Executive's level of bona fide services for the Company (whether as an employee or an independent contractor) will permanently decrease to no more than forty (40) percent of the average level of bona fide services performed by the Executive for the Company over the immediately preceding thirty-six (36) months. The determination of whether and when a separation from service has occurred shall be made in accordance with this subparagraph and in a manner consistent with Treasury Regulation Section 1.409A-1(h). All reimbursements and in-kind benefits provided under this Agreement shall be made or provided in accordance with the requirements of Section 409A to the extent that such reimbursements or in-kind benefits are subject to Section 409A, including, where applicable, the requirements that (i) any reimbursement is for expenses incurred during the Executive's lifetime (or during a shorter period of time specified in this Agreement), (ii) the amount of expenses eligible for reimbursement (and the in-kind benefits to be provided) during a calendar year may not affect the expenses eligible for reimbursement (and the in-kind benefits to be provided) in any other calendar year, (iii) the reimbursement of an eligible expense will be made on or before the last day of the calendar year following the year in which the expense is incurred, and (iv) the right to reimbursement (or in-kind benefits) is not subject to set off or liquidation or exchange for any other benefit. For purposes of Section 409A, the Executive's right to any installment payments under this Agreement shall be treated as a right to receive a series of separate and distinct payments. Whenever a payment under this Agreement specifies a payment period with reference to a number of days (e.g., "payment shall be made within ninety (90) days following the date of termination"), the actual date of payment within the specified period shall be within the sole discretion of the Company.

4. EXECUTIVE REMEDY. The Executive shall be under no obligation to seek other employment or other engagement of the Executive's services. The Executive acknowledges and agrees that the payment and rights provided under Section 3 are fair and reasonable, and are the Executive's sole and exclusive remedy, in lieu of all other remedies at law or in equity, for termination of the Executive's employment by the Company upon exercise of its Termination Right pursuant to this Agreement or upon a Termination for Good Reason.

5. **ADDITIONAL PAYMENTS FOLLOWING A CHANGE IN CONTROL.**

(a) If, during the Employment Period and within two (2) years after a Change in Control, the Company shall terminate the Executive's employment other than due to the Executive's death, a Termination for Cause, a Termination due to Disability or if the Executive shall effect a Termination for Good Reason:

(i) the Company shall pay to the Executive, in a lump sum in cash within thirty (30) days after the Termination Date, the aggregate of the following amounts:

(A) the Unconditional Entitlements;

(B) the amount equal to the product of 1 times the sum of (y) the Annual Base Salary, and (z) the greater of the target bonus for the then current fiscal year under the Plans or any successor annual bonus plan and the average Annual Bonus paid to or for the benefit of the Executive for the prior three (3) full years (or any shorter period during which the Executive has been employed by the Company), and

(ii) the Company shall provide the Executive the Conditional Benefits minus the Severance Amount.

(b) If any payment or benefit (including payments and benefits pursuant to this Agreement) the Executive would receive in connection with a Change in Control from the Company or otherwise (the "**Payment**") would (i) constitute a "parachute payment" within the meaning of Section 280G of the Code, and (ii) but for this paragraph, be subject to the excise tax imposed by Section 4999 of the Code (the "**Excise Tax**"), then the Company shall cause to be determined, before any amounts of the Payment are paid to the Executive, which of the following two alternative forms of payment shall be paid to the Executive: (A) payment in full of the entire amount of the Payment (a "**Full Payment**"), or (B) payment of only a part of the Payment so that the Executive receives the largest payment possible without the imposition of the Excise Tax (a "**Reduced Payment**"). A Full Payment shall be made in the event that the amount received by the Executive on a net after-tax basis is greater than what would be received by the Executive on a net after-tax basis if the Reduced Payment were made, otherwise a Reduced Payment shall be made. If a Reduced Payment is made, (i) the Payment shall be paid only to the extent permitted under the Reduced Payment alternative, and the Executive shall have no rights to any additional payments and/or benefits constituting the Payment, and (ii) reduction in payments and/or benefits shall occur in the following order: (A) reduction of cash payments; (B) cancellation of accelerated vesting of equity awards other than stock options; (C) cancellation of accelerated vesting of stock options; and (D) reduction of other benefits paid to Executive. In the event that acceleration of compensation from the Executive's equity awards is to be reduced, such acceleration of vesting shall be canceled in the reverse order of the date of grant.

