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

FORM 10-K

(Mark One)

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

For the fiscal year ended December 31, 2019

or

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

For the transition period from to

Commission file number 001-35409

Merrimack Pharmaceuticals, Inc.

(Exact name of registrant as specified in its charter)

Delaware	**04-3210530**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. Employer Identification No.)**
One Broadway, 14th Floor Cambridge, MA	**02142**
(Address of principal executive offices)	**(Zip Code)**

Registrant's telephone number, including area code: (617) 441-1000

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

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, $0.01 par value	**MACK**	**Nasdaq Global Market**

Securities registered pursuant to Section 12(g) of the Act: Preferred Stock Purchase Rights

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

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

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

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). ☒ Yes ☐ No

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

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

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

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

The aggregate market value of the voting and non-voting common equity held by non-affiliates of the registrant, based on the last sale price for such stock on June 28, 2019, was $79,466,932.

As of March 8, 2020, there were 13,380,243 shares of Common Stock, $0.01 par value per share, outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

The registrant intends to file a definitive proxy statement pursuant to Regulation 14A in connection with its 2020 Annual Meeting of Stockholders. Portions of such proxy statement are incorporated by reference into Part III of this Annual Report on Form 10-K.

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FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K contains forward-looking statements that involve substantial risks and uncertainties. All statements, other than statements of historical facts, contained in this Annual Report on Form 10-K, including statements regarding our strategy, future operations, future financial position, future revenues, projected costs, prospects, plans and objectives of management, are forward-looking statements. The words “anticipate,” “believe,” “estimate,” “expect,” “intend,” “may,” “plan,” “predict,” “project,” “target,” “potential,” “will,” “would,” “could,” “should,” “continue” and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words.

The forward-looking statements in this Annual Report on Form 10-K include, among other things, statements about:

- our plans to cease development of our product candidates and diagnostics;
- our plans to seek to divest our product candidates and other assets;
- our rights to receive payments related to the milestone events under the asset purchase and sale agreement with Ipsen S.A.;
- our rights to receive payments related to the milestone events under the asset purchase agreement with Elevation Oncology, Inc. (formerly known as 14ner Oncology, Inc.), when expected or at all;
- our intellectual property position;
- our cash runway and the sufficiency of our financial resources to fund our operations; and
- our estimates regarding expenses, future revenues, capital requirements and needs for additional financing.

We may not actually achieve the plans, intentions or expectations disclosed in our forward-looking statements, and you should not place undue reliance on our forward-looking statements. Actual results or events could differ materially from the plans, intentions and expectations disclosed in the forward-looking statements we make. We have included important factors in the cautionary statements included in this Annual Report on Form 10-K, particularly in Part I, Item 1A. Risk Factors, that could cause actual results or events to differ materially from the forward-looking statements that we make. Our forward-looking statements do not reflect the potential impact of any future acquisitions, mergers, dispositions, joint ventures, collaborations or investments that we may make.

You should read this Annual Report on Form 10-K and the documents that we have filed as exhibits to this Annual Report on Form 10-K completely and with the understanding that our actual future results may be materially different from what we expect. We do not assume any obligation to update any forward-looking statements, whether as a result of new information, future events or otherwise, except as required by law.

NOTE REGARDING TRADEMARKS

ONIVYDE® is a registered trademark of Ipsen S.A. Any other trademarks, trade names and service marks referred to in this Annual Report on Form 10-K are the property of their respective owners.

PART I

Item 1. Business

Overview

We are a biopharmaceutical company based in Cambridge, Massachusetts that is entitled to receive up to $450.0 million in contingent milestone payments related to our sale of ONIVYDE® to Ipsen S.A., or Ipsen, in April 2017 and up to $54.5 million in contingent milestone payments related to our sale of MM-121 and MM-111 to Elevation Oncology, Inc. (formerly known as 14ner Oncology, Inc.), or Elevation, in July 2019. We do not have any ongoing research or development activities and are seeking potential acquirers for our remaining preclinical and clinical assets. We do not have any employees and instead use external consultants for the operation of our company.

On April 3, 2017, we completed the sale of ONIVYDE and MM-436 (the "commercial business") to Ipsen (the "Ipsen sale"). At the time of the sale ONIVYDE was approved in the United States for the second line treatment of metastatic adenocarcinoma of the pancreas. In connection with the Ipsen sale, we are eligible to receive up to $450.0 million in additional regulatory approval-based milestone payments.

The remaining up to $450.0 million in potential milestone payments resulting from the Ipsen sale consist of:

- $225.0 million upon approval by the U.S. Food and Drug Administration, or FDA, of ONIVYDE for the first-line treatment of metastatic adenocarcinoma of the pancreas, subject to certain conditions;
- $150.0 million upon approval by the FDA of ONIVYDE for the treatment of small-cell lung cancer after failure of first-line chemotherapy; and
- $75.0 million upon approval by the FDA of ONIVYDE for an additional indication unrelated to those described above.

On May 30, 2019, we announced the completion of our review of strategic alternatives, following which our board of directors implemented a series of measures designed to extend our cash runway into 2027 and preserve our ability to capture the potential milestone payments resulting from the Ipsen sale. We have based this estimate on assumptions that may prove to be wrong, and we could use our financial resources sooner than we currently expect. In connection with that announcement, we discontinued the discovery efforts on our remaining preclinical programs: MM-401, an agonistic antibody targeting a novel immuno-oncology target, TNFR2; and MM-201, a highly stabilized agonist-Fc fusion protein targeting death receptors 4 and 5. We are seeking potential acquirers for our remaining preclinical and clinical assets.

The termination of our executive management team and all other employees was substantially completed by June 28, 2019 and fully completed by July 12, 2019. As of July 12, 2019, we do not have any employees. We have engaged external consultants to run our day-to-day operations. We have also entered into consulting agreements with certain former members of our executive management team who are supporting our relationship with current partners, assisting with the potential sale of remaining preclinical and clinical assets, and assisting with certain legal and regulatory matters and the continued wind-down of operations.

On April 15, 2019, we repaid in full all principal, accrued and unpaid interest, fees, costs and expenses under our Loan and Security Agreement, or loan agreement, with Hercules Capital, Inc., or Hercules, in an aggregate amount equal to $16.0 million.

In May 2019, we monetized certain assets to strengthen our cash position. This included the sale of our entire equity position in Silver Creek Pharmaceuticals, Inc., or Silver Creek, resulting in $7.8 million in cash, and the sale of laboratory equipment from our research and development operations, resulting in approximately $1.4 million in cash.

On July 12, 2019, we completed the sale to Elevation, or the Elevation sale, of our anti-HER3 antibody programs, MM-121 (seribantumab) and MM-111. In connection with the Elevation sale, we received an upfront cash payment of $3.5 million and are eligible to receive up to $54.5 million in additional potential development, regulatory approval and commercial-based milestone payments, consisting of:

- $3.0 million for achievement of the primary endpoint in the first registrational clinical study of either MM-121 or MM-111;
- up to $16.5 million in total payments for the achievement of various regulatory approval and reimbursement-based milestones in the United States, Europe and Japan; and
- up to $35.0 million in total payments for achieving various cumulative worldwide net sales targets between $100.0 million and $300.0 million for MM-121 and MM-111.

On July 25, 2019, our board of directors announced, authorized and declared a special cash dividend of $20.0 million to holders of our common stock. The special dividend was payable on September 5, 2019 to stockholders of record as of the close of business on August 28, 2019. The special dividend resulted in a decrease to additional paid-in capital.

On December 3, 2019, we received the remaining $5.0 million milestone payment from Ipsen pursuant to a license and collaboration agreement, or the Servier agreement, between Ipsen and Les Laboratoires Servier SAS, or Servier (as assignee from Shire plc), triggered by Ipsen's and Servier's decision to progress the ongoing multi-part clinical trial evaluating ONIVYDE in patients with small-cell lung cancer into the second randomized portion of the trial focused on efficacy assessment. We entered into the Servier agreement in 2014, and on April 3, 2017, the Servier agreement was assigned to Ipsen in connection with the completion of the Ipsen sale. We have received all $33.0 million in milestone payments to which we were eligible under the Servier agreement.

As a result of the $5.0 million milestone payment from Ipsen, our board of directors announced, authorized and declared a special cash dividend of $6.7 million to holders of our common stock. The special dividend was payable on December 23, 2019 to stockholders of record as of the close of business on December 16, 2019. The special dividend resulted in a decrease to additional paid-in capital.

We previously devoted substantially all our resources to our drug discovery and development efforts, including conducting clinical trials for our product candidates, protecting our intellectual property and providing general and administrative support for these operations. We have financed our operations primarily through private placements of convertible preferred stock, collaborations, public offerings of our securities, secured debt financings, sales of ONIVYDE and the Ipsen sale.

As of December 31, 2019, we had unrestricted cash and cash equivalents of $16.6 million. We expect that our cash and cash equivalents as of December 31, 2019 will be sufficient to continue our operations into 2027, when we estimate the longest-term potential Ipsen milestone may be achieved.

We have a history of losses from our continuing operations. We do not expect to be profitable from our continuing operations in the future. As of December 31, 2019, we had an accumulated deficit of $540.6 million. Our net loss from our continuing operations was $21.3 million and $60.8 million for years ended December 31, 2019 and 2018, respectively. We do not expect to have any research and development expenses going forward.

Collaboration and License Agreements

We are party to certain collaboration and license agreements. We consider the following agreements to be material to our business.

Ipsen

On April 3, 2017, we completed the Ipsen sale. Pursuant to the Asset Purchase and Sale Agreement, dated as of January 7, 2017, or the Ipsen sale agreement, between us and Ipsen, Ipsen acquired our right, title and interest in the commercial business. Pursuant to the Ipsen sale agreement, we received $575.0 million in cash, plus a working capital adjustment of $5.7 million, and are eligible to receive up to $450.0 million in additional regulatory approval-based milestone payments. Ipsen has agreed pursuant to the Ipsen sale agreement to use commercially reasonable efforts to develop ONIVYDE in connection with obtaining the regulatory approval by the FDA of ONIVYDE for certain indications. We also retained the right to receive net milestone payments that were payable for the ex-U.S. development and commercialization of ONIVYDE for up to $33.0 million pursuant to the Servier agreement. We have received all $33.0 million in milestone payments to which we were eligible under the Servier agreement. We entered into the Servier agreement in 2014, and on April 3, 2017, the Servier agreement was assigned to Ipsen in connection with the completion of the sale of the commercial business.

In connection with the Ipsen sale, we entered into a sublease agreement with Ipsen under which Ipsen was subleasing approximately 64,550 square feet of our leased space in Cambridge, Massachusetts through the end of our lease term on June 30, 2019.

Intellectual Property

We own or control a limited number of U.S. patents and patent applications and several corresponding foreign patents and patent applications. This intellectual property relates to several early stage programs that we are no longer advancing on our own, but that may be of value to one or more potential buyer or licensees. During 2020, we will continue to evaluate the usefulness of maintaining the current patent portfolio to our business.

Government Regulation

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

Data Protection

We are subject to data protection laws and regulations (i.e., laws and regulations that address privacy and data security). The legislative and regulatory landscape for data protection continues to evolve, and in recent years there has been an increasing focus on privacy and data security issues. In the United States, numerous federal and state laws and regulations, including state data breach notification laws, state health information privacy laws and federal and state consumer protection laws govern the collection, use, disclosure and protection of health-related and other personal information. Failure to comply with data protection laws and regulations could result in government enforcement actions (which could include civil or criminal penalties), private litigation and/or adverse publicity and could negatively affect our operating results and business. In addition, we may obtain health information from third parties (e.g., healthcare providers who prescribe our products) that are subject to privacy and security requirements under the federal Health Insurance Portability and Accountability Act of 1996, as amended by the Health Information Technology for Economic and Clinical Health Act. We could be subject to criminal penalties if we knowingly obtain or disclose individually identifiable health information in a manner that is not authorized or permitted.

Employees

The termination of our executive management team and all other employees was substantially completed by June 28, 2019 and fully completed by July 12, 2019. As of July 12, 2019, we do not have any employees. We have engaged external consultants to run our day-to-day operations. We have also entered into consulting agreements with certain former members of our executive management team who are supporting our relationship with current partners, assisting with the potential sale of remaining preclinical and clinical assets, and assisting with certain legal and regulatory matters and the continued wind-down of operations.

Financial Information

Financial information is provided in our consolidated financial statements included in this Annual Report on Form 10-K and in Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations.

Information about our dependence on limited amounts of customers is provided in Note 1, "Nature of the Business and Summary of Significant Accounting Policies – Concentration of Credit Risk" in the accompanying notes to the consolidated financial statements.

Our Corporate Information

We were originally incorporated in the Commonwealth of Massachusetts in 1993 and reincorporated under the laws of the State of Delaware in October 2010. Our principal executive offices are located at One Broadway, 14th Floor, Cambridge, MA 02142, and our telephone number is (617) 441-1000.

Information Available on the Internet

We maintain a website with the address www.merrimack.com. We are not including the information contained on our website as a part of, or incorporating it by reference into, this Annual Report on Form 10-K. Our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, and all amendments to those reports, are available to you free of charge through the "SEC Filings" link in the "Investors" section of our website as soon as reasonably practicable after those materials have been electronically filed with, or furnished to, the Securities and Exchange Commission, or the SEC. We also make available on our website our corporate governance guidelines, the charters for our audit committee, corporate governance and nominating committee, and organization and compensation committee, and our code of business conduct and ethics, which applies to our directors, officers and employees, and such information is available in print and free of charge to any of our stockholders who requests it. In addition, we intend to disclose on our website any amendments to, or waivers from, our code of business conduct and ethics that are required to be publicly disclosed pursuant to rules of the SEC.

Item 1A. Risk Factors

The following risk factors and other information included in this Annual Report on Form 10-K should be carefully considered. The risks and uncertainties described below are not the only ones we face. Additional risks and uncertainties not presently known to us or that we presently deem less significant may also impair our business operations. Please see page 2 of this Annual Report on Form 10-K for a discussion of some of the forward-looking statements that are qualified by these risk factors. If any of the following risks occur, our business, financial condition, results of operations and future growth prospects could be materially and adversely affected.

Risks Related to Our Business Strategy

Our business strategy depends substantially upon our ability to receive future contingent milestone payments.

Our business strategy depends substantially upon our ability to receive future milestone payments from Ipsen and Elevation. On May 30, 2019, we announced the completion of our review of strategic alternatives. Following this review, our board of directors implemented a series of measures designed to extend our cash runway into 2027 and preserve our ability to capture the potential milestone payments resulting from the Ipsen sale. We are entitled to receive up to $450.0 million in contingent milestone payments related to our sale of ONIVYDE to Ipsen and up to $54.5 million in contingent milestone payments related to our sale of MM-121 and MM-111 to Elevation. We do not have any ongoing research or development activities. Any failure to achieve such milestones or a perception that the milestones may not be achieved will materially and adversely affect the company and the value of the common stock.

Even if some or all of the milestones set forth in the Ipsen sale agreement and Elevation agreement are achieved, it may take significantly longer than we anticipate and could require us to raise additional funding in order to maintain our ability to receive payment for such milestones.

Achievement of the milestones set forth in the Ipsen sale agreement and the Elevation agreement are not guaranteed and there is significant risk that some or all of such milestones will not be achieved when anticipated, if at all. If achievement of the milestones is delayed beyond what we currently anticipate, it could require us to raise additional funds in order to maintain our ability to receive payment for the potential future achievement of such milestones. Sources of funds may not be available or, if available, may not be available on terms satisfactory to us. Raising additional funds could be dilutive or otherwise disadvantageous to our stockholders. Any delay in receipt of the potential benefit to the company or our stockholders resulting from achievement of such milestones, in addition to any additional uncertainty as to whether such milestones will be achieved at all, would materially and adversely affect the company and the value of the common stock.

Time and costs associated with winding down our research and development activities and any return of cash to stockholders may be significant.

There are significant costs associated with winding down our normal historic operations, such as separation of employees, termination of contracts and engagement of external consultants, all of which have and may in the future reduce our cash resources. Additionally, in connection with the special cash dividends paid on September 5, 2019 and December 23, 2019 to our stockholders of record as of August 28, 2019 and December 16, 2019, respectively, we incurred third party costs associated with the distribution of such dividends and may incur such costs with any future distribution of cash, if declared by our board of directors, all of which costs have reduced and would reduce our cash resources.

We rely on external consultants for the execution of our business strategy.

We do not have any employees and instead use a limited number of external consultants for the operation of our company, any of whom may terminate their consultancy with us at any time. The loss of some or all of our consultants could delay or inhibit our ability to run our operations or consummate any divestitures of our remaining assets or could interfere with our ability to receive and distribute any potential milestones from Ipsen or Elevation.

We may be treated as a "public shell" company which could have negative consequences, including potential Nasdaq delisting of our common stock.

Our common stock is currently listed on the Nasdaq Global Market. We have no current plans to delist our common stock from Nasdaq. However, following our cessation of normal business operations, we may be treated as a "public shell" company under the Nasdaq rules and the Securities Act of 1933, as amended, or the Securities Act, or the Exchange Act. Although Nasdaq evaluates whether a listed company is a public shell company based on a facts and circumstances determination, a Nasdaq-listed company with no or nominal operations and either no or nominal assets, assets consisting solely of cash and cash equivalents, or assets consisting of any amount of cash and cash equivalents and nominal other assets is generally considered to be a public shell company. Listed companies determined to be public shell companies by Nasdaq may be subject to delisting proceedings or additional and more stringent listing criteria.

If our common stock is delisted from Nasdaq, or if in the future we determine to delist our common stock, we would expect that such securities would qualify for trading over-the-counter, or OTC, in the United States on a market colloquially referred to as the "Pink Sheets." Securities quoted OTC are generally subject to lesser requirements than securities listed for trading on a U.S. national stock exchange, such as Nasdaq, including reduced corporate governance and public reporting standards.

If Nasdaq should delist our common stock from trading, or if in the future we determine to delist our common stock, a reduction in some or all of the following may occur, each of which could have a material adverse effect on holders of our common stock: the liquidity of our common stock; the market price of the common stock; the number of institutional and general investors that will consider investing in the common stock; the number of investors in general that will consider investing in the common stock; the number of market makers in our common stock; the availability of information concerning the trading prices and volume of the common stock; and the number of broker-dealers willing to execute trades in our common stock. In addition to the foregoing, there are certain consequences under the Securities Act of being a public shell company, including the unavailability of Rule 144 thereunder for the resale of restricted securities and the inability to utilize Form S-8 for the registration of employee benefit plan securities.

We have been, and in the future may be, subject to securities litigation, which is expensive and could divert our attention.

We have been, and may in the future be, subject to securities class action litigation. Securities litigation against us could result in substantial costs and divert our management's attention, which could seriously harm our business. For instance, a putative stockholder class action suit was filed by a purported stockholder of ours in the Superior Court of Massachusetts for the County of Middlesex against us and our directors. The case was captioned *Robert Garfield v. Merrimack Pharmaceuticals Inc., et al.*, or the Garfield Action. The Garfield Action complaint alleged that our directors breached their fiduciary duties by entering into the Ipsen sale agreement and that the definitive proxy statement relating to the Ipsen sale contained inadequate disclosures and omissions. Although we believed that the Garfield Action was without merit, to avoid the risk of the litigation delaying or adversely affecting the Ipsen sale and to minimize the expense of defending the litigation related to the Ipsen sale, we agreed to make supplemental disclosures related to the Ipsen sale and to pay the plaintiff's counsel $375,000 in attorney's fees in connection with the resolution of the Garfield Action. As a result, the plaintiff concluded that the claims in the Garfield Action were mooted, and the Garfield Action was dismissed with prejudice. Nonetheless, there can be no guarantee that we will not be the target of additional securities class action litigation in the future.

Actions of activist stockholders against us could be disruptive and potentially costly and the possibility that activist stockholders may seek changes that contest, or conflict with, our strategic direction could cause uncertainty about the strategic direction of our business.

Activist stockholders may from time to time attempt to effect changes in our strategic direction and, in furtherance thereof, may seek changes in how we are governed. While our board of directors and management strive to maintain constructive, ongoing communications with all of our stockholders, including activist stockholders, and welcomes their views and opinions with the goal of working together constructively to enhance value for all stockholders, activist campaigns that contest, or conflict with, our strategic direction could have an adverse effect on us because:

- responding to proxy contests and other actions by activist stockholders can disrupt our operations, be costly and time-consuming, and divert the attention of our board of directors and management from the pursuit of business strategies, which could adversely affect our results of operations and financial condition;
- perceived uncertainties as to our future direction as a result of changes to the composition of our board of directors may lead to the perception of a change in the direction of the business, instability or lack of continuity which may be exploited by our competitors, may result in the loss of potential business opportunities and make it more difficult to attract and retain qualified personnel and business partners;
- these types of actions could cause significant fluctuations in our stock price based on temporary or speculative market perceptions or other factors that do not necessarily reflect the underlying fundamentals and prospects of our business; and
- if individuals are elected to our board of directors with a specific agenda, it may adversely affect our ability to effectively implement our business strategy and create additional value for our stockholders.

In connection with our 2019 Annual Meeting of Stockholders, an activist investor initially proposed its own slate of director candidates. That activist investor ultimately withdrew its slate of director candidates prior to the 2019 Annual Meeting of Stockholders and all of our director nominees were elected at the 2019 Annual Meeting of Stockholders. That activist investor continues to have a Schedule 13D filed with respect to us and it remains a possibility that such activist investor may still, from time to time, attempt to effect changes in our strategic direction and, in furtherance thereof, may seek changes in how we are governed.

Risks Related to the Sale and Divestiture of Assets

There can be no guarantee that Ipsen will comply with its obligation to use commercially reasonable efforts in connection with the development of ONIVYDE or that the milestones set forth in the Ipsen sale agreement will be achieved.

Ipsen has agreed to use commercially reasonable efforts to develop ONIVYDE in connection with obtaining the regulatory approval by the FDA of ONIVYDE for certain indications. There is no guarantee that Ipsen will undertake such development however, or that any of its efforts will lead to the successful approval of ONIVYDE for such additional indications or lead to achievement of the milestones set forth in the Ipsen sale agreement. We also do not have any right to receive updates on the progress of Ipsen's development of ONIVYDE beyond what Ipsen chooses to disclose publicly. The milestones set forth in the Ipsen sale agreement may not be achieved and we may not receive any future contingent payments.

Our business strategy depends substantially upon our ability to receive future milestone payments from Ipsen. Any failure to achieve such milestones or a perception that the milestones may not be achieved will materially and adversely affect the company and the value of the common stock.

There can be no guarantee that Elevation will comply with its obligation to use commercially reasonable efforts in connection with the development of MM-121 and MM-111 or that the milestones set forth in the asset purchase agreement with Elevation will be achieved.

Elevation has agreed to use commercially reasonable efforts to develop MM-121 and MM-111. However, there is no guarantee that Elevation will take the steps set forth in the Elevation agreement or that any of its efforts will lead to the successful approval of MM-121 or MM-111 by the FDA or other regulatory bodies. The milestones set forth in the Elevation agreement may not be achieved and we may not receive any future contingent payments. Because our business strategy depends substantially upon our ability to receive future milestone payments, including from Elevation, any failure to achieve such milestones or a perception that the milestones may not be achieved will materially and adversely affect the company and the value of the common stock.

Ipsen did not assume any of the excluded liabilities under the Ipsen sale agreement.

Pursuant to the Ipsen sale agreement, Ipsen assumed only certain specified liabilities set forth in the Ipsen sale agreement and did not assume all of the liabilities associated with the commercial business. Certain liabilities remain with us post-closing. While we believe that we have adequately accrued for these liabilities or are adequately insured against certain of the risks associated with such excluded liabilities, we could incur additional expenditures in resolving any such liabilities. If we become subject to liability based upon such contractual obligations or otherwise and we are required to indemnify the counterparties, it could have a material adverse effect on our financial position.

