

**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, DC 20549**

Form 10-K

(Mark One)

ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the fiscal year ended December 31, 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: 001-37359

BLUEPRINT MEDICINES CORPORATION

(Exact name of registrant as specified in its charter)

Delaware
*(State or other jurisdiction of
incorporation or organization)*
45 Sidney Street
Cambridge, MA
(Address of principal executive offices)

26-3632015
*(IRS Employer
Identification No.)*

02139
(Zip Code)

Registrant's telephone number, including area code: **(617) 374-7580**

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

<i>Title of Class</i>	<i>Trading Symbols</i>	<i>Name of Exchange on Which Registered</i>
Common Stock, par value \$0.001 per share	BPMC	Nasdaq Global Select Market

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

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

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

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

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

Indicate by check mark 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 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
Non-accelerated filer

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 Act). Yes No

As of June 28, 2019, the aggregate market value of the voting and non-voting common equity held by non-affiliates of the registrant, based on the last reported sales price for the registrant's common stock, par value \$0.001 per share, on the Nasdaq Global Select Market on such date, was approximately \$4,627,796,219.

Number of shares of the registrant's common stock, par value \$0.001 per share, outstanding on February 10, 2020: 54,027,009

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's definitive proxy statement for its 2020 Annual Meeting of Stockholders, which the registrant intends to file with the Securities and Exchange Commission pursuant to Regulation 14A within 120 days after the end of the registrant's fiscal year ended December 31, 2019, are incorporated by reference into Part III of this Annual Report on Form 10-K.

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Unless otherwise stated, all references to “us,” “our,” “Blueprint,” “Blueprint Medicines,” “we,” the “Company” and similar designations in this Annual Report on Form 10-K refer to Blueprint Medicines Corporation and its consolidated subsidiaries.

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 are forward-looking statements. In some cases, you can identify forward-looking statements by words such as “aim,” “anticipate,” “believe,” “contemplate,” “continue,” “could,” “estimate,” “expect,” “intend,” “may,” “plan,” “potential,” “predict,” “project,” “seek,” “should,” “target,” “will,” “would” or the negative of these words or other comparable terminology, although not all forward-looking statements contain these identifying words.

The forward-looking statements in this Annual Report on Form 10-K include, but are not limited to, statements about:

- the initiation, timing, progress and results of our pre-clinical studies and clinical trials, including our ongoing clinical trials and any planned clinical trials for avapritinib, pralsetinib, fisogatinib and BLU-263, and our research and development programs;
- our ability to advance drug candidates into, and successfully complete, clinical trials;
- the timing or likelihood of regulatory actions, filings and approvals for our drug candidates and our ability to successfully expand the indication for avapritinib, obtain marketing approval for avapritinib in additional jurisdictions and obtain marketing approval for pralsetinib;
- our ability and plans in continuing to build out our commercial infrastructure and successfully launching, marketing and selling AYWAKIT™ (avapritinib) and any future drug candidate for which we receive marketing approval in the U.S. and Europe;
- the rate and degree of market acceptance of AYWAKIT and any current and future drug candidates for which we receive marketing approval;
- the pricing and reimbursement of AYWAKIT and any future drugs for which we receive marketing approval;
- our ability to successfully develop manufacturing processes for our drug and drug candidates and secure manufacturing, packaging and labeling arrangements for development activities and commercial production;
- the implementation of our business model and strategic plans for our business, drug and drug candidates and technology;
- the scope of protection we are able to establish and maintain for intellectual property rights covering our drug, drug candidates and technology;
- the potential benefits of our collaborations with F. Hoffmann-La Roche Ltd and Hoffmann-La Roche Inc. and CStone Pharmaceuticals, as well as our ability to maintain these collaborations and establish other strategic collaborations;
- the potential benefits of our exclusive license agreement with Clementia Pharmaceuticals, Inc.;
- the development of a companion diagnostic test for AYWAKIT to identify patients with a PDGFRA D842V mutation or companion diagnostic tests for our current or future drug candidates;

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- our financial performance, estimates of our expenses, future revenues, capital requirements and our needs for future financing; and
- developments relating to our competitors and our industry.

Any forward-looking statements in this Annual Report on Form 10-K reflect our current views with respect to future events or to our future financial performance and involve known and unknown risks, uncertainties and other important factors that may cause our actual results, performance or achievements to be materially different from any future results, performance or achievements expressed or implied by these forward-looking statements. We have included important factors in the cautionary statements included in this Annual Report on Form 10-K, particularly in the “Risk Factors” section, that could cause actual results or events to differ materially from the forward-looking statements that we make. Given these uncertainties, you should not place undue reliance on these forward-looking statements. Our forward-looking statements do not reflect the potential impact of any future acquisitions, mergers, dispositions, joint ventures or investments we may make or enter into.

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, performance or achievements may be materially different from what we expect. Except as required by law, we assume no obligation to update or revise these forward-looking statements for any reason, even if new information becomes available in the future.

This Annual Report on Form 10-K also contains estimates, projections and other information concerning our industry, our business and the markets for certain diseases, including data regarding the estimated size of those markets, and the incidence and prevalence of certain medical conditions. Information that is based on estimates, forecasts, projections, market research or similar methodologies is inherently subject to uncertainties and actual events or circumstances may differ materially from events and circumstances reflected in this information. Unless otherwise expressly stated, we obtained this industry, business, market and other data from reports, research surveys, studies and similar data prepared by market research firms and other third parties, industry, medical and general publications, government data and similar sources.

PART I

Item 1. Business.

Overview

We are a precision therapy company focused on genomically defined cancers, rare diseases and cancer immunotherapy. Our approach is to leverage our novel target discovery engine to systematically and reproducibly identify kinases that are drivers of diseases and to craft highly selective and potent therapies that may provide significant and durable clinical responses for patients without adequate treatment options. This integrated biology and chemistry approach enables us to identify, characterize and design drug candidates to inhibit novel kinase targets that have been difficult to selectively inhibit. We believe that our uniquely targeted, scalable approach empowers the rapid design and development of new treatments and increases the likelihood of success. We have one precision therapy approved by the U.S. Food and Drug Administration, or FDA, and are currently advancing multiple investigational medicines in clinical development, along with multiple research programs.

Avapritinib and BLU-263 — Systemic Mastocytosis and other Mast Cell Disorders

Avapritinib

We are developing avapritinib for the treatment of systemic mastocytosis, or SM, a rare disorder that causes an overproduction of mast cells and the accumulation of mast cells in the bone marrow and other organs, which can lead to a wide range of debilitating symptoms and organ dysfunction and failure. Nearly all cases of SM are driven by the KIT D816V mutation, which aberrantly activates mast cells.

We are currently evaluating avapritinib in an ongoing registration-enabling Phase 1 clinical trial in advanced SM, which we refer to as our EXPLORER trial, an ongoing registration-enabling Phase 2 clinical trial in advanced SM, which we refer to as our PATHFINDER trial, and an ongoing registration-enabling Phase 2 clinical trial in indolent and smoldering SM, which we refer to as our PIONEER trial. We plan to present updated data from the EXPLORER and PATHFINDER trials in the second half of 2020. In December 2019, we reported initial data from the dose-finding portion (part 1) of the PIONEER trial at the 61st American Society of Hematology Annual Meeting and Exposition, or ASH annual meeting. We plan to report updated data from part 1 of the PIONEER trial in a late-breaking oral presentation on March 14, 2020 at the annual meeting for the American Academy of Allergy, Asthma & Immunology, or AAAAI annual meeting. Based on these data, we expect to initiate patient screening in part 2 of the PIONEER trial in the second quarter of 2020 and complete enrollment by the end of 2020.

We plan to submit a supplemental new drug application, or NDA, to the FDA for avapritinib for the treatment of advanced SM in the second half of 2020, which we anticipate will be focused on data from patients in the EXPLORER and PATHFINDER trials who were treated with avapritinib at a starting dose of 200 mg once daily, or QD, supported by pooled data from all doses. The FDA has granted orphan drug designation to avapritinib for the treatment of mastocytosis, and the European Commission has granted orphan medicinal product designation to avapritinib for the treatment of mastocytosis. In addition, the FDA has granted breakthrough therapy designation to avapritinib for the treatment of advanced SM, including the subtypes of aggressive SM, SM with an associated hematologic neoplasm and mast cell leukemia.

BLU-263

We are developing BLU-263 for the treatment of indolent SM and other mast cell disorders. BLU-263 is an investigational, orally available, potent and highly selective KIT inhibitor currently in the discovery stage. BLU-263 is designed to have equivalent potency as avapritinib, improved selectivity for KIT, with low off-target activity, and lower penetration of the central nervous system relative to avapritinib based on preclinical data, which we believe will enable development of BLU-263 in a broad population of patients with indolent SM, including patients with lower disease burden requiring potentially life-long chronic therapy, as well as patients with other KIT-driven mast cell disorders. We plan to submit an investigational new drug application, or IND, for BLU-263 for indolent SM and initiate a Phase 1 trial in healthy volunteers in the first half of 2020.

Pralsetinib — RET-altered Cancers

We are developing pralsetinib for the treatment of RET-altered non-small cell lung cancer, or NSCLC, medullary thyroid carcinoma, or MTC, and other solid tumors. Pralsetinib is an investigational, orally available, potent and highly selective inhibitor that targets RET, a receptor tyrosine kinase. Pralsetinib is designed to inhibit the activating RET fusions and mutations that drive cancer growth and remain active in the presence of resistance mutations that we predict will arise from treatment with first generation therapies. RET activating fusions and mutations drive disease in subsets of patients with NSCLC, and cancers of the thyroid, including MTC and papillary thyroid cancer, or PTC, and our research suggests that RET may drive disease in subsets of patients with colon cancer, breast cancer, pancreatic cancer and other cancers.

We are currently evaluating pralsetinib in an ongoing registration-enabling Phase 1/2 clinical trial in patients with RET-altered NSCLC, MTC and other advanced solid tumors, which we refer to as our ARROW trial. In January 2020, we reported top-line data from the ARROW trial in RET fusion-positive NSCLC patients treated with pralsetinib at 400 mg QD. We plan to report top-line data from the ARROW trial in RET-mutant MTC patients in the second quarter of 2020. In addition, we plan to present the registration data from the ARROW trial of pralsetinib in RET fusion-positive NSCLC and RET-mutant MTC in 2020. We recently announced the activation of the first trial site for our Phase 3 clinical trial evaluating pralsetinib in patients with first-line RET fusion-positive NSCLC, which we refer to as our AccelerET Lung trial, and we plan to initiate a Phase 3 clinical trial of pralsetinib in first-line RET-mutant MTC in the second half of 2020.

In January 2020, we initiated the submission of a rolling NDA to the FDA for the treatment of patients with RET fusion-positive NSCLC, and we expect to complete the submission in the first quarter of 2020. We plan to submit an NDA to the FDA for pralsetinib for the treatment of patients with MTC previously treated with an approved multi-kinase inhibitor in the second quarter of 2020. In addition, we plan to submit a marketing authorization application, or MAA, to the European Medicines Agency, or EMA, for pralsetinib for RET fusion-positive NSCLC in the second quarter of 2020.

The FDA has granted orphan drug designation to pralsetinib for the treatment of RET-rearranged NSCLC, JAK1/2-positive NSCLC or TRKC-positive NSCLC, and the FDA has granted breakthrough therapy designation to pralsetinib for the treatment of patients with RET-fusion positive NSCLC that has progressed following platinum-based chemotherapy and to pralsetinib for the treatment of patients with RET mutation-positive MTC that requires systemic treatment and for which there are no acceptable alternative treatments.

Avapritinib — Gastrointestinal Stromal Tumors

We are also developing avapritinib for the treatment of gastrointestinal stromal tumors, or GIST, a rare disease that is a sarcoma, or tumor of bone or connective tissue, of the gastrointestinal, or GI, tract. Avapritinib is an orally available, potent and highly selective inhibitor that targets KIT and PDGFRA mutations. These mutations abnormally activate receptor tyrosine kinases that are drivers of GIST.

In January 2020, the FDA granted approval of avapritinib under the brand name AYWAKIT for the treatment of adults with unresectable or metastatic GIST harboring a PDGFRA exon 18 mutation, including PDGFRA D842V mutations. The efficacy of AYWAKIT was established from 43 patients in the NAVIGATOR trial with unresectable or metastatic GIST harboring PDGFRA exon 18 mutations, including 38 patients with PDGFRA D842V mutations. The safety of AYWAKIT in patients with unresectable or metastatic GIST was evaluated in 204 patients who received 300 mg QD or 400 mg QD dosing in the NAVIGATOR trial.

We are also developing avapritinib for the treatment of third-line and later GIST (including fourth-line GIST). We are currently evaluating avapritinib for the treatment of GIST in an ongoing registration-enabling global, randomized Phase 3 clinical trial comparing avapritinib to regorafenib in third-line GIST, which we refer to as our VOYAGER trial. The FDA is currently reviewing our NDA for avapritinib for the treatment of fourth-line GIST, and this application has a Prescription Drug User Fee Act, or PDUFA, action date of May 14, 2020. As part of the review, the FDA has requested top-line data from our VOYAGER trial. We expect to provide the top-line data to the FDA early in the second quarter of 2020 to enable the FDA to take action by the PDUFA action date and we also expect to report the top-line data in the second quarter of 2020.

Based on data from the VOYAGER trial, we plan to submit a supplemental NDA to the FDA for avapritinib for the treatment of third-line GIST in the second half of 2020. In addition, the EMA is currently reviewing our MAA for the treatment of adult patients with PDGFRA D842V mutant GIST, regardless of prior therapy, and we anticipate a decision from the European Commission in the third quarter of 2020. We plan to pursue an MAA for third-line and later GIST (including fourth-line GIST) based on data from our VOYAGER trial.