(c) The independent registered public accounting firm engaged by the Company for general audit purposes as of the day prior to the effective date of the Change in Control, or a nationally recognized law firm, shall make all determinations required to be made under this Section 5. If the independent registered public accounting firm or nationally

recognized law firm so engaged by the Company is serving as accountant or auditor for the individual, entity or group effecting the Change in Control, the Company shall appoint a nationally recognized law firm or independent registered public accounting firm or law firm to make the determinations required hereunder. The Company shall bear all expenses with respect to the determinations by such independent registered public accounting firm required to be made hereunder.

(d) The independent registered public accounting firm or law firm engaged to make the determinations hereunder shall provide its calculations, together with detailed supporting documentation, to the Company and the Executive within fifteen (15) calendar days after the date on which Executive's right to a Payment is triggered (if requested at that time by the Company or Executive) or such other time as requested by the Company or Executive. Any good faith determinations of the accounting firm or law firm made hereunder shall be final, binding and conclusive upon the Company and Executive.

(e) The Company's obligation to make the payments provided for in this Agreement and otherwise to perform its obligations hereunder shall not be affected by any set-off, counterclaim, recoupment, defense or other claim, right or action which the Company may have against the Executive or others. In no event shall the Executive be obligated to seek other employment or take any other action by way of mitigation of the amounts payable to the Executive under any of the provisions of this Agreement and such amounts shall not be reduced whether or not the Executive obtains other employment. The Company agrees to pay as incurred, to the full extent permitted by law, all legal fees and expenses which the Executive may reasonably incur as a result of any contest (regardless of the outcome thereof) by the Company, the Executive or others of the validity or enforceability of, or liability under, any provision of this Agreement or any guarantee of performance thereof (including as a result of any contest by the Executive about the amount of any payment pursuant to this Agreement), plus, in each case, interest on any delayed payment at the applicable Federal rate provided for in Section 7872(f)(2)(A) of the Code.

6. CONFIDENTIALITY.

(a) **Confidentiality.** Without the prior written consent of the Company, except (y) as reasonably necessary in the course of carrying out the Executive's duties hereunder or (z) to the extent required by an order of a court having competent jurisdiction or under subpoena from an appropriate government agency, the Executive shall not disclose any Confidential Information unless such Confidential Information has been previously disclosed to the public by the Company or has otherwise become available to the public (other than by reason of the Executive's breach of this Section 6(a)). The term "**Confidential Information**" shall include, but shall not be limited to: (i) the identities of the existing and prospective customers or clients of the Company and its Affiliates, including names, addresses, credit status, and pricing levels; (ii) the buying and selling habits and customs of existing and prospective customers or clients of the Company and its Affiliates; (iii) financial information about the Company and its Affiliates; (iv) product and systems specifications, concepts for new or improved products and other product or systems data; (v) the identities of, and special skills possessed by, employees of the Company and its Affiliates; (vi) the identities of and pricing information about the suppliers and vendors of the Company and its Affiliates; (vii) training programs developed by the

Company or its Affiliates; (viii) pricing studies, information and analyses; (ix) current and prospective products and inventories; (x) financial models, business projections and market studies; (xi) the financial results and business conditions of the Company and its Affiliates; (xii) business plans and strategies of the Company and its Affiliates; (xiii) special processes, procedures, and services of suppliers and vendors of the Company and its Affiliates; and (xiv) computer programs and software developed by the Company or its Affiliates.

(b) Company Property. Promptly following the Executive's termination of employment, the Executive shall return to the Company all property of the Company, and all copies thereof in the Executive's possession or under the Executive's control, except that the Executive may retain the Executive's personal notes, diaries, rolodexes, mobile devices, calendars and electronic calendars, and correspondence of a personal nature.

(c) Nonsolicitation. The Executive agrees that, while the Executive is employed by the Company and during the one-year period following the Executive's termination of employment with the Company (the "**Restricted Period**"), the Executive shall not directly or indirectly, (i) solicit any individual who is, on the Termination Date (or was, during the six-month period prior to the Termination Date), employed by the Company or its Affiliates to terminate or refrain from renewing or extending such employment or to become employed by or become a consultant to any other individual or entity other than the Company or its Affiliates or (ii) induce or attempt to induce any customer or investor (in each case, whether former, current or prospective), supplier, licensee or other business relation of the Company or any of its Affiliates to cease doing business with the Company or such Affiliate, or in any way interfere with the relationship between any such customer, investor, supplier, licensee or business relation, on the one hand, and the Company or any of its Affiliates, on the other hand. Any payments owed to Executive at time of separation as described herein shall be contingent upon Executive's compliance with the post-employment nonsolicitation provisions.