Elevation did not assume any of the excluded liabilities under the Elevation agreement.

Pursuant to the Elevation agreement, Elevation assumed only certain specified liabilities set forth in the Elevation agreement and did not assume all of the liabilities associated with MM-121 or MM-111. Certain liabilities remain with us post-closing. While we believe that we have adequately accrued for these liabilities or are adequately insured against certain of the risks associated with such excluded liabilities, we could incur additional expenditures in resolving any such liabilities. If we become subject to liability based upon such contractual obligations or otherwise and we are required to indemnify the counterparties, it could have a material adverse effect on our financial position.

The Ipsen sale agreement may expose us to contingent liabilities.

We have agreed to indemnify Ipsen for certain breaches of representations, warranties or covenants made by us in the Ipsen sale agreement and for certain specified existing litigation. We have agreed that if we cannot pay our indemnification obligations, Ipsen will have set-off rights against any future contingent payments. Indemnification claims by Ipsen could further materially and adversely affect our financial condition and/or significantly reduce any future contingent payments.

The Elevation agreement may expose us to contingent liabilities.

We have agreed to indemnify Elevation for certain breaches of representations, warranties or covenants made by us in the Elevation agreement. We have agreed that Elevation will have set-off rights against any future contingent payments. Indemnification claims by Elevation could materially and adversely affect our financial condition and/or significantly reduce any future contingent payments.

Risks Related to Our Financial Position and Need for Additional Capital

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

Since inception, we have incurred significant operating losses. Our net loss from continuing operations was $21.3 million and $68.5 million for the years ended 2019 and 2018, respectively. As of December 31, 2019, we had an accumulated deficit of $540.6 million. To date, we have financed our operations primarily through private placements of convertible preferred stock, collaborations, public offerings of our securities, secured debt financings, sales of ONIVYDE and the Ipsen sale. We had devoted substantially all of our efforts to research and development, including clinical trials and to commercialization of our first product, ONIVYDE, which was sold to Ipsen. We have not completed development of or commercialized any other product candidates or diagnostics other than ONIVYDE.

Although we are not actively developing product candidates and do not have any current plans to do so, to become and remain profitable, we would need to succeed in developing and commercializing products with significant market potential. This would require us to be successful in a range of challenging activities, including discovering product candidates, completing preclinical testing and clinical trials of our product candidates, obtaining regulatory approval for these product candidates and manufacturing, marketing and selling or partnering those products for which we may in the future seek and receive regulatory approval. We may never undertake or succeed in these activities and may never generate revenues that are significant or large enough to achieve profitability. Even 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 depress the value of our company and could impair our ability to raise capital, expand our business or diversify our product offerings, to the extent we undertake such activities, or continue our operations. A decline in the value of our company could also cause our stockholders to lose all or part of their investment.

In the event we determine to pursue any future product development efforts, we will need substantial additional funding. In that case, if we are unable to raise capital when needed, we would be forced to delay, reduce or eliminate such product development programs or commercialization efforts.

In the event we determine to pursue any future product development efforts, we will need substantial additional funding. Although we are not currently developing our product candidates and do not have any current plans to do so, we expect that we would incur significant research and development expenses to the extent that we decide to do so. In addition, we may need additional funding to execute our business strategy and maintain our ability to receive payment for some or all of the milestones set forth in the Ipsen sale agreement or the Elevation agreement. If we are unable to raise capital when needed or on attractive terms, we would be forced to delay, reduce or eliminate any such future research and development programs or commercialization efforts and/or we could be forced to revise or abandon our current business strategy.

Our future capital requirements will depend on many factors, including:

- whether we realize the anticipated cost savings in connection with our restructuring efforts;
- our ability to successfully divest our product candidates and other assets;
- the timing and amount of potential milestone payments related to ONIVYDE that we may receive from Ipsen and Servier;
- the timing and amount of potential milestone payments that we may receive from Elevation;
- the timing and amount of any special dividend to our stockholders that our board of directors may declare;
- the timing and amount of general and administrative expenses required to continue to operate our company;
- the extent to which we owe any taxes for current, future or prior periods, including as a result of any audits by taxing authorities;
- the extent to which we invest in any future research or development activities of our product candidates;
- the costs of preparing, filing and prosecuting patent applications and maintaining, enforcing and defending intellectual property-related claims;
- the extent to which we acquire or invest in businesses, products and technologies; and
- the costs associated with operating as a public company and maintaining compliance with exchange listing and SEC requirements.

Conducting preclinical testing and clinical trials is a time-consuming, expensive and uncertain process that takes years to complete, and we may never generate the necessary data required to obtain regulatory approval and, even if regulatory approval is obtained, achieve product sales of any of our product candidates. In addition, any of our product candidates, even if approved, may not achieve commercial success. If we undertake future development of our product candidates but fail to generate sufficient revenues from collaborations or the commercialization of any of our product candidates, we will need to continue to rely on additional financing to achieve our business objectives.

Raising additional capital may cause dilution to our existing stockholders, restrict our operations or require us to relinquish rights to our revenue streams or product candidates.

We expect that we would finance any future cash needs through a combination of divestitures of our product candidates or other assets, equity offerings and debt financings. There can be no assurance as to the timing, terms or consummation of any divestiture or financing. 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, the ownership interest of our stockholders will be diluted, and the terms of these securities may include liquidation or other preferences that adversely affect the rights of our stockholders. 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 arrangements with third parties, we may have to relinquish valuable rights to our future revenue streams or product candidates.

On December 15, 2017, we filed a registration statement on Form S-3 with the SEC to allow the issuance of our securities from time to time in one or more offerings of up to $150,000,000 in aggregate dollar amount. This registration statement was declared effective by the SEC on January 5, 2018. If we are unable to raise additional funds through divestitures or equity or debt financings when needed, we may not have enough funding to execute our business strategy and maintain our ability to receive payment for some or all of the milestones set forth in the Ipsen sale agreement, the Servier agreement or the Elevation agreement.

Future indebtedness may limit cash flow available to invest in the ongoing needs of our business.

We have had in the past, and may in the future have, a significant amount of indebtedness. In July 2013, we issued $125.0 million aggregate principal amount of 4.50% convertible notes due 2020, or convertible notes. In December 2015, we issued $175.0 million aggregate principal amount of 11.50% senior secured notes due 2022, or 2022 notes. In July 2018, we entered into the loan agreement with Hercules, which provided for a term loan advance of $15.0 million. Although we used a portion of the proceeds from the Ipsen sale to fully extinguish the 2022 notes, we have extinguished all but $56,000 of the aggregate remaining principal amount of the convertible notes, and in April 2019, we repaid in full all principal, accrued and unpaid interest, fees, costs and expenses under the loan agreement, we could in the future incur additional indebtedness.

Substantial debt combined with our other financial obligations and contractual commitments could have significant adverse consequences, including:

- requiring us to dedicate a substantial portion of our resources to the payment of interest on, and principal of, our debt, which will reduce the amounts available to fund working capital, capital expenditures, product development efforts and other general corporate purposes;
- increasing our vulnerability to adverse changes in general economic, industry and market conditions;
- obligating us to restrictive covenants that may reduce our ability to take certain corporate actions or obtain further debt or equity financing;
- limiting our flexibility in planning for, or reacting to, changes in our business and the industry in which we compete; and
- placing us at a competitive disadvantage compared to our competitors that have less debt or better debt servicing options.

To the extent we seek funds from external sources in the future, such funds may not be available on acceptable terms, if at all. In addition, a failure to comply with the covenants under any future debt instruments could result in an event of default under those instruments, and such debt instruments could require covenants and pledges of our assets as collateral which could limit our ability to obtain other debt financing.

We might not be able to utilize our net operating loss carryforwards and research and development tax credit carryforwards.

As of December 31, 2019, we had net operating loss carryforwards for federal and state income tax purposes of $204.2 million and $289.8 million, respectively. Our existing federal and state net operating loss carryforwards begin to expire in 2033. We also had available research and development credits for federal and state income tax purposes of approximately $28.8 million and $18.9 million, respectively. The federal and state research and development credits will begin to expire in 2022 and 2025, respectively. These net operating loss and tax credit carryforwards could expire unused or could be unavailable to offset our future income tax liabilities. Under the newly enacted federal income tax law, federal net operating losses incurred in 2018 and in future years may be

carried forward indefinitely, but the deductibility of such federal net operating losses is limited. It is uncertain how various states will respond to the newly enacted federal tax law. If our ability to use our historical net operating loss and tax credit carryforwards is materially limited, it would harm our future operating results by effectively increasing our future tax obligations. In addition, the Ipsen sale was an installment sale given the potential milestone payments that could be received by us in future years. If we receive milestone payments in future years pursuant to the Ipsen sale, we will be liable for interest to the federal government pursuant to Internal Revenue Code section 453A and state governments pursuant to similar state tax provisions because it was an installment sale. The interest is compounding and is calculated based on the number of years between 2017 and the year the milestone payment is received by us. Any interest charges can not be offset by net operating loss carryforwards.

Our investments are subject to risks that could result in losses.

We have invested and plan to continue to invest our cash in a variety of financial instruments, principally securities issued by the U.S. government and its agencies, investment grade corporate bonds, including commercial paper, and money market instruments. All of these investments are subject to credit, liquidity, market and interest rate risk. Such risks, including the failure or severe financial distress of the financial institutions that hold our cash, cash equivalents and investments, may result in a loss of liquidity, impairment to our investments, realization of substantial future losses, or a complete loss of the investments in the long-term, which may have a material adverse effect on our business, results of operations, liquidity and financial condition. In order to manage the risk to our investments, we maintain an investment policy that, among other things, limits the amount that we may invest in any one issue or any single issuer and requires us to only invest in high credit quality securities, but there can be no guarantee that our investments will not result in losses.

Risks Related to the Development and Commercialization of Our Product Candidates

Although we have in the past depended heavily on the success of our product candidates, we do not have any product candidates currently in active development. Future clinical trials of our product candidates, if any, may not be successful. If we are unable to successfully develop or commercialize our product candidates, or experience significant delays in doing so, our business will be materially harmed.

Although we have invested a significant portion of our efforts and financial resources in the development of our product candidates for the treatment of various types of cancer, we are no longer actively developing any of our product candidates. Our ability to generate meaningful product revenues will depend heavily on the successful development of our product candidates, if pursued. To the extent that we pursue development in the future of any of our product candidates, success will depend on several factors, including the following:

- successful enrollment in, and completion of, preclinical studies and clinical trials;
- receipt of marketing approvals from the FDA and similar regulatory authorities outside the United States for our product candidates, including our diagnostics;
- establishing manufacturing capabilities, which we would anticipate doing primarily through arrangements with third-party manufacturers;
- launching commercial sales of any approved products, whether alone or in collaboration with others;
- acceptance of any approved products by patients, the medical community and third-party payors;
- effectively competing with other therapies;
- a continued acceptable safety profile of any products following approval; and
- qualifying for, maintaining, enforcing and defending intellectual property rights and claims.

If we do not undertake development of any product candidates or achieve one or more of these factors in a timely manner or at all, we could experience significant delays or an inability to successfully develop our product candidates, which would materially harm our business.

For example, on April 4, 2019, we announced that we were discontinuing development of MM-310 as a result of a comprehensive review of available safety data from our Phase 1 clinical trial of MM-310 in patients with solid tumors. Based on emerging data since the amendment of the clinical protocol in late 2018, we concluded that the trial would not be able to reach an optimal therapeutic index for MM-310.

Also, in November 2018, we announced that we were discontinuing development of all ongoing MM-121 programs based on the results of the interim analysis of the SHERLOC clinical trial that were announced on October 19, 2018, including terminating the SHERBOC clinical trial. The decision to terminate the SHERLOC clinical trial was made based on an interim analysis triggered by the occurrence of 75% of events required for trial completion, which demonstrated that the addition of MM-121 to docetaxel did not improve progression free survival over docetaxel alone in this patient population.

In addition, in September 2018, we announced top-line results from the CARRIE clinical trial, showing that the trial did not meet its primary or secondary efficacy endpoints in patients who received MM-141 in combination with nab-paclitaxel and gemcitabine, compared to nab-paclitaxel and gemcitabine alone. These results were consistent in all subgroups analyzed. Based on these results, we are not devoting additional resources to and have ceased all of our development activities for MM-141.

To the extent that we conduct clinical trials of our product candidates in the future and such trials fail to demonstrate safety and efficacy to the satisfaction of the FDA or similar regulatory authorities outside the United States 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 our product candidates.

We may never receive approval to commercialize our product candidates in the United States or other jurisdictions. Before obtaining regulatory approval for the sale of our product candidates, we must conduct extensive clinical trials to demonstrate the safety and efficacy of our product candidates in humans. Clinical testing is expensive, difficult to design and implement, can take many years to complete and is uncertain as to outcome. To the extent that we conduct clinical trials of our product candidates, a failure of one or more of such trials could occur at any stage of testing. The outcome of preclinical testing and early clinical trials may not be predictive of the success of later clinical trials, and successful interim results of a clinical trial do not necessarily predict successful final results.

We may experience numerous unexpected events during, or as a result of, clinical trials that could delay or prevent our ability to receive regulatory approval or commercialize our product candidates, including:

- regulators or institutional review boards may not authorize us or our investigators to commence a clinical trial or conduct a clinical trial at a prospective trial site;
- clinical trials of our product candidates 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 of our product candidates may be larger than we anticipate, enrollment in these clinical trials may be insufficient or slower than we anticipate or patients 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;
- we might have to suspend or terminate clinical trials of our product candidates for various reasons, including a finding of a lack of clinical response or a finding that the patients are being exposed to unacceptable health risks;
- regulators or institutional review boards may require that we or our investigators suspend or terminate clinical research for various reasons, including noncompliance with regulatory requirements;
- the cost of clinical trials of our product candidates may be greater than we anticipate;
- the supply or quality of our product candidates, companion diagnostics or other materials necessary to conduct clinical trials of our product candidates may be insufficient or inadequate or prohibitively expensive; and
- our product candidates may have undesirable side effects or other unexpected characteristics, causing us or our investigators to suspend or terminate the trials.

For example, on November 7, 2018, we announced an amendment to our Phase 1 clinical trial of MM-310 to extend the dosing interval of MM-310 from every three weeks to every four weeks as a result of emerging cumulative grade 3 peripheral neuropathy following multiple cycles of treatment observed in three patients. On April 4, 2019, we announced that we were discontinuing development of MM-310 as a result of a comprehensive review of available safety data from the Phase 1 clinical trial. Based on emerging data since the amendment of the clinical protocol in late 2018, we concluded that the trial would not be able to reach an optimal therapeutic index for MM-310.

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gemcitabine, compared to nab-paclitaxel and gemcitabine alone. Based on these results, we are not devoting additional resources to and have ceased all of our development activities for MM-141.

Preclinical and clinical data may not be predictive of the success of later clinical trials, and are often susceptible to varying interpretations and analyses. Many companies that have believed their product candidates performed satisfactorily in preclinical studies and clinical trials have nonetheless failed to obtain marketing approval of their products.

If we are required to conduct additional clinical trials or other testing of our product candidates beyond those that we contemplate, if we are unable to successfully complete clinical trials of our product candidates or other testing, if the results of these trials or tests are not positive or are only modestly positive or if there are safety concerns, we may:

- be delayed in obtaining marketing approval for our product candidates;
- not obtain marketing approval at all;
- obtain approval for indications that are not as broad as intended;
- have the product removed from the market after obtaining marketing approval;
- be subject to additional post-marketing testing requirements;
- be subject to restrictions on how the product is distributed or used; or
- be unable to obtain reimbursement for use of the product.

Delays in testing or approvals may result in increases to our product development costs. Significant clinical trial delays also could shorten any periods during which we may have the exclusive right to commercialize our product candidates or allow our competitors to bring products to market before we do and impair our ability to commercialize our product candidates and may harm our business and results of operations.

If serious adverse or undesirable side effects are identified during the development of our product candidates or following their approval and commercialization, we may need to modify or abandon our development or marketing of such product or product candidate.

Although we are not actively developing any of our product candidates, to the extent that we do decide to undertake development, the risk of failure is high. It is impossible to predict when or if any of our product candidates will prove effective or safe in humans or will receive regulatory approval, and it is impossible to ensure that safety or efficacy issues will not arise following regulatory approval. Currently marketed therapies for solid tumors are generally limited to some extent by their toxicity. Use of our product candidates as monotherapies in clinical trials also has resulted in adverse events consistent in nature with other marketed therapies. When used in combination with other marketed or investigational therapies, our product candidates may exacerbate adverse events associated with the other therapy. If our products or product candidates, either alone or in combination with other therapies, result in undesirable side effects or have characteristics that are unexpected, we may need to modify or abandon any such future development or marketing.

For example, on November 7, 2018, we announced an amendment to our Phase 1 clinical trial of MM-310 to extend the dosing interval of MM-310 from every three weeks to every four weeks as a result of emerging cumulative grade 3 peripheral neuropathy following multiple cycles of treatment observed in three patients. On April 4, 2019, we announced that we were discontinuing development of MM-310 as a result of a comprehensive review of available safety data from the Phase 1 clinical trial. Based on emerging data since the amendment of the clinical protocol in late 2018, we concluded that the trial would not be able to reach an optimal therapeutic index for MM-310.

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

We face an inherent risk of product liability exposure related to the testing of our product candidates in human clinical trials and an even greater risk related to the commercial sale of any products that we may develop. If we cannot successfully defend ourselves against claims that any of our product candidates caused injuries, we will incur substantial liabilities. Regardless of merit or eventual outcome, liability claims may result in:

- decreased demand for the products or product candidates that we may develop;
- injury to our reputation and significant negative media attention;

- withdrawal of patients from clinical trials;
- significant costs to defend the related litigation;
- substantial monetary awards to patients;
- loss of revenue; and
- the inability to commercialize any products that we may develop.

We currently hold $5.0 million in product liability insurance coverage, which may not be adequate to cover all liabilities that we may incur. Insurance coverage is increasingly expensive. We may not be able to maintain insurance coverage at a reasonable cost or in an amount adequate to satisfy any or every liability that may arise.

Risks Related to Our Intellectual Property

If we fail to fulfill our obligations under our intellectual property licenses with third parties, we could lose license rights that are important to our business.

We are a party to intellectual property license agreements with third parties and may enter into additional license agreements in the future. Our existing license agreements impose, and we expect that our future license agreements will impose, various diligence, milestone payment, royalty, insurance and other obligations on us. If we fail to comply with these obligations, our licensors may have the right to terminate these agreements, in which event we might not be able to develop and market any product that is covered by these agreements. Termination of these licenses or reduction or elimination of our licensed rights may result in our having to negotiate new or reinstated licenses with less favorable terms. The occurrence of such events could materially harm our business.

If we are unable to obtain and maintain patent protection for our technology and products, or if our licensors are unable to obtain and maintain patent protection for the technology or products that we license from them, our competitors could develop and commercialize technology and products similar or identical to ours, and our ability to successfully commercialize our technology and products may be adversely affected.

Our product development strategy depends in large part on our licensors' ability to obtain and maintain patent protection in the United States and other countries with respect to our proprietary technology and products. In some circumstances, we may not have the right to control the preparation, filing and prosecution of patent applications, or to maintain the patents, covering technology or products that we license from third parties. Therefore, we cannot be certain that these patents and applications will be prosecuted and enforced in a manner consistent with the best interests of our business. In addition, if third parties who license patents to us fail to maintain such patents, or lose rights to those patents, the rights we have licensed may be reduced or eliminated.

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

The patent position of biotechnology and pharmaceutical companies generally is highly uncertain, involves complex legal and factual questions and has in recent years been the subject of much litigation. As a result, the issuance, scope, validity, enforceability and commercial value of our licensors' patent rights are highly uncertain. Our licensors' pending and future patent applications may not result in patents being issued that protect our technology or products or that effectively prevent others from commercializing competitive technologies and products. Changes in either the patent laws or interpretation of the patent laws in the United States and other countries may diminish the value of our patents or narrow the scope of our patent protection. The laws of foreign countries may not protect our rights to the same extent as the laws of the United States. Publications of discoveries in the scientific literature often lag behind the actual discoveries, and patent applications in the United States and other jurisdictions are typically not published until 18 months after filing, or in some cases not at all. Therefore, we cannot be certain that we or our licensors were the first to make the inventions claimed in our owned and licensed patents or pending patent applications, or that we or our licensors were the first to file for patent protection of such inventions. Assuming the other requirements for patentability are met, the first to file a patent application is entitled to the patent. Under the America Invents Act enacted in 2011, the United States moved to this first to file system in 2013 from the previous system under which the first to make the claimed invention was entitled to the patent. We may become involved in opposition, interference or derivation proceedings challenging our patent rights or the patent rights of others. An adverse determination in any such proceeding could reduce the scope of, or invalidate, our patent rights, allow third parties to commercialize our technology or products and compete directly with us, without payment to us, or result in our inability to manufacture or commercialize products without infringing third-party patent rights.

Even if our owned and licensed patent applications issue as patents, they may not issue in a form that will provide us with any meaningful protection, prevent competitors from competing with us or otherwise provide us with any competitive advantage. Our competitors may be able to circumvent our owned or licensed patents by developing similar or alternative technologies or products in a non-infringing manner. The issuance of a patent is not conclusive as to its scope, validity or enforceability, and our owned and licensed patents may be challenged in the courts or patent offices in the United States and abroad. Such challenges may result in patent claims being narrowed, invalidated or held unenforceable, which could limit our ability to stop or prevent us from stopping others from using or commercializing similar or identical technology and products, or limit the duration of the patent protection of our technology and products. Given the amount of time required for the development, testing and regulatory review of new product candidates, patents protecting such candidates might expire before or shortly after such candidates are commercialized. As a result, our owned and licensed patent portfolio may not provide us with sufficient rights to exclude others from commercializing products similar or identical to ours.

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

Competitors may infringe our patents. To counter infringement or unauthorized use, we may be required to initiate infringement lawsuits, 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 at issue 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.

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 a material 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 our products and product candidates and use our proprietary technologies without infringing the enforceable proprietary rights of third parties. We may become party to, or threatened with, future adversarial proceedings or litigation regarding intellectual property rights with respect to our products and technology, including interference or derivation proceedings before the U.S. Patent and Trademark Office. 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 products 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 access to the same technologies licensed to us. We could be forced, including by court order, to cease commercializing the infringing technology or product. In addition, we could be found liable for monetary damages. A finding of infringement could prevent us from commercializing our product candidates, prevent us from divesting certain assets or force us to cease some of our business operations, which could materially harm our business. Claims that we have misappropriated the confidential information or trade secrets of third parties can have a similar negative impact on our business.

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

Many of our former employees were previously employed at universities or other biotechnology or pharmaceutical companies, including our competitors or potential competitors. Although we try to ensure that our employees do not use the proprietary information or know-how of others in their work for us, we may be subject to claims that we or these employees have used or disclosed intellectual property, including trade secrets or other proprietary information, of any such employee's former employer. Litigation may be necessary to defend against these claims. If we fail in defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights or personnel. Even if we are successful in defending against such claims, litigation could result in substantial costs and be a distraction to management.

Intellectual property litigation could cause us to spend substantial resources and distract our personnel from their normal responsibilities.

Even if resolved in our favor, litigation or other legal proceedings relating to intellectual property claims may cause us to incur significant expenses, and could distract our personnel from their normal responsibilities. In addition, there could be public announcements of the results of hearings, motions or other interim proceedings or developments and 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. Such litigation or proceedings could substantially increase our operating losses and reduce our resources available for development or other activities. We may not have sufficient financial or other resources to adequately conduct such litigation or proceedings. Some of our competitors

may be able to sustain the costs of such litigation or proceedings more effectively than we can because of their substantially greater financial resources. Uncertainties resulting from the initiation and continuation of patent litigation or other proceedings could have a material adverse effect on our ability to compete in the marketplace and operate our business.