The FDA has granted breakthrough therapy designation to avapritinib for the treatment of patients with unresectable or metastatic GIST harboring the PDGFRA D842V mutation. The FDA has also granted orphan drug designation to avapritinib for the treatment of GIST and fast track designation to avapritinib for (i) the treatment of patients with unresectable or metastatic GIST that progressed following treatment with imatinib and a second tyrosine kinase inhibitor and (ii) the treatment of patients with unresectable or metastatic GIST with the PDGFRA D842V mutation regardless of prior therapy. In addition, the European Commission has granted orphan medicinal product designation to avapritinib for the treatment of GIST.

Fisogatinib — Hepatocellular Carcinoma

We are developing fisogatinib for the treatment of advanced hepatocellular carcinoma, or HCC. Fisogatinib is an investigational, orally available, potent and highly selective inhibitor that targets FGFR4, a kinase that is aberrantly activated in a defined subset of patients with HCC, the most common type of liver cancer. We are currently evaluating fisogatinib in an ongoing Phase 1 clinical trial in patients with advanced HCC. As part of our collaboration with CStone Pharmaceuticals, or CStone, we are also evaluating fisogatinib in combination with CS1001, a clinical-stage anti-PDL1 immunotherapy being developed by CStone, for the treatment of locally advanced or metastatic HCC in an ongoing Phase 1b/2 trial conducted in multiple clinical sites in China. The FDA has granted orphan drug designation to fisogatinib for the treatment of HCC.

Discovery Platform

We plan to continue to leverage our discovery platform to systematically and reproducibly identify kinases that are drivers of diseases in genomically defined patient populations and craft drug candidates that potently and selectively target these kinases. In January 2020, we announced the nomination of a development candidate for the treatment of EGFR Exon 19/L858R+T790M+C797S, which we refer to as resistant EGFR-positive triple mutant NSCLC. Following this nomination, we currently have five wholly-owned discovery programs, consisting of the following: BLU-263; the development candidate for the treatment of resistant EGFR-positive triple mutant NSCLC; a pre-development candidate program targeting EGFR Exon 19/L858R+C797S, which we refer to as resistant EGFR-positive double mutant NSCLC; and two pre-development candidate programs for undisclosed kinase targets. EGFR Exon 19/L858R+T790M+C797S and EGFR Exon 19/L858R+C797S are acquired resistance mutations in NSCLC patients following treatment with osimertinib. We plan to nominate up to two additional development candidates by the end of 2020.

Development and Commercialization Rights

We currently have worldwide development and commercialization rights to avapritinib, pralsetinib and fisogatinib, other than the rights licensed to CStone for these drug candidates in Mainland China, Hong Kong, Macau and Taiwan, or the CStone territory. We currently have worldwide development and commercialization rights to all of our discovery programs, other than the discovery-stage cancer immunotherapy programs under collaboration with F. Hoffmann-La Roche Ltd and Hoffmann-La Roche Inc., which we collectively refer to as Roche, and BLU-782, which is licensed to Clementia Pharmaceuticals, Inc., or Clementia, a wholly-owned subsidiary of Ipsen S.A .

Collaborations and Licenses

Roche. We entered into a collaboration with Roche in March 2016. Under our collaboration agreement with Roche, we are working with Roche to discover, develop and commercialize up to four small molecule therapeutics targeting kinases believed to be important in cancer immunotherapy, as single products or possibly in combination with other therapeutics. In the fourth quarter of 2019, we and Roche announced one of the kinase targets under the collaboration, MAP4K1, which is believed to play a role in T cell regulation.

CStone. We entered into a collaboration with CStone in June 2018. Under our collaboration agreement with CStone, we are seeking to develop and commercialize avapritinib, pralsetinib and figogatinib, including back-up forms and certain other forms, in the CStone territory either as a monotherapy or as part of a combination therapy.

Clementia. In October 2019, we entered into a license agreement with Clementia, a wholly-owned subsidiary of Ipsen S.A., and granted an exclusive, worldwide, royalty-bearing license to Clementia to develop and commercialize BLU-782, as well as specified other compounds related to the BLU-782 program. BLU-782 is an investigational, orally available, potent and highly selective inhibitor that targets mutant activin-like kinase 2, or ALK2, in development for the treatment of fibrodysplasia ossificans progressiva, or FOP. Clementia is planning to commence a potentially pivotal Phase 2 trial of BLU-782 for the treatment of FOP in 2020 as a monotherapy. The FDA has granted a rare pediatric disease designation, orphan drug designation and fast track designation to BLU-782, each for the treatment of FOP.

We will continue to evaluate additional collaborations, partnerships and licenses that could maximize the value for our programs and allow us to leverage the expertise of strategic collaborators, partners and licensors, including in additional geographies where we may not have current operations or expertise. We are also focused on engaging in collaborations, partnerships and license agreements to capitalize on our discovery platform outside of our primary strategic focus area of cancer and rare diseases.

Our Strategy

Our vision is to leverage our scientific platform to design innovative first-in-class or best-in-class medicines targeting novel kinase biology and become a leading platform-enabled, fully-integrated, global precision therapy company focused on discovering, developing and commercializing a portfolio of precision therapies to patients with cancer and rare diseases. Key elements of our strategy to achieve this goal are as follows:

- Continue to build our global commercial capability as we rapidly advance the commercial launch of AYWAKIT in the U.S. and additional planned commercial launches for avapritinib and pralsetinib in the U.S. and Europe.
- Continue to expand our strategic focus on SM and related mast cell disorders, including avapritinib for the treatment of advanced and indolent SM and BLU-263 for the treatment of indolent SM, and if successful, seek global regulatory approvals.
- Rapidly advance the clinical development of pralsetinib as a potential treatment for RET-altered cancers, including RET-fusion NSCLC and MTC, and seek global regulatory approvals.
- Obtain global regulatory approvals for avapritinib for the treatment of third-line and later GIST (including fourth-line GIST).
- Continue to expand our broad, differentiated pipeline of kinase drug candidates for genomically defined cancers, rare diseases and cancer immunotherapy.
- Evaluate potential strategic collaborations and licenses to maximize the value of our programs and platform where we may not have current operations or expertise.
- Maintain a commitment to Blueprint Medicines' patient-focused and science-driven culture as we grow our business.

Our Focus — Highly Selective Kinase Drugs for Genomically Defined Cancers and Rare Diseases

Kinases are enzymes that function in many signaling pathways to regulate critical cellular functions. Kinase-dependent signaling networks are present in multiple different cell types and deregulation of these networks can lead to disease pathology. Abnormal activation of kinases has been shown to drive several key activities of cancer cells, including growth, survival, metabolism, cell motility and angiogenesis. Kinases may become abnormally activated through a number of mechanisms, including when: (1) a gene mutates creating a change in the resulting protein

sequence; (2) chromosomes become rearranged creating a translocation or a fusion gene; or (3) excessive amounts of protein are created due to gene duplication or dysregulation leading to overexpression. There is a strong link between genomic alterations in kinases and disease, including specific forms of cancer and rare diseases. Several kinases have been validated as oncogenes, which are genes that when altered can initiate and maintain cancer growth. Ongoing genomic analyses of tumor data sets continue to identify new roles for kinases as drivers of disease.

Despite these successes, many opportunities remain in kinase drug discovery and development.

- **Identifying novel kinase drivers of disease.** Very few kinases are the focus of approved drugs. Further, the function of the majority of the kinome still remains unexplored. Thus, there is substantial opportunity for developing novel and transformative therapies that target well-characterized but currently difficult-to-drug kinases as well as kinases of unknown biology, or KUBs, which constitute the majority of the kinome.
- **Crafting very selective kinase drugs.** Due to the high degree of homology between kinases, specific targeting of a given kinase can be challenging. Many of the approved kinase drugs inhibit multiple kinases and are referred to as multi-kinase inhibitors. Due to inhibition of off-target kinases, these multi-kinase inhibitors often give rise to severe unwanted effects, which can negatively impact the ability to dose patients at sufficient levels to achieve optimal efficacy. We believe increasing selectivity will minimize off-target toxicities and will improve efficacy by enabling higher dose levels and greater target inhibition. Further, combination therapies require that the drugs have non-overlapping toxicities, which could be minimized with more selective agents.
- **Generating novel chemical matter required to target difficult-to-drug kinases.** Novel chemical matter is needed to address targets that are known but have proven difficult-to-drug. Pharmaceutical companies generally rely on known chemical families as the basis of drug discovery programs. Consequently, the vast majority of pharmaceutical companies have similar compound libraries. New approaches are needed to develop novel chemistry and differentiated libraries that can inhibit difficult-to-drug kinases in alternate ways.
- **Overcoming resistance mediated by the alteration of kinase targets.** Most approved kinase inhibitors provide only temporary disease control. Patients may relapse due to the emergence of on-target resistance mutations. Novel approaches are needed to predict and inhibit resistant mutants thus providing more durable clinical responses.

Our Approach and Platform

Our approach is to systematically and reproducibly identify kinases that are drivers of diseases in genomically defined patient populations and to craft drug candidates that provide significant and durable clinical responses to patients. This approach enables us to drug known kinase targets that have been difficult to inhibit selectively and also identify, characterize and design drug candidates to inhibit novel kinase targets. By focusing on diseases in genomically defined patient populations, we believe that we can quickly identify the patients most likely to respond, resulting in a more efficient development path with a greater likelihood of success.

Our approach is enabled by our drug discovery platform consisting of two pillars:

- a proprietary, highly-annotated library of novel compounds; and
- a novel target discovery engine, which is a comprehensive process that interrogates kinase biology from many angles using genomics, structural biology and cell biology.

Our proprietary compound library is a unique collection of small molecules designed and developed entirely in-house by Blueprint Medicines' scientists as kinase inhibitors and enriched for drug-like properties. We do not owe royalties or other fees to any parties associated with our novel target discovery engine and our proprietary compound library. This provides high-quality compounds to start kinase drug discovery programs and to use in identifying new

kinase targets. The compounds were designed as kinase inhibitors without specific targets in mind, a design strategy that yielded a diversity of novel chemical structures that provide access to unique chemical matter. Each compound has been extensively characterized for binding to over 450 kinases and disease-relevant kinase mutants, and the majority of known kinases are targeted by at least one compound family. Thus, this “annotated” compound library provides high-quality medicinal chemistry starting points that enable quick-starts to drug discovery programs, avoiding the expense and time spent running high throughput screens. Notably, our proprietary compound library has yielded high quality chemical starting points for previously difficult-to-drug kinases. We have continued to expand our proprietary compound library to cover a significant portion of the kinome and anticipate that as part of our discovery efforts we will continue to increase the number of compound families that inhibit each kinase target.

We have established a novel target discovery engine, which was developed entirely in-house, to provide new insights into the biology of kinases as drivers of disease and to identify new kinase drug targets. There are two aspects to the novel target discovery engine:

- **Genomics approach to identify novel kinase targets.** Our high-capacity computing infrastructure allows not only storage of very large genomic databases but also rapid analyses of these data using proprietary algorithms developed by our bioinformaticians. For example, using our proprietary kinase fusion detection algorithm to analyze human tumor sequences, we have identified both novel kinase fusions and new disease indications for several known kinase fusions.
- **Cell-based screens to identify novel kinase targets.** In this approach, a subset of the compounds in our proprietary compound library that exhibit remarkable potency and/or selectivity for one or a few kinases — our “tool compounds” — are used as probes in disease-relevant cell-based screens. Many of these tool compounds inhibit KUBs and thus allow us to evaluate potential roles for these relatively unexplored kinases in human disease.

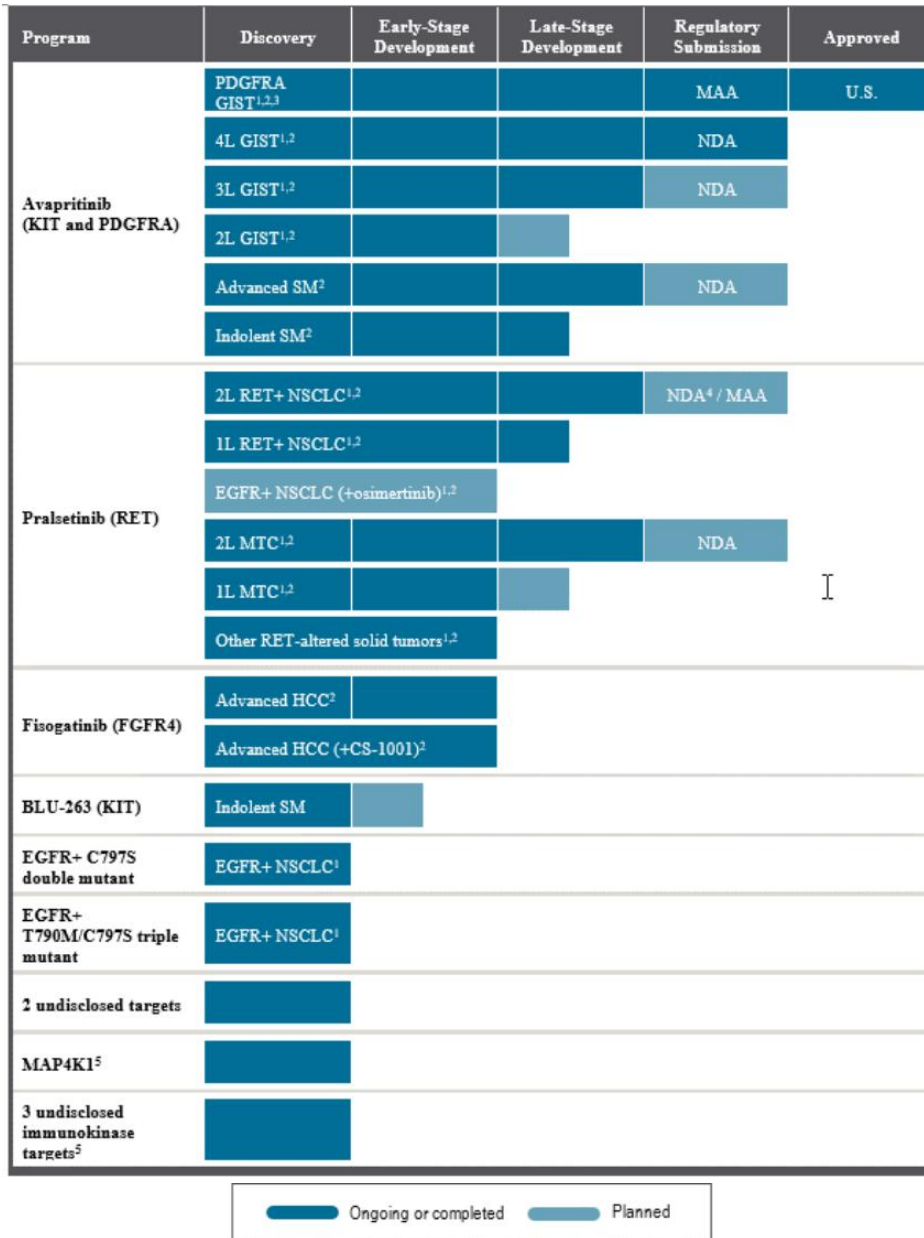
Another aspect of our novel discovery engine is predicting resistance mutations. Through our structural and cell biology expertise, we predict mutations in kinases that render the enzyme insensitive to inhibition by an approved drug or compound in development. While treatment of patients with genomically defined cancers with a targeted therapy typically results in a significant anti-tumor response, frequently the response is not durable. In tumors driven by an activated kinase, kinase reactivation via mutation is a common mechanism of resistance. Using our structural biology and computational chemistry expertise, we predict what changes in the kinase might result in a resistant enzyme and then confirm this prediction in a relevant cell culture model.