(d) Noncompetition. The Executive agrees that, during the Restricted Period, the Executive shall not be employed by, serve as a consultant to, or otherwise assist or directly or indirectly provide services to a Competitor (as defined below) if (i) the services that the Executive is to provide to the Competitor are the same as, or substantially similar to, any of the services that the Executive provided to the Company or the Affiliates, and such services are to be provided with respect to any location in which the Company or an Affiliate had material operations during the twelve (12) month period prior to the Termination Date, or with respect to any location in which the Company or an Affiliate had devoted material resources to establishing operations during the twelve (12) month period prior to the Termination Date; or (ii) the trade secrets, Confidential Information, or proprietary information (including, without limitation, confidential or proprietary methods) of the Company and the Affiliates to which the Executive had access could reasonably be expected to benefit the Competitor if the Competitor were to obtain access to such secrets or information. For purposes of this paragraph, services provided by others shall be deemed to have been provided by the Executive to Competitor if the Executive had material supervisory responsibilities with respect to the provision of such services. The term "**Competitor**" means any enterprise (including a person, firm, business, division, or other unit, whether or not incorporated) during any period in which a material portion of its business is (and during any period in which it intends to enter into business activities that would be) materially competitive in any way with any business in which the Company or any of the Affiliates were

engaged during the twelve (12) month period prior to the Executive's Termination Date (including, without limitation, any business if the Company devoted material resources to entering in such business during such twelve (12) month period), but for purposes of clause (c) above, the term "Competitor" shall be limited to those businesses to which the Executive devoted more than an insignificant amount of time while employed by the Company. Notwithstanding the foregoing, the term "**Competitor**" shall not include a business of a Competitor if such business would not, as a stand-alone enterprise, constitute a "Competitor" under the foregoing definition, provided that Executive does not render any services to, or otherwise assist the portion of the business that competes with the Company and its Affiliates. For the avoidance of doubt, the Company's and Affiliates' businesses shall include, without limitation, the lines of business set forth in the Company's annual report on Form 10-K, provided that nothing in this sentence shall be construed to limit the type of business of the Company and the Affiliates or the restrictions with respect to such businesses in the future. Any payments owed to Executive at time of separation as described herein shall be contingent upon Executive's compliance with the post-employment noncompetition provisions.

(e) **Equitable Remedies.** The Executive acknowledges that the Company would be irreparably injured by a violation of Section 6 and the Executive agrees that the Company, in addition to any other remedies available to it for such breach or threatened breach, on meeting the standards required by law, shall be entitled to a preliminary injunction, temporary restraining order, or other equivalent relief, restraining the Executive from any actual or threatened breach of Section 6. If a bond is required to be posted in order for the Company to secure an injunction or other equitable remedy, the parties agree that said bond need not be more than a nominal sum.

(f) **Employee Proprietary Information and Inventions Assignment.** The terms of that certain Employee Proprietary Information, Inventions Assignment and Non-Competition Agreement between the Executive and the Company dated August 6, 2015 are hereby incorporated by reference (the "**Invention Assignment Agreement**"). To the extent that there are any conflicts between the terms and conditions of the Invention Assignment Agreement and this Agreement, the terms and conditions of this Agreement shall control. All non-conflicting terms of the Invention Assignment Agreement are hereby expressly preserved.

(g) **Severability; Blue Pencil.** The Executive acknowledges and agrees that the Executive has had the opportunity to seek advice of counsel in connection with this Agreement and the restrictive covenants contained herein are reasonable in geographical scope temporal duration and in all other respects. If it is determined that any provision of this Section 6 is invalid or unenforceable, the remainder of the provisions of this Section 6 shall not thereby be affected and shall be given full effect, without regard to the invalid portions. If any court or other decision-maker of competent jurisdiction determines that any of the covenants in this Section 6 is unenforceable because of the duration or geographic scope, of such provision, then after such determination becomes final and unappealable, the duration or scope of such provision, as the case may be, shall be reduced so that such provision becomes enforceable, and in its reduced form, such provision shall be enforced.