If we are unable to protect the confidentiality of our trade secrets, our business and competitive position would be harmed.

In addition to our patented technology and products, we rely on trade secrets, including unpatented know-how, technology and other proprietary information, to maintain our competitive position. We seek to protect these trade secrets, in part, by entering into non-disclosure and confidentiality agreements with parties that have access to them, such as our employees, corporate collaborators, outside scientific collaborators, sponsored researchers, contract manufacturers, consultants, advisors and other third parties. We have entered into confidentiality and invention or patent assignment agreements with our employees and consultants. Any of these parties may breach these agreements and disclose our proprietary information, 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 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, our competitive position would be harmed.

Risks Related to Data Protection and Cybersecurity

Our failure to comply with data protection laws and regulations could lead to government enforcement actions, private litigation and/or adverse publicity and could negatively affect our operating results and business.

We are subject to data protection laws and regulations that address privacy and data security. The legislative and regulatory landscape for data protection continues to evolve, and in recent years there has been an increasing focus on privacy and data security issues. In the United States, numerous federal and state laws and regulations, including state data breach notification laws, state health information privacy laws and federal and state consumer protection laws govern the collection, use, disclosure and protection of health-related and other personal information. Failure to comply with data protection laws and regulations could result in government enforcement actions, which could include civil or criminal penalties, private litigation and/or adverse publicity and could negatively affect our operating results and business. In addition, we may obtain health information from third parties (e.g., healthcare providers who prescribe our products) that are subject to privacy and security requirements under the Health Insurance Portability and Accountability Act of 1996, as amended by the Health Information Technology for Economic and Clinical Health Act. We could be subject to criminal penalties if we knowingly obtain or disclose individually identifiable health information in a manner that is not authorized or permitted.

The collection and use of personal health data in the European Union is governed by the provisions of the General Data Protection Regulation, or GDPR, which came into effect in May 2018. This regulation imposes several requirements relating to the consent of the individuals to whom the personal data relates, the information provided to the individuals, notification of data processing obligations to the competent national data protection authorities and the security and confidentiality of the personal data. The GDPR also imposes strict rules on the transfer of personal data out of the European Union to the United States. Failure to comply with the requirements of the GDPR and the related national data protection laws of the European Union Member States may result in significant fines and other administrative penalties.

Significant disruptions of information technology systems or security breaches could adversely affect our business.

We are increasingly dependent upon information technology systems, infrastructure and data to operate our business. In the ordinary course of business, we collect, store and transmit large amounts of confidential information (including, among other things, trade secrets or other intellectual property, proprietary business information and personal information). It is critical that we do so in a secure manner to maintain the confidentiality and integrity of such confidential information. We also have outsourced significant elements of our operations to third parties, and as a result we manage a number of third-party vendors who have or could have access to our confidential information. Our information technology systems, and those of third-party vendors with whom we contract, and the large amounts of confidential information stored on those systems, make such systems vulnerable to service interruptions or to security breaches from inadvertent or intentional actions by our consultants, third-party vendors, and/or business partners, or from cyber-attacks by malicious third parties. Because we outsource our information technology systems, we are subject to risks that the activities of our third-party vendors may adversely affect our business even if an attack or breach does not directly target our systems. Cyber-attacks are increasing in their frequency, sophistication and intensity, and have become increasingly difficult to detect. Cyber-attacks could include the deployment of harmful malware, ransomware, denial-of-service attacks, social engineering and other means to affect service reliability and threaten the confidentiality, integrity and availability of information. Cyber-attacks could also include phishing attempts or e-mail fraud to cause payments or information to be transmitted to an unintended recipient.

Significant disruptions of our information technology systems, or those of our third-party vendors, or security breaches could adversely affect our business operations and/or result in the loss, misappropriation and/or unauthorized access, use or disclosure of, or the prevention of access to, confidential information, including, among other things, trade secrets or other intellectual property, proprietary business information and personal information, and could result in financial, legal, business and reputational harm to us. For example, any such event that leads to unauthorized access, use or disclosure of personal information, including personal information regarding our patients or employees, could harm our reputation, require us to comply with federal and/or state breach notification laws and foreign law equivalents, and otherwise subject us to liability under laws and regulations that protect the privacy and security of personal information. Security breaches and other inappropriate access can be difficult to detect, and any delay in identifying them may lead to increased harm of the type described above. While we have implemented security measures to protect our information technology systems and infrastructure, there can be no assurance that such measures will prevent service interruptions or security breaches that could adversely affect our business.

Risks Related to Personnel Matters

Our future success depends on our ability to retain qualified personnel.

We do not have any employees and instead use a limited number of external consultants for the operation of our company, any of whom may terminate their consultancy with us at any time. We may not be able to attract and retain consultants on acceptable terms given the competition among numerous pharmaceutical and biotechnology companies for similar personnel. 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. We do not maintain "key person" insurance.

Our corporate restructuring and the associated headcount reduction may not result in anticipated savings, could result in total costs and expenses that are greater than expected and could disrupt our business.

We announced on November 7, 2018, April 4, 2019 and May 30, 2019 a series of reductions in headcount as part of a corporate restructuring as we close out clinical and development activities. We may not realize, in full or in part, the anticipated benefits, savings and improvements in our cost structure from our restructuring efforts due to unforeseen difficulties, delays or unexpected costs. If we are unable to realize the expected operational efficiencies and cost savings from the restructuring, our operating results and financial condition would be adversely affected. Furthermore, our restructuring plan may be disruptive to our operations. For example, our headcount reductions could yield unanticipated consequences, such as increase difficulties in implementing our business strategy.

We have entered into and may continue to enter into or seek to enter into business combinations, acquisitions or divestitures which may be difficult to consummate, disrupt our business, divert management attention or dilute stockholder value.

As part of our business strategy, we may enter into business combinations, acquisitions or divestitures. Although we consummated the Ipsen sale in April 2017 and the sale to Elevation of MM-121 and MM-111 in July 2019, we have limited experience in making acquisitions and divestitures. In addition, acquisitions and divestitures are typically accompanied by a number of risks, including:

- the difficulty of integrating or separating the operations and personnel of the acquired companies or divested product;
- the potential disruption of our ongoing business and distraction of management;
- potential unknown liabilities and expenses;
- the failure to achieve the expected benefits of the combination, acquisition or divestiture;
- the maintenance of acceptable standards, controls, procedures and policies; and
- the impairment of relationships with personnel as a result of any integration or separation of management and other personnel.

If we are not successful in completing acquisitions or divestitures that we may pursue in the future, we would be required to reevaluate our business strategy and we may have incurred substantial expenses and devoted significant management time and resources in seeking to complete the acquisitions or divestitures. In addition, with future acquisitions, if pursued, we could use substantial portions of our available cash as all or a portion of the purchase price or could issue additional securities as consideration for these acquisitions, which could cause our stockholders to suffer significant dilution.

Our corporate compliance efforts cannot guarantee that we are in compliance with all potentially applicable regulations.

We are subject to extensive regulation by federal, state and other authorities within the United States and numerous entities outside of the United States. We cannot provide any assurance that governmental authorities will find that our business practices comply with current or future administrative or judicial interpretations of potentially applicable laws and regulations. If we fail to comply with any of these laws and regulations, we could be subject to a range of regulatory actions, including suspension or termination of clinical trials, the failure to approve a product candidate, restrictions on our products or manufacturing processes, withdrawal of products from the market, significant fines, disqualification or debarment from participation in federally-funded healthcare programs or other sanctions or litigation, any of which events may have a significant adverse impact on our business.

Risks Related to Our Common Stock

Our directors and principal stockholders maintain the ability to significantly influence all matters submitted to stockholders for approval.

Our directors and stockholders who own more than 5% of our outstanding common stock, in the aggregate, beneficially own a large portion of our capital stock. As a result, if these stockholders were to choose to act together, they would be able to significantly influence all matters submitted to our stockholders for approval, as well as our management and affairs. For example, these persons, if they choose to act together, would significantly influence the election of directors and approval of any merger, consolidation or sale of all or substantially all of our assets. This concentration of voting power could discourage, delay or prevent an acquisition of our company on terms that other stockholders may desire.

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 our stockholders might otherwise receive a premium for their shares. These provisions could also limit the price that investors might be willing to pay in the future for shares of our common stock, thereby depressing the market price of our common stock. In addition, 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. Because our board of directors is responsible for appointing the members of our management team, these provisions could in turn affect any attempt by our stockholders to replace current members of our management team. Among others, these provisions:

- allow the authorized number of our directors to be changed only by resolution of our board of directors;
- establish advance notice requirements for stockholder proposals that can be acted on at stockholder meetings and nominations to our board of directors;
- require that stockholder actions must be effected at a duly called stockholder meeting and prohibit actions by our stockholders by written consent;
- limit who may call stockholder meetings;
- authorize our board of directors to issue preferred stock without stockholder approval, which could be used to institute a “poison pill” that would work to dilute the stock ownership of a potential hostile acquirer, effectively preventing acquisitions that have not been approved by our board of directors; and
- require the approval of the holders of at least 75% 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.

We have entered into a Section 382 Rights Agreement, and if the share purchase rights issued pursuant to such agreement are exercised, it could materially and adversely affect the market price of our common stock.

We entered into a Section 382 Rights Agreement, or the Rights Agreement, on December 3, 2019, with Computershare Trust Company, N.A., a federally chartered trust company, as Rights Agent. The Rights Agreement is intended to discourage acquisitions of our common stock which could result in a cumulative “ownership change” as defined under Section 382, thereby preserving our

current ability to utilize net operating loss carryforwards to offset future income tax obligations, which would become subject to limitations if we were to experience an "ownership change," as defined under Section 382. While this Rights Agreement is intended to preserve our current ability to utilize net operating loss carryforwards, it effectively deters current and future purchasers from accumulating 4.9% or more of our common stock, which could delay or discourage takeover attempts that our stockholders may consider favorable. In addition, if the share purchase rights issued pursuant to the Rights Agreement are exercised, it could materially and adversely affect the market price of our common stock.

Our stock price has been and may in the future be volatile, which could cause holders of our common stock to incur substantial losses.

Our stock price has been and in the future may be subject to substantial price volatility. The stock market in general and the market for biotechnology companies in particular have experienced extreme volatility that has often been unrelated to the operating performance of particular companies. As a result of this volatility, our stockholders could incur substantial losses. The market price for our common stock may be influenced by many factors, including:

- the timing and amount of potential milestone payments that we may receive from Ipsen, Servier and/or Elevation;
- the success of competitive products or technologies;
- results of clinical trials of our product candidates or those of our competitors;
- regulatory or legal developments in the United States and other countries;
- developments or disputes concerning patents or other proprietary rights;
- the recruitment or departure of key personnel;
- variations in our financial results or those of companies that are perceived to be similar to us;
- changes in the structure of healthcare payment systems;
- market conditions in the pharmaceutical and biotechnology sectors and issuance of new or changed securities analysts' reports or recommendations;
- activism by any single large stockholder or combination of stockholders;
- general economic, industry and market conditions; and
- the other factors described in this "Risk Factors" section.

Because we do not anticipate paying regular cash dividends on our common stock in the foreseeable future, capital appreciation, if any, will be the sole source of gain for holders of our common stock.

We have not historically declared or paid regular cash dividends on our common stock. Although our board of directors declared special cash dividends of $6.7 million, $20.0 million and $140.0 million, which were payable on December 23, 2019, September 5, 2019 and May 26, 2017, respectively, to stockholders of record as of the close of business on December 16, 2019, August 28, 2019 and May 17, 2017, respectively, we do not currently intend to pay any regular cash dividends in the foreseeable future. In addition, the terms of any future debt agreements may in the future preclude us from paying dividends. As a result, capital appreciation, if any, of our common stock will be the sole source of gain for holders of our common stock for the foreseeable future.

Future sales of shares of our common stock, including by us or our directors, or shares issued upon the exercise of currently outstanding options could cause the market price of our common stock to drop significantly, even if our business is doing well.

A substantial portion of our outstanding common stock can be traded without restriction at any time. In addition, a portion of our outstanding common stock is currently restricted as a result of federal securities laws, but can be sold at any time subject to applicable volume limitations. As such, sales of a substantial number of shares of our common stock in the public market could occur at any time. These sales, or the perception in the market that the holders of a large number of shares intend to sell shares, by us or others, could reduce the market price of our common stock. In addition, we have a significant number of shares that are subject to outstanding options. The exercise of these options and the subsequent sale of the underlying common stock could cause a further decline in our stock price. For instance, in April 2016, we issued an aggregate of 1,236,766 shares of our common stock to certain holders of our convertible notes who had agreed to convert an aggregate of $64.2 million of convertible notes. Any such sales also might make it difficult for us to sell equity securities in the future at a time and at a price that we deem appropriate. We cannot predict the size of future issuances or the effect, if any, that any future issuances may have on the market price for our common stock.

Furthermore, on December 15, 2017, we filed a registration statement on Form S-3 with the SEC to allow the issuance of our securities from time to time in one or more offerings of up to $150,000,000 in aggregate dollar amount. This registration statement was declared effective by the SEC on January 5, 2018. Any sale of additional shares of our common stock or other securities could reduce the market price of our common stock.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

We do not currently own or lease any facilities or property that are material to our business.

Item 3. Legal Proceedings

We are not currently a party to any material legal proceedings.

Item 4. Mine Safety Disclosures

Not applicable.

PART II

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

Our common stock is publicly traded on the Nasdaq Global Market under the symbol "MACK".

Holders

As of February 29, 2020, there were approximately 106 holders of record of our common stock. This number does not include beneficial owners whose shares are held by nominees in street name.

Dividends

Our board of directors declared special cash dividends of $20.0 million and $6.7 million, which were payable on September 5, 2019 to stockholders of record as of the close of business on August 28, 2019 and December 23, 2019 to stockholders of record as of the close of business on December 16, 2019, respectively. We do not currently intend to pay any regular cash dividends in the foreseeable future.

Item 6. Selected Financial Data

Not Applicable.

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 our financial statements and the notes to those financial statements appearing elsewhere in this Annual Report on Form 10-K. This discussion contains forward-looking statements that involve significant risks and uncertainties. As a result of many factors, such as those set forth in Part I, Item 1A. Risk Factors of this Annual Report on Form 10-K, which are incorporated herein by reference, our actual results may differ materially from those anticipated in these forward-looking statements.

Overview

We are a biopharmaceutical company based in Cambridge, Massachusetts that is entitled to receive up to $450.0 million in contingent milestone payments related to our sale of ONIVYDE® to Ipsen S.A., or Ipsen, in April 2017 and up to $54.5 million in contingent milestone payments related to our sale of MM-121 and MM-111 to Elevation Oncology, Inc. (formerly known as 14ner Oncology, Inc.), or Elevation, in July 2019. We do not have any ongoing research or development activities and are seeking potential acquirers for our remaining preclinical and clinical assets. We do not have any employees and instead use external consultants for the operation of our company.

On April 3, 2017, we completed the sale of ONIVYDE and MM-436 (the "commercial business") to Ipsen (the "Ipsen sale"). In connection with the Ipsen sale, we are eligible to receive up to $450.0 million in additional regulatory approval-based milestone payments. We entered into a license and collaboration agreement, or the Servier agreement, between Ipsen and Les Laboratoires Servier SAS, or Servier (as assignee from Shire plc) in 2014, and on April 3, 2017, the Servier agreement was assigned to Ipsen in connection with the completion of the Ipsen sale. We have received all $33.0 million in milestone payments under the Servier agreement.

The remaining up to $450.0 million in potential milestone payments resulting from the Ipsen sale consist of:

- $225.0 million upon approval by the U.S. Food and Drug Administration, or FDA, of ONIVYDE for the first-line treatment of metastatic adenocarcinoma of the pancreas, subject to certain conditions;
- $150.0 million upon approval by the FDA of ONIVYDE for the treatment of small-cell lung cancer after failure of first-line chemotherapy; and
- $75.0 million upon approval by the FDA of ONIVYDE for an additional indication unrelated to those described above.

Our non-commercial assets, including our clinical and preclinical development programs, were not included in the Ipsen sale and remain assets of ours.

On May 30, 2019, we announced the completion of our review of strategic alternatives, following which our board of directors implemented a series of measures designed to extend our cash runway into 2027 and preserve our ability to capture the potential milestone payments resulting from the Ipsen sale. We have based this estimate on assumptions that may prove to be wrong, and we could use our financial resources sooner than we currently expect. In connection with that announcement, we discontinued the discovery efforts on our remaining preclinical programs: MM-401, an agonistic antibody targeting a novel immuno-oncology target, TNFR2; and MM-201, a highly stabilized agonist-Fc fusion protein targeting death receptors 4 and 5. We are seeking potential acquirers for our remaining preclinical and clinical assets.

The termination of our executive management team and all other employees was substantially completed by June 28, 2019 and fully completed by July 12, 2019. As of July 12, 2019, we do not have any employees. We have engaged external consultants to run our day-to-day operations. We have also entered into consulting agreements with certain former members of our executive management team who are supporting our relationship with current partners, assisting with the potential sale of remaining preclinical and clinical assets, and assisting with certain legal and regulatory matters and the continued wind-down of operations.

On April 15, 2019, we repaid in full all principal, accrued and unpaid interest, fees, costs and expenses under our Loan and Security Agreement, or loan agreement, with Hercules Capital, Inc., or Hercules, in an aggregate amount equal to $16.0 million.

In May 2019, we monetized certain assets to strengthen our cash position. This included the sale of our entire equity position in Silver Creek Pharmaceuticals, Inc., or Silver Creek, resulting in $7.8 million in cash, and the sale of laboratory equipment from our research and development operations, resulting in approximately $1.4 million in cash.

On July 12, 2019, we completed the sale to Elevation, or the Elevation sale, of our anti-HER3 antibody programs, MM-121 (seribantumab) and MM-111. In connection with the Elevation sale, we received an upfront cash payment of $3.5 million and are eligible to receive up to $54.5 million in additional potential development, regulatory approval and commercial-based milestone payments, consisting of:

- $3.0 million for achievement of the primary endpoint in the first registrational clinical study of either MM-121 or MM-111;
- Up to $16.5 million in total payments for the achievement of various regulatory approval and reimbursement-based milestones in the United States, Europe and Japan; and
- Up to $35.0 million in total payments for achieving various cumulative worldwide net sales targets between $100.0 million and $300.0 million for MM-121 and MM-111.

On July 25, 2019, our board of directors announced, authorized and declared a special cash dividend of $20.0 million to holders of our common stock. The special dividend was payable on September 5, 2019 to stockholders of record as of the close of business on August 28, 2019. The special dividend resulted in a decrease to additional paid-in capital.

On December 3, 2019, our board of directors announced, authorized and declared a special cash dividend of $6.7 million to holders of our common stock. The special dividend was payable on December 23, 2019 to stockholders of record as of the close of business on December 16, 2019. The special dividend resulted in a decrease to additional paid-in capital.

We previously devoted substantially all of our resources to our drug discovery and development efforts, including conducting clinical trials for our product candidates, protecting our intellectual property and providing general and administrative support for these operations. We have financed our operations primarily through private placements of convertible preferred stock, collaborations, public offerings of our securities, secured debt financings, sales of ONIVYDE and the Ipsen sale.

As of December 31, 2019, we had unrestricted cash and cash equivalents of $16.6 million. We expect that our cash and cash equivalents as of December 31, 2019 will be sufficient to continue our operations into 2027, when we estimate the longest-term potential Ipsen milestone may be achieved.

We have a history of losses from our continuing operations. We do not expect to be profitable from our continuing operations in the future. As of December 31, 2019, we had an accumulated deficit of $540.6 million. Our net loss from our continuing operations was $21.3 million and $60.8 million for years ended December 31, 2019 and 2018, respectively. We do not expect to have any research and development expenses going forward.

Strategic Partnerships, Licenses and Collaborations

Servier

On September 23, 2014, we entered into the Servier agreement for the development and commercialization of ONIVYDE outside of the United States and Taiwan, or the licensed territory. As part of the Servier agreement, we granted an exclusive, royalty-bearing right and license under our patent rights and know-how to develop and commercialize ONIVYDE in the licensed territory. On April 3, 2017, the Servier agreement and all other agreements related to the subject collaboration and any associated obligations, including our agreement related to commercial supply of ONIVYDE, were assigned to Ipsen in connection with the completion of the Ipsen sale. We retained the rights to receive net milestone payments that may become payable pursuant to the Servier agreement for the ex-U.S. development and commercialization of ONIVYDE for up to $33.0 million, which is comprised of potential payments of $18.0 million from the sale of ONIVYDE in two additional major European countries, $5.0 million related to the sale of ONIVYDE in the first major non-European, non-Asian country and $10.0 million for the first patient dosed in a pivotal clinical trial in an indication other than pancreatic cancer. In October 2018, we received a payment of $5.0 million from Ipsen against the milestone related to the first patient dosed in a pivotal clinical trial of ONIVYDE in an indication other than pancreatic cancer as a result of the commencement of a multi-part study that Ipsen and Servier are conducting in patients with small-cell lung cancer.

In November 2019, we received the remaining $5.0 million from Ipsen against the milestone related to the decision by Ipsen and Servier to progress to the randomized part of the study focused on efficacy. We have received all of the $33.0 million in milestone payments to which we were eligible under the Servier agreement.

Silver Creek Pharmaceuticals, Inc.

As of December 31, 2018, we held an equity investment in Silver Creek, which was accounted for as an equity method investment. The carrying value of the investment in Silver Creek was $7.4 million at December 31, 2018. During the year ended December 31, 2018, we recorded a loss associated with Silver Creek of $3.1 million as a component of other (expense) income, net in the consolidated statements of operations and comprehensive loss, representing our proportionate share of Silver Creek's losses during the year ended December 31, 2018.

As of May 7, 2019, the carrying value of our investment in Silver Creek was $6.4 million. On May 7, 2019, we sold our entire equity position in Silver Creek for $7.8 million. Accordingly, a $1.4 million gain on sale of our equity investment was recognized during the year ended December 31, 2019 within other (expense) income, net in the consolidated statement of operations and comprehensive loss.

Financial Operations Overview

Research and development expenses

Research and development expenses consisted of the costs associated with our research and discovery activities, conduct of preclinical studies and clinical trials, manufacturing development efforts and activities related to regulatory filings. Our research and development expenses consisted of:

- employee salaries and related expenses, which included stock-based compensation and benefits for the personnel involved in our drug discovery and development activities;
- external research and development expenses incurred under agreements with third-party contract research organizations and investigative sites;
- manufacturing material expense for third-party manufacturing organizations and consultants, including costs associated with manufacturing product prior to product approval;
- license fees for and milestone payments related to in-licensed products and technologies; and
- facilities, depreciation and other allocated expenses, which included direct and allocated expenses for rent and maintenance of facilities, depreciation of leasehold improvements and equipment, and laboratory and other supplies.

We expensed research and development costs as incurred. As a result of completing the closeout of our SHERLOC, SHERBOC and MM-310 clinical trials, the discontinuation of the discovery efforts for our remaining preclinical programs, MM-401 and MM-201, and the termination of all remaining employees as of July 12, 2019, we no longer have any ongoing research or development activities. Accordingly, no research and development costs were recognized in the second half of 2019 and we do not anticipate incurring any such costs in future periods.

We have historically used our employee and infrastructure resources across multiple research and development programs. We tracked expenses related to our most advanced product candidates on a per project basis. Accordingly, we allocated internal employee-related and infrastructure costs, as well as third-party costs, to each of these programs. We do not allocate to specific development programs either stock-based compensation expense or expenses related to preclinical programs. Costs that were not directly attributable to specific clinical programs, such as wages related to shared laboratory services, travel and employee training and development, are not allocated and are considered general research and discovery expenses.