Our Pipeline

We have leveraged our discovery platform to develop a robust drug pipeline of orally available, potent and selective small molecule kinase inhibitors that target genomic drivers in genomically defined cancers, rare diseases and cancer immunotherapy.

We currently have worldwide development and commercialization rights to avapritinib, pralsetinib and fisogatinib, other than the rights licensed to CStone for these drug candidates in the CStone territory. We currently have worldwide development and commercialization rights to all of our discovery programs, other than the discovery-stage cancer immunotherapy programs under the Roche collaboration.

The following chart summarizes our most advanced programs, each of which is described in further detail below.



1. Unresectable or metastatic disease.
2. CStone Pharmaceuticals has exclusive rights to develop and commercialize avapritinib, pralsetinib and fisogatinib in Mainland China, Hong Kong, Macau and Taiwan. Blueprint Medicines retains all rights in the rest of the world. For more information, see “—Collaborations and Licenses” below.
3. Approved in the U.S. for the treatment of adults with unresectable or metastatic GIST harboring a PDGFRA exon 18 mutation, including PDGFRA D842V mutations. The proposed MAA indication is unresectable or metastatic GIST harboring a PDGFRA D842V mutation.
4. Expect to complete rolling NDA submission in the first quarter of 2020.
5. In collaboration with Roche. Blueprint Medicines has U.S. commercial rights for up to two programs. Roche has worldwide commercialization rights for up to two programs and ex-U.S. commercialization rights for up to two programs. For more information, see “—Collaborations and Licenses” below.

Precision Therapy Approach

Our approved therapy AYWAKIT and all of our current drug candidates and development programs target patient populations with genomically defined diseases. Generally, as we advance our drug candidates through clinical development, we enrich our clinical trials by selecting patients most likely to respond to our drug candidates to confirm mechanistic and clinical proof-of-concept. We are also collaborating with third parties to develop and commercialize companion diagnostic tests for avapritinib, pralsetinib and fisogatinib. We may collaborate with other third parties in the future to develop and commercialize additional companion diagnostic tests or to develop assays to measure target engagement, pathway modulation and early response.

Estimated Epidemiology of Patients and Frequency of Targeted Genomic Alterations

The table below lists the diseases and genomic drivers targeted by our most advanced programs, and for each of these diseases, the corresponding estimated number of patients in the U.S., France, Germany, Italy, Spain, the United Kingdom and Japan, or the Major Markets. In addition, the table lists the estimated frequency of the genomic alterations that we are initially targeting for each of these diseases.

Drug Candidate	Initial Diseases	Estimated Number of Patients ⁽¹⁾		Genomic Drivers	Estimated Frequency of Alteration (% of Patients)
		U.S.	Total Major Markets		
Avapritinib	GIST	3,200 first line	8,500 first line	D842V mutant PDGFRA	~5-6% of primary GIST
		2,900 second line	7,500 second line	KIT mutations	~80%
		3,400 ≥ third line	7,400 ≥ third line		
Avapritinib/ BLU-263	SM	1,600 advanced SM	3,750 advanced SM	KIT D816V mutation	~95%
		30,000 indolent or smoldering SM	71,250 indolent or smoldering SM		
Pralsetinib	NSCLC	147,300 first line	374,500 first line	RET fusions	~1-2%
		87,800 second line	218,000 second line	RET mutations	~60%
	MTC	650 all lines	1,300 all lines		
Fisogatinib	HCC ⁽²⁾	20,200 first line	63,500 first line	Aberrant FGFR4 signaling	~30%
		7,400 second line	22,700 second line		

- (1) Based on estimated prevalence for SM and MTC patients and estimated incidence for GIST, HCC and NSCLC patients. Estimates for GIST, HCC and NSCLC include metastatic and unresectable patient populations.
- (2) The incidence of HCC outside of the Major Markets (including in China, South Korea, Taiwan and Singapore) represents an additional opportunity for fisogatinib.

Avapritinib and BLU-263 — Systemic Mastocytosis and other Mast Cell Disorders

Disease Overview

SM is a disorder of the mast cells, the key effector cells of allergic inflammation, which have several physiologic roles including wound healing, regulation of vascular and epithelial permeability and immune cell recruitment. The signature of SM is the overproduction of mast cells and the accumulation of mast cells in the bone marrow and other organs. In advanced forms of SM, abnormal mast cells may also accumulate in the liver, spleen, GI tract and bones. Mast cell activation and histamine release can lead to severe allergic symptoms ranging from a skin rash to hives, fever and anaphylaxis, while mast cell accumulation in advanced cases of SM can eventually lead to organ dysfunction and failure.

SM comprises a spectrum of disease, with approximately 95% of patients having a KIT D816V mutation, the underlying driver of disease for most SM patients. The diagnosis, which is usually made in adulthood, involves a complex diagnostic algorithm that begins with confirmation of SM and subsequently categorizes patients into indolent or advanced subtypes of disease. Indolent SM is the most common form of SM and is characterized by often severe,

unpredictable and debilitating symptoms due to mast cell activation. Symptoms may include hypersensitivity reactions, including unpredictable anaphylaxis, gastrointestinal distress including severe nausea, vomiting and diarrhea, and extensive skin rashes that cause pain, discomfort and social isolation. Advanced SM is a more rare form of SM associated with mast cell infiltration of organ systems resulting in increasingly severe impact on life expectancy, and includes three subsets: aggressive SM, or ASM, advanced SM with an associated hematologic neoplasm, SM-AHN, and mast cell leukemia, or MCL. These advanced forms of SM have a median overall survival of three to five years and are characterized by prominent organopathy and dysfunction, as well as symptoms of mast cell activation.

Population studies estimate the prevalence rate of all subtypes of SM is approximately 9.6 per 100,000 people. Of all SM patients, advanced SM accounts for approximately 5% of the patients, and indolent SM, including an intermediate form referred to as smoldering SM, account for the remaining 95% of patients.

The current treatment paradigm for SM varies by disease subtype. Currently, there are no approved targeted therapies that address the approximately 95% of SM patients with the KIT D816V mutation. Midostaurin, which was approved in April 2017 by the FDA for the treatment of advanced SM, is a multi-kinase inhibitor with limited KIT D816V inhibitory activity, and imatinib does not address patients with the KIT D816V mutation.

For patients with indolent SM, management is symptom-directed and includes avoidance of triggers of mast cell activation (such as insect stings). Treatments for indolent SM include histamine blockers, cromolyn, epinephrine, corticosteroids, and, in cases of refractory patients, cytoreductive agents. Patients often take multiple symptom-directed treatments to manage their disease, and a reduction in polypharmacy burden is an important treatment goal. Within indolent SM, key opinion leaders see the greatest degree of unmet need for the fraction of patients who have a heavy symptom burden that current therapies fail to address.

For patients with advanced SM, treatments include midostaurin, interferon-alpha or cytoreductive agents to reduce mast cell burden or treatments aimed at addressing the associated blood disorder. Patients with advanced SM typically have a three to five-year overall survival prognosis.

Avapritinib – Clinical Development for Patients with SM

We are developing avapritinib, an orally available, potent and highly selective inhibitor that targets KIT and PDGFRA mutations, for the treatment of systemic mastocytosis.

We are currently evaluating avapritinib in the registration-enabling Phase 1 EXPLORER trial, the registration-enabling Phase 2 PATHFINDER trial, and the registration-enabling Phase 2 PIONEER trial. We plan to present updated data from the EXPLORER and PATHFINDER trials in the second half of 2020. In December 2019, we reported initial data from the dose-finding portion (part 1) of the PIONEER trial at the 61st ASH annual meeting. We plan to report updated data from part 1 of the PIONEER trial in a late-breaking oral presentation on March 14, 2020 at the AAAAI annual meeting. Based on these data, we expect to initiate patient screening in part 2 of the PIONEER trial in the second quarter of 2020 and complete enrollment by the end of 2020.

We plan to submit a supplemental NDA to the FDA for avapritinib for the treatment of advanced SM in the second half of 2020, which we anticipate will be focused on data from patients in the EXPLORER and PATHFINDER trials who started at the proposed dose of 200 mg QD, supported by pooled data from all doses. The FDA has granted orphan drug designation to avapritinib for the treatment of mastocytosis, and the European Commission has granted orphan medicinal product designation to avapritinib for the treatment of mastocytosis. In addition, the FDA has granted breakthrough therapy designation to avapritinib for the treatment of advanced SM, including the subtypes of aggressive SM, SM with an associated hematologic neoplasm and mast cell leukemia.

Phase 1 EXPLORER Trial

The EXPLORER trial is an open-label, single-arm trial designed to identify the recommended Phase 2 dose, or RP2D, and demonstrate proof-of-concept in patients with advanced SM. Key trial endpoints include overall response

rate, or ORR, duration of response, or DOR, quantitative measures of mast cell burden, patient-reported outcomes and safety. The EXPLORER trial has completed patient enrollment.

Data Presented at the 24th Congress of the European Hematology Association in June 2019

As of a data cutoff date of January 2, 2019, 69 patients were treated with avapritinib in the Phase 1 EXPLORER clinical trial, including seven patients with ASM, 37 patients with SM-AHN, nine patients with MCL, 15 patients with indolent or smoldering SM, and one patient without SM who had chronic myelomonocytic leukemia. Diagnoses were centrally reviewed by a committee of SM experts following an initial assessment by local investigators. Forty-two patients (61 percent) had a prior treatment, including 15 patients (22 percent) who had previously received the multi-kinase inhibitor Rydapt® (midostaurin).

Clinical Activity Data – Advanced SM. Thirty-nine patients with advanced SM (three ASM, 28 SM-AHN, eight MCL) were evaluable for response by the modified IWG-MRT-ECNM criteria, or IWG criteria, a method for assessing clinical response in advanced SM patients with regulatory precedent in the U.S. and Europe. Confirmation of response was defined as a response duration of at least 12 weeks. Evaluable patients generally had more advanced disease at baseline than the overall trial population.

In evaluable patients across all doses studied, the confirmed ORR was 77 percent. Nine patients had complete remission with a full or partial recovery of peripheral blood counts, or CR/CRh, (23 percent), 18 patients had partial remission (46 percent) and three patients had clinical improvement (8 percent). No patients had progressive disease as the initial response. In addition, the 12-month DOR rate was 74 percent, and 49 patients (71 percent) remained on treatment with durations up to nearly three years (34 months).

Across all enrolled patients, the median overall survival, or OS, was not reached. The estimated 24-month OS rate was 78 percent in all advanced SM patients: 100 percent in ASM patients, 70 percent in SM-AHN patients and 88 percent in MCL patients.

Avapritinib demonstrated strong clinical activity in patients with SRSF2, ASXL1 and/or RUNX1, or collectively S/A/R mutation positive genotypes, who historically have particularly poor prognoses. In 22 evaluable patients with S/A/R genotypes, the confirmed ORR was 73 percent and five patients had a CR/CRh (23 percent).

Nearly all patients had significant declines on objective measures of mast cell burden. Across all patients evaluable on these measures, 100 percent had a ≥ 50 percent decline in serum tryptase, 93 percent had a ≥ 50 percent reduction in bone marrow mast cells, 84 percent had palpable spleens become non-palpable, and 88 percent had a ≥ 50 percent reduction in KIT D816V mutation allele fraction.

Clinical Activity Data – Indolent or Smoldering SM. Avapritinib showed strong clinical activity in patients with indolent or smoldering SM. Nearly all patients had ≥ 50 percent reductions in serum tryptase, bone marrow mast cells and KIT D816V mutation allele fraction. In addition, improvements on these measures were deep and rapid. Thirteen of 15 evaluable patients had normalized serum tryptase levels, and 12 of 13 evaluable patients had complete clearance of mast cell aggregates from the bone marrow. All indolent and smoldering SM patients achieved a ≥ 50 percent reduction in serum tryptase by the first post-baseline assessment.