7. **SUCCESSORS.**

(a) This Agreement is personal to the Executive and without the prior written consent of the Company shall not be assignable by the Executive otherwise than by will or the laws of descent and distribution. This Agreement shall inure to the benefit of and be enforceable by the Executive's legal representatives.

(b) This Agreement shall inure to the benefit of and be binding upon the Company and its successors and assigns and any party acting in the form of a receiver or trustee capacity.

(c) The Company will require any successor (whether direct or indirect, by purchase, merger, consolidation or otherwise) to all or substantially all of the business and/or assets of the Company to assume expressly and agree to perform this Agreement in the same manner and to the same extent that the Company would be required to perform it if no such succession had taken place. As used in this Agreement, "Company" shall mean the Company as hereinbefore defined and any successor to its business and/or assets as aforesaid which assumes and agrees to perform this Agreement by operation of law, or otherwise.

8. **MISCELLANEOUS.**

(a) This Agreement shall be construed, and the rights and obligations of the parties hereunder determined, in accordance with the substantive laws of the State of Michigan, without regard to its conflict-of-laws principles. For the purposes of any suit, action or proceeding based upon, arising out of or relating to this Agreement or the negotiation, execution or performance hereof, the parties hereby expressly submit to the jurisdiction of all federal and state courts sitting within the confines of the Federal Eastern District of Michigan (the "**Venue Area**") and consent that any order, process, notice of motion or other application to or by any such court or a judge thereof may be served within or without such court's jurisdiction by registered mail or by personal service in accordance with Section 8(b). The parties agree that such courts shall have the exclusive jurisdiction over any such suit, action or proceeding commenced by either or both of said parties. Each party hereby irrevocably waives any objection that it may now or hereafter have to the laying of venue of any suit, action or proceeding based upon, arising out of or relating to this Agreement or the negotiation, execution or performance hereof, brought in any federal or state court sitting within the confines of the Venue Area and hereby further irrevocably waives any claim that any such suit, action or proceeding brought in any such court has been brought in an inconvenient forum. The captions of this Agreement are not part of the provisions hereof and shall have no force or effect. This Agreement may not be amended or modified otherwise than by a written agreement executed by the parties hereto or their respective successors and legal representatives.

(b) All notices and other communications hereunder shall be in writing and shall be given by hand delivery to the other party or by registered or certified mail, return receipt requested, postage prepaid, addressed as follows:

If to the Executive: At Executive's address as it appears in the Company's books and records or at such other place as Executive shall have designated by notice as herein provided to the Company

If to the Company: Gemphire Therapeutics Inc.
Attn: CEO
Gemphire Therapeutics Inc.
17199 N. Laurel Park Drive, Ste. 401
Livonia, Michigan 48152
Telephone: (248) 681-9815
Fax: (734) 864-5765

with a copy to: Honigman Miller Schwartz and Cohn LLP
350 East Michigan Avenue, Suite 300
Kalamazoo, Michigan 49007
Attention: Phillip D. Torrence, Esq.
Telephone: (269) 337-7702
Fax: (269) 337-7703
Email: ptorrence@honigman.com

or to such other address as either party shall have furnished to the other in writing in accordance herewith. Notice and communications shall be effective when actually received by the addressee.

(c) The invalidity or unenforceability of any provision of this Agreement shall not affect the validity or enforceability of any other provision of this Agreement.

(d) The Company hereby agrees to indemnify the Executive and hold the Executive harmless to the extent provided under Certificate of Incorporation of the Company (as amended), the By-Laws of the Company (as amended) and the Indemnification Agreement entered into by and between the Company and the Executive against and in respect of any and all actions, suits, proceedings, claims, demands, judgments, costs, expenses (including reasonable attorney's fees), losses, and damages resulting from the Executive's good faith performance of the Executive's duties and obligations with the Company. This obligation shall survive the termination of the Executive's employment with the Company.

(e) From and after the Effective Date, the Company shall cover the Executive under directors' and officers' liability insurance both during and, while potential liability exists, after the Employment Period in the same amount and to the same extent as the Company covers its other executive officers and directors.

(f) The Company may withhold from any amounts payable under this Agreement such Federal, state, local or foreign taxes as shall be required to be withheld pursuant to any applicable law or regulation.