The following table summarizes our principal product development programs, including the research and development expenses allocated to each clinical product candidate, for the years ended December 31, 2019 and 2018:

	Years Ended December 31,	
(in thousands)	**2019**	**2018**
MM-121	$ 3,584	$ 26,760
MM-310	1,826	4,297
Legacy programs	304	4,565
Preclinical, general research and discovery	5,162	13,259
Stock-based compensation	224	1,093
Total research and development expenses	$ 11,100	$ 49,974

In connection with the Ipsen sale, all expenses related to the commercial business have been reclassified under discontinued operations.

During the second quarter of 2019, we ceased all research and development activities related to all of our programs listed above and are actively pursuing the sale of any of our remaining program assets.

MM-121 (seribantumab)

In February 2015, we initiated the global, open-label, biomarker-selected, Phase 2 randomized SHERLOC clinical trial evaluating MM-121 in combination with docetaxel, versus docetaxel alone, in patients with heregulin positive non-small cell lung cancer. On October 19, 2018, we announced the termination of the SHERLOC clinical trial based on an interim analysis triggered by the occurrence of 75% of events required for trial completion, which demonstrated that the addition of MM-121 to docetaxel did not improve progression free survival over docetaxel alone in this patient population.

In February 2018, we dosed the first patient in our global, double-blinded, placebo-controlled, biomarker-selected Phase 2 randomized SHERBOC clinical trial evaluating MM-121 in combination with fulvestrant, versus fulvestrant alone, in patients with heregulin positive, hormone receptor positive, ErbB2 (HER2) negative, metastatic breast cancer. On November 7, 2018, we announced that we were discontinuing development of all ongoing MM-121 programs, including terminating the SHERBOC clinical trial based on the results of the interim analysis of the SHERLOC clinical trial. The costs for MM-121 were expensed as incurred, as we believed the costs to maintain the intellectual property for MM-121 increased the likelihood of selling or out-licensing the program.

On July 12, 2019, we completed the Elevation sale of our anti-HER3 antibody programs, MM-121 (seribantumab) and MM-111.

MM-310

In March 2017, we initiated a Phase 1 clinical trial of MM-310 to evaluate its safety and preliminary activity in patients with solid tumors and to identify the maximum tolerated dose. On November 7, 2018, we announced an amendment to the clinical trial to extend the dosing interval of MM-310 from every three weeks to every four weeks as a result of emerging cumulative grade 3 peripheral neuropathy following multiple cycles of treatment observed in three patients. On April 4, 2019, we announced that we were discontinuing development of MM-310 as a result of a comprehensive review of available safety data from the Phase 1 clinical trial. Based on emerging data since the amendment of the clinical protocol in late 2018, we concluded that the trial would not be able to reach an optimal therapeutic index for MM-310. The MM-310 program was discontinued, and we do not expect to incur any future costs related to MM-310.

Legacy Programs

In January 2017, we announced the completion of a strategic pipeline review as a result of which many product candidates in our pipeline were put on hold until such time as we determine the conditions are appropriate to invest in them. These molecules include MM-302, MM-151, MM-131 and certain early stage discovery efforts.

In June 2018, we announced top-line results from the global, double-blinded, placebo-controlled, Phase 2 randomized CARRIE clinical trial of MM-141, showing that the trial did not meet its primary or secondary efficacy endpoints in patients who received MM-141 in combination with nab-paclitaxel and gemcitabine, compared to nab-paclitaxel and gemcitabine alone. Based on these results, we are not devoting additional resources to and have ceased all of our development activities for MM-141.

General and administrative expenses

General and administrative expenses consist primarily of salaries and other related costs for personnel, including stock-based compensation expenses and benefits, legal, intellectual property, business development, finance, information technology, corporate communications, investor relations and human resources departments. Other general and administrative expenses include costs for employee training and development, board of directors costs, depreciation, insurance expenses, facility-related costs not otherwise included in research and development expenses, legal and professional fees, and accounting and information technology services fees.

Restructuring expenses

As a result of the corporate restructuring activities we announced on November 7, 2018, April 30, 2019 and May 30, 2019, we recognized total restructuring expenses of $4.8 million and $1.3 million for the years ended December 31, 2019 and 2018, respectively, related to one-time employee termination benefits comprised of severance, benefits and related costs, all of which are expected to result in cash expenditures. Approximately $5.6 million and $0.4 million of these payments were made during the years ended December 31, 2019 and 2018, respectively. The remaining $0.1 million as of December 31, 2019 is expected to be paid in the first half of 2020.

As a result of the restructuring we announced on January 8, 2017, we paid $0.6 million in restructuring expense for the year ended December 31, 2018. There were no restructuring expenses related to the January 2017 restructuring for the year ended December 31, 2018.

Interest income

Interest income consists primarily of interest income associated with our cash, cash equivalents and marketable securities.

Interest expense

Interest expense for the years ended December 31, 2019 and 2018 consisted primarily of cash and non-cash interest related to the loan agreement with Hercules that we entered into on July 2, 2018, as well as the loss we recorded on the extinguishment of the loan agreement in the second quarter of 2019.

Other (expense) income, net

Other (expense) income, net consists primarily of our proportionate share of losses from our equity method investment in Silver Creek, offset by the gain we recorded upon the sale of the investment in the second quarter of 2019.

Critical Accounting Policies and Significant Judgments and Estimates

Our management's discussion and analysis of our financial condition and results of operations is based on our consolidated financial statements, which we have prepared in accordance with the rules and regulations of the Securities and Exchange Commission, or the SEC, and generally accepted accounting principles in the United States, or GAAP. The preparation of these consolidated financial statements requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the date of the financial statements, as well as the reported expenses during the reporting periods. We evaluate our estimates and judgments on an ongoing basis. We base our estimates on historical experience and on various other factors that we believe are reasonable under the circumstances, the results of which form the basis for making judgments about the carrying value of assets and liabilities that are not readily apparent from other sources. Our actual results may differ from these estimates under different assumptions or conditions.

While our significant accounting policies are more fully described in Note 1, "Nature of the Business and Summary of Significant Accounting Policies," in the accompanying notes to the consolidated financial statements appearing at the end of this Annual Report on Form 10-K, we believe that the following accounting policies are the most critical to aid in fully understanding and evaluating our financial condition and results of operations.

Accrued expenses

As part of the process of preparing financial statements, we are required to estimate accrued expenses. This process involves identifying services that have been performed on our behalf and estimating the level of services performed and the associated costs incurred for such services where we have not yet been invoiced or otherwise notified of actual cost. We record these estimates in our consolidated financial statements as of each balance sheet date. Examples of estimated accrued expenses include:

- fees due to contract research organizations in connection with preclinical and toxicology studies and clinical trials;
- fees paid to investigative sites in connection with clinical trials; and
- professional service fees.

In accruing service fees, we estimate the time period over which services will be provided and the level of effort in each period. If the actual timing of the provision of services or the level of effort varies from the estimate, we will adjust the accrual accordingly. In the event that we do not identify costs that have been incurred or we under or overestimate the level of services performed or the costs of such services, our actual expenses could differ from such estimates. The date on which some services commence, the level of services performed on or before a given date and the cost of such services are often subjective determinations. We make estimates based on the facts and circumstances known to us at the time and in accordance with GAAP. There have been no material changes in estimates for the periods presented.

Stock-based compensation expense

We account for our stock-based compensation awards in accordance with Accounting Standards Codification, or ASC, 718, *Compensation – Stock Compensation*. ASC 718 requires all share-based payments to employees, including grants of employee stock options, to be recognized in the consolidated statements of operations and comprehensive loss based on their grant date fair values. For stock options granted to employees and to members of our board of directors for their service on the board of directors, we estimate the grant date fair value of each option award using the Black-Scholes option pricing model. The use of the Black-Scholes option pricing model requires us to make assumptions with respect to the expected term of the option, the expected volatility of our common stock consistent with the expected term of the option, the risk-free interest rate consistent with the expected term of the option and the expected dividend yield of our common stock. Stock-based compensation expense related to employee stock options is measured using the fair value of the award at the grant date and is adjusted quarterly to reflect actual forfeitures. Stock-based compensation expense is then recognized on a straight-line basis over the vesting period, which is also the requisite service period.

Prior to the adoption of Accounting Standards Update, or ASU, No. 2018-07, *Compensation—Stock Compensation (Topic 718): Improvements to Nonemployee Share-Based Payment Accounting*, or ASU 2018-07, as discussed in Note 1 to our consolidated financial statements appearing at the end of this document, the measurement date for non-employee awards was generally the date the services are completed, resulting in financial reporting period adjustments to stock-based compensation during the vesting terms for changes in the fair value of the awards. After the adoption of ASU 2018-07, the measurement date for non-employee awards is the later of the adoption date of ASU 2018-07, or the date of grant, without change in the fair value of the award.

Results of Operations

Comparison of the years ended December 31, 2019 and 2018

	Years Ended December 31,	
(in thousands)	**2019**	**2018**
Operating expenses:		
Research and development expenses	$ 11,100	$ 49,974
General and administrative expenses	16,169	15,601
Gain on sale of assets	(4,910)	—
Total operating expenses	22,359	65,575
Loss from continuing operations	(22,359)	(65,575)
Interest income	777	1,299
Interest expense	(1,528)	(956)
Other income (expense), net	370	(3,230)
Net loss from continuing operations before income tax benefit	(22,740)	(68,462)
Income tax benefit	1,473	7,695
Net loss from continuing operations	$ (21,267)	$ (60,767)

Research and development expenses

Research and development expenses were $11.1 million for the year ended December 31, 2019 compared to $50.0 million for the year ended December 31, 2018, a decrease of $38.9 million, or 78%. This decrease was primarily attributable to:

- $23.2 million decrease in expenses related to the discontinuation of the MM-121 clinical trials;
- $8.1 million decrease in expenses related to our preclinical, general research and discovery primarily due to our reduction in headcount;
- $4.3 million decrease in expense related to legacy programs mainly due to the discontinuation of the MM-141 clinical trial;
- $2.5 million decrease in expense related to the discontinuation of the MM-310 clinical trial; and
- $0.9 million decrease in stock-based compensation related to reduction in headcount due to restructuring.

During the year ended December 31, 2019, we ceased all research and development activities and no research and development expenses were recognized in the second half of the year then ended. We do not expect to incur any research and development cost in future periods.

General and administrative expenses

General and administrative expenses were $16.2 million for the year ended December 31, 2019 compared to $15.6 million for the year ended December 31, 2018, an increase of $0.6 million, or 4%. This increase was primarily attributable to legal and other professional fees resulting from the contested proxy process with respect to our 2019 Annual Meeting of Stockholders and an increase in restructuring expenses recognized offset by a decrease in corporate expenses related to reduced headcount levels and stock-based compensation in 2019 compared to 2018. We expect general and administrative costs to decrease in future periods as we look to sell our remaining preclinical and clinical assets and continue to streamline our operations.

Interest income

Interest income was $0.8 million for the year ended December 31, 2019 compared to $1.3 million for the year ended December 31, 2018, primarily attributable to the interest income associated with our marketable securities and interest bearing cash and cash equivalents accounts.

Interest expense

Interest expense was $1.5 million for the year ended December 31, 2019, which primarily represents the $1.0 million loss on extinguishment we recorded upon repayment of the loan agreement with Hercules. Interest expense was $1.0 million for the year ended December 31, 2018, primarily attributable to the loan agreement with Hercules, which was paid in full in April 2019. We do not expect to incur interest expense in the future.

Other income (expense), net

Other income was $0.4 million for the year ended December 31, 2019 compared to $3.2 million of expense for the year ended December 31, 2018. The income of $0.4 million for the year ended December 31, 2019 represents the $1.4 million gain we recorded on the sale of our equity method investment in Silver Creek offset by our proportionate share of Silver Creek's losses which we recorded prior to the sale of our investment. The $3.2 million of expense for the year ended December 31, 2018 was primarily attributable to our proportionate share of losses from our equity method investment in Silver Creek.

Income tax benefit

We recognized an income tax benefit of $1.5 million and $7.7 million in continuing operations for the years ended December 31, 2019 and 2018, respectively. The 2019 and 2018 income tax benefit relate to the Servier milestones received.

Liquidity and Capital Resources

Sources of liquidity

We have financed our operations through December 31, 2019 primarily through private placements of convertible preferred stock, collaborations, public offerings of our securities, secured debt financings, sales of ONIVYDE and the Ipsen sale. Through December 31, 2019, we have received $580.7 million from the Ipsen sale, $268.2 million from the sale of convertible preferred stock and warrants, $126.7 million of net proceeds from the sale of common stock in our initial public offering and a July 2013 follow-on underwritten public offering, $38.6 million of net proceeds from our 2015 "at the market offering" program, or the ATM offering, $39.6 million of net proceeds from a secured debt financing, $120.6 million of net proceeds from the issuance of the convertible notes in our July 2013 underwritten public offering, $168.5 million of net proceeds from the issuance of the 2022 notes, $492.5 million of upfront license fees, milestone payments, reimbursement of research and development costs and manufacturing services and other payments from our collaborations, $68.9 million of cash receipts related to ONIVYDE sales, $33.0 million in milestone payments related to the development and commercialization of ONIVYDE and $14.7 million in net borrowings pursuant to the loan agreement with Hercules. As of December 31, 2019, we had unrestricted cash and cash equivalents of $16.6 million.

On July 2, 2018, we entered into the loan agreement with Hercules pursuant to which a term loan of up to an aggregate principal amount of $25.0 million was available to us. The loan agreement provided for an initial term loan advance of $15.0 million, which closed on July 2, 2018, and, at our option, two additional term loan advances of $5.0 million each upon the occurrence of certain funding conditions prior to December 31, 2018 and December 31, 2019, respectively. As a result of the decision to terminate the SHERLOC clinical trial, we did not meet the prerequisite funding conditions for drawing the two additional term loan advances under the loan agreement. We received net proceeds totaling $14.7 million.

On April 15, 2019, we repaid in full all principal, accrued and unpaid interest, fees, costs and expenses under the loan agreement with Hercules in an aggregate amount equal to $16.0 million. We had previously borrowed $15.0 million under the loan agreement. See Note 9, “Borrowings,” in the accompanying notes to the consolidated financial statements.

On July 25, 2019, our board of directors announced, authorized and declared a special cash dividend of $20.0 million on our common stock. The special dividend was paid on September 5, 2019 to stockholders of record as of the close of business on August 28, 2019.

On December 3, 2019, our board of directors announced, authorized and declared a special cash dividend of $6.7 million on our common stock. The special dividend was paid on December 23, 2019 to stockholders of record as of the close of business on December 16, 2019.

Cash flows

The following table provides information regarding our cash flows for the years ended December 31, 2019 and 2018:

	Years Ended December 31,	
(in thousands)	**2019**	**2018**
Net cash used in operating activities	(31,368)	(65,588)
Net cash provided by (used in) investing activities	69,825	(22,598)
Net cash (used in) provided by financing activities	(42,540)	14,632
Net decrease in cash, cash equivalents and restricted cash	$ (4,083)	$ (73,554)

Operating activities

Cash used in operating activities was $31.4 million during the year ended December 31, 2019. The cash used in operating activities was primarily a result of our $21.3 million net loss from continuing operations and net decrease in assets and liabilities of $8.2 million. The net decrease in operating assets and liabilities during the year ended December 31, 2019 was primarily driven by the decrease in prepaid expenses and other assets and decreases in accounts payable, accrued expenses and other and deferred rent and tax incentives. This decrease was offset by non-cash adjustments including $2.4 million of stock-based compensation expense, $2.2 million in depreciation and amortization, $1.5 million benefit from intraperiod tax allocation, $1.0 million of loss on extinguishment of debt and offset by $3.5 million of gain on sale of in progress research and development asset, $2.0 million of gain on sale of property and equipment, $0.4 million of gain on equity method investment.

Cash used in operating activities was $65.6 million during the year ended December 31, 2018. The cash used in operating activities was primarily a result of our $60.8 million net loss from continuing operations and net decrease in assets and liabilities of $7.0 million. The net decrease in operating assets and liabilities during the year ended December 31, 2018 was primarily driven by the increase in prepaid expenses and other assets and decreases in accounts payable, accrued expenses and other and deferred rent and tax incentives. This decrease was offset by non-cash adjustments including $7.7 million benefit from intraperiod tax allocation, $4.1 million in depreciation and amortization, $3.1 million of stock-based compensation expense, $3.1 million in loss on equity method investment and $0.2 million non-cash activity related to discontinued operations.

Investing activities

Cash provided by investing activities of $69.8 million during the year ended December 31, 2019 was primarily due to proceeds from maturities and sales of marketable securities totaling $51.5 million, proceeds from sale of equity method investment totaling $7.8 million, milestone payments relating to the sale of the commercial business totaling $5.0 million, proceeds on sale of in progress research and development asset totaling $3.5 million and proceeds on sale of equipment totaling $2.0 million.

Cash used in investing activities of $22.6 million during the year ended December 31, 2018 was primarily due to purchases of marketable securities totaling $103.1 million, offset by proceeds from maturities and sales of marketable securities totaling $52.5 million and milestone payments relating to the sale of the commercial business totaling $28.0 million.

Financing activities

Cash used in financing activities of $42.5 million during the year ended December 31, 2019 was due to the cash dividends paid of $26.7 million and repayment of debt of $15.0 million and payment of debt extinguishment costs of approximately $1.0 million. Cash provided by financing activities of $14.6 million during the year ended December 31, 2018 was due to proceeds from the issuance of the note payable related to the loan agreement with Hercules.

Funding requirements

We have incurred significant expenses and operating losses to date. On May 30, 2019, we announced the completion of our review of strategic alternatives, following which our board of directors implemented a series of measures designed to extend our cash runway into 2027 and preserve our ability to capture the potential milestone payments resulting from the Ipsen sale. In connection with that announcement, we discontinued the discovery efforts on our remaining preclinical programs and implemented a reduction in headcount resulting in the termination of all remaining employees as of July 12, 2019. Our future capital requirements will depend on many factors, including:

- whether we realize the anticipated cost savings in connection with our restructuring efforts;
- our ability to successfully divest our product candidates and other assets;
- the timing and amount of potential milestone payments related to ONIVYDE that we may receive from Ipsen;
- the timing and amount of potential milestone payments that we may receive from Elevation;
- the timing and amount of any special dividend to our stockholders that our board of directors may declare;
- the timing and amount of general and administrative expenses required to continue to operate our company;
- the extent to which we owe any taxes for current, future or prior periods, including as a result of any audits by taxing authorities;
- the extent to which we invest in any future research or development activities of our product candidates;
- the costs of preparing, filing and prosecuting patent applications and maintaining, enforcing and defending intellectual property-related claims;
- the extent to which we acquire or invest in businesses, products and technologies; and
- the costs associated with operating as a public company and maintaining compliance with exchange listing and SEC requirements.

We expect that we would finance any future cash needs through a combination of divestitures of our product candidates or other assets, equity offerings and debt financings. There can be no assurance as to the timing, terms or consummation of any divestiture or financing. 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, the ownership interest of our stockholders will be diluted, and the terms of these securities may include liquidation or other preferences that adversely affect the rights of our stockholders. 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 arrangements with third parties, we may have to relinquish valuable rights to our future revenue streams or product candidates.

Certain Contractual Obligations and Commitments

On July 2, 2018, we entered into the loan agreement, as amended, with Hercules pursuant to which a term loan of up to an aggregate principal amount of $25.0 million was available to us. The loan agreement provided for an initial term loan advance of $15.0 million, which closed on July 2, 2018, and, at our option, two additional term loan advances of $5.0 million each upon the occurrence of certain funding conditions prior to December 31, 2018 and December 31, 2019, respectively. As a result of the decision to terminate the SHERLOC clinical trial, we did not meet the prerequisite funding conditions for drawing the two additional term loan advances under the loan agreement. The term loan bore interest at an annual rate equal to the greater of 9.25% and 9.25% plus the prime rate of interest minus 5.25%. The loan agreement provided for interest-only payments for eighteen months and repayment of the aggregate outstanding principal balance of the term loan in monthly installments starting on February 1, 2020 and continuing through August 1, 2021. In addition, we paid a fee of $0.3 million upon closing and were required to pay a fee of 5.55% of the aggregate amount of advances under the loan agreement at maturity. On April 15, 2019, we repaid in full all principal, accrued and unpaid interest, fees, costs and expenses under the loan agreement with Hercules in an aggregate amount equal to $16.0 million. See Note 9, “Borrowings,” in the accompanying notes to the consolidated financial statements.

In May 2014, the Massachusetts Life Sciences Center, or the MLSC, awarded us an additional $0.6 million of tax incentives under its Life Science Tax Incentive Program, which allows us to monetize approximately $0.6 million of state research and development tax credits. In exchange for these incentives, we pledged to hire an incremental 31 employees and to maintain the additional headcount through at least December 31, 2018. Due to our failure to meet this headcount target as of December 31, 2016 as a result of our October 2016 corporate restructuring activities, we will be required to repay approximately $0.3 million of this award.

In March 2015, the MLSC awarded us an additional $1.4 million of tax incentives under its Life Science Tax Incentive Program, which allows us to monetize approximately $1.2 million of state research and development tax credits. In exchange for these incentives, we pledged to hire an incremental 75 employees and to maintain the additional headcount through at least December 31, 2019. Due to our failure to meet this headcount target as of December 31, 2016 as a result of our October 2016 corporate restructuring activities, we will be required to repay approximately $1.0 million of this award.

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 SEC rules.

Tax Loss Carryforwards

At December 31, 2019, we had net operating loss carryforwards for federal and state income tax purposes of $204.2 million and $289.8 million, respectively. Our existing federal and state net operating loss carryforwards begin to expire in 2033. We also had available research and development credits for federal and state income tax purposes of approximately $28.8 million and $18.9 million, respectively. The federal and state research and development credits will begin to expire in 2022 and 2025, respectively. As of December 31, 2019, we also had available investment tax credits for state income tax purposes of less than $0.1 million, which began to expire in 2019. We have orphan drug credits of $122.7 million, which begin to expire in 2031.

We have evaluated the positive and negative evidence bearing upon the realizability of our deferred tax assets, which are comprised principally of net operating loss carryforwards and research and development credits. Under the applicable accounting standards, we have considered our history of losses and concluded that it is more likely than not that we will not recognize the benefits of federal and state deferred tax assets. Accordingly, a full valuation allowance has been established against the deferred tax assets.

Utilization of the net operating loss and tax credit carryforwards may be subject to a substantial annual limitation under Section 382 of the Internal Revenue Code of 1986, as amended, or the Internal Revenue Code, due to ownership change limitations that have occurred previously or that could occur in the future. These ownership changes may limit the amount of net operating loss and tax credit carryforwards that can be utilized annually to offset future taxable income and tax. We completed an evaluation of ownership changes through December 31, 2019 to assess whether utilization of our net operating loss or tax credit carryforwards would be subject to an annual limitation under Section 382 of the Internal Revenue Code. We believe that we can utilize all of our existing tax attributes as a result of the analysis. To the extent an ownership change occurs in the future, the net operating loss and tax credit carryforwards may be subject to limitation.

We have not, as of yet, conducted a study of our domestic research and development credit carryforwards and Orphan Drug Credits. This study may result in an increase or decrease to our credit carryforwards; however, until a study is completed and any adjustment is known, no amounts are being presented as an uncertain tax position. A full valuation allowance has been provided against our credits, and if an adjustment is required, this adjustment would be offset by an adjustment to the valuation allowance. As a result, there would be no impact to the statement of operations and comprehensive loss, balance sheet or cash flows if an adjustment were required.