Safety Data. Avapritinib was generally well-tolerated with most adverse events, or AEs, reported by investigators as Grade 1 or 2. Across all grades, the most common non-hematologic treatment-emergent AEs (regardless of relationship to avapritinib) reported by investigators (>15 percent) were periorbital edema, diarrhea, nausea, fatigue, peripheral edema, vomiting, cognitive effects, hair color changes, arthralgia, abdominal pain, dizziness, decreased appetite, pruritis, constipation and dysgeusia. The most common hematologic treatment-emergent AEs reported by investigators (>10 percent) were anemia, thrombocytopenia and neutropenia. In addition, intracranial bleeding occurred in six patients with pre-existing thrombocytopenia, a known risk factor for intracranial bleeding, and one patient who had a life-threatening fall prior to intracranial bleeding. Five of these patients resumed and remained on treatment with

avapritinib following dose modifications. Cytopenias were the most common Grade 3 and 4 treatment-related AEs. No Grade 5 treatment-related AEs were reported by investigators.

Updated Data Reported in December 2019

As of a data cutoff of August 30, 2019, updated efficacy data from the EXPLORER trial showed a centrally confirmed ORR of 77 percent in 48 patients evaluable for response per modified IWG criteria. ORR was defined as complete remission with full or partial recovery of peripheral blood counts, partial remission or clinical improvement. Median DOR and median OS were not reached. Median follow-up was 21 months, with patients receiving ongoing treatment up to approximately 3.5 years.

The safety results were generally consistent with the data reported at the 24th Congress of the European Hematology Association, or EHA annual meeting. In 80 patients evaluable for safety as of the data cutoff date, avapritinib was generally well-tolerated with most AEs reported by investigators as Grade 1 or 2. Across all grades, the most common treatment-emergent AEs reported by investigators were periorbital edema, anemia, diarrhea, fatigue, peripheral edema, nausea, thrombocytopenia, vomiting and cognitive effects. Only six patients discontinued due to treatment-related adverse events. As of the data cutoff date, no new intracranial bleeding events had been observed in the EXPLORER trial since our previous data presentation at the EHA annual meeting

Phase 2 PIONEER Trial

The PIONEER trial is a randomized, double-blind, placebo-controlled, registration-enabling trial in patients with indolent and smoldering SM. Key trial endpoints include the change in patient-reported disease symptoms as measured by the Indolent SM Symptom Assessment Form Total Symptom Score, or ISM-SAF TSS, quantitative measures of mast cell burden and safety. Part 1 of the PIONEER trial was designed to test three doses of avapritinib (25 mg, 50 mg and 100 mg QD) versus placebo to determine a RP2D. Major eligibility criteria included adults with indolent SM confirmed by central pathology review and moderate to severe symptom burden, despite best available supportive care medications. The dose-finding part 1 of the PIONEER trial has completed patient enrollment. We expect to initiate patient screening in part 2 of the PIONEER trial in the second quarter of 2020 and complete enrollment by the end of 2020.

Initial Data Presented at ASH Annual Meeting in December 2019

As of a data cutoff date of November 12, 2019, 39 patients were randomized in part 1 of the PIONEER trial across four concurrent cohorts, including 10 patients in each avapritinib dose cohort and nine patients in the placebo cohort. The enrolled population had a median time on study of 12 weeks (range: 1-30 weeks).

Baseline Patient Characteristics. At baseline, all patients had symptomatic disease despite best available therapy. Median ISM-SAF TSS was 52 [range: 19-100 (total possible range: 0-110)]. Patients were taking a median of three medications (range: 1-7) to treat their disease. Mean serum tryptase was 84 micrograms per liter.

Clinical Activity Data. Across all avapritinib dose cohorts, reductions in serum tryptase were robust, occurred rapidly and were sustained in patients treated up to 30 weeks. The placebo cohort showed no change in serum tryptase at 12 weeks.

Timepoint	Mean Percent Change in Serum Tryptase			
	Avapritinib 25 mg QD	Avapritinib 50 mg QD	Avapritinib 100 mg QD	Placebo
Cycle 1, Day 8 (first post-baseline assessment)	-37.72%	-54.08%	-56.16%	7.05%
Cycle 4, Day 1 (12 weeks)	-48.24%	-66.67%	-61.83%	0.39%

Tryptase is an enzyme released by activated mast cells. Elevated tryptase in blood serum is a hallmark of SM and a component of the World Health Organization diagnostic criteria. Reduction in serum tryptase is a component of the IWG criteria for advanced SM.

Safety Data. All doses of avapritinib tested were well-tolerated, and most reported AEs were Grade 1 or 2. There were no reported cases of intracranial bleeding, thrombocytopenia or anemia. Across all avapritinib cohorts, five patients (16.7 percent) had Grade 3 AEs, and no patients had serious AEs. In patients treated with placebo, two patients (22.2 percent) had Grade 3 AEs, and two patients (22.2 percent) had serious AEs. There was one Grade 3 cognitive effect reported in the 100 mg cohort. The event resolved following dose modification, and the patient remained on therapy as of the data cutoff date. No patients discontinued treatment due to an AE.

Phase 2 PATHFINDER Trial

The PATHFINDER trial is an open-label, single-arm registration-enabling trial designed to confirm the clinical activity of avapritinib in patients with advanced SM. Key trial endpoints include ORR, DOR, quantitative measures of mast cell burden, patient-reported outcomes and safety. Patient enrollment is ongoing. We plan to present updated data from the PATHFINDER trial in the second half of 2020.

BLU-263 – Planned Clinical Development for Patients with SM and other Mast Cell Disorders

We are developing BLU-263 for the treatment of indolent SM and other mast cell disorders. BLU-263 is an investigational, orally available, potent and highly selective KIT inhibitor currently in the discovery stage. BLU-263 is designed to have equivalent potency as avapritinib, improved selectivity for KIT, with low off-target activity, and lower penetration of the central nervous system relative to avapritinib based on preclinical data, which we believe will enable development of BLU-263 in a broad population of patients with indolent SM, including patients with lower disease burden requiring potentially life-long chronic therapy, as well as patients with other KIT-driven mast cell disorders. We plan to submit an IND for BLU-263 for indolent SM and initiate a Phase 1 trial in healthy volunteers in the first half of 2020.

Pralsetinib — RET-altered Cancers

Disease Overview

RET is a receptor tyrosine kinase that activates multiple downstream pathways involved in cell proliferation and survival. RET can be activated by mutation or when a portion of the RET gene that encodes the kinase domain is joined to part of another gene creating a fusion gene that encodes an aberrantly activated RET fusion protein. RET activating mutations are implicated in advanced MTC (approximately 90% of patients), and RET fusions are implicated in several cancers, including papillary thyroid carcinoma (approximately 10- 20% of patients) and NSCLC (1-2% of patients). Our genomics analyses on the landscape of kinase fusions identified RET fusions in breast and colon cancer patient samples (both <1% of patients), providing a therapeutic rationale for the use of RET inhibitors in multiple patient subpopulations.

The identification of RET fusions as drivers in some cancers prompted the use of approved multi-kinase inhibitors with RET inhibitory activity to treat patients whose tumors express a RET fusion protein. However, we believe these drugs cannot be dosed at levels required to sufficiently inhibit RET due to toxicities that result from inhibition of the primary targets. For example, currently approved therapies such as vandetanib and cabozantinib demonstrate lower objective response rates and DOR in patients with RET-altered NSCLC compared to selective kinase inhibitors targeting other kinase drivers such as EGFR, ALK and ROS1.

One of the greatest challenges in treating cancer is the ability of tumor cells to become resistant to therapy. Kinase reactivation via mutation to evade small molecule inhibition is a common mechanism of resistance. We have predicted future resistance mutations of drugs with RET inhibitory activity. Thus, there is a clear need for a selective RET inhibitor that targets both oncogenic RET fusions and activating mutations and their predicted RET resistance mutations.

Pralsetinib — Clinical Development for Patients with RET-Altered NSCLC, MTC and other Solid Tumors

We are developing pralsetinib for the treatment of RET-altered NSCLC, MTC, and other solid tumors. Pralsetinib is an investigational, orally available, potent and highly selective inhibitor that targets RET, a receptor tyrosine kinase. Pralsetinib is designed to inhibit the activating RET fusions and mutations that drive cancer growth and remain active in the presence of resistance mutations that we predict will arise from treatment with first generation therapies. RET activating fusions and mutations drive disease in subsets of patients with NSCLC, and cancers of the thyroid, including MTC and PTC, and our research suggests that RET may drive disease in subsets of patients with colon cancer, breast cancer, pancreatic cancer and other cancers.

We are currently evaluating pralsetinib in the ongoing ARROW trial. In January 2020, we reported top-line data from the ARROW trial in RET fusion-positive NSCLC patients treated with pralsetinib at the proposed dose of 400 mg QD. We plan to present the registration data from the ARROW trial of pralsetinib in RET fusion-positive NSCLC and RET-mutant MTC in 2020. We recently announced the activation of the first trial site for the AcceleRET Lung trial evaluating pralsetinib in patients with first-line RET fusion-positive NSCLC, and we plan to initiate a Phase 3 clinical trial of pralsetinib in first-line RET-mutant MTC in the second half of 2020.

In January 2020, we initiated the submission of a rolling NDA to the FDA for the treatment of patients with RET fusion-positive NSCLC and expect to complete the submission in the first quarter of 2020. We plan to submit an NDA to the FDA for pralsetinib for the treatment of patients with MTC previously treated with an approved multi-kinase inhibitor in the second quarter of 2020. In addition, we plan to submit an MAA to the EMA, for pralsetinib for RET fusion-positive NSCLC in the second quarter of 2020.

The FDA has granted orphan drug designation to pralsetinib for the treatment of RET-rearranged NSCLC, JAK1/2-positive NSCLC or TRKC-positive NSCLC, and the FDA has granted breakthrough therapy designation to pralsetinib for the treatment of patients with RET-fusion positive NSCLC that has progressed following platinum-based chemotherapy and to pralsetinib for the treatment of patients with RET mutation-positive MTC that requires systemic treatment and for which there are no acceptable alternative treatments.

Phase 1/2 ARROW Trial

The ARROW trial is a Phase 1/2 open-label, registration-enabling trial in patients with RET-altered NSCLC, MTC and other advanced solid tumors. Trial objectives include assessing response, pharmacokinetics, pharmacodynamics and safety. The dose-escalation portion of the ARROW trial is complete, and the expansion portion is actively enrolling patients across various cohorts.

Data Presented at ASCO Annual Meeting in June 2019

The presented data included 120 patients with RET-fusion NSCLC, 64 patients with RET-mutant MTC and 12 patients with other RET-altered cancers (nine PTC, two pancreatic cancer and one intrahepatic bile duct carcinoma) enrolled in the ARROW trial as of a data cutoff date of April 28, 2019. The patients with RET-fusion NSCLC and RET-mutant MTC received a starting dose of 400 mg QD, which is the RP2D. Patients with other RET-altered cancers were included regardless of starting dose.

At baseline, 40 percent of the RET-fusion NSCLC patients had brain metastases. Brain metastases commonly occur in NSCLC patients, and the prognosis in these patients is typically poor. Regardless of starting dose and including the dose-escalation portion of the ARROW trial, the RET-fusion NSCLC patients have been on treatment up to 24 months.

For clinical activity data, NSCLC and MTC patients were evaluable if they were enrolled as of November 14, 2018 with follow-up through the data cutoff date, which enabled them to have at least two radiographic scans. Tumor response was assessed by Response Evaluation Criteria in Solid Tumors, or RECIST, version 1.1.

Clinical Activity Data — RET-Fusion NSCLC. As of the data cutoff date, 48 patients with RET-fusion NSCLC were evaluable for response assessment, including 35 patients previously treated with platinum-based chemotherapy.

- Nearly all patients (90 percent) had radiographic tumor reductions.
- The ORR was 60 percent (one complete response, or CR, and 20 partial responses, or PRs); all responses were confirmed, and the disease control rate, or DCR, was 100 percent in the patients previously treated with platinum-based chemotherapy.
- The ORR was 71 percent (five confirmed PRs) in seven patients naïve to prior systemic treatment.
- Across all patients, the median DOR was not reached, and 82 percent of responders remained on treatment as of the data cutoff date.
- In nine patients with measurable brain metastases, 78 percent had shrinkage of brain metastases.
- No patients starting at the 400 mg QD dose had disease progression due to new brain involvement.
- Pralsetinib was highly active regardless of RET fusion partner, including RET-KIF5B and RET-CCDC6.

Clinical Activity Data — RET-Mutant MTC and Other RET-Altered Cancers. As of the data cutoff date, 32 patients with RET-mutant MTC were evaluable for response assessment, including 16 patients previously treated with the multi-kinase inhibitors cabozantinib or vandetanib.

- The ORR was 63 percent (nine confirmed PRs, one PR pending confirmation) and the DCR was 94 percent in RET-mutant MTC patients previously treated with cabozantinib or vandetanib.
- Across all RET-mutant MTC patients, the median DOR was not reached and all responders remained on treatment as of the data cutoff date, with treatment durations up to 15.6 months for patients receiving a starting dose of 400 mg QD.

As of the data cutoff date, clinical activity data were reported in patients with other RET-altered cancers:

- Six patients with PTC were evaluable for response assessment by RECIST version 1.1. In these patients, the ORR was 83 percent (three confirmed PRs, two PRs pending confirmation).
- Five patients with PTC have remained on treatment for one year or longer, and eight patients with PTC remained on treatment as of the data cutoff date.
- Additional responses were observed in patients with other RET-fusion cancers, including pancreatic cancer (one confirmed PR, one PR pending confirmation) and intrahepatic bile duct carcinoma (one confirmed PR).