(g) The Executive's or the Company's failure to insist upon strict compliance with any provision of this Agreement or the failure to assert any right the Executive or the Company may have hereunder, including, without limitation, the right of the executive to effect a Termination for Good Reason shall not be deemed to be a waiver of such provision of right or any other provision or right of this Agreement.

(h) This Agreement, the Invention Assignment Agreement, and all agreements, documents, instruments, schedules, exhibits or certificates prepared in connection herewith, represent the entire understanding and agreement between the parties with respect to the subject matter hereof, supersede all prior agreements or negotiations between such parties, including the Prior Agreement, and may be amended, supplemented or changed only by an agreement in writing which makes specific reference to this Agreement or the agreement or document delivered pursuant hereto, as the case may be, and which is signed by the party against whom enforcement of any such amendment, supplement or modification is sought.

SIGNATURES ON THE FOLLOWING PAGE

IN WITNESS WHEREOF, the Company and the Executive have executed this Agreement as of the date first above written.

THE EXECUTIVE:

/s/ Seth C. Reno
SETH C. RENO

THE COMPANY:

GEMPHIRE THERAPEUTICS INC.

By: /s/ Mina Sooch
Name: MINA SOOCH
Title: CEO & PRESIDENT

SIGNATURE PAGE TO EMPLOYMENT AGREEMENT

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the incorporation by reference in the Registration Statements (Form S-8 No. 333-225435, Form S-8 No. 333-222675, Form S-8 No. 333-213946, Form S-8 No. 333-213014, Form S-3 No. 333-220315 and Form S-3 No. 333-217296) of Gemphire Therapeutics Inc. of our report dated March 15, 2019, with respect to the financial statements and schedule of Gemphire Therapeutics Inc. included in the Annual Report on Form 10-K for the year ended December 31, 2018.

/s/ ERNST & YOUNG LLP

Detroit, Michigan
March 15, 2019

**CERTIFICATION OF PRINCIPAL EXECUTIVE OFFICER AND PRINCIPAL FINANCIAL OFFICER
PURSUANT TO EXCHANGE ACT RULE 13a-14(a) OR 15d-14(a), AS ADOPTED PURSUANT TO
SECTION 302 OF THE SARBANES OXLEY ACT OF 2002**

I, Steven Gullans, Ph.D., certify that:

1. I have reviewed this annual report on Form 10-K of Gemphire Therapeutics Inc. for the period ended December 31, 2018;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations, and cash flows of the registrant as of, and for, the periods presented in this report;
4. I am responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's Board of Directors (or persons performing the equivalent functions):
 - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 15, 2019

/s/ STEVEN GULLANS

Name: Steven Gullans, Ph.D.
Title: President and Chief Executive Officer
(Principal Executive Officer and Principal Financial Officer)

**CERTIFICATION OF PRINCIPAL EXECUTIVE OFFICER AND PRINCIPAL FINANCIAL OFFICER,
PURSUANT TO 18 U.S.C. SECTION 1350, AS ADOPTED PURSUANT TO SECTION 906 OF THE
SARBANES-OXLEY ACT OF 2002***

Pursuant to the requirement set forth in Rule 13a-14(b) or Rule 15d-14(b) of the Securities and Exchange Act of 1934, as amended (the "Exchange Act"), and Section 1350 of Chapter 63 of Title 18 of the United States Code, Steven Gullans, Ph.D., President and Chief Executive Officer of Gemphire Therapeutics Inc. (the "Company"), hereby certifies that, to the best of his knowledge:

1. The Company's Annual Report on Form 10-K for the period ended December 31, 2018, to which this Certification is attached as Exhibit 32.1 (the "Annual Report") fully complies with the requirements of Section 13(a) or Section 15(d) of the Exchange Act, and
2. The information contained in the Annual Report fairly presents, in all material respects, the financial condition of the Company at the end of the period covered by the Annual Report and results of operations of the Company for the period covered by the Annual Report.

/s/ STEVEN GULLANS
President and Chief Executive Officer
(Principal Executive Officer and Principal Financial Officer)

Dated: March 15, 2019

- This certification accompanies the report to which it relates, is not deemed filed with the Securities and Exchange Commission and is not to be incorporated by reference into any filing of Gemphire Therapeutics Inc. under the Securities Act of 1933, as amended, or the Exchange Act made before or after the date of the report, irrespective of any general incorporation language contained in such filing.
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