382 Rights Agreement

On December 3, 2019, we entered into a Section 382 Rights Agreement, or the Rights Agreement, with Computershare Trust Company, N.A., a federally chartered trust company, as Rights Agent. Pursuant to the Rights Agreement, on December 13, 2019, we issued a dividend of one preferred share purchase right, or a Right, for each share of our common stock to the stockholders of record on that date. Each Right entitles the registered holder to purchase from us one one-thousandth of a share of Series Z Junior Preferred Stock, par value $0.01 per share, or the Preferred Shares, at a price of $18.00 per one one-thousandth of a Preferred Share represented by a Right, subject to adjustment. The description and terms of the Rights are set forth in the Rights Agreement.

Recent Accounting Pronouncements

See Note 1, “Nature of the Business and Summary of Significant Accounting Policies,” in the accompanying notes to the consolidated financial statements for a description of recent accounting pronouncements applicable to our business.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

We invest in a variety of financial instruments, principally cash deposits, money market funds, securities issued by the U.S. government and its agencies and corporate debt securities. The goals of our investment policy are preservation of capital, fulfillment of liquidity needs and fiduciary control of cash and investments. We also seek to maximize income from our investments without assuming significant risk.

Our primary exposure to market risk is interest income sensitivity, which is affected by changes in the general level of interest rates, particularly because our investments are in short-term marketable securities. Due to the short-term duration of our investment portfolio and the low risk profile of our investments, an immediate 10% change in interest rates would not have a material effect on the fair market value of our portfolio. We have the ability and intention to hold our investments until maturity, and therefore, we would not expect our operating results or cash flows to be affected to any significant degree by the effect of a sudden change in market interest rates on our investment portfolio.

We do not currently have any auction rate or mortgage-backed securities. We do not believe our cash, cash equivalents and marketable securities have significant risk of default or illiquidity, however we cannot provide absolute assurance that in the future our investments will not be subject to adverse changes in market value.

Item 8. Financial Statements and Supplementary Data

Our consolidated financial statements, together with the report of our independent registered public accounting firm, appear on pages F-1 through F-23 of this Annual Report on Form 10-K.

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

None.

Item 9A. Controls and Procedures

Evaluation of Disclosure Controls and Procedures

Our management, with the participation of our principal executive and financial officer, evaluated the effectiveness of our disclosure controls and procedures as of December 31, 2019. The term “disclosure controls and procedures,” as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act means controls and other procedures of a company that are designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the SEC’s rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is accumulated and communicated to the company’s management, including its principal executive and principal financial officers, as appropriate to allow timely decisions regarding required disclosure. Management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives and management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures. Based on the evaluation of our disclosure controls and procedures as of December 31, 2019, our principal executive and financial officer concluded that, as of such date, our disclosure controls and procedures were effective at the reasonable assurance level.

Internal Control Over Financial Reporting

Management's Annual Report on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting for the company. Internal control over financial reporting is defined in Rule 13a-15(f) or 15d-15(f) promulgated under the Exchange Act as a process designed by, or under the supervision of, the company's principal executive and principal financial officers and effected by the company's board of directors, management and other personnel, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with GAAP and includes those policies and procedures that:

- pertain to the maintenance of records that in reasonable detail accurately and fairly reflect the transactions and dispositions of the assets of the company;
- provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with GAAP, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and
- provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Therefore, even those systems determined to be effective can provide only reasonable assurance with respect to financial statement preparation and presentation. Projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Our management assessed the effectiveness of our internal control over financial reporting as of December 31, 2019. In making this assessment, management used the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission in Internal Control-Integrated Framework (2013). Based on its assessment, management concluded that, as of December 31, 2019, our internal control over financial reporting is effective based on those criteria.

The effectiveness of our internal control over financial reporting as of December 31, 2019 has been audited by Marcum LLP, an independent registered public accounting firm, as stated in their report, which appears herein.

Changes in Internal Control Over Financial Reporting

On May 30, 2019, we announced the completion of our review of strategic alternatives, following which our board of directors implemented a series of measures designed to extend our cash runway for several years and preserve our ability to capture the potential milestone payments resulting from the Ipsen sale. In connection with the implementation of these measures, we commenced efforts to terminate our executive management team and all other employees, which was fully completed by July 12, 2019. We do not have any employees. We have engaged external consultants to run our day-to-day operations. We have also entered into consulting agreements with certain former members of our executive management team to assist with this transition.

In connection with the transition of the management of the day-to-day operations of the company to external consultants, we migrated our enterprise resource planning system to a less complex accounting system. Due to the termination of all employees, we have also significantly modified our internal control procedures over financial reporting to reflect the reduction in transaction volume and reliance on external consultants to manage the day-to-day operations of the company. In connection with these significant changes to the business and the control environment, we have updated our risk assessment of internal controls over financial reporting. During the second half of December 31, 2019, we have taken steps to redesign and implement internal controls over the cash disbursements process, information technology general controls and the accounting closing and reporting processes. As of December 31, 2019, we believe the controls are effectively designed to provide reasonable assurance on the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with GAAP.

Other than the above, no change in our internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) occurred during the year ended December 31, 2019 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. Other Information

None.

PART III

Item 10. Directors, Executive Officers and Corporate Governance

The information required by this Item 10 will be included in our definitive proxy statement to be filed with the SEC with respect to our 2020 Annual Meeting of Stockholders and is incorporated herein by reference.

Item 11. Executive Compensation

The information required by this Item 11 will be included in our definitive proxy statement to be filed with the SEC with respect to our 2020 Annual Meeting of Stockholders and is incorporated herein by reference.

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

The information required by this Item 12 will be included in our definitive proxy statement to be filed with the SEC with respect to our 2020 Annual Meeting of Stockholders and is incorporated herein by reference.

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

The information required by this Item 13 will be included in our definitive proxy statement to be filed with the SEC with respect to our 2020 Annual Meeting of Stockholders and is incorporated herein by reference.

Item 14. Principal Accountant Fees and Services

The information required by this Item 14 will be included in our definitive proxy statement to be filed with the SEC with respect to our 2020 Annual Meeting of Stockholders and is incorporated herein by reference.

PART IV

Item 15. Exhibits and Financial Statement Schedules

(1) Financial Statements

Our consolidated financial statements are set forth on pages F-1 through F-23 of this Annual Report on Form 10-K and are incorporated herein by reference.

(2) Financial Statement Schedules

Schedules have been omitted since they are either not required or not applicable or the information is otherwise included herein.

(3) Exhibits

Exhibit Number	Description of Exhibit
1.1	Sales Agreement, dated as of December 15, 2017, by and between the Registrant and Cowen and Company, LLC (incorporated by reference to Exhibit 1.2 to the Registrant's Registration Statement on Form S-3 filed on December 15, 2017)
2.1	Asset Purchase and Sale Agreement, dated as of January 7, 2017, by and between the Registrant and Ipsen S.A. (incorporated by reference to Exhibit 2.1 to the Registrant's Current Report on Form 8-K filed on January 9, 2017)
3.1	Restated Certificate of Incorporation of the Registrant, as amended (incorporated by reference to Exhibit 3.1 to the Registrant's Quarterly Report on Form 10-Q filed on August 7, 2018)
3.2	Amended and Restated Bylaws of the Registrant (incorporated by reference to Exhibit 3.5 to the Registrant's Registration Statement on Form S-1, as amended, filed on January 13, 2012)
3.3	Certificate of Designation of Series Z Junior Preferred Stock of the Registrant, as filed with the Secretary of State of the State of Delaware on December 3, 2019 (incorporated by reference to Exhibit 3.1 to the Registrant's Current Report on Form 8-K filed on December 3, 2019)
4.1	Specimen certificate evidencing shares of common stock (incorporated by reference to Exhibit 4.1 to the Registrant's Annual Report on Form 10-K filed on March 12, 2018)
4.2	Indenture, dated as of July 17, 2013, by and between the Registrant and Wells Fargo Bank, National Association, as trustee (incorporated by reference to Exhibit 4.1 to the Registrant's Current Report on Form 8-K filed on July 18, 2013)
4.3	First Supplemental Indenture, dated as of July 17, 2013, by and between the Registrant and Wells Fargo Bank, National Association, as trustee (incorporated by reference to Exhibit 4.2 to the Registrant's Current Report on Form 8-K filed on July 18, 2013)
4.4	Section 382 Rights Agreement, dated as of December 3, 2019, between the Registrant and Computershare Trust Company, N.A., as Rights Agent (incorporated by reference to Exhibit 3.1 to the Registrant's Current Report on Form 8-K filed on December 3, 2019)
4.5*	Description of the Registrant's Securities Registered under Section 12 of the Exchange Act
10.1#	2008 Stock Incentive Plan (incorporated by reference to Exhibit 10.2 to the Registrant's Registration Statement on Form S-1, as amended, filed on July 8, 2011)
10.2#	2011 Stock Incentive Plan (incorporated by reference to Exhibit 10.3 to the Registrant's Registration Statement on Form S-1, as amended, filed on January 13, 2012)
10.3#	Form of Incentive Stock Option Agreement under 2011 Stock Incentive Plan (incorporated by reference to Exhibit 10.4 to the Registrant's Registration Statement on Form S-1, as amended, filed on January 13, 2012)
10.4#	Form of Non-Qualified Stock Option Agreement under 2011 Stock Incentive Plan (incorporated by reference to Exhibit 10.5 to the Registrant's Registration Statement on Form S-1, as amended, filed on January 13, 2012)
10.11#	Scientific Advisory Board Consulting and Confidentiality Agreement, dated as of February 6, 2018, by and between the Registrant and George D. Demetri (incorporated by reference to Exhibit 10.11 to the Registrant's Annual Report on Form 10-K filed on March 12, 2018)
10.12#	Form of Indemnification Agreement between the Registrant and each director and executive officer (incorporated by reference to Exhibit 10.12 to the Registrant's Registration Statement on Form S-1, as amended, filed on August 19, 2011)

Exhibit Number	Description of Exhibit
10.22†	Exclusive License Agreement, dated as of November 1, 2000, by and between the Registrant (as successor-in-interest to Hermes BioSciences, Inc.) and The Regents of the University of California, as amended on October 6, 2003, September 13, 2006, June 6, 2007 and September 28, 2007 (incorporated by reference to Exhibit 10.20 to the Registrant's Registration Statement on Form S-1, as amended, filed on October 26, 2011)
10.23†	Collaboration Agreement, dated as of November 16, 2009, by and between the Registrant and Adimab LLC, as amended on April 27, 2010, June 2, 2010 and October 11, 2011 (incorporated by reference to Exhibit 10.22 to the Registrant's Registration Statement on Form S-1, as amended, filed on October 26, 2011)
10.24†	Sublicense Agreement, dated as of June 30, 2008, by and between the Registrant and Dyax Corp. (incorporated by reference to Exhibit 10.23 to the Registrant's Registration Statement on Form S-1, as amended, filed on July 8, 2011)
10.25†	Amended and Restated Collaboration Agreement, dated as of January 24, 2007, by and between the Registrant and Dyax Corp., as amended on July 31, 2008 and November 6, 2009 (incorporated by reference to Exhibit 10.24 to the Registrant's Registration Statement on Form S-1, as amended, filed on October 26, 2011)
10.26	Amendment to Amended and Restated Collaboration Agreement, dated as of January 18, 2012, by and between the Registrant and Dyax Corp. (incorporated by reference to Exhibit 10.26 to the Registrant's Annual Report on Form 10-K filed on March 20, 2013)
10.29	Stipulation and Agreement of Settlement and Release, dated as of October 6, 2017, by and among the Registrant, Wells Fargo Bank, National Association, Wolverine Flagship Fund Trading Limited, 1992 MSF International Ltd (formerly known as Highbridge International LLC) and 1992 Tactical Credit Master Fund, L.P. (formerly known as Highbridge Tactical Credit & Convertibles Master Fund, L.P.) (incorporated by reference to Exhibit 10.1 to the Registrant's Current Report on Form 8-K filed on October 10, 2017)
10.30	Stock Purchase Agreement, dated as of May 7, 2019, by and among the Registrant, HNKK Holdings Limited and Silver Creek Pharmaceuticals, Inc. (incorporated by reference to Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q filed on July 17, 2019)
10.31†	Asset Purchase Agreement, dated as of May 28, 2019, by and between the Registrant and 14ner Oncology, Inc. (incorporated by reference to Exhibit 2.1 to the Registrant's Current Report on Form 8-K filed on May 30, 2019)
10.32	Amendment No. 1 to Asset Purchase Agreement, dated as of June 24, 2019, by and between the Registrant and 14ner Oncology, Inc. (incorporated by reference to Exhibit 2.1 to the Registrant's Current Report on Form 8-K filed on June 24, 2019)
10.33	Amendment No. 2 to Asset Purchase Agreement, dated as of June 28, 2019, by and between the Registrant and 14ner Oncology, Inc. (incorporated by reference to Exhibit 2.1 to the Registrant's Current Report on Form 8-K filed on July 1, 2019)
10.34#	Separation and Release of Claims Agreement, dated as of April 12, 2019, by and between the Registrant and Sergio L. Santillana (incorporated by reference to Exhibit 10.5 to the Registrant's Quarterly Report on Form 10-Q filed on July 17, 2019)
10.35#	Transition, Separation and Release of Claims Agreement, dated as of June 25, 2019, by and between the Registrant and Daryl C. Drummond (incorporated by reference to Exhibit 10.6 to the Registrant's Quarterly Report on Form 10-Q filed on July 17, 2019)
10.36#	Transition, Separation and Release of Claims Agreement, dated as of June 25, 2019, by and between the Registrant and Jean M. Franchi (incorporated by reference to Exhibit 10.7 to the Registrant's Quarterly Report on Form 10-Q filed on July 17, 2019)
10.37#	Transition, Separation and Release of Claims Agreement, dated as of June 25, 2019, by and between the Registrant and Jeffrey A. Munsie (incorporated by reference to Exhibit 10.8 to the Registrant's Quarterly Report on Form 10-Q filed on July 17, 2019)
10.38#	Transition, Separation and Release of Claims Agreement, dated as of June 25, 2019, by and between the Registrant and Richard Peters (incorporated by reference to Exhibit 10.9 to the Registrant's Quarterly Report on Form 10-Q filed on July 17, 2019)
10.39	Cooperation Agreement, dated as of September 18, 2019, by and among the Registrant, Newtyn Management, LLC, Newtyn Partners, LP, Newtyn TE Partners, LP, Noah G. Levy, Newtyn Capital Partners, LP, Ledo Capital, LLC, Western Standard, LLC, Western Standard Partners, LP, Western Standard Partners QP, LP and Eric D. Andersen (incorporated by reference to Exhibit 10.1 to the Registrant's Current Report on Form 8-K filed on September 20, 2019)

Exhibit Number	Description of Exhibit
21.1*	Subsidiaries of the Registrant
23.1*	Consent of PricewaterhouseCoopers LLP, an independent registered public accounting firm
23.2*	Consent of Marcum LLP, an independent registered public accounting firm
31.1*	Certification of Principal Executive Officer pursuant to Rule 13a-14(a) or Rule 15d-14(a) of the Securities Exchange Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002
31.2*	Certification of Principal Financial Officer pursuant to Rule 13a-14(a) or Rule 15d-14(a) of the Securities Exchange Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002
32.1+	Certification of Principal Executive Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
32.2+	Certification of 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 Database
101.PRE*	XBRL Taxonomy Extension Presentation Linkbase Document

* Filed herewith.

\+ Furnished herewith.

\# Management contract or compensatory plan, contract or agreement.

† Confidential treatment granted as to portions of the exhibit. Confidential materials omitted and filed separately with the Securities and Exchange Commission.

Item 16. Form 10-K Summary

Not applicable.

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.

MERRIMACK PHARMACEUTICALS, INC.

Date: March 12, 2020

By: /s/ Gary L. Crocker
Gary L. Crocker
President

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

Signature	Title	Date
/s/ Gary L. Crocker Gary L. Crocker	President and Chairman of the Board (Principal Executive, Financial and Accounting Officer)	March 12, 2020
/s/ Eric D. Andersen Eric D. Andersen	Director	March 12, 2020
/s/ Noah G. Levy Noah G. Levy	Director	March 12, 2020
/s/ Ulrik B. Nielsen, Ph.D. Ulrik B. Nielsen, Ph.D.	Director	March 12, 2020
/s/ Russell T. Ray Russell T. Ray	Director	March 12, 2020

MERRIMACK PHARMACEUTICALS, INC.
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Report of Independent Registered Public Accounting Firm

To the Board of Directors and Stockholders of Merrimack Pharmaceuticals, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheet of Merrimack Pharmaceuticals, Inc. (the “Company”) as of December 31, 2019, the related consolidated statements of operations and comprehensive loss, stockholders’ equity and cash flows for the year ended December 31, 2019, and the related notes (collectively referred to as the “financial statements”). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2019, and the results of its operations and its cash flows for the year ended December 31, 2019, in conformity with accounting principles generally accepted in the United States of America.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) ("PCAOB"), the Company's internal control over financial reporting as of December 31, 2019, based on the criteria established in Internal Control - Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) in 2013 and our report dated March 12, 2020, expressed an unqualified opinion on the effectiveness of the Company’s internal control over financial reporting.

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 audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audit 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 audit 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 audit provides a reasonable basis for our opinion.

/s/ Marcum LLP

Marcum LLP

We have served as the Company’s auditor since 2019.

Boston, Massachusetts
March 12, 2020

Opinion on Internal Control over Financial Reporting

We have audited Merrimack Pharmaceuticals, Inc.'s (the "Company") internal control over financial reporting as of December 31, 2019, based on criteria established in *Internal Control-Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission. In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2019, based on criteria established in *Internal Control – Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) ("PCAOB"), the consolidated balance sheets as of December 31, 2019 and the related consolidated statements of operations and comprehensive loss, stockholders' equity and cash flows and the related notes for the year ended December 31, 2019 of the Company, and our report dated March 12, 2020 expressed an unqualified opinion on those financial statements.

Basis for Opinion

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

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

Definition and Limitations of Internal Control over Financial Reporting

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

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

Marcum LLP

Boston, Massachusetts
March 12, 2020
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Report of Independent Registered Public Accounting Firm

To the Board of Directors and Stockholders of Merrimack Pharmaceuticals, Inc.

Opinion on the Financial Statements

We have audited the consolidated balance sheet of Merrimack Pharmaceuticals, Inc. and its subsidiaries (the "Company") as of December 31, 2018, and the related consolidated statement of operations and comprehensive loss, of stockholders' equity and of cash flows for the year ended December 31, 2018, including the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2018, and the results of its operations and its cash flows for the year ended December 31, 2018 in conformity with accounting principles generally accepted in the United States of America.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's consolidated financial statements based on our audit. 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 audit of these consolidated financial statements 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 consolidated financial statements are free of material misstatement, whether due to error or fraud.

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

Emphasis of Matter

As discussed in Note 1 to the consolidated financial statements, the Company will require additional financing to fund future operations. Management's evaluation of the events and conditions and management's plans to mitigate this matter are also described in Note 1.

/s/PricewaterhouseCoopers LLP
Boston, Massachusetts
March 6, 2019

We served as the Company's auditor from 2002 to 2019.

Merrimack Pharmaceuticals, Inc.

Consolidated Balance Sheets

(in thousands, except per share amounts)	December 31, 2019	December 31, 2018
Assets		
Current assets:		
Cash and cash equivalents	$ 16,580	$ 20,079
Marketable securities	—	51,199
Restricted cash	—	584
Prepaid expenses and other current assets	2,112	4,240
Total current assets	18,692	76,102
Property and equipment, net	—	2,269
Equity method investment	—	7,428
Other assets	1,390	2,744
Total assets	$ 20,082	$ 88,543
Liabilities and stockholders' equity		
Current liabilities:		
Accounts payable, accrued expenses and other	$ 2,714	$ 13,677
Deferred rent	—	1,118
Other current liability	56	—
Total current liabilities	2,770	14,795
Note payable, net of discount	—	14,873
Other long-term liabilities	—	56
Total liabilities	2,770	29,724
Commitments and contingencies (Note 14)		
Stockholders' equity:		
Preferred stock, $0.01 par value: 10,000 shares authorized at December 31, 2019 and 2018; no shares issued or outstanding at December 31, 2019 or 2018	—	—
Common stock, $0.01 par value: 30,000 shares authorized at December 31, 2019 and 2018; 13,380 and 13,343 shares issued and outstanding at December 31, 2019 and 2018, respectively	1,334	1,334
Additional paid-in capital	556,587	580,771
Accumulated other comprehensive loss	—	(9)
Accumulated deficit	(540,609)	(523,277)
Total stockholders' equity	17,312	58,819
Total liabilities and stockholders' equity	$ 20,082	$ 88,543

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

Merrimack Pharmaceuticals, Inc.

Consolidated Statements of Operations and Comprehensive Loss

(in thousands, except per share amounts)	Years Ended December 31, 2019	2018
Operating expenses:		
Research and development expenses	$ 11,100	$ 49,974
General and administrative expenses	16,169	15,601
Gain on sale of assets	(4,910)	—
Total operating expenses	22,359	65,575
Loss from continuing operations	(22,359)	(65,575)
Other income and expenses:		
Interest income	777	1,299
Interest expense	(1,528)	(956)
Other income (expense), net	370	(3,230)
Total other income and expenses	(381)	(2,887)
Net loss from continuing operations before income tax benefit	(22,740)	(68,462)
Income tax benefit	1,473	7,695
Net loss from continuing operations	(21,267)	(60,767)
Discontinued operations:		
Income from discontinued operations, net of tax	3,935	20,261
Net loss	(17,332)	(40,506)
Other comprehensive loss:		
Unrealized gain (loss) on marketable securities	9	(9)
Other comprehensive loss	9	(9)
Comprehensive loss	$ (17,323)	$ (40,515)
Basic and dilutive net loss per common share		
Net loss from continuing operations	$ (1.59)	$ (4.55)
Net income from discontinued operations, net of tax	0.29	1.52
Net loss per share	$ (1.30)	$ (3.03)
Weighted-average common shares used in per share calculations—basic and diluted	13,353	13,343
Cash dividends paid per common share	$ 2.00	$ —

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

Merrimack Pharmaceuticals, Inc.

Consolidated Statements of Stockholders' Equity

(in thousands)	Common Stock Shares	Common Stock Amount	Additional Paid-In Capital	Accumulated Other Comprehensive Loss	Accumulated Deficit	Total Stockholders' Equity
Balance at December 31, 2017	13,343	$ 1,334	$ 577,721	$ —	$ (482,771)	$ 96,284
Stock-based compensation	—	—	3,050	—	—	3,050
Unrealized loss on marketable securities	—	—	—	(9)	—	(9)
Net loss	—	—	—	—	(40,506)	(40,506)
Balance at December 31, 2018	13,343	$ 1,334	$ 580,771	$ (9)	$ (523,277)	$ 58,819
Stock-based compensation	—	—	2,371	—	—	2,371
Unrealized gain on marketable securities	—	—	—	9	—	9
Exercise of stock options	37	—	145	—	—	145
Dividends paid	—	—	(26,700)	—	—	(26,700)
Net loss	—	—	—	—	(17,332)	(17,332)
Balance at December 31, 2019	13,380	$ 1,334	$ 556,587	$ —	$ (540,609)	$ 17,312

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

Merrimack Pharmaceuticals, Inc.