Four patients (two with RET-fusion NSCLC, two with RET-mutant MTC) enrolled in the ARROW trial were previously treated with selpercatinib. Among them:

- Two patients had a PR, one of which was confirmed as of the data cutoff date, and one of which was pending as of the data cutoff date and subsequently confirmed prior to the presentation.
- One patient had stable disease with radiographic tumor reductions and remained on treatment as of the data cutoff date.

Safety Data. As of the data cutoff date, 226 patients received a starting dose of 400 mg QD and were evaluable for safety. Across all patients, pralsetinib was well-tolerated and most AEs reported by investigators were Grade 1 or 2. Across all grades, the most common treatment-emergent AEs (regardless of relationship to pralsetinib) reported by investigators (≥ 15 percent) were constipation, hypertension, increased aspartate aminotransferase, neutropenia, diarrhea, fatigue, anemia, increased alanine aminotransferase and increased blood creatinine. Investigator-reported Grade 3 or 4 treatment-related AEs (≥ 2 percent) included neutropenia, hypertension, anemia, increased blood creatine phosphokinase and leukopenia.

Across all patients, only four percent of patients discontinued treatment with pralsetinib due to treatment-related AEs. Seven percent of patients with RET-fusion NSCLC discontinued treatment with pralsetinib due to treatment-related AEs, and no patients with RET-mutant MTC discontinued treatment with pralsetinib due to treatment-related AEs.

Top-line Data Reported for Pralsetinib in NSCLC Patients in January 2020

Top-line efficacy data were reported for patients treated with pralsetinib who were evaluable for response assessment per RECIST version 1.1, as determined by blinded independent central review, as of a data cutoff date of November 18, 2019. All patients received the proposed dose of 400 mg QD.

In 80 patients with RET fusion-positive NSCLC previously treated with platinum-based chemotherapy, the ORR was 61 percent (95% confidence interval, or CI: 50-72%) per independent central review (two responses pending confirmation). Overall, 95 percent of patients had tumor shrinkage, including 14 percent of patients with complete regression of target tumors. The median DOR was not reached (95% CI: 11.3 months, not estimable).

In 26 patients with treatment-naïve RET fusion-positive NSCLC, the ORR was 73 percent (95% CI: 52-88%) per independent central review (all responses confirmed), with 12 percent of patients achieving CR. All patients had tumor shrinkage.

Top-line safety data were consistent with those reported at the ASCO Annual Meeting in June 2019. Pralsetinib was well-tolerated, and most AEs were Grade 1 or 2. Across all patients enrolled in the ARROW trial treated with the proposed dose of 400 mg QD (N=354), only four percent of patients discontinued treatment with pralsetinib due to treatment-related AEs.

Phase 3 AcceleRET Lung Trial

We recently announced the activation of the first trial site for the AcceleRET Lung trial evaluating pralsetinib in patients with first-line RET fusion-positive NSCLC. The primary objective of the AcceleRET Lung trial is to evaluate the potential of pralsetinib to extend progression free survival, or PFS, compared to platinum-based chemotherapy with or without pembrolizumab in patients with first-line RET fusion-positive NSCLC. The trial's primary endpoint is PFS, and secondary endpoints include OS, ORR and DOR.

Avapritinib — Gastrointestinal Stromal Tumors (GIST)

Disease Overview

GIST is a rare disease that is a sarcoma of the GI tract. Tumors arise within cells in the wall of the GI tract and occur most often in the stomach or small intestine. Most patients are diagnosed between the ages of 50-80 with diagnosis triggered by GI bleeding, incidental findings during surgery or imaging, or in rare cases acute presentation due to tumor rupture or GI obstruction. The standard workup at primary presentation includes pathologic confirmation and imaging to assess extent of disease.

The GIST treatment paradigm has advanced dramatically over the past years. Patients diagnosed with localized disease undergo potentially curative tumor resection, while imatinib is given to high risk resected patients to prolong the time to recurrence. The advent of imatinib has improved the prognosis of patients with unresectable or metastatic disease to a five-year median overall survival. Unresectable or metastatic patients typically receive imatinib, followed by sunitinib and regorafenib as the disease progresses.

For patients with KIT-driven GIST, current medical therapies slow the course of disease, but progression is inevitable in most cases. Up to 50% of patients treated with frontline imatinib relapse within approximately 18 months. Of the secondary resistance mutations that lead to relapse, many of the mutations confer resistance to current treatments. A therapy that effectively suppresses a broad spectrum of KIT mutations and that is potentially amenable to combinations with existing agents is needed.

Patients with PDGFRA D842V-driven GIST have great unmet medical need, as no approved medical therapies are effective. Progression can occur within as little as three months, and the median overall survival is 15 months for patients with advanced disease.

GIST is a tumor type that depends on continued signaling of a single, aberrantly active kinase. Most GISTs result from primary mutations in KIT or PDGFRA. Approximately 80% of patients have KIT-driven GIST. Imatinib effectively inhibits most KIT primary mutations. However, over time, secondary mutations occur elsewhere in the KIT gene that lead to kinase activation despite the presence of imatinib, thereby leading to disease progression. The most common mutation in the PDGFRA gene is D842V, found in approximately 5-6% of frontline GIST patients. Currently, AYVAKIT is the only FDA-approved treatment for patients with D842V mutant PDGFRA-driven GIST. PDGFRA has a very similar active site structure to KIT, and the PDGFRA D842V mutation is homologous to KIT D816V.

AYVAKIT (avapritinib) — FDA-Approved Therapy for Unresectable or Metastatic GIST Harboring a PDGFRA Exon 18 Mutation

We are developing avapritinib for the treatment of GIST, a rare disease that is a sarcoma, or tumor of bone or connective tissue, of the GI tract. Avapritinib is an orally available, potent and highly selective inhibitor that targets KIT and PDGFRA mutations. These mutations abnormally activate receptor tyrosine kinases that are drivers of GIST.

In January 2020, the FDA granted approval of avapritinib under the brand name AYVAKIT for the treatment of adults with unresectable or metastatic GIST harboring a PDGFRA exon 18 mutation, including PDGFRA D842V mutations. The efficacy of AYVAKIT was established from 43 patients in the NAVIGATOR trial with unresectable or metastatic GIST harboring PDGFRA exon 18 mutations, including 38 patients with PDGFRA D842V mutations. The

safety of AYVAKIT in patients with unresectable or metastatic GIST was evaluated in 204 patients who received 300 mg QD or 400 mg QD dosing in the NAVIGATOR trial.

In addition, the FDA has granted breakthrough therapy designation to avapritinib for the treatment of patients with unresectable or metastatic GIST harboring the PDGFRA D842V mutation. The FDA has also granted orphan drug designation to avapritinib for the treatment of GIST and fast track designation to avapritinib for (i) the treatment of patients with unresectable or metastatic GIST that progressed following treatment with imatinib and a second tyrosine kinase inhibitor and (ii) the treatment of patients with unresectable or metastatic GIST with the PDGFRA D842V mutation regardless of prior therapy.

Avapritinib — Clinical Development for Patients with Advanced GIST

We are also developing avapritinib for the treatment of third-line and later GIST (including fourth-line GIST). We are currently evaluating avapritinib for the treatment of GIST in the VOYAGER trial. The FDA is currently reviewing our NDA for avapritinib for the treatment of fourth-line GIST, and this application has a PDUFA action date of May 14, 2020. As part of the review, the FDA has requested top-line data from our VOYAGER trial. We expect to provide the top-line data to the FDA early in the second quarter of 2020 to enable the FDA to take action by the PDUFA action date and we also expect to report the top-line data in the second quarter of 2020.

Based on data from the VOYAGER trial, we plan to submit a supplemental NDA to the FDA for avapritinib for the treatment of third-line GIST in the second half of 2020. In addition, the EMA is currently reviewing our MAA for the treatment of adult patients with PDGFRA D842V mutant GIST, regardless of prior therapy, and we anticipate a decision from the European Commission in the third quarter of 2020. We plan to pursue an MAA for third-line and later GIST (including fourth-line GIST) based on data from our VOYAGER trial.

The FDA has granted breakthrough therapy designation to avapritinib for the treatment of patients with unresectable or metastatic GIST harboring the PDGFRA D842V mutation. The FDA has also granted orphan drug designation to avapritinib for the treatment of GIST and fast track designation to avapritinib for (i) the treatment of patients with unresectable or metastatic GIST that progressed following treatment with imatinib and a second tyrosine kinase inhibitor and (ii) the treatment of patients with unresectable or metastatic GIST with the PDGFRA D842V mutation regardless of prior therapy. In addition, the European Commission has granted orphan medicinal product designation to avapritinib for the treatment of GIST.

Phase 1 NAVIGATOR Trial

The NAVIGATOR trial is a registration-enabling trial designed to evaluate the safety, tolerability and clinical activity of avapritinib in patients with unresectable or metastatic GIST. The trial consists of two parts, a dose escalation portion and an expansion portion. Trial objectives include assessing response using blinded central radiology review, as well as pharmacokinetics and pharmacodynamic measures. The NAVIGATOR trial has completed patient enrollment.

Data Presented at ASCO Annual Meeting in June 2019 for Fourth-Line GIST

As of a data cutoff date of November 16, 2018, 204 patients were treated with avapritinib at a starting dose of 300 or 400 mg QD in the NAVIGATOR trial. Patients with fourth-line or later GIST had a median of four prior lines of therapy (ranging from three to 11) prior to receiving avapritinib.

Clinical Activity Data. As of the data cutoff date, 111 patients with fourth-line GIST were treated at a starting dose of 300 or 400 mg QD and evaluable for response assessments. Patients were evaluable if they had at least one centrally reviewed radiographic scan, and data were based on modified RECIST version 1.1 for GIST.

In evaluable patients with fourth-line GIST:

- The ORR was 22 percent, with one confirmed CR and 23 PRs (one pending confirmation).
- The median DOR was 10.2 months.
- Median follow-up was 10.8 months.

Safety Data. Avapritinib had a favorable safety profile in patients treated at a starting dose of 300 or 400 mg QD, with most AEs determined by investigators to be Grade 1 or 2 as of the data cutoff date. Across all patients treated with avapritinib as of the data cutoff date, eight percent of patients discontinued treatment with avapritinib due to treatment-related AEs. A lower incidence of commonly reported AEs was reported at 300 mg QD dosing compared to 400 mg QD dosing.

Across all grades, the most common treatment-emergent AEs (regardless of relationship to avapritinib) reported by investigators (≥ 25 percent) were nausea, fatigue, anemia, cognitive effects, periorbital edema, vomiting, decreased appetite, diarrhea, increased lacrimation and peripheral edema. Investigator-reported Grade 3 or 4 treatment-related AEs (≥ 2 percent) included anemia, fatigue, cognitive effects, increased blood bilirubin, diarrhea, hypophosphatemia, decreased neutrophil count, neutropenia and lymphopenia.

Phase 3 VOYAGER Trial

The VOYAGER trial is a global, open-label, randomized, registration-enabling Phase 3 trial designed to evaluate the safety and efficacy of avapritinib versus regorafenib in patients with third- or fourth-line GIST. The trial is designed to enroll patients randomized 1:1 to receive either avapritinib or regorafenib at multiple sites. The trial's primary endpoint is PFS and secondary endpoints include ORR, OS and European Organisation for Research and Treatment of Cancer Quality of Life individual scores in patients. We expect to provide the top-line data to the FDA early in the second quarter of 2020 and report the top-line data in the second quarter of 2020.

Fisogatinib — Hepatocellular Carcinoma

Disease Overview

Liver cancer is the second leading cause of cancer-related deaths worldwide, and HCC accounts for most liver cancers. The highest incidence of HCC occurs in regions with endemic hepatitis B virus, or HBV, including Southeast Asia and sub-Saharan Africa. In the U.S., HCC is the fastest rising cause of cancer-related death. Over the past two decades, the incidence of HCC has tripled while the five-year survival rate has remained below 12%.

Cirrhosis is a key risk factor for HCC — the disease etiology varies by geography with the common theme of chronic conditions that lead to cirrhosis. In North America, the main risk factors for cirrhosis are infection with hepatitis C virus, or HCV, followed by HBV infection, alcohol consumption and nonalcoholic steatohepatitis. In the European Union, the main risk factors for cirrhosis are HCV, HBV and alcohol consumption. In Asia and sub-Saharan Africa, the major risk factor is chronic HBV infection.

The diagnosis of HCC is typically made in adults, peaking around age 70. Disease management is complicated by concurrent liver disease, which often compromises liver function in these patients. Patients are staged depending on extent of liver disease, performance status and liver function status; these factors guide treatment selection. The stage distribution at diagnosis varies by region. Countries with active national screening programs, such as Taiwan and Japan, tend to diagnose many more patients in the early stages of disease. There are currently no treatments for molecularly defined patient subgroups in HCC.

Despite advances in the treatment of HCC, including the approvals of nivolumab, pembrolizumab and levatinib, the prognosis for patients with advanced HCC remains poor, and there is a significant unmet need for new treatments for HCC, including FGFR4-driven HCC. Patients diagnosed at an early stage receive potentially curative transplant, resection or ablative therapies. Treatments for intermediate to advanced stage patients include high-dose chemotherapy delivered directly to the liver (transarterial chemoembolization), the multi-kinase inhibitors sorafenib, regorafenib, cabozantinib and levatinib, and the immunotherapies nivolumab and pembrolizumab. There are no approved treatments that selectively target FGFR4. Sorafenib and levatinib have overall response rates of 2% and 19%, respectively, in treatment-naïve patients. Nivolumab, pembrolizumab, regorafenib and cabozantinib have overall response rates ranging from 4 to 17% in patients previously treated with or intolerant to sorafenib. In clinical practice, patients often require dose modifications or discontinue therapy with multi-kinase inhibitors due to tolerability issues. There is a clear need for medical therapies with a favorable risk-benefit profile and the potential to be used alone or in combination with other approved or emerging therapies for advanced HCC.

The FGFR4 signaling pathway is a promising new driver for the development of molecularly targeted therapy in HCC. The link between aberrant FGFR4 signaling and HCC was first established when an amplicon, a region of replicated DNA, that includes FGF19, the ligand that activates FGFR4, was identified in HCC patients. We estimate that more than 5% of tumors of HCC patients have this amplicon. The physiologic role of the receptor, FGFR4, and its ligand, FGF19, is to regulate bile acid metabolism in hepatocytes and liver regeneration following injury. FGF19 is normally produced in the small intestine and signals to hepatocytes through an endocrine mechanism. FGF19 forms an active signaling complex together with FGFR4 and its co-receptor Klotho- β . Signaling of the active complex leads to decreased CYP7A1 transcription with a resultant decrease in bile acid synthesis, as well as increased growth, proliferation and survival signals.

Subsequent data suggest that FGFR4 signaling is a driver in a subset of HCC patients in whom the pathway is aberrantly activated. In these patients, FGF19 is overexpressed in hepatocytes (which do not normally express FGF19), leading to autocrine signaling and tumor growth. Pre-clinical experiments in a genetically engineered mouse model demonstrate that exogenous FGF19 expression is sufficient to induce liver tumor growth and that tumorigenesis is dependent on FGFR4. The three elements that constitute an active FGFR4 signaling complex, FGF19, FGFR4 and Klotho- β , are expressed together uniquely in HCC, although it is possible that they may also occur in rare cases of other solid tumors.

We have used our novel drug discovery platform to identify a potentially broader target responder population in addition to the FGF19-amplified patient population. We estimate that approximately 25% of HCC tumors overexpress FGF19 without amplification. We have also demonstrated a significant anti-tumor response with an FGFR4 inhibitor in an HCC patient-derived xenograft model that overexpresses FGF19 in the absence of amplification. Some of these results were published in *Cancer Discovery* in 2015. We estimate that approximately 30% of patients have FGFR4-activated HCC, and data suggest patients with HCC patients with FGFR4 pathway activation resulting in activation of the FGFR4 pathway generally have poor outcomes relative to other HCC patients.

Fisogatinib — Clinical Development for Patients with Advanced HCC

We are developing fisogatinib for the treatment of advanced HCC. Fisogatinib is an investigational, orally available, potent and highly selective inhibitor that targets FGFR4, a kinase that is aberrantly activated in a defined subset of patients with HCC, the most common type of liver cancer. We are currently evaluating fisogatinib in an ongoing Phase 1 clinical trial in patients with advanced HCC. As part of our collaboration with CStone, we are also evaluating fisogatinib in combination with CS1001, a clinical-stage anti-PDL1 immunotherapy being developed by CStone, for the treatment of locally advanced or metastatic HCC in an ongoing Phase 1b/2 trial conducted in multiple clinical sites in China. See “—Collaborations and Licenses” below for more information. The FDA has granted orphan drug designation to fisogatinib for the treatment of HCC.

Collaborations and Licenses

Roche

In March 2016, we entered into a collaboration and license agreement, or the Roche agreement, as may be amended from time to time, with Roche for the discovery, development and commercialization of small molecule therapeutics targeting kinases believed to be important in cancer immunotherapy, as single products or possibly in combination with other therapeutics. As a result of an amendment to the Roche agreement in the fourth quarter of 2019, we and Roche are currently conducting activities for up to four programs under the collaboration. In the fourth quarter of 2019, we and Roche announced one of the kinase targets under the collaboration, MAP4K1, which is believed to play a role in T cell regulation.

Under the Roche agreement, Roche was initially granted up to five option rights to obtain an exclusive license to exploit products derived from the collaboration programs in the field of cancer immunotherapy. Such option rights are triggered upon the achievement of Phase 1 proof-of-concept. For up to two collaboration programs, if Roche exercises its option, Roche will receive worldwide, exclusive commercialization rights for the licensed products. For up to two collaboration programs, if Roche exercises its option, we will retain commercialization rights in the U.S. for the licensed products, and Roche will receive commercialization rights outside of the U.S. for the licensed products. We will also retain worldwide rights to any products for which Roche elects not to exercise its applicable option. Prior to

Roche's exercise of an option, we will have the lead responsibility for drug discovery and pre-clinical development of all collaboration programs. In addition, we will have the lead responsibility for the conduct of all Phase 1 clinical trials other than those Phase 1 clinical trials for any product in combination with Roche's portfolio of therapeutics, for which Roche will have the right to lead the conduct of such Phase 1 clinical trials. Pursuant to the Roche agreement, the parties will share the costs of Phase 1 development for each collaboration program. In addition, Roche will be responsible for post-Phase 1 development costs for each licensed product for which it retains global commercialization rights, and we and Roche will share post-Phase 1 development costs for each licensed product for which we retain commercialization rights in the U.S.

We received an upfront cash payment of \$45.0 million in March 2016 upon execution of the Roche agreement, and subject to the terms of the Roche agreement, we will be eligible to receive up to approximately \$940.0 million in contingent option fees and milestone payments related to specified research, pre-clinical, clinical, regulatory and sales-based milestones. Of the total contingent payments, up to approximately \$190.0 million are for option fees and milestone payments for research, pre-clinical and clinical development events prior to licensing across all four potential collaboration programs. In the second quarter of 2018, we achieved and received a \$10.0 million research milestone payment. In the fourth quarter of 2019, we achieved and received an \$8.0 million research milestone payment. In addition, for any licensed product for which Roche retains worldwide commercialization rights, we will be eligible to receive tiered royalties ranging from low double-digits to high-teens on future net sales of the licensed product. For any licensed product for which we retain commercialization rights in the U.S., we and Roche will be eligible to receive tiered royalties ranging from mid-single-digits to low double-digits on future net sales in the other party's respective territories in which it commercializes the licensed product. The upfront cash payment and any payments for milestones, option fees and royalties are non-refundable, non-creditable and not subject to set-off.

Under the Roche agreement, each party has granted the other party specified intellectual property licenses to enable the other party to perform its obligations and exercise its rights under the Roche agreement, including license grants to enable each party to conduct research, development and commercialization activities pursuant to the terms of the Roche agreement. Following Roche's exercise of its option with respect to the collaboration programs for which it will obtain worldwide rights, we will grant Roche an exclusive license under our intellectual property to develop and commercialize the licensed products generated through such collaboration program. Similarly, Roche will grant us an exclusive license under Roche's intellectual property to develop and commercialize licensed products in the U.S. for the collaboration programs on which we will retain rights in the U.S., with Roche receiving a license under our intellectual property to develop and commercialize such licensed products outside of the U.S.

Subject to the terms and conditions of the Roche agreement, we have agreed to work exclusively with Roche with respect to each collaboration target. We are not obligated to work exclusively with Roche within the field of cancer immunotherapy. In addition, subject to specified exceptions, Roche has a right of first negotiation in the event that we desire to grant any third party rights to develop or commercialize a licensed product under either of the collaboration programs for which we will retain commercialization rights in the U.S. Roche's right of first negotiation will not apply in connection with a change of control of us, an assignment by us in accordance with the terms of the Roche agreement or certain agreements with contract research organizations, contract manufacturing organizations, academic institutions, not-for-profit third parties or distributors.

The Roche agreement will continue until the date when no royalty or other payment obligations are or will become due, unless earlier terminated in accordance with the terms of the Roche agreement. Prior to its exercise of its first option, Roche may terminate the Roche agreement at will, in whole or on a collaboration target-by-collaboration target basis, upon 120 days' prior written notice to us. Following its exercise of an option, Roche may terminate the Roche agreement at will, in whole, on a collaboration target-by-collaboration target basis, on a collaboration program-by-collaboration program basis or, if a licensed product has been commercially sold, on a country-by-country basis, (i) upon 120 days' prior written notice if a licensed product has not been commercially sold or (ii) upon 180 days' prior written notice if a licensed product has been commercially sold. Either party may terminate the Roche agreement for the other party's uncured material breach or insolvency and in certain other circumstances agreed to by the parties. In certain termination circumstances, we are entitled to retain specified licenses to be able to continue to exploit the licensed products.

CStone

On June 1, 2018, we entered into a collaboration and license agreement, or the CStone agreement, with CStone pursuant to which we granted CStone exclusive rights to develop and commercialize avapritinib, pralsetinib and fisogatinib, including certain back-up forms and certain other forms thereof, which we refer to collectively as the licensed products, in the CStone territory, either as a monotherapy or as part of a combination therapy. We will retain exclusive rights to the licensed products outside the CStone territory.

We received an upfront cash payment of \$40.0 million, and subject to the terms of the CStone agreement, will be eligible to receive up to approximately \$346.0 million in milestone payments, including \$118.5 million related to development and regulatory milestones and \$227.5 million related to sales-based milestones. In addition, CStone will be obligated to pay us tiered percentage royalties on a licensed product-by-licensed product basis ranging from the mid-teens to low twenties on annual net sales of each licensed product in the CStone territory, subject to adjustment in specified circumstances. CStone will be responsible for costs related to the development of the licensed products in the CStone territory, other than specified costs related to the development of fisogatinib as a combination therapy in the CStone territory that will be shared by us and CStone. During the year ended December 31, 2019, we achieved several development and regulatory milestones resulting in an aggregate of \$12.0 million in milestone payments paid or payable by CStone under the CStone agreement.

Pursuant to the terms of the CStone agreement, CStone will be responsible for conducting all development and commercialization activities in the CStone territory related to the licensed products. Subject to specified exceptions, during the term of the CStone agreement, each party has agreed that neither it nor its affiliates will conduct specified development and commercialization activities in the CStone territory related to selective inhibitors of FGFR4, KIT, PDGFRA and RET. In addition, under the CStone agreement, each party has granted the other party specified intellectual property licenses to enable the other party to perform its obligations and exercise its rights under the CStone agreement, including license grants to enable each party to conduct research, development and commercialization activities pursuant to the terms of the CStone agreement.

The CStone agreement will continue on a licensed product-by-licensed product and region-by-region basis until the later of (i) 12 years after the first commercial sale of a licensed product in a region in the CStone territory and (ii) the date of expiration of the last valid patent claim related to our patent rights or any joint collaboration patent rights for the licensed product that covers the composition of matter, method of use or method of manufacturing such licensed product in such region. Subject to the terms of the CStone agreement, CStone may terminate the CStone agreement in its entirety or with respect to one or more licensed products for convenience by providing written notice to us after June 1, 2019, and CStone may terminate the CStone agreement with respect to a licensed product for convenience at any time by providing written notice to us following the occurrence of specified events. In addition, we may terminate the CStone agreement under specified circumstances if CStone or certain other parties challenges our patent rights or any joint collaboration patent rights or if CStone or its affiliates do not conduct any material development or commercialization activities with respect to one or more licensed products for a specified period of time, subject to specified exceptions. Either party may terminate the CStone agreement for the other party's uncured material breach or insolvency. In certain termination circumstances, the parties are entitled to retain specified licenses to be able to continue to exploit the licensed products, and in the event of termination by CStone for our uncured material breach, we will be obligated to pay CStone a low single digit percentage royalty on a licensed product-by-licensed product on annual net sales of such licensed product in the CStone territory, subject to a cap and other specified exceptions.

Clementia

On October 15, 2019, we entered into a license agreement, or the Clementia agreement, with Clementia, a wholly-owned subsidiary of Ipsen S.A. Under the Clementia agreement, we granted an exclusive, worldwide, royalty-bearing license to Clementia to develop and commercialize BLU-782, an oral, highly selective investigational ALK2 inhibitor in Phase 1 clinical development for the treatment of FOP, as well as specified other compounds related to the BLU-782 program, which we refer to as the Clementia licensed products.

We received an upfront cash payment of \$25 million, and subject to the terms of the Clementia agreement, we will be eligible to receive up to \$510.0 million in other payments and potential development, regulatory and sales-based milestone payments for the Clementia licensed products. In addition, Clementia is obligated to pay to us royalties on

aggregate annual worldwide net sales of Clementia licensed products at tiered percentage rates ranging from the low- to mid-teens, subject to adjustment in specified circumstances under the Clementia agreement, and to purchase specified manufacturing inventory from our company.

Under the terms of the Clementia agreement, we will be responsible for specified activities during a transition period, including the completion of all activities necessary for database lock for the ongoing Phase 1 clinical trial in healthy volunteers, and Clementia will be responsible for conducting all other development and commercialization activities related to the Clementia licensed products, including the design, timing and conduct of any Phase 2 clinical trial evaluating BLU-782 for the treatment of FOP.

During the term of the agreement, we have agreed not to exploit any compound covered by the licensed patents for the treatment of FOP or multiple osteochondromas, or MO. In addition, with respect to any small molecule compound not covered by the licensed patents, we have agreed not to research, develop or manufacture any small molecule compound for the treatment of FOP or MO for a period of five years from the effective date of the Clementia agreement and not to commercialize any small molecule compound for the treatment of FOP or MO for a period of seven years from the effective date of the Clementia agreement.

Unless earlier terminated in accordance with the terms of the Clementia agreement, the agreement will expire on a country-by-country, licensed product-by-licensed product basis on the date when no royalty payments are or will become due. Clementia may terminate the agreement at any time on or after the second anniversary of the effective date of the agreement upon at least 12 months' prior written notice to us, which cannot be delivered before the first anniversary of the effective date. Either party may terminate the agreement for the other party's uncured material breach or insolvency and in certain other circumstances agreed to by the parties. In certain termination circumstances, we are entitled to retain specified licenses to be able to continue to exploit the Clementia licensed products.