Consolidated Statements of Cash Flows

(in thousands)	Years Ended December 31, 2019	2018
Cash flows from operating activities		
Net loss	$ (17,332)	$ (40,506)
Less:		
Income from discontinued operations	3,935	20,261
Loss from continuing operations	(21,267)	(60,767)
Adjustments to reconcile net loss to net cash used in operating activities		
Non-cash interest expense	141	240
Purchased premiums and interest on marketable securities	—	(2)
Amortization and accretion on marketable securities	(292)	(651)
Loss on extinguishment of debt	971	—
Non-cash activity related to discontinued operations	—	(171)
Benefit from intra-period tax allocation	(1,500)	(7,695)
Loss on disposal of property and equipment	—	167
Gain on sale of property and equipment	(1,984)	—
Gain on sale of in progress research and development asset	(3,500)	—
Depreciation and amortization expense	2,228	4,074
Stock-based compensation expense	2,371	3,050
(Gain) loss on equity method investment	(372)	3,123
Changes in operating assets and liabilities:		
Accounts receivable	—	100
Prepaid expenses and other assets	3,917	(993)
Accounts payable, accrued expenses and other	(12,081)	(3,801)
Deferred rent	—	(2,262)
Net cash used in operating activities	(31,368)	(65,588)
Cash flows from investing activities		
Purchase of marketable securities	—	(103,055)
Proceeds from sales and maturities of marketable securities	51,500	52,500
Purchase of property and equipment	—	(118)
Proceeds from sale of in progress research and development asset	3,500	—
Proceeds from sale of equity method investment	7,800	—
Proceeds from sale of property and equipment	2,025	75
Proceeds from sale of a discontinued operation	5,000	28,000
Net cash provided by (used in) investing activities	69,825	(22,598)
Cash flows from financing activities		
Proceeds from exercise of options	145	—
Proceeds from issuance of note payable, net of issuance costs	—	14,632
Repayment of debt	(15,000)	—
Payment of debt extinguishment costs	(985)	—
Payment of dividends	(26,700)	—
Net cash (used in) provided by financing activities	(42,540)	14,632
Net decrease in cash, cash equivalents and restricted cash	(4,083)	(73,554)
Cash, cash equivalents and restricted cash, beginning of period	20,663	94,217
Cash, cash equivalents and restricted cash, end of period	$ 16,580	$ 20,663
Supplemental disclosure of cash flows		
Cash paid for income taxes	$ —	$ 390
Cash paid for interest	$ 1,400	$ 586

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

1. Nature of the Business and Summary of Significant Accounting Policies

Nature of the Business

Merrimack Pharmaceuticals, Inc. (the "Company") is a biopharmaceutical company based in Cambridge, Massachusetts that is entitled to receive up to $450.0 million in contingent milestone payments related to its sale of ONIVYDE® and MM-436 (the "Commercial Business") to Ipsen S.A. ("Ipsen") in April 2017 (the "Ipsen Sale"). The Company does not have any ongoing research or development activities and is seeking potential acquirers for its remaining preclinical and clinical assets. The Company does not have any employees and instead uses external consultants for the operation of the Company.

The $450.0 million in potential milestone payments resulting from the Ipsen Sale consist of:

- $225.0 million upon approval by the U.S. Food and Drug Administration ("FDA") of ONIVYDE for the first-line treatment of metastatic adenocarcinoma of the pancreas, subject to certain conditions;
- $150.0 million upon approval by the FDA of ONIVYDE for the treatment of small-cell lung cancer after failure of first-line chemotherapy; and
- $75.0 million upon approval by the FDA of ONIVYDE for an additional indication unrelated to those described above.

On May 30, 2019, the Company announced the completion of its review of strategic alternatives, following which the Company's board of directors (the "Board") implemented a series of measures designed to extend the Company's cash runway and preserve its ability to capture the potential milestone payments resulting from the Ipsen Sale. In connection with that announcement, the Company discontinued the discovery efforts on its remaining preclinical programs: MM-401, an agonistic antibody targeting a novel immuno-oncology target, TNFR2; and MM-201, a highly stabilized agonist-Fc fusion protein targeting death receptors 4 and 5. The Company is seeking potential acquirers for its remaining preclinical and clinical assets.

The Company's termination of its executive management team and all other employees was substantially completed by June 28, 2019 and fully completed by July 12, 2019. As of July 12, 2019, the Company does not have any employees. The Company has engaged external consultants to run the day-to-day operations of the Company. The Company has also entered into consulting agreements with certain former members of its executive management team who are supporting the Company's relationship with current partners, assisting with the potential sale of remaining preclinical and clinical assets, and assisting with certain legal and regulatory matters and the continued wind-down of operations.

On April 15, 2019, the Company repaid in full all principal, accrued and unpaid interest, fees, costs and expenses under its Loan and Security Agreement (the "Loan Agreement") with Hercules Capital, Inc. ("Hercules") in an aggregate amount equal to $16.0 million.

In May 2019, the Company monetized certain assets to strengthen its cash position. This includes the sale of its entire equity position in Silver Creek Pharmaceuticals, Inc. ("Silver Creek"), resulting in $7.8 million in cash, and the sale of laboratory equipment from its research and development operations, resulting in approximately $1.4 million in cash.

On July 12, 2019, the Company completed the sale to Elevation Oncology, Inc. (formerly known as 14ner Oncology, Inc.) ("Elevation") of its anti-HER3 antibody programs, MM-121 (seribantumab) and MM-111 (the "Elevation Sale"). In connection with the Elevation Sale, the Company received an upfront cash payment of $3.5 million. The Company is also eligible to receive up to $54.5 million in additional potential development, regulatory approval and commercial-based milestone payments, consisting of:

- $3.0 million for achievement of the primary endpoint in the first registrational clinical study of either MM-121 or MM-111;
- Up to $16.5 million in total payments for the achievement of various regulatory approval and reimbursement-based milestones in the United States, Europe and Japan; and
- Up to $35.0 million in total payments for achieving various cumulative worldwide net sales targets between $100.0 million and $300.0 million for MM-121 and MM-111.

On July 25, 2019, the Board authorized and declared a special cash dividend of $20.0 million to holders of the Company's common stock, which was payable on September 5, 2019 to stockholders of record as of the close of business on August 28, 2019.

On November 29, 2019, the Company received the remaining $5.0 million milestone payment that became payable for the ex-U.S. development and commercialization of ONIVYDE pursuant to a license and collaboration agreement (the “Servier Agreement”) between Ipsen and Les Laboratoires Servier SAS (“Servier”) (as assignee from Shire plc). The Company entered into the Servier Agreement in 2014, and on April 3, 2017, the Servier Agreement was assigned to Ipsen in connection with the completion of the Ipsen Sale.

On December 3, 2019, the Board authorized and declared a special cash dividend of $6.7 million to holders of the Company's common stock, which was payable on December 23, 2019 to stockholders of record as of the close of business on December 16, 2019.

The Company is subject to risks and uncertainties common to companies in the biopharmaceutical industry, including, among other things, its ability to secure additional capital to fund operations, development by competitors of new technological innovations, protection of proprietary technology and compliance with government regulations. None of the Company’s product candidates are approved for any indication by the FDA or any other regulatory agency. The Company operates in an environment of rapid change in technology and substantial competition from pharmaceutical and biotechnology companies, among others. In addition, the Company is dependent upon the services of its external consultants for the operation of the Company. The Company’s business strategy depends substantially upon its ability to receive future milestone payments from Ipsen. Any failure to achieve such milestones or a perception that the milestones may not be achieved will materially and adversely affect the Company and the value of its common stock.

The Company has evaluated whether there are conditions and events, considered in the aggregate, that raise substantial doubt about the Company’s ability to continue as a going concern within one year after the date that the consolidated financial statements are issued. As of December 31, 2019, the Company had an accumulated deficit of $540.6 million. During the year ended December 31, 2019, the Company incurred a net loss from continuing operations of $21.3 million and used $31.4 million of cash in continuing operations for operating activities. The Company expects to continue to generate operating losses in the foreseeable future. Based on current projections, the Company expects that its cash and cash equivalents of $16.6 million at December 31, 2019 will allow the Company to continue its operations into 2027, when the Company estimates the longest-term potential Ipsen milestone may be achieved. The continued viability of the Company beyond that point is dependent on its ability to raise additional capital to finance its operations or to reduce operating expenses. There can be no assurance that the Company will be able to obtain sufficient capital to cover its costs on acceptable terms, if at all.

The Company expects that it would finance any future cash needs through a combination of divestitures of its product candidates or other assets, equity offerings and debt financings. There can be no assurance as to the timing, terms or consummation of any divestiture or financing, and the terms of any such financing may adversely affect the holdings or the rights of the Company’s stockholders or require the Company to relinquish rights to certain of its revenue streams or product candidates.

Summary of Significant Accounting Policies

Segment Information

Operating segments are defined as components of an enterprise engaging in business activities for which discrete financial information is available and regularly reviewed by the chief operating decision maker in deciding how to allocate resources and in assessing performance. The Company views its operations and manages its business as one operating segment and the Company operates in only one geographic region (the United States).

Basis of Presentation and Consolidation

The accompanying consolidated financial statements have been prepared under U.S. generally accepted accounting principles (“GAAP”) and include the accounts of the Company and its wholly owned subsidiaries, all intercompany accounts and transactions have been eliminated.

Consolidated Statements of Cash Flows

The following table provides a reconciliation of cash, cash equivalents and restricted cash reported within the statement of financial position that sum to the total of the same such amounts shown in the statement of cash flows:

(in thousands)	December 31, 2019	December 31, 2018
Cash and cash equivalents	$ 16,580	$ 20,079
Restricted cash (short-term)	—	584
Total cash, cash equivalents and restricted cash shown in the consolidated statement of cash flows	$ 16,580	$ 20,663

Restricted cash on the statement of financial position for 2018 primarily represents amounts pledged as collateral for operating lease obligations as contractually required.

Use of Estimates

GAAP requires the Company's management to make estimates and judgments that may affect the reported amounts of assets, liabilities, revenues, expenses and related disclosures. The Company bases estimates and judgments on historical experience and on various other factors that it believes to be reasonable under the circumstances. The most significant estimates in these consolidated financial statements include, but may not be limited to, accounting for stock-based compensation and the accrual of remaining clinical trial expenses and professional service expenses. The Company's actual results may differ from these estimates under different assumptions or conditions. The Company evaluates its estimates on an ongoing basis. Changes in estimates are reflected in reported results in the period in which they become known by the Company's management.

Cash, Cash Equivalents and Restricted Cash

Cash and cash equivalents are short-term, highly liquid investments with original maturities of three months or less at the date of purchase. Investments qualifying as cash equivalents primarily consist of money market funds, commercial paper, corporate notes and bonds and certificates of deposit.

Cash accounts with any type of restriction are classified as restricted cash. If restrictions are expected to be lifted in the next twelve months, the restricted cash account is classified as current. As of December 31, 2018, the Company's restricted cash of $0.6 million represents amounts pledged as collateral for operating lease obligations as contractually required. As of December 31, 2019, the Company had no restriction on any of its cash and cash equivalents.

Marketable Securities

Marketable debt securities consist of investments with original maturities greater than 90 days at their acquisition date. The Company classifies all of its marketable debt securities as available-for-sale securities. The Company's marketable debt securities are measured and reported at fair value using quoted prices in active markets for similar securities. Unrealized gains and losses on available-for-sale securities are reported as accumulated other comprehensive loss, which is a separate component of stockholders' equity. The cost of securities sold is determined on a specific identification basis, and realized gains and losses are included in other income and expenses, net in the consolidated statements of operations and comprehensive loss.

The Company evaluates its marketable debt securities with unrealized losses for other-than-temporary impairment. When assessing marketable debt securities for other-than-temporary declines in value, the Company considers such factors as, among other things, how significant the decline in value is as a percentage of the original cost, how long the market value of the investment has been less than its original cost, the Company's ability and intent to retain the investment for a period of time sufficient to allow for any anticipated recovery in fair value and market conditions in general. If any adjustment to fair value reflects a decline in the value of the investment that the Company considers to be "other than temporary," the Company reduces the investment to fair value through a charge to the statement of operations and comprehensive loss. No such adjustments were necessary during the periods presented.

Fair Value of Financial Instruments

Fair value is an exit price, representing the amount that would be received from the sale of an asset or paid to transfer a liability in an orderly transaction between market participants. Fair value is determined based on observable and unobservable inputs. Observable inputs reflect readily obtainable data from independent sources, while unobservable inputs reflect certain market assumptions. As a basis for considering such assumptions, GAAP establishes a three-tier value hierarchy, which prioritizes the inputs used to develop the assumptions and for measuring fair value as follows: (Level 1) observable inputs such as quoted prices in active markets for identical assets; (Level 2) inputs other than the quoted prices in active markets that are observable either directly or indirectly; and (Level 3) unobservable inputs in which there is little or no market data, which requires the Company to develop its own assumptions. This hierarchy requires the Company to use observable market data, when available, and to minimize the use of unobservable inputs when determining fair value.

Property and Equipment

Property and equipment, including leasehold improvements, are recorded at cost and depreciated when placed into service using the straight-line method, based on their estimated useful lives as follows:

Asset Classification	Estimated Useful Life (in years)
Lab equipment	3 - 7
IT equipment	3 - 7
Leaseholds improvements	Lesser of useful life or lease term
Furniture and fixtures	3 - 7

Costs for capital assets not yet placed into service have been capitalized as construction-in-progress and will be depreciated in accordance with the above guidelines once placed into service. Costs for repairs and maintenance are expensed as incurred, while major betterments are capitalized. The Company capitalizes interest cost incurred on funds used to construct property and equipment. The capitalized interest is recorded as part of the asset to which it relates and is depreciated over the asset's estimated useful life. Upon retirement or sale, the cost of assets disposed of and the related accumulated depreciation are removed from the accounts and any resulting gain or loss is reflected in earnings.

Accrued Expenses

As part of the process of preparing financial statements, the Company is required to estimate accrued expenses. This process involves identifying services that have been performed on the Company's behalf and estimating the level of services performed and the associated costs incurred for such services where the Company has not yet been invoiced or otherwise notified of actual cost. The Company records these estimates in its consolidated financial statements as of each balance sheet date. Examples of estimated accrued expenses include:

- fees due to contract research organizations in connection with preclinical and toxicology studies and clinical trials;
- fees paid to investigative sites in connection with clinical trials; and
- professional service fees.

In accruing service fees, the Company estimates the time period over which services will be provided and the level of effort in each period. If the actual timing of the provision of services or the level of effort varies from the estimate, the Company adjusts the accrual accordingly. In the event that the Company does not identify costs that have been incurred or it under or overestimates the level of services performed or the costs of such services, its actual expenses could differ from such estimates. The date on which some services commence, the level of services performed on or before a given date and the cost of such services are often subjective determinations. The Company prepares its estimates based on the facts and circumstances known to it at the time and in accordance with GAAP. There have been no material changes in estimates for the periods presented.

Research and Development Expenses

Research and development expenses are charged to expense as incurred. Research and development expenses are comprised of costs incurred in performing research and development activities, including personnel-related costs, stock-based compensation, facilities, research-related overhead, clinical trial costs, contracted services, research-related manufacturing, license fees and other external costs. The Company accounts for nonrefundable advance payments for goods and services that will be used in future research and development activities as expenses when the services have been performed or when the goods have been received rather than when the payment is made. During the year ended December 31, 2019, the Company ceased its research and development activities.

General and Administrative Expenses

General and administrative expenses are comprised of salaries and other related costs for personnel, including stock-based compensation expenses and benefits, in the Company's commercial, legal, intellectual property, business development, finance, information technology, corporate communications, investor relations and human resources departments. Other general and administrative expenses include costs for employee training and development, board of directors costs, depreciation, insurance expenses, facility-related costs not otherwise included in research and development expenses, professional fees for legal services, including patent-related expenses, and accounting and information technology services.

Stock-Based Compensation Expense

The Company accounts for all stock-based payments to employees and non-employees, including grants of employee stock options, to be recognized in the consolidated statements of operations and comprehensive loss based on their grant date fair values. For stock options granted to employees, non-employees and to members of the Board for their service on the Board, the Company estimates the grant date fair value of each option award using the Black-Scholes option pricing model. The use of the Black-Scholes option pricing model requires the Company to make assumptions with respect to the expected term of the option, the expected volatility of the Company's common stock consistent with the expected term of the option, the risk-free interest rate consistent with the expected term of the option and the expected dividend yield of the Company's common stock. Stock-based compensation expense related to employee stock options is measured using the fair value of the award at the grant date and is adjusted quarterly to reflect actual forfeitures. Stock-based compensation expense is then recognized on a straight-line basis over the vesting period, which is also the requisite service period.

Net Loss Per Common Share

Basic net loss per share is calculated by dividing the net loss attributable to Merrimack Pharmaceuticals, Inc. by the weighted-average number of common shares outstanding during the period.

Diluted net loss per share is computed by dividing the net loss attributable to Merrimack Pharmaceuticals, Inc. by the weighted-average number of dilutive common shares outstanding during the period. Dilutive shares outstanding is calculated by adding to the weighted shares outstanding any potential (unissued) shares of common stock from outstanding stock options based on the treasury stock method. In a period when a net loss is reported, all common stock equivalents are excluded from the calculation because they would have an anti-dilutive effect, meaning the loss per share would be reduced. Therefore, in periods where a loss is reported, there is no difference in basic and dilutive loss per share.

The Company follows the two-class method when computing net loss per share, when it has issued shares that meet the definition of participating securities. The two-class method determines net loss per share for each class of common and participating securities according to dividends declared or accumulated and participating rights in undistributed earnings. The two-class method requires income available to common stockholders for the period to be allocated between common and participating securities based on their respective rights to receive dividends, as if all income for the period has been distributed, or losses to be allocated if they are contractually required to fund losses. There were no amounts allocated to participating securities for the years ended December 31, 2019 and 2018, as the Company was in a loss position and had no shares that met the definition of participating securities outstanding as of December 31, 2019 and 2018.

Comprehensive Loss

Comprehensive loss consists of net loss and unrealized gains (losses) on available-for-sale marketable debt securities.

Other Income (Expense), Net

The Company records other income or expense related to the Company's proportionate share of losses from its equity investment in Silver Creek, and other income or expense-related items as components of "Other income (expense), net" within the consolidated statements of operations and comprehensive loss.

The Company recognized income of $0.4 million and expenses of $3.2 million in other (expense) income, respectively. The income of $0.4 million for the year ended December 31, 2019 represents the $1.4 million gain the Company recorded on the sale of its equity method investment in Silver Creek offset by its proportionate share of Silver Creek's losses which the Company recorded prior to the sale of its investment. The $3.2 million expense for the year ended December 31, 2018 was primarily related to the Company's proportionate share of losses from its equity investment in Silver Creek.

Income Taxes

The Company accounts for income taxes under the asset and liability method. Under this method, deferred tax assets and liabilities are recognized for the estimated future tax consequences attributable to differences between financial statement carrying amounts of existing assets and liabilities and their respective tax bases. Deferred tax assets and liabilities are measured using enacted rates in effect for the year in which these temporary differences are expected to be recovered or settled. Valuation allowances are provided if based on the weight of available evidence, it is more likely than not that some or all of the deferred tax assets will not be realized.

The Company provides reserves for potential payments of tax to various tax authorities related to uncertain tax positions and other issues. Reserves are based on a determination of whether and how much of a tax benefit taken by the Company in its tax filing is more likely than not to be realized following resolution of any potential contingencies present related to the tax benefit. Potential interest and penalties associated with such uncertain tax positions are recorded as components of income tax expense. To date, the Company has not taken any uncertain tax positions or recorded any reserves, interest or penalties.

Concentration of Credit Risk

Financial instruments that subject the Company to credit risk consist primarily of cash, cash equivalents and marketable securities. The Company places its cash deposits in accredited financial institutions and, therefore, the Company's management believes these funds are subject to minimal credit risk. The Company invests cash equivalents in money market funds. The Company has no significant off-balance sheet concentrations of credit risk such as foreign currency exchange contracts, option contracts or other hedging arrangements.

Recently Adopted Accounting Pronouncements

In June 2018, the Financial Accounting Standards Board ("FASB") issued Accounting Standards Update ("ASU") No. 2018-07, *Compensation-Stock Compensation (Topic 718): Improvements to Nonemployee Share-Based Payment Accounting* ("ASU 2018-07"). ASU 2018-07 largely aligns the accounting for share-based payment awards issued to employees and nonemployees by expanding the scope of Topic 718 to apply to nonemployee share-based transactions, as long as the transaction is not effectively a form of financing. The new guidance was adopted on January 1, 2019 and it did not have a material impact on the Company's consolidated financial statements.

In February 2016, the FASB issued ASU No.2016-02, *Leases (Topic 842)* ("ASU 2016-02"), which supersedes all existing lease accounting guidance within Accounting Standards Codification ("ASC") 840, *Leases*. The new standard requires that lease assets and lease liabilities be recognized by lessees for those leases previously classified as operating leases under ASC 840, with limited exceptions. This update also creates a new definition of a lease and provides guidance as to whether a contract is or contains a lease. This guidance was effective for annual reporting periods beginning after December 15, 2018, including interim periods within those annual reporting periods. In July 2018, the FASB issued ASU No. 2018-10, *Codification Improvements to Topic 842, Leases* ("ASU 2018-10"). The amendments in ASU 2018-10 affect narrow aspects of the guidance issued in ASU 2016-02. The Company adopted the new leasing standards on January 1, 2019, using a modified retrospective transition approach to be applied to leases existing as of, or entered into after, January 1, 2019. The Company reviewed its existing lease contracts and the impact of the new leasing standards on its financial position, consolidated results of operations and disclosures. Upon adoption of the new leasing standards, the Company recognized a lease liability and related right-of-use asset on its consolidated balance sheet related to the lease of its former principal research and office space located at One Kendall Square in Cambridge, Massachusetts. The adoption of the new leasing standards did not have a significant impact on the Company's consolidated balance sheet, as the Company's primary lease (that is, its former research and office space located at One Kendall Square in Cambridge, Massachusetts) expired in June 2019. The adoption of the new leasing standard did not have a significant impact on the Company's consolidated statements of operations or cash flows.

Recently Issued Accounting Pronouncements

In June 2016, the FASB issued ASU No. 2016-13, *Financial Instruments – Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments*, which represents a new credit loss standard that will change the impairment model for most financial assets and certain other financial instruments. Specifically, this guidance will require entities to utilize a new "expected loss" model as it relates to trade and other receivables. In addition, entities will be required to recognize an allowance for estimated credit losses on available-for-sale debt securities, regardless of the length of time that a security has been in an unrealized loss position. This guidance will be effective for annual reporting periods beginning after December 15, 2019, including interim periods within those annual reporting periods, and early adoption is permitted. The new guidance was adopted on January 1, 2020 and it did not have a material impact on the Company's consolidated financial statements.

In August 2018, the FASB issued ASU No. 2018-13, *Disclosure Framework – Changes to the Disclosure Requirements for Fair Value Measurement* ("ASU 2018-13"). This standard eliminates, adds and modifies certain disclosure requirements for fair value measurements as part of its disclosure framework project. ASU 2018-13 is effective for annual reporting periods beginning after December 15, 2019 and interim periods within those annual periods and early adoption is permitted. The new guidance was adopted on January 1, 2020 and it did not have a material impact on the Company's consolidated financial statements.

From time to time, new accounting pronouncements are issued by the FASB or other standard setting bodies that the Company adopts as of the specified effective date. Unless otherwise discussed above, the Company does not believe that the adoption of recently issued standards has or may have a material impact on the Company's consolidated financial statements or disclosures.

2. Discontinued Operations - Sale of Commercial Business

Ipsen

On April 3, 2017, the Company completed the sale of the Commercial Business to Ipsen. The Commercial Business represented a discontinued operation since the disposal of the Commercial Business was a strategic shift that had a major effect on the Company's operations and financial results. The Company will not have further significant involvement in the operations of the discontinued Commercial Business. The operating results of the Commercial Business are reported as discontinued operations, net of tax in the consolidated statements of operations and comprehensive loss for all periods presented.