Intellectual Property

Our commercial success depends in part on our ability to obtain and maintain proprietary or intellectual property protection for avapritinib, pralsetinib, fisogatinib and BLU-263, as well as our core technologies, including our novel target discovery engine, our proprietary compound library, and other know-how; to operate without infringing on the proprietary rights of others; and to prevent others from infringing our proprietary or intellectual property rights. Our policy is to seek to protect our proprietary and intellectual property position by, among other methods, filing U.S., international and foreign patent applications related to our proprietary technology, inventions and improvements that are important to the development and implementation of our business. We also rely on trade secrets, know-how and continuing technological innovation to develop and maintain our proprietary and intellectual property position.

We file patent applications directed to AYWAKIT and our drug candidates in an effort to establish intellectual property positions regarding these new chemical entities as well as uses of these new chemical entities in the treatment of diseases and to other technologies, including patient selection markers and diagnostic discoveries that may be useful with our drug and drug candidates. We also file patent applications directed to novel fusions that we have discovered through our target discovery engine and the use of these fusions in diagnosing and treating disease. As of January 31, 2020, we owned 31 issued U.S. patents, 19 pending U.S. patent applications, 12 pending U.S. provisional applications, 38 issued foreign patents, 141 foreign pending patent applications, and five pending Patent Cooperation Treaty, or PCT, international patent applications. The foreign issued patents and patent applications are in a number of jurisdictions, including Argentina, Australia, Brazil, Canada, China, the European Union, Gulf Cooperation Council, Hong Kong, Israel, Japan, South Korea, Mexico, New Zealand, Philippines, Russia, Singapore, South Africa, and Taiwan. Our issued patents and pending patent applications pertain to our pipeline, including our programs for avapritinib, pralsetinib, fisogatinib, BLU-263 as well as additional kinase discovery programs and novel recurrent fusions.

The intellectual property portfolios for our most advanced programs as of January 31, 2020 are summarized below. Prosecution is a lengthy process, during which the scope of the claims initially submitted for examination by the USPTO and by patent offices in other countries are often significantly narrowed by the time they issue, if they issue at all. We expect this to be the case with respect to our pending patent applications referred to below.

KIT and PDGFRA Program — AYVAKIT (avapritinib) and BLU-263

The intellectual property portfolio for our KIT and PDGFRA program contains patent applications directed to compositions of matter for avapritinib, BLU-263 and analogs thereof, compositions of matter for KIT and PDGFRA inhibitors with different compound families, as well as methods of use and manufacture. As of January 31, 2020, we owned nine issued U.S. patents, 10 issued foreign patents, including one European patent validated in 38 countries, two pending U.S. non-provisional patent applications, seven pending U.S. provisional applications, one pending PCT international patent application and 21 pending foreign patent applications directed to our KIT and PDGFRA program, including avapritinib and BLU-263. The patents that have issued or will issue covering our KIT and PDGFRA program will have a statutory expiration date between 2034 and 2040. Patent term adjustments or patent term extensions could result in later expiration dates.

RET Program — Pralsetinib

The intellectual property portfolio for our RET program contains patent applications directed to compositions of matter for pralsetinib and analogs and compositions of matter for RET inhibitors with different compound families, as well as methods of use. As of January 31, 2020, we owned five issued U.S. patents, four pending U.S. non-provisional patent applications, two pending PCT international applications and 30 pending foreign patent applications directed to our RET program, including pralsetinib. The patents that have issued or will issue covering our RET program will have a statutory expiration date between 2036 and 2039. Patent term adjustments or patent term extensions could result in later expiration dates.

FGFR4 Program — Fisogatinib

The intellectual property portfolio for our FGFR4 program contains patent applications directed to compositions of matter for fisogatinib and analogs and compositions of matter for FGFR4 inhibitors with different compound families as well as methods of use. As of January 31, 2020, we owned eight issued U.S. patents, three pending U.S. patent applications, one pending PCT international application, 31 pending foreign patent applications and 22 issued foreign patents directed to our FGFR4 program, including fisogatinib. The patents that have issued or will issue covering our FGFR4 program will have a statutory expiration date between 2033 and 2039. Patent term adjustments or patent term extensions could result in later expiration dates.

Platform

The intellectual property portfolio directed to our platform includes patent applications directed to novel gene fusions and the uses of these fusions for detecting and treating conditions implicated with these fusions. As of January 31, 2020, we owned six issued U.S. patents, seven pending U.S. patent applications, seven pending European Union patent applications and five issued European patent directed to this technology, which, if issued, will have statutory expiration dates ranging from 2034 to 2035.

The term of individual patents depends upon the legal term for patents in the countries in which they are obtained. In most countries, including the U.S., the patent term is 20 years from the earliest filing date of a non-provisional patent application. In the U.S., a patent's term may be lengthened by patent term adjustment, which compensates a patentee for administrative delays by the U.S. Patent and Trademark Office, or the USPTO, in examining and granting a patent, or may be shortened if a patent is terminally disclaimed over an earlier filed patent. The term of a patent that covers a drug or biological product may also be eligible for patent term extension when FDA approval is granted, provided statutory and regulatory requirements are met. See “— Government Regulation — U.S. Patent Term Restoration and Marketing Exclusivity” below for additional information on such exclusivity. In the future, if and when our drug candidates receive approval by the FDA or foreign regulatory authorities, we expect to apply for patent term extensions on issued patents covering those drugs, depending upon the length of the clinical trials for each drug and other factors. There can be no assurance that any of our pending patent applications will issue or that we will benefit from any patent term extension or favorable adjustment to the term of any of our patents.

As with other biotechnology and pharmaceutical companies, our ability to maintain and solidify our proprietary and intellectual property position for our drug, drug candidates and technologies will depend on our success in obtaining

effective patent claims and enforcing those claims if granted. However, our pending patent applications, and any patent applications that we may in the future file or license from third parties may not result in the issuance of patents. We also cannot predict the breadth of claims that may be allowed or enforced in our patents. Any issued patents that we may receive in the future may be challenged, invalidated or circumvented. For example, we cannot be certain of the priority of inventions covered by pending third-party patent applications. If third parties prepare and file patent applications in the U.S. that also claim technology or therapeutics to which we have rights, we may have to participate in interference proceedings in the USPTO to determine priority of invention, which could result in substantial costs to us, even if the eventual outcome is favorable to us, which is highly unpredictable. In addition, because of the extensive time required for clinical development and regulatory review of a drug or drug candidate we may develop, it is possible that, before any of our approved drugs or drug candidates can be commercialized, any related patent may expire or remain in force for only a short period following commercialization, thereby limiting protection such patent would afford the respective product and any competitive advantage such patent may provide.

In addition to patents, we rely upon unpatented trade secrets and know-how and continuing technological innovation to develop and maintain our competitive position. We seek to protect our proprietary information, in part, by executing confidentiality agreements with our collaborators, third-party service providers, and scientific advisors, and non-competition, non-solicitation, confidentiality, and invention assignment agreements with our employees. We have also executed agreements requiring assignment of inventions with selected scientific advisors, consultants and collaborators. The confidentiality agreements we enter into are designed to protect our proprietary information and the agreements or clauses requiring assignment of inventions to us are designed to grant us ownership of technologies that are developed through our relationship with the respective counterparty. We cannot guarantee, however, that these agreements will afford us adequate protection of our intellectual property and proprietary information rights.

With respect to the building of our proprietary compound library, we consider trade secrets and know-how to be our primary intellectual property. Trade secrets and know-how can be difficult to protect. In particular, we anticipate that with respect to our discovery platform, these trade secrets and know-how will over time be disseminated within the industry through independent development and public presentations describing the methodology.

Competition

The pharmaceutical and biotechnology industries are characterized by rapidly advancing technologies, intense competition and a strong emphasis on proprietary drugs. While we believe that our technology, development experience and scientific knowledge provide us with competitive advantages, we face potential competition from many different sources, including major pharmaceutical, specialty pharmaceutical and biotechnology companies, academic institutions and governmental agencies and public and private research institutions. AYVAKIT and any other drug candidates that we successfully develop and commercialize will compete with existing drugs and new drugs that may become available in the future.

We compete in the segments of the pharmaceutical, biotechnology and other related markets that address inhibition of kinases in cancer and other rare diseases. There are other companies working to develop therapies in the field of kinase inhibition for cancer and other diseases. These companies include divisions of large pharmaceutical companies and biotechnology companies of various sizes.

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

Our commercial opportunity could be reduced or eliminated if our competitors develop and commercialize drugs that are safer, more effective, have fewer or less severe side effects, are more convenient or are less expensive than any drugs that we or our collaborators may develop. Our competitors also may obtain FDA or other regulatory approval

for their drugs more rapidly than we may obtain approval for ours, which could result in our competitors establishing a strong market position before we or our collaborators are able to enter the market. The key competitive factors affecting the success of AYWAKIT and our current or future drug candidates, if approved, are likely to be their efficacy, safety, convenience, price, the effectiveness of companion diagnostic tests in guiding the use of related therapeutics, the level of generic competition and the availability of reimbursement from government and other third-party payors.

AYVAKIT or our drug candidates, if approved for the indications for which we are currently conducting or planning clinical trials, will compete with the drugs discussed below and will likely compete with other drugs that are currently in development.

SM

We are developing avapritinib for SM, including advanced SM and indolent and smoldering SM, and we are developing BLU-263 for the treatment of indolent SM and other mast cell disorders. If avapritinib receives marketing approval for advanced SM, it will face competition from Novartis AG's midostaurin, a multi-kinase inhibitor with KIT D816V inhibitory activity. In addition, if avapritinib is approved for advanced SM or if avapritinib or BLU-263 are approved for indolent SM, they may face competition from other drug candidates in development for these indications, including drug candidates being developed by AB Science S.A. and Allakos Inc.

GIST

We are developing avapritinib for advanced GIST. Currently, AYWAKIT is the only FDA-approved treatment of adults with unresectable or metastatic GIST harboring a PDGFRA exon 18 mutation, including PDGFRA D842V mutations. If avapritinib receives marketing approval for third-line GIST, it will face competition from Bayer AG's regorafenib, and if avapritinib receives marketing approval for second-line GIST, it will face competition from Pfizer Inc.'s sunitinib. In addition, AYWAKIT may face competition from drug candidates in development for GIST, including PDGFRA D842V mutant GIST, including those being developed by AB Science S.A., ARIAD Pharmaceuticals, Inc., a wholly-owned subsidiary of Takeda Pharmaceutical Company Limited, AROG Pharmaceuticals, Inc., Celldex Therapeutics, Inc., Deciphera Pharmaceuticals, LLC, Exelixis, Inc., Ningbo Tai Kang Medical Technology Co. Ltd. and Xencor, Inc.

RET-altered Cancers

We are developing pralsetinib for patients with RET-altered NSCLC, MTC and other advanced solid tumors. If pralsetinib receives marketing approval for patients with RET-driven cancers, it may face competition from other drug candidates in development, including those being developed by AstraZeneca plc, Boston Pharmaceuticals, Inc., Eisai Inc., Exelixis, Inc., GlaxoSmithKline plc, Loxo Oncology, Inc., a wholly-owned subsidiary of Eli Lilly and Company, Mirati Therapeutics, Inc., Novartis AG, Pfizer Inc. Roche, Stemline Therapeutics, Inc., and Turning Point Therapeutics, Inc., as well as several approved multi-kinase inhibitors with RET activity being evaluated in clinical trials, including alectinib, apatinib, cabozantinib, dovitinib, lenvatinib, sorafenib, sunitinib and vandetinib.

HCC

We are developing fisogatinib for patients with advanced HCC. If fisogatinib receives marketing approval for patients with FGFR4-activated HCC, it will face competition from Bristol-Myers Squibb Company's nivolumab and Merck & Co., Inc.'s pembrolizumab, immune checkpoint inhibitors approved by the FDA for the treatment of HCC, as well as sorafenib, cabozantinib, regorafenib and lenvatinib, multi-kinase inhibitors approved for the treatment of HCC. In addition, fisogatinib may face competition from other drug candidates in development by Abbisko Therapeutics Co., Ltd, AstraZeneca plc, Bayer AG, Celgene Corporation, Eisai Inc., H3 Biomedicine Inc., Incyte Corporation, Johnson & Johnson, Novartis AG, Sanofi S.A., Taiho Pharmaceutical Co., Ltd., U3 Pharma GmbH, a wholly-owned subsidiary of Daiichi Sankyo Company, Limited, and Xoma Ltd.

Commercialization

Our vision is to leverage our scientific platform to design innovative first-in-class or best-in-class medicines targeting novel kinase biology and become a leading platform-enabled, fully-integrated, global precision therapy company focused on discovering, developing and commercializing a portfolio of precision therapies to patients with cancer and rare diseases. We have established our own commercial organization in the U.S. in connection with our commercial launch of AYVAKIT in January 2020. We are continuing to expand our commercialization capabilities and to build our distribution capabilities with an initial focus on the U.S. and Europe.

We believe our portfolio strategy focused on genomically defined cancers, rare diseases and cancer immunotherapy will allow us to efficiently commercialize any approved drugs in the U.S. and Europe on our own initially and worldwide longer-term, using a small and highly specialized sales force similar to those of other rare disease companies. However, we may also establish collaborations with pharmaceutical companies to leverage their capabilities to maximize the potential of our pipeline. We currently have worldwide development and commercialization rights to avapritinib, pralsetinib and fisogatinib, other than the rights licensed to CStone for these drug candidates in the CStone territory.

Manufacturing and Supply

We do not own or operate, and currently have no plans to establish, any manufacturing facilities. We currently rely, and expect to continue to rely, on third parties for the manufacture of our drug candidates for pre-clinical and clinical testing, as well as for commercial manufacture of any drug we may commercialize. To date, we have obtained materials for avapritinib, pralsetinib, BLU-263 and fisogatinib for our ongoing and planned clinical testing from third-party manufacturers. We obtain our supplies from these manufacturers on a purchase order basis and do not have a long-term supply arrangement in place. Although we may enter into long-term supply arrangements for the commercial supply of AYVAKIT in the future, we currently obtain our supplies of AYVAKIT from these manufacturers on a purchase order basis and may continue to do so in the near future.