Discontinued Operations

The consolidated financial statements for the years ended December 31, 2019 and 2018 reflect the operations of the Commercial Business as a discontinued operation. Discontinued operations for the years ended December 31, 2019 and 2018 includes the following:

(in thousands)	Years Ended December 31,	
	2019	2018
Expenses:		
Research and development expenses	—	171
Total expenses	—	171
Other income and expenses:		
Gain on sale of Commercial Business	5,000	28,000
Income from discontinued operations	$ 5,000	$ 27,829
Income tax expense	(1,065)	(7,568)
Total income from discontinued operations	$ 3,935	$ 20,261

During the years ended December 31, 2019 and 2018, the Company received $5.0 million and $28.0 million of the potential $33.0 million in milestone payments related to the development and commercialization of ONIVYDE, respectively. The Company included the $5.0 million and $28.0 million in discontinued operations because the amounts directly relate to the Commercial Business, which was classified as a discontinued operation. The Company also recorded $0.2 million of research and development expense in discontinued operations in the year ended December 31, 2018, as this expense is directly associated with the $28.0 million in milestones. The Company received all of the net milestone payments that related to the development and commercialization of ONIVYDE under the Servier Agreement of $33.0 million as of December 31, 2019.

3. Investment in Silver Creek

As of December 31, 2018, the Company held an equity investment in Silver Creek, which was accounted for as an equity method investment. The carrying value of the investment in Silver Creek was $7.4 million at December 31, 2018. During the year ended December 31, 2018, the Company recorded a loss associated with Silver Creek of $3.1 million as a component of other (expense) income, net in the consolidated statements of operations and comprehensive loss, representing its proportionate share of Silver Creek's losses during the year ended December 31, 2018.

As of May 7, 2019, the carrying value of the Company's investment in Silver Creek was $6.4 million. During the year ended December 31, 2019, the Company recorded a loss associated with Silver Creek of $1.0 million as a component of other (expense) income, net in the consolidated statements of operations and comprehensive loss, representing its proportionate share of Silver Creek's losses during the period from January 1, 2019 to May 7, 2019. On May 7, 2019, the Company sold its entire equity position in Silver Creek for $7.8 million. Accordingly, a $1.4 million of gain on sale of its equity investment was recognized during the year ended December 31, 2019 within other (expense) income, net in the consolidated statement of operations and comprehensive loss.

4. Net Loss Per Common Share

The stock options are excluded from the calculation of diluted loss per share because the net loss for the years ended December 31, 2019 and 2018 causes such securities to be anti-dilutive. Securities excluded from the calculation of diluted loss per share are shown in the chart below:

(in thousands)	Years Ended December 31,	
	2019	2018
Outstanding options to purchase common stock	1,924	2,233

5. License and Collaboration Agreements

On April 3, 2017, the Servier Agreement was assigned to Ipsen in connection with the completion of the Ipsen Sale, as discussed in Note 1, "Nature of the Business and Summary of Significant Accounting Policies." The Company retained the rights to receive net milestone payments that may become payable pursuant to the Servier Agreement for the ex-U.S. development and commercialization of ONIVYDE for up to $33.0 million. For the years ended December 31, 2019 and 2018, the Company received $5.0 million and $28.0 million of milestone payments, respectively.

6. Fair Value of Financial Instruments

The Company's cash, restricted cash, accounts receivable, prepaid expenses, and other current assets, accounts payable, accrued expenses and variable interest rate note payable are recorded at cost, which approximates fair value due to their short-term nature.

The following tables summarize assets and liabilities measured at fair value on a recurring basis as of December 31, 2019 and 2018 and the input categories associated with those assets and liabilities:

	December 31, 2019		
(in thousands)	**Level 1**	**Level 2**	**Level 3**
Cash equivalents:			
Money market funds	$ 16,375	$ —	$ —
Totals	$ 16,375	$ —	$ —

	December 31, 2018		
(in thousands)	**Level 1**	**Level 2**	**Level 3**
Cash equivalents:			
Money market funds	$ 16,292	$ —	$ —
Commercial paper	—	1,998	—
Totals	$ 16,292	$ 1,998	$ —
(in thousands)			
Marketable securities			
Commercial paper	$ —	$ 31,766	$ —
Corporate debt securities	—	7,479	—
Government securities	—	11,954	—
Totals	$ —	$ 51,199	$ —

There were no liabilities measured at fair value on a recurring basis as of December 31, 2019 and 2018.

7. Property and Equipment, Net

Property and equipment, net as of December 31, 2019 and 2018 consisted of the following:

	December 31,	
(in thousands)	**2019**	**2018**
Lab equipment	$ —	$ 13,304
IT equipment	—	3,781
Leasehold improvements	—	19,392
Furniture and fixtures	—	306
Total property and equipment, gross	—	36,783
Less: Accumulated depreciation	—	(34,514)
Total property and equipment, net	$ —	$ 2,269

Depreciation expense was $2.2 million and $4.1 million for the years ended December 31, 2019 and 2018, respectively.

During the years ended December 31, 2019 and 2018, the Company recognized a gain on sale of property and equipment of $2.0 million and a loss of $0.2 million loss related to the disposal of property and equipment, respectively.

8. Accounts Payable, Accrued Expenses and Other

Accounts payable, accrued expenses and other as of December 31, 2019 and 2018 consisted of the following:

(in thousands)	December 31, 2019	2018
Accounts payable	$ 271	$ 1,034
Accrued goods and services	372	2,082
Accrued clinical trial costs	320	1,683
Accrued drug purchase costs	371	4,245
Accrued payroll and related benefits	—	2,315
Accrued restructuring expenses	66	921
Income taxes payable	—	83
Deferred tax incentives	1,314	1,314
Total accounts payable, accrued expenses and other	$ 2,714	$ 13,677

9. Borrowings

Loan Agreement

On July 2, 2018, the Company entered into a Loan and Security Agreement (the "Loan Agreement") by and among the Company, certain subsidiaries of the Company from time to time party thereto, the several banks and other financial institutions or entities from time to time parties thereto (collectively referred to as "Lender") and Hercules Capital, Inc., in its capacity as administrative agent and collateral agent for itself and Lender (in such capacity, "Agent") pursuant to which a term loan of up to an aggregate principal amount of $25.0 million was available to the Company. The Loan Agreement provided for an initial term loan advance of $15.0 million, which closed on July 2, 2018, and, at the Company's option, two additional term loan advances of $5.0 million each upon the occurrence of certain funding conditions prior to December 31, 2018 and December 31, 2019, respectively. As a result of the decision to terminate the SHERLOC clinical trial, the Company did not meet the prerequisite funding conditions for drawing the two additional term loan advances under the Loan Agreement.

During the year ended December 31, 2018, there was no scheduled principal repayments related to the Loan Agreement. On April 15, 2019, the Company repaid in full all principal, accrued and unpaid interest, fees, costs and expenses under the Loan Agreement in an aggregate amount equal to $16.0 million (the "Payoff Amount"). The Payoff Amount included a prepayment penalty of $0.2 million and a fee of $0.8 million, which were recorded to interest expense. The loss on extinguishment of the debt of approximately $1.0 million was recorded as interest expense during the second quarter of 2019. The loss on extinguishment represents the difference between the reacquisition price of the debt and the net carrying amount of the extinguished debt. In connection with the payment of the Payoff Amount, all liens and security interests granted to secure the obligations under the Loan Agreement and all guaranties of the obligations under the Loan Agreement terminated.

During the years ended December 31, 2019 and 2018, the Company recognized $1.5 million and $1.0 million of interest expense related to the Loan Agreement, respectively.

10. Restructuring Activities

On November 7, 2018, the Company announced that it was implementing a reduction in headcount as part of a corporate restructuring. The corporate restructuring followed a comprehensive review of the Company's product candidate pipeline. Under this corporate restructuring, the Company recognized total restructuring expenses of $1.3 million for the year ended December 31, 2018 consisting of one-time employee termination benefits of $1.0 million recorded in research and development expense and $0.3 million recorded in general and administrative expense. These one-time employee termination benefits are comprised of severance, benefits and related costs, all of which are expected to result in cash expenditures. Approximately $0.4 million of these payments were made during the fourth quarter of 2018, and the accrued remaining payments at December 31, 2018 were approximately $0.9 million.

During the year ended December 31, 2019, the Company recognized additional restructuring expenses of $4.8 million, consisting of one-time employee termination benefits of $2.0 million recorded in research and development expense and $2.8 million recorded in general and administrative expense. These one-time employee termination benefits are comprised of severance, benefits and related costs, all of which are expected to result in cash expenditures. During the year ended December 31, 2019, the Company paid approximately $5.6 million of these restructuring expenses. The remaining payments of approximately $0.1 million are expected to be paid in the first half of 2020.

The following table summarizes the charges related to the restructuring activities as of December 31, 2019 and 2018:

(in thousands)	Accrued Restructuring Expenses at December 31, 2018	Expenses	Less: Payments	Accrued Restructuring Expenses at December 31, 2019
Severance, benefits and related costs due to workforce reduction	$ 921	$ 4,783	$ (5,638)	$ 66
Totals	$ 921	$ 4,783	$ (5,638)	$ 66

(in thousands)	Accrued Restructuring Expenses at December 31, 2017	Expenses	Less: Payments	Accrued Restructuring Expenses at December 31, 2018
Severance, benefits and related costs due to workforce reduction	$ 628	$ 1,289	$ (996)	$ 921
Totals	$ 628	$ 1,289	$ (996)	$ 921

11. Common Stock

As of December 31, 2019 and 2018, the Company had 30.0 million shares of $0.01 par value common stock authorized. There were approximately 13.4 million and 13.3 million shares of common stock issued and outstanding as of December 31, 2019 and 2018, respectively.

Stockholder Rights Agreement

On November 22, 2019, the Board created, as of and contingent with the Section 382 Rights Agreement with Computershare Trust Company, N.A., as Rights Agent (the "Rights Agreement") being signed, a series of junior participating preferred stock of the Company to be designated "Series Z Junior Participating Preferred Stock" with a par value of $0.01 per share, and stated the designation and number of shares:

Designation and Amount. The shares of this series shall be designated as Series Z Junior Participating Preferred Stock (the "**Series Z Junior Preferred Stock**"), and the number of shares constituting the Series Z Junior Preferred Stock shall be 30,000. Such number of shares may be increased or decreased by resolution of the Board; provided, that no decrease shall reduce the number of shares of Series Z Junior Preferred Stock to a number less than the number of shares then outstanding plus the number of shares reserved for issuance upon the exercise of outstanding options, rights or warrants or upon the conversion of any outstanding securities issued by the Company convertible into Series Z Junior Preferred Stock.

On December 3, 2019, the Company entered into the Rights Agreement in an effort to protect stockholder value by attempting to diminish the risk that the Company's ability to use its net operating losses ("NOLs") to reduce potential future federal income tax obligations may become substantially limited. The Company's ability to utilize its NOLs may be substantially limited if the Company experiences an "ownership change" within the meaning of Section 382 of the Internal Revenue Code of 1986, as amended (the "Internal Revenue Code"). The Rights Agreement is intended to act as a deterrent to any person acquiring beneficial ownership of 4.9% or more of the Company's outstanding common stock without the approval of the Board.

The Board authorized the issuance of one Right for each outstanding share of common stock, par value $0.01 per share, of the Company, payable to stockholders of record date of the close of business on December 13, 2019 (the "Record Date"). Subject to the terms, provisions and conditions of the Rights Agreement, if the Rights become exercisable, each Right would initially represent the right to purchase from the Company one one-thousandth of a share of Series Z Junior Preferred Stock, par value $0.01 per share, of the Company (the "Preferred Shares") for a purchase price of $18.00 (the "Purchase Price"). Until a Right is exercised, the holder thereof, as such, will have no rights as a stockholder of the Company, including, without limitation, the right to vote or to receive dividends.

The Rights will not be exercisable until the earlier of (i) ten business days after a public announcement that a person has become an "Acquiring Person" by acquiring beneficial ownership of 4.9% or more of outstanding common stock has become such (or, in the event an exchange is effected in accordance with Section 24 of the Rights Agreement and the Board determines that a later date is advisable, then such later date), and (ii) ten business days (or such later date as may be specified by the Board prior to such time as any person becomes an Acquiring Person) after the commencement of a tender or exchange offer by or on behalf of a person that, if completed, would result in such person becoming an Acquiring Person (the "Distribution Date").

Until the Distribution Date, the Rights will be transferred with and only with the common stock, and (unless the Rights are redeemed or expire) the surrender or transfer of any common stock outstanding on or after the Record Date will constitute the transfer of the Rights associated with such common stock. Upon the Distribution Date, the Rights may be transferred separately from the common stock, and each Right, other than Rights held by an Acquiring Person, will entitle its holder to purchase from the Company one one-thousandth of a Preferred Share in exchange for the Purchase Price. The Rights will be evidenced, with respect to any of the common stock certificates outstanding as of the Record Date, by such common stock certificate with a copy of the Summary of Rights to Purchase Preferred Shares.

If any person becomes an Acquiring Person, proper provision shall be made so that each holder of a Rights, other than rights beneficially owned by an Acquiring Person, an associate or affiliate of the Acquiring Person or any person with whom such person is acting in concert (all of which will thereafter be void), will thereafter have the right to receive, upon exercise thereof, that number of common stock having a market value equal to two times the Purchase Price of the Right. If the Board so elects, the Company shall deliver, upon payment of the Purchase Price, an amount of cash or securities equivalent in value to the number of common stock issuable upon exercise of a Right.

If, at any time after a person becomes an Acquiring Person, the Company is acquired in a merger or other business combination transaction or 50% or more of its consolidated assets or earning power are sold, proper provision will be made so that each holder of a Right will thereafter have the right to receive, upon the exercise thereof at the then current Purchase Price, that number of shares of common stock of the acquiring company which at the time of such transaction will have a market value of two times the Purchase Price.

At any time prior to the time any person becomes an Acquiring Person, the Board may redeem the Rights in whole, but not in part, at a price of $0.0001 per Right (the "Redemption Price"). The redemption of the Rights may be made effective at such time, on such basis and with such conditions as the Board in its sole discretion may establish. Immediately upon any redemption of the Rights, the right to exercise the Rights will terminate and the only right of the holders of Rights will be to receive the Redemption Price.

At any time after any person becomes an Acquiring Person and prior to the acquisition by any person or group of a majority of the outstanding common stock, the Board may exchange the Rights (other than Rights owned by an Acquiring Person, which shall have become void), in whole or in part, at an exchange ratio of one common stock per Right (subject to adjustment). The exchange of the Rights by the Board may be made effective at such time, on such basis and with such conditions as the Board in its sole discretion may establish.

The Rights will expire on the earlier of (i) the close of business on December 2, 2022, (ii) the close of business on the date that the Board determines that (A) the Rights Agreement is no longer necessary or desirable for the preservation of the Tax Benefits or (B) the Tax Benefits have been fully utilized and may no longer be carried forward, (iii) the time at which the Rights are redeemed, (iv) the time at which the Rights are exchanged, and (v) if the Rights Agreement has not been approved by the stockholders prior to the conclusion of the Company's 2020 annual meeting, the close of business on such date.

The Purchase Price payable, and the number of Preferred Shares or other securities or property issuable, upon exercise of the Rights is subject to adjustment from time to time to prevent dilution (i) in the event of a stock dividend on the Preferred Shares payable in Preferred Shares or a subdivision or combination of the Preferred Shares, (ii) upon the grant to holders of the Preferred Shares of certain rights or warrants to subscribe for or purchase Preferred Shares at a price, or securities convertible into Preferred Shares with a conversion price, less than the then current market price of the Preferred Shares, or (iii) upon the distribution to holders of the Preferred Shares of evidences of indebtedness or assets (excluding regular periodic cash dividends paid out of earnings or retained earnings or dividends payable in Preferred Shares) or of subscription rights or warrants (other than those referred to above). The number of outstanding Rights and the number of Preferred Shares issuable upon exercise of each Right are also subject to adjustment in the event of a stock split of the Common Shares or a stock dividend on the Common Shares payable in Common Shares or subdivisions, consolidations or combinations of the Common Shares occurring, in any such case, prior to the Distribution Date.

With certain exceptions, no adjustment in the Purchase Price will be required until cumulative adjustments require an adjustment of at least 1% in such Purchase Price. No fractional Preferred Shares will be issued (other than fractions which are integral multiples of one one-thousandth of a Preferred Share, which may, at the election of the Company, be evidenced by depositary receipts), and in lieu thereof, an adjustment in cash will be made based on the market price of the Preferred Shares on the last trading day prior to the date of exercise.

12. Stock-Based Compensation

In 2008, the Company adopted the 2008 Stock Incentive Plan (as amended, the “2008 Plan”) for employees, officers, directors, consultants and advisors. The 2011 Stock Incentive Plan (the “2011 Plan”) became effective upon closing of the Company’s initial public offering in April 2012. Upon effectiveness of the 2011 Plan, no further awards were available to be issued under the 2008 Plan. The 2011 Plan is administered by the Board and permits the Company to grant incentive and non-qualified stock options, stock appreciation rights, restricted stock, restricted stock units and other stock-based awards. Additional shares also become available for grant by reason of the forfeiture, cancellation, expiration or termination of existing awards. The Company registered 0.5 million, 0.5 million, 0.4 million, 0.4 million, 0.4 million and 0.3 million additional shares of common stock related to the 2011 Plan in March 2019, March 2018, February 2016, February 2015, March 2014 and February 2013, respectively. As of December 31, 2019, there were 1.0 million shares remaining available for grant under the 2011 Plan.

The Board authorized and declared a special cash dividend of $20.0 million to holders of the Company's common stock, which was payable on September 5, 2019 to stockholders of record as of the close of business on August 28, 2019 (the “September Special Dividend”). The Board authorized and declared a special cash dividend of $6.7 million on the Company's common stock, which was payable on December 23, 2019 to stockholders of record as of the close of business on December 16, 2019 (the “December Special Dividend”). The Board determined, in accordance with the adjustment provision of the 2011 Plan, that the special cash dividends were unusual and non-recurring and that appropriate adjustment to the stock options to purchase shares of the Company’s common stock outstanding under the 2011 Plan was required. The Company treated those adjustments as a modification to the original stock option grant because the terms of the agreements were modified in order to preserve the value of the option awards after a large non-recurring cash dividend. These options were amended to decrease the exercise price and increase the shares subject to the stock option.

The calculation of the incremental compensation expense is based on the excess of the fair value of the award measured immediately before and after the modification. As a result, the Company recognized an incremental compensation expense of $0.1 million associated with the modification arising from the December Special Dividend for the year ended December 31, 2019. However, as the fair value of the underlying stock decreased more than the exercise price upon modification arising from the September Special Dividend, and the result was a decrease in the fair value of such options. Accordingly, no incremental value was provided and no additional compensation cost was recorded by the Company for the September Special Dividend.

During the years ended December 31, 2019 and 2018, the Company issued options to purchase 3.9 million and 1.2 million shares of common stock, respectively. Stock options granted to employees vest over a three-year period. Stock options granted to non-employee directors prior to 2018 generally vested immediately. Stock options granted to non-employee directors in 2019 and 2018 vest over a one-year period, ending on the earlier of the one-year anniversary of the grant date or the day prior to the Company’s next annual meeting of stockholders after the grant date. Stock options granted to non-employee consultants in 2019 vest over a two-year period.

The fair value of stock options granted to employees during the years ended December 31, 2019 and 2018 was estimated at the date of grant using the following assumptions:

	Years Ended December 31,	
	2019	2018
Risk-free interest rate	1.6 – 1.8%	2.3 – 2.9%
Expected dividend yield	0%	0%
Expected term	5.3 – 5.4 years	5.3 – 5.8 years
Expected volatility	67%	62 – 64%

The Company uses the simplified method to calculate the expected term, as it does not have sufficient historical exercise data to provide a reasonable basis upon which to estimate the expected term of its stock options. Under this approach, the expected term is calculated to be the average of the ten-year contractual term of the option and the weighted-average vesting term of the option, taking into consideration multiple vesting tranches. The computation of expected volatility is based on the historical volatility of comparable companies from a representative peer group selected based on industry and market capitalization. The risk-free interest rate is based on a treasury instrument whose term is consistent with the expected life of the stock options. Stock-based compensation expense related to employee stock options is measured using the fair value of the award at the grant date and is adjusted quarterly to reflect actual forfeitures. Stock-based compensation expense is then recognized on a straight-line basis over the vesting period, which is also the requisite service period.

The Company recognized stock-based compensation expense during the years ended December 31, 2019 and 2018 as follows:

	Years Ended December 31,	
(in thousands)	2019	2018
Research and development expense	$ 223	$ 1,092
General and administrative expense	2,148	1,958
Total stock-based compensation expense	$ 2,371	$ 3,050

The following table summarizes stock option activity during the year ended December 31, 2019:

(in thousands, except per share amounts)	Options	Weighted-Average Exercise Price	Weighted-Average Remaining Contractual Term (in years)	Aggregate Intrinsic Value
Outstanding at December 31, 2018	2,233	$ 14.97	7.66	$ —
Granted	3,910	$ 12.67		
Exercised	(37)	$ 3.90		
Forfeited	(4,182)	$ 14.32		
Outstanding at December 31, 2019	1,924	$ 11.93	6.71	$ 12
Vested and expected to vest at December 31, 2019	1,924	$ 11.93	6.71	$ 12
Exercisable at December 31, 2019	1,360	$ 14.14	5.97	$ 2

The weighted-average grant date fair value of stock options granted during the years ended December 31, 2019 and 2018 was $8.41 and $4.47, respectively.

The aggregate intrinsic value was calculated as the difference between the exercise price of the stock options and the fair value of the underlying common stock. The aggregate intrinsic value of options exercised during the year ended December 31, 2019 was $0.1 million. There were no option exercises during the year ended December 31, 2018.

As of December 31, 2019, there was $2.0 million of total unrecognized stock-based compensation expense related to unvested employee stock options. The Company expects to recognize this expense over a weighted-average period of approximately 1.25 years.

13. Income Taxes

Intraperiod tax allocation rules require the Company to allocate the provision for income taxes between continuing operations and other categories of earnings, such as discontinued operations. In periods in which there is pre-tax loss from continuing operations and pre-tax income in other categories of earnings, such as discontinued operations, the Company must allocate to continuing operations an income tax benefit for the loss in continuing operations with an offsetting income tax expense to discontinued operations. For the years ended December 31, 2019 and 2018, the Company recognized an income tax benefit of $1.5 million and $7.7 million, respectively, in continuing operations and income tax expense in discontinued operations of $1.1 million and $7.6 million, respectively.

A reconciliation of the Company's effective tax rate to the statutory federal income tax rate is as follows:

	Years Ended December 31,	
	2019	2018
Federal income tax at statutory federal rate	21.0%	21.0%
State taxes	6.2	6.2
Permanent differences	(1.2)	(0.1)
Stock-based compensation	—	(0.4)
Tax Cuts and Jobs Act impact	—	0.1
Tax credits	0.7	2.5
Forfeiture of vested stock options	(24.8)	—
Other	0.2	—
Change in valuation allowance	4.4	(18.1)
Total	6.5%	11.2%

The reconciliation of the Company's effective tax rate to the statutory tax rate includes a reduction to the deferred tax asset for stock options that have been forfeited. The Company will no longer receive a tax deduction for these options in the future and as such the deferred tax asset has been reversed into income tax expense. An offsetting reduction to the valuation allowance has also been recorded.

Temporary differences that give rise to significant net deferred tax assets as of December 31, 2019 and 2018 are as follows:

	December 31,	
(in thousands)	2019	2018
Deferred tax assets		
Net operating losses	$ 61,189	$ 54,407
Capitalized research and development expenses	564	705
Credit carryforwards	166,459	166,367
Depreciation	—	2,725
Deferred compensation	1,479	6,315
Election out of installment method	820	—
Accrued expenses	—	655
Other temporary differences	1,089	2,423
Installment sale tax basis	15,868	14,881
Total gross deferred tax assets	247,468	248,478
Valuation allowance	(247,468)	(248,478)

At December 31, 2019, the Company had net operating loss carryforwards for federal and state income tax purposes of $204.2 million and $289.8 million, respectively. The Company's existing federal and state net operating loss carryforwards begin to expire in 2033. The Company also had available research and development credits for federal and state income tax purposes of approximately $28.8 million and $18.9 million, respectively. The federal and state research and development credits will begin to expire in 2022 and 2025, respectively. As of December 31, 2019, the Company also had available investment tax credits for state income tax purposes of less than $0.1 million, which began to expire in 2019. The Company has orphan drug credits of $122.7 million, which begin to expire in 2031.

Utilization of the net operating loss and tax credit carryforwards may be subject to a substantial annual limitation under Section 382 of the Internal Revenue Code due to ownership change limitations that have occurred previously or that could occur in the future. These ownership changes may limit the amount of net operating loss and tax credit carryforwards that can be utilized annually to offset future taxable income and tax. The Company completed an evaluation of ownership changes through December 31, 2019 to

assess whether utilization of the Company's net operating loss or tax credit carryforwards would be subject to an annual limitation under Section 382 of the Internal Revenue Code. The Company believes it can utilize all of its existing tax attributes as a result of the analysis. The Company has not performed an evaluation of ownership changes since December 31, 2019. To the extent an ownership change occurs in the future, the net operating loss and tax credit carryforwards may be subject to limitation.

The Company has not, as of yet, conducted a study of its domestic research and development credit carryforwards and orphan drug credits. This study may result in an increase or decrease to the Company's credit carryforwards; however, until a study is completed and any adjustment is known, no amounts are being presented as an uncertain tax position. A full valuation allowance has been provided against the Company's credits, and if an adjustment is required, this adjustment would be offset by an adjustment to the valuation allowance. As a result, there would be no impact to the statement of operations and comprehensive loss, balance sheet or cash flows if an adjustment were required.

As of December 31, 2019, the Company has evaluated the positive and negative evidence bearing upon the realizability of its remaining deferred tax assets, which are comprised principally of net operating loss carryforwards and research and development credits. Under the applicable accounting standards, management has considered the Company's history of losses and concluded that it is more likely than not that the Company will not recognize the benefits of its deferred tax assets. Accordingly, a full valuation allowance has been established against the deferred tax assets. The change in the valuation allowance against the deferred tax assets in the years ended December 31, 2019 and 2018 was as follows:

(in thousands)	Balance at Beginning of Period	Additions	Deductions	Balance at End of Period
December 31, 2018	236,067	12,411	—	248,478
December 31, 2019	248,478	—	(1,010)	247,468

The change in the valuation allowance in in the year ended December 31, 2019 primarily relates to the net operating loss deferred tax assets generated for the current year.

14. Commitments and Contingencies

Operating Leases

The Company adopted the new leasing standards on January 1, 2019 using the modified retrospective transition method, which does not require restatement of prior periods, for all the leases existing as of the adoption date. The adoption of the new leasing standards did not have a significant impact on the Company's consolidated financial statements. As of January 1, 2019, the Company's only existing lease was the lease of its former principal research and office space located at One Kendall Square in Cambridge, Massachusetts, which expired in June 2019. Total rent expense, net of rental income received from subleases, was less than $0.1 million and $0.1 million for the years ended December 31, 2019 and 2018, respectively.

15. Related Party Transactions

Related parties of the Company held approximately 4% of the outstanding shares of Silver Creek Series A and Series B preferred stock as of December 31, 2018.

16. Retirement Plan

On May 31, 2002, the Company established a 401(k) defined contribution savings plan (the "401(k) Plan") for its employees who meet certain service period and age requirements. Contributions are permitted up to the maximum allowed under the Internal Revenue Code of each covered employee's salary. The 401(k) Plan permits the Company to contribute at its discretion. For the years ended December 31, 2019 and 2018, the Company made contributions of $0.2 million and $0.4 million, respectively, to the 401(k) Plan.

Exhibit 4.5

DESCRIPTION OF SECURITIES REGISTERED UNDER SECTION 12 OF THE SECURITIES EXCHANGE ACT OF 1934, AS AMENDED

The following description of the securities of Merrimack Pharmaceuticals, Inc. ("us," "our," "we" or the "Company") registered under Section 12 of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), is intended as a summary only and therefore is not a complete description. This description is based upon, and is qualified by reference to, our certificate of incorporation, our bylaws and applicable provisions of the Delaware General Corporation Law (the "DGCL"). You should read our certificate of incorporation and bylaws, which are incorporated by reference as Exhibit 3.1 and Exhibit 3.2, respectively, to the Annual Report on Form 10-K of which this Exhibit is a part, for the provisions that are important to you.

Authorized Capital Stock

Our authorized capital stock consists of 30,000,000 shares of common stock and 10,000,000 shares of preferred stock, of which 30,000 shares are designated as series Z junior participating preferred stock. Our common stock is registered under Section 12(b) of the Exchange Act, and we have preferred stock purchase rights registered under Section 12(g) of the Exchange Act.

Common Stock

Voting Rights. Holders of our common stock are entitled to one vote for each share held on all matters submitted to a vote of stockholders and do not have cumulative voting rights. Each election of directors by our stockholders will be determined by a plurality of the votes cast by the stockholders entitled to vote on the election. In general, except (1) for the election of directors, (2) as described below under "—Provisions of Our Certificate of Incorporation and Bylaws and Delaware Law That May Have Anti-Takeover Effects—Super-Majority Voting," (3) in the future to the extent that we have two or more classes or series of stock outstanding with separate voting rights and (4) as otherwise required by law, any matter to be voted on by our stockholders at any meeting is decided by the vote of the holders of a majority in voting power of the votes cast by the holders of shares of our stock present or represented at the meeting and voting affirmatively or negatively on such matter.

Dividends. Holders of common stock are entitled to receive proportionately any dividends as may be declared by our board of directors, subject to any preferential dividend rights of outstanding preferred stock.

Liquidation and Dissolution. In the event of our liquidation or dissolution, the holders of our common stock are entitled to receive proportionately all assets available for distribution to stockholders after the payment of all debts and other liabilities and subject to the prior rights of any of our outstanding preferred stock.

Other Rights. Holders of our common stock have no preemptive, subscription, redemption or conversion rights. The rights, preferences and privileges of holders of our common stock are subject to and may be adversely affected by the rights of the holders of shares of any series of our preferred stock that we may designate and issue in the future.

Preferred Stock

Under the terms of our certificate of incorporation, our board of directors is authorized to issue shares of preferred stock in one or more series without stockholder approval. Our board of directors has the discretion to determine the rights, preferences, privileges and restrictions, including voting rights, dividend rights, conversion rights, redemption privileges and liquidation preferences, of each series of preferred stock. The purpose of authorizing our board of directors to issue preferred stock and determine its rights and preferences is to eliminate delays associated with a stockholder vote on specific issuances. The issuance of preferred stock, while providing flexibility in connection with possible acquisitions, future financings and other corporate purposes, could have the effect of making it more difficult for a third party to acquire, or could discourage a third party from seeking to acquire, a majority of our outstanding voting stock.

Effects of Authorized but Unissued Stock

We have shares of common stock and preferred stock available for future issuance without stockholder approval, subject to any limitations imposed by the listing standards of The Nasdaq Global Market. We may utilize these additional shares for a variety of corporate purposes, including for future public offerings to raise additional capital or facilitate corporate acquisitions or for payment as a dividend on our capital stock. The existence of unissued and unreserved common stock and preferred stock may enable our board of directors to issue shares to persons friendly to current management or to issue preferred stock with terms that could have the effect of making it more difficult for a third party to acquire, or could discourage a third party from seeking to acquire, a controlling interest in our company by means of a merger, tender offer, proxy contest or otherwise. In addition, if we issue preferred stock, the issuance could adversely affect the voting power of holders of common stock and the likelihood that such holders will receive dividend payments and payments upon liquidation.

Provisions of Our Certificate of Incorporation and Bylaws and Delaware Law That May Have Anti-Takeover Effects

Delaware Law. We are subject to Section 203 of the DGCL. Subject to certain exceptions, Section 203 prevents a publicly held Delaware corporation from engaging in a "business combination" with any "interested stockholder" for three years following the date that the person became an interested stockholder, unless the interested stockholder attained such status with the approval of our board of directors, the business combination is approved by our board of directors and stockholders in a prescribed manner, or the interested stockholder acquired at least 85% of our outstanding voting stock in the transaction in which it became an interested stockholder. A "business combination" includes, among other things, a merger or consolidation involving us and the "interested stockholder" and the sale of more than 10% of our assets. In general, an "interested stockholder" is any entity or person beneficially owning 15% or more of our outstanding voting stock and any entity or person affiliated with or controlling or controlled by such entity or person.

Stockholder Action; Special Meeting of Stockholders; Advance Notice Requirements for Stockholder Proposals and Director Nominations. Our certificate of incorporation and our bylaws provide that any action required or permitted to be taken by our stockholders at an annual meeting or special meeting of stockholders may only be taken if it is properly brought before such meeting and may not be taken by written action in lieu of a meeting. Our certificate of incorporation and our bylaws also provide that, except as otherwise required by law, special meetings of the stockholders can only be called by our chairman of the board, our chief executive officer or our board of directors. In addition, our bylaws establish an advance notice procedure for stockholder proposals to be brought before an annual meeting of stockholders, including proposed nominations of candidates for election to our board of directors. Stockholders at an annual meeting may only consider proposals or nominations specified in the notice of meeting or brought before the meeting by or at the direction of our board of directors, or by a stockholder of record on the record date for the meeting, who is entitled to vote at the meeting and who has delivered timely written notice in proper form to our secretary of the stockholder's intention to bring such business before the meeting. These provisions could have the effect of delaying until the next stockholder meeting stockholder actions that are favored by the holders of a majority of our outstanding voting securities. These provisions also could discourage a third party from making a tender offer for our common stock, because even if it acquired a majority of our outstanding voting stock, it would be able to take action as a stockholder, such as electing new directors or approving a merger, only at a duly called stockholders meeting and not by written consent.

Super-Majority Voting. The DGCL provides generally that the affirmative vote of a majority of the shares entitled to vote on any matter is required to amend a corporation's certificate of incorporation or bylaws, unless a corporation's certificate of incorporation or bylaws, as the case may be, requires a greater percentage. Our bylaws may be amended or repealed by a majority vote of our board of directors or the affirmative vote of the holders of at least 75% of the votes that all our stockholders would be entitled to cast in any annual election of directors. In addition, the affirmative vote of the holders of at least 75% of the votes that all our stockholders would be entitled to cast in any election of directors is required to amend or repeal or to adopt any provisions inconsistent with any of the provisions of our certificate of incorporation described above.

Removal of Directors by Stockholders. Our bylaws provide that members of our board of directors may be removed, with or without cause, by a majority in voting power of the shares of capital stock of our company issued and outstanding and entitled to vote in any annual election of directors, subject to any rights of any series of preferred stock.

Preferred Stock Purchase Rights

Pursuant to a Section 382 Rights Agreement (the "Rights Agreement"), dated December 3, 2019, between us and Computershare Trust Company, N.A., as Rights Agent, the Company issued a dividend of one preferred share purchase right (a "Right") for each share of common stock, payable on December 13, 2019 (the "Record Date") to the stockholders of record on that date. Each Right entitles the registered holder to purchase from the Company one one-thousandth of a share of Series Z Junior Preferred Stock (the "**Preferred Shares**") of the Company, at a price of $18.00 per one one-thousandth of a Preferred Share represented by a Right (the "**Purchase Price**"), subject to adjustment.

This description of the Rights is based upon, and qualified by reference to, the Rights Agreement. You should read the Rights Agreement which is incorporated by reference as an exhibit to the Annual Report on Form 10-K of which this Exhibit is a part, for the provisions that are important to you. The Certificate of Designation of Series Z Junior Preferred Participating Stock is also incorporated by reference as an exhibit to the Annual Report on Form 10-K of which this Exhibit is a part. Capitalized terms used but not defined in this section are defined in the Rights Agreement.

The Rights

The Rights are not exercisable until the Distribution Date. The Distribution Date will be the earlier of (i) the Close of Business on the tenth day following a public announcement that an Acquiring Person (as defined below) has become such (or, in the event an exchange is effected in accordance with Section 24 of the Rights Agreement and the board determines that a later date is advisable, then such later date) or (ii) the Close of Business on the tenth Business Day (or such later date as may be determined by action of the board prior to such time as any Person becomes an Acquiring Person) following the commencement of a tender offer or exchange offer, the consummation of which would result in the Beneficial Ownership by a Person or group of 4.9% or more of the then outstanding common stock.

Until the Distribution Date, the Rights will be transferred with and only with the common stock, and (unless the Rights are redeemed or expire) the surrender or transfer of any common stock outstanding on or after the Record Date will constitute the transfer of the Rights associated with such common stock. Upon the Distribution Date, the Rights may be transferred separately from the common stock, and each Right, other than Rights held by an Acquiring Person, will entitle its holder to purchase from the Company one one-thousandth of a Preferred Share in exchange for the Purchase Price.

The Rights will be evidenced, with respect to any of the common stock certificates outstanding as of the Record Date, by such common stock certificate with a copy of the Summary of Rights to Purchase Preferred Shares substantially in the form attached as Exhibit C to the Rights Agreement (unless such Rights are recorded in book entry).

Acquiring Person

An "Acquiring Person" is any Person or group of Affiliated or Associated Persons that has acquired Beneficial Ownership (as defined below) of 4.9% or more of the common stock then outstanding. However, a Person shall not be deemed to be an Acquiring Person if such Person, at the time of the first public announcement of the Rights Agreement, is a Beneficial Owner of 4.9% or more of the common stock then outstanding (a "Grandfathered Stockholder"); provided, however, that if a Grandfathered Stockholder increases its Beneficial Ownership of the common stock of the Company as of any date on or after the date of the public announcement of this Agreement, then such Grandfathered Stockholder shall no longer be deemed to be a Grandfathered Stockholder unless, upon such acquisition of Beneficial Ownership of additional common stock of the Company, such Person is not then the Beneficial Owner of 4.9% or more of the common stock of the Company then outstanding; provided, further, that upon the first decrease of a Grandfathered Stockholder's Beneficial Ownership below 4.9% of the common stock of the Company then outstanding, such Grandfathered Stockholder shall no longer be deemed to be a Grandfathered Stockholder and this proviso shall have no further force or effect with respect to such Person.

In general, "Beneficial Ownership" shall include any securities such Person, or any of such Person's Affiliates or Associates (i) would be deemed to actually or constructively own for purposes of Section 382 of the Code and the regulations promulgated thereunder, (to the extent ownership of such securities would be attributed to such Persons

under Section 382 of the Code and the regulations promulgated thereunder), or (ii) which are directly or indirectly beneficially owned by any other Person with whom such Person has any agreement, arrangement or understanding, whether or not in writing, for the purpose of acquiring, holding, voting or disposing of any securities of the Company or cooperating in obtaining, changing or influencing the control of the Company; provided, that the effect of such agreement, arrangement or understanding is to treat such Person as an "entity" under Section 1.382-3(a)(1) of the Department of Treasury regulations.

From and after the time any Person becomes an Acquiring Person, if the Rights evidenced by a Right Certificate are or were acquired or Beneficially Owned by an Acquiring Person, an Associate or Affiliate of an Acquiring Person or any Person with whom such Person is Acting in Concert, such Rights shall become void, and any holder of such Rights shall thereafter have no right to exercise such Rights.

Flip-in Event

If any Person becomes an Acquiring Person, proper provision shall be made so that each holder of a Rights, other than Rights Beneficially Owned by an Acquiring Person, an Associate or Affiliate of the Acquiring Person or any Person with whom such Person is Acting in Concert (all of which will thereafter be void), will thereafter have the right to receive, upon exercise thereof, that number of shares of common stock having a market value equal to two times the Purchase Price of the Right. If the board so elects, the Company shall deliver, upon payment of the Purchase Price, an amount of cash or securities equivalent in value to the number of shares of common stock issuable upon exercise of a Right.

Flip-over Event

If, at any time after a Person becomes an Acquiring Person, the Company is acquired in a merger or other business combination transaction or 50% or more of its consolidated assets or earning power are sold, proper provision will be made so that each holder of a Right will thereafter have the right to receive, upon the exercise thereof at the then current Purchase Price, that number of shares of common stock of the acquiring company which at the time of such transaction will have a market value of two times the Purchase Price.

Exchange

At any time after any Person becomes an Acquiring Person and prior to the acquisition by any Person or group of a majority of the outstanding common stock, the board may exchange the Rights (other than Rights owned by an Acquiring Person, which shall have become void), in whole or in part, at an exchange ratio of one share of common stock per Right (subject to adjustment). The exchange of the Rights by the Board may be made effective at such time, on such basis and with such conditions as the board in its sole discretion may establish.

Preferred Shares

Preferred Shares purchasable upon exercise of the Rights will not be redeemable. Each Preferred Share will be entitled to a quarterly dividend payment of 1,000 multiplied by the dividend declared per share of common stock. In the event of liquidation, the holders of the Preferred Shares will be entitled to a payment per share equal to 1,000 multiplied by the aggregate payment made per share of common stock. Each Preferred Share will have 1,000 votes, voting together with the common stock. In the event of any merger, consolidation or other transaction in which common stock is exchanged, each Preferred Share will be entitled to receive 1,000 multiplied by the amount received per share of common stock. Because of the nature of the dividend, liquidation and voting rights of the Preferred Shares, the value of the one one-thousandth of a Preferred Share purchasable upon exercise of each Right should approximate the value of one share of common stock.

Purchase Price Adjustments

The Purchase Price payable, and the number of Preferred Shares or other securities or property issuable, upon exercise of the Rights is subject to adjustment from time to time to prevent dilution (i) in the event of a stock dividend on the Preferred Shares payable in Preferred Shares or a subdivision or combination of the Preferred Shares, (ii) upon the

grant to holders of the Preferred Shares of certain rights or warrants to subscribe for or purchase Preferred Shares at a price, or securities convertible into Preferred Shares with a conversion price, less than the then current market price of the Preferred Shares, or (iii) upon the distribution to holders of the Preferred Shares of evidences of indebtedness or assets (excluding regular periodic cash dividends paid out of earnings or retained earnings or dividends payable in Preferred Shares) or of subscription rights or warrants (other than those referred to above). The number of outstanding Rights and the number of Preferred Shares issuable upon exercise of each Right are also subject to adjustment in the event of a stock split of the common stock or a stock dividend on the common stock payable in shares of common stock or subdivisions, consolidations or combinations of the common stock occurring, in any such case, prior to the Distribution Date.

With certain exceptions, no adjustment in the Purchase Price will be required until cumulative adjustments require an adjustment of at least 1% in such Purchase Price. No fractional Preferred Shares will be issued (other than fractions which are integral multiples of one one-thousandth of a Preferred Share, which may, at the election of the Company, be evidenced by depositary receipts), and in lieu thereof, an adjustment in cash will be made based on the market price of the Preferred Shares on the last trading day prior to the date of exercise.

Expiration

The Rights will expire on the earlier of (i) the Close of Business on December 2, 2022, (ii) the close of business on the date that the board determines that (A) the Rights Agreement is no longer necessary or desirable for the preservation of the Tax Benefits or (B) the Tax Benefits have been fully utilized and may no longer be carried forward, (iii) the time at which the Rights are redeemed, (iv) the time at which the Rights are exchanged, and (v) if the Rights Agreement has not been approved by the stockholders prior to the conclusion of the Company's 2020 annual meeting, the Close of Business on such date.

Redemption

At any time prior to the time any Person becomes an Acquiring Person, the board may redeem the Rights in whole, but not in part, at a price of $0.0001 per Right (the "Redemption Price"). The redemption of the Rights may be made effective at such time, on such basis and with such conditions as the board in its sole discretion may establish. Immediately upon any redemption of the Rights, the right to exercise the Rights will terminate and the only right of the holders of Rights will be to receive the Redemption Price.

Amendment

The terms of the Rights may be amended by the board without the consent of the holders of the Rights. However, from and after such time as any Person becomes an Acquiring Person, the Rights Agreement shall not be amended or supplemented in any manner which would adversely affect the interests of the holders of Rights (other than Rights owned by an Acquiring Person, which shall have become void).

Rights of Holders

Until a Right is exercised, the holder thereof, as such, will have no rights as a stockholder of the Company, including, without limitation, the right to vote or to receive dividends.

Process to Seek Exemption

Any person who desires to effect any acquisition of securities that would, if consummated, result in such person becoming an Acquiring Person may, prior to such time and in accordance with Section 36 of the Rights Agreement, request that the board grant an exemption with respect to such acquisition under the Rights Agreement so that such Person would be deemed to be an "Exempt Person" under the Rights Agreement.

Exhibit 21.1

SUBSIDIARIES OF THE REGISTRANT

Name	Jurisdiction of Incorporation
Merrimack Pharmaceuticals UK Limited*	UK
Merrimack Securities Corporation*	Massachusetts

* wholly owned

Exhibit 23.1

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the Registration Statements on Form S-3 (No. 333-222093) and Form S-8 (Nos. 333-180996, 333-186370, 333-194313, 333-202346, 333-209745, 333-223577 and 333-230084) of Merrimack Pharmaceuticals, Inc. of our report dated March 6, 2019 relating to the financial statements, which appears in this Form 10-K.

/s/ PricewaterhouseCoopers LLP
Boston, Massachusetts
March 12, 2020

Exhibit 23.2

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the incorporation by reference in the Registration Statements of Merrimack Pharmaceuticals, Inc. on Form S-3 (No. 333-222093) and Form S-8 (Nos. 333-180996, 333-186370, 333-194313, 333-202346, 333-209745, 333-223577 and 333-230084) of our report dated March 12, 2020, with respect to our audit of the consolidated financial statements of Merrimack Pharmaceutical, Inc. as of December 31, 2019 and for the year ended December 31, 2019 and our report dated March 12, 2020 with respect to our audit of the effectiveness of internal control over financial reporting of Merrimack Pharmaceuticals, Inc. as of December 31, 2019, which reports are included in this Annual Report on Form 10-K of Merrimack Pharmaceuticals, Inc. for the year ended December 31, 2019.

/s/ Marcum LLP

Marcum LLP
Boston, Massachusetts
March 12, 2020

Exhibit 31.1

CERTIFICATIONS

I, Gary L. Crocker, certify that:

1. I have reviewed this Annual Report on Form 10-K of Merrimack Pharmaceuticals, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 12, 2020

/s/ Gary L. Crocker
Gary L. Crocker
President
(Principal Executive Officer)

Exhibit 31.2

CERTIFICATIONS

I, Gary L. Crocker, certify that:

1. I have reviewed this Annual Report on Form 10-K of Merrimack Pharmaceuticals, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 12, 2020

/s/ Gary L. Crocker
Gary L. Crocker
President
(Principal Financial Officer)

Exhibit 32.1

CERTIFICATION PURSUANT TO 18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the Annual Report on Form 10-K of Merrimack Pharmaceuticals, Inc. (the "Company") for the period ended December 31, 2019 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), the undersigned, Richard Peters, M.D., Ph.D., President and Chief Executive Officer of the Company, hereby certifies, pursuant to 18 U.S.C. Section 1350, that to his knowledge:

(1) the Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

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

Date: March 12, 2020

/s/ Gary L. Crocker
Gary L. Crocker
President
(Principal Executive Officer)

Exhibit 32.2

CERTIFICATION PURSUANT TO 18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the Annual Report on Form 10-K of Merrimack Pharmaceuticals, Inc. (the "Company") for the period ended December 31, 2019 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), the undersigned, Jean M. Franchi, Chief Financial Officer and Treasurer of the Company, hereby certifies, pursuant to 18 U.S.C. Section 1350, that to her knowledge:

(1) the Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

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

Date: March 12, 2020

/s/ Gary L. Crocker
Gary L. Crocker
President
(Principal Financial Officer)