We do not currently have arrangements in place for redundant supply for commercial active pharmaceutical ingredient, or API, and drug substance or for clinical and commercial drug product. As we have done for AYVAKIT, for all of our drug candidates, we intend to identify and qualify additional manufacturers to provide the API, drug substance and drug product prior to submission of an NDA to the FDA and/or an MAA to the EMA.

Avapritinib, pralsetinib, BLU-263 and fisogatinib are compounds of low molecular weight, generally called small molecules. They can be manufactured in reliable and reproducible synthetic processes from readily available starting materials. The chemistry is amenable to scale-up and does not require unusual equipment in the manufacturing process. We expect to continue developing drug candidates that can be produced cost-effectively at contract manufacturing facilities.

Under the terms of our agreements related to the development and commercialization of companion diagnostic tests, third parties are responsible for the commercialization of companion diagnostic tests for avapritinib in order to identify GIST patients with the PDGFRA D842V mutation, pralsetinib in order to identify NSCLC patients with RET fusions and fisogatinib in order to identify HCC patients with FGFR4 pathway activation. We generally expect to rely on third parties for the manufacture of any other companion diagnostic tests we may seek to develop.

Government Regulation

Government authorities in the U.S. at the federal, state and local level and in other countries extensively regulate, among other things, the research and clinical development, testing, manufacture, quality control, approval, labeling, packaging, storage, record-keeping, promotion, advertising, distribution, post-approval monitoring and reporting, marketing, and export and import of drug products, such as those we are developing. Generally, before a new drug can be marketed, considerable data demonstrating its quality, safety and efficacy must be obtained, organized into a format specific to each regulatory authority, submitted for review and approved by the regulatory authority.

The process of obtaining regulatory approvals and the subsequent compliance with appropriate federal, state, local and foreign statutes and regulations require the expenditure of substantial time and financial resources. Failure to comply with the applicable regulatory requirements at any time during the product development process, approval process or after approval may subject an applicant to administrative or judicial sanctions. These sanctions could include, among other actions, the regulatory authority's refusal to approve pending applications, withdrawal of an approval, clinical holds, untitled or warning letters, voluntary product recalls or withdrawals from the market, product seizures, total or partial suspension of production or distribution, injunctions, debarment, fines, refusals of government contracts, restitution, disgorgement, or civil or criminal penalties. Any agency or judicial enforcement action could have a material adverse effect on us.

U.S. Drug Development

In the U.S., the FDA regulates drugs under the Federal Food, Drug, and Cosmetic Act, or FDCA, and its implementing regulations. Drugs are also subject to other federal, state and local statutes and regulations. Our drug candidates must be approved by the FDA through the NDA process before they may be legally marketed in the U.S. The process required by the FDA before a drug may be marketed in the U.S. generally involves the following:

- completion of extensive nonclinical tests, sometimes referred to as pre-clinical laboratory tests, animal studies and formulation studies performed in accordance with applicable regulations, including the FDA's good laboratory practice, or GLP, regulations;
- submission to the FDA of an IND, which must become effective before human clinical trials may begin and must be actively maintained, including by submitting annual reports;
- performance of adequate and well-controlled human clinical trials in accordance with applicable IND and other clinical trial-related regulations, sometimes referred to as good clinical practices, or GCPs, to establish the safety and efficacy of the proposed drug for its proposed indication;
- submission to the FDA of an NDA for a new drug;
- a determination by the FDA within 60 days of its receipt of an NDA to file the NDA for review;
- review of the drug candidate by an FDA advisory committee, where appropriate or if applicable;
- payment of user fees for FDA review of the NDA (unless a fee waiver applies);
- satisfactory completion of an FDA pre-approval inspection of the manufacturing facility or facilities at which the API and finished drug product are produced to assess compliance with the FDA's current good manufacturing practice, or cGMP, requirements;
- potential FDA audit of the pre-clinical study sites and/or clinical trial sites that generated the data in support of the NDA; and
- FDA review and approval of the NDA prior to any commercial marketing or sale of the drug in the U.S.

The data required to support an NDA is generated in two distinct development stages: pre-clinical and clinical. For new chemical entities, the pre-clinical development stage generally involves synthesizing the active component, developing the formulation and determining the manufacturing process, as well as carrying out non-human toxicology, pharmacology and drug metabolism studies in the laboratory, which support subsequent clinical testing. The conduct of the pre-clinical tests must comply with federal regulations, including GLPs, where applicable. The sponsor must submit the results of the pre-clinical tests, together with manufacturing information, analytical data, any available clinical data or literature and a proposed clinical protocol, to the FDA as part of the IND. An IND is a request for authorization from the FDA to administer an investigational drug product to humans. The central focus of an IND submission is on the pre-clinical data, general investigational plan and the protocol(s) for human trials. The IND automatically becomes effective

30 days after receipt by the FDA, unless the FDA raises concerns or questions regarding the proposed clinical trials and places the IND on clinical hold within that 30-day time period. In such a case, the IND sponsor and the FDA must resolve any outstanding concerns or questions before the clinical trial can begin. The FDA may also impose clinical holds on a drug candidate at any time before or during clinical trials due to safety concerns or non-compliance. Accordingly, we cannot be sure that submission of an IND will result in the FDA allowing clinical trials to begin, or that, once begun, issues will not arise that could cause the trial to be suspended or terminated.

The clinical stage of development involves the administration of the drug candidate to healthy volunteers and/or patients under the supervision of qualified investigators, generally physicians not employed by or under the trial sponsor's control, in accordance with GCPs, which include the requirement that all research subjects provide their informed consent for their participation in any clinical trial. Clinical trials are conducted under protocols detailing, among other things, the objectives of the clinical trial, dosing procedures, subject selection and exclusion criteria, and the parameters to be used to monitor subject safety and assess efficacy. Each protocol, and any subsequent amendments to the protocol, must be submitted to the FDA as part of the IND. Further, each clinical trial must be reviewed and approved by an independent institutional review board, or IRB, at or servicing each institution at which the clinical trial will be conducted. An IRB is charged with protecting the welfare and rights of trial participants and considers such items as whether the risks to individuals participating in the clinical trials are minimized and are reasonable in relation to anticipated benefits. The IRB also approves the informed consent form that must be provided to each clinical trial subject or his or her legal representative and must monitor the clinical trial until completed. There are also requirements governing the reporting of ongoing clinical trials and completed clinical trial results to public registries.

Clinical trials are generally conducted in three sequential phases that may overlap or be combined, known as Phase 1, Phase 2 and Phase 3 clinical trials. Phase 1 clinical trials for oncology indications generally involve a small number of disease-affected patients who are treated with the drug candidate in escalating dose cohorts. The primary purpose of these clinical trials is to determine the MTD, or a recommended dose if the MTD is not achieved, assess the pharmacokinetic, or PK, profile, pharmacologic action, side effect tolerability and safety of the drug. Phase 1 clinical trials for oncology indications may also evaluate preliminary evidence of clinical activity. Phase 2 clinical trials typically involve studies in disease-affected patients to determine the dose required to produce the desired benefits. At the same time, safety and further PK and PD information is collected, as well as identification of possible adverse effects and safety risks and preliminary evaluation of efficacy. Phase 3 clinical trials generally involve large numbers of patients (from several hundred to several thousand subjects) at multiple sites, in multiple countries and are designed to provide the data necessary to demonstrate the efficacy of the drug for its intended use, its safety in use, and to establish the overall benefit/risk relationship of the drug and provide an adequate basis for physician labeling. Phase 3 clinical trials may include comparisons with placebo and/or other comparator treatments. The duration of treatment is often extended to mimic the actual use of a drug during marketing. Generally, two adequate and well-controlled Phase 3 clinical trials are required by the FDA for approval of an NDA.

Post-approval trials, sometimes referred to as Phase 4 clinical trials, may be conducted after initial marketing approval. These trials are used to gain additional experience from the treatment of patients in the intended therapeutic indication. In certain instances, FDA may mandate the performance of Phase 4 clinical trials.

Progress reports detailing the results of the clinical trials must be submitted at least annually to the FDA and written IND safety reports must be submitted to the FDA and the investigators for serious and unexpected adverse reactions, any finding from other clinical studies, tests in laboratory animals, or *in vitro* testing that suggests a significant risk for human subjects, or any clinically important increase in the rate of a serious suspected adverse reaction over that listed in the protocol or investigator brochure. Phase 1, Phase 2 and Phase 3 clinical trials may not be completed successfully within any specified period, if at all. The FDA or the clinical trial sponsor may suspend or terminate a clinical trial at any time on various grounds, including a finding that the research subjects or patients are being exposed to an unacceptable health risk. Similarly, an IRB can suspend or terminate approval of a clinical trial at its institution if the clinical trial is not being conducted in accordance with the IRB's requirements or if the drug has been associated with unexpected serious harm to patients. In addition, some clinical trials are overseen by an independent group of qualified experts organized by the clinical trial sponsor, known as a data safety monitoring board or committee. This group provides authorization for whether or not a trial may move forward at designated check points based on access to certain data from the trial. We may also suspend or terminate a clinical trial based on evolving business objectives and/or competitive climate. Concurrent with clinical trials, companies usually complete additional animal studies and must also develop additional information about the chemistry and physical characteristics of the drug as well as finalize a process

for manufacturing the drug in commercial quantities in accordance with cGMP requirements. The manufacturing process must be capable of consistently producing quality batches of the drug candidate and, among other things, cGMPs impose extensive procedural, substantive and recordkeeping requirements to ensure and preserve the long-term stability and quality of the final drug product. In addition, appropriate packaging must be selected and tested and stability studies must be conducted to demonstrate that the drug candidate does not undergo unacceptable deterioration over its shelf life.

NDA and FDA Review Process

Following trial completion, trial data are analyzed to assess safety and efficacy. The results of pre-clinical studies and clinical trials are then submitted to the FDA as part of an NDA, along with proposed labeling for the drug and information about the manufacturing process and facilities that will be used to ensure drug quality, results of analytical testing conducted on the chemistry of the drug, and other relevant information. The NDA is a request for approval to market the drug and must contain adequate evidence of safety and efficacy, which is demonstrated by extensive pre-clinical and clinical testing. The application includes both negative or ambiguous results of pre-clinical studies and clinical trials as well as positive findings. Data may come from company-sponsored clinical trials intended to test the safety and efficacy of a use of a drug, or from a number of alternative sources, including studies initiated by investigators. To support marketing approval, the data submitted must be sufficient in quality and quantity to establish the safety and efficacy of the investigational drug product to the satisfaction of the FDA. FDA approval of an NDA must be obtained before a drug may be offered for sale in the U.S.

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

Under the Prescription Drug User Fee Act, or PDUFA, as amended, each NDA must be accompanied by a user fee. The FDA adjusts the PDUFA user fees on an annual basis. According to the FDA's fiscal year 2020 fee schedule, effective through September 30, 2020, the user fee for an application requiring clinical data, such as an NDA, is \$2,942,965. PDUFA also imposes an annual prescription drug product program fee for human drugs (\$325,424). Fee waivers or reductions are available in certain circumstances, including a waiver of the application fee for the first application filed by a small business. In addition, no user fees are assessed on NDAs for products designated as orphan drugs, unless the product also includes a non-orphan indication.

The FDA reviews all NDAs submitted before it accepts them for filing and may request additional information rather than accepting an NDA for filing. The FDA must make a decision on accepting an NDA for filing within 60 days of receipt. Once the submission is accepted for filing, the FDA begins an in-depth review of the NDA. Under the goals and policies agreed to by the FDA under PDUFA, for a new molecular entity the FDA has ten months from the filing date in which to complete its initial review of a standard NDA and respond to the applicant, and six months from the filing date for a priority NDA. The submission of a major amendment at any time during the review cycle may extend the PDUFA action date by up to three months. Only one extension can be given per review cycle. The FDA does not always meet its PDUFA goal dates for standard and priority NDAs, and the review process is often significantly extended by FDA requests for additional information or clarification.

After the NDA submission is accepted for filing, the FDA reviews the NDA to determine, among other things, whether the proposed drug is safe and effective for its intended use, and whether the drug is being manufactured in accordance with cGMP to assure and preserve the drug's identity, strength, quality and purity. The FDA may refer applications for novel drugs or drug candidates that present difficult questions of safety or efficacy to an advisory committee, typically a panel that includes clinicians and other experts, for review, evaluation and a recommendation as to whether the application should be approved and under what conditions. The FDA is not bound by the recommendations of an advisory committee, but it considers such recommendations carefully when making decisions. The FDA will likely re-analyze the clinical trial data, which could result in extensive discussions between the FDA and us during the review process. The review and evaluation of an NDA by the FDA is extensive and time consuming and may take longer than originally planned to complete, and we may not receive a timely approval, if at all.

Before approving an NDA, the FDA will conduct a pre-approval inspection of the manufacturing facilities for the new drug to determine whether they comply with cGMPs. The FDA will not approve the drug unless it determines

that the manufacturing processes and facilities are in compliance with cGMP requirements and adequate to assure consistent production of the drug within required specifications. In addition, before approving an NDA, the FDA may also audit data from clinical trials by inspecting the sponsor or clinical trial sites to ensure compliance with GCP requirements. After the FDA evaluates the application, manufacturing process and manufacturing facilities where the drug product and/or its API will be produced, it may issue an approval letter or a Complete Response Letter. An approval letter authorizes commercial marketing of the drug with specific prescribing information for specific indications. A Complete Response Letter indicates that the review cycle of the application is complete, and the application is not ready for approval. A Complete Response Letter usually describes all of the specific deficiencies in the NDA identified by the FDA. The Complete Response Letter may require additional clinical data and/or an additional pivotal clinical trial(s), and/or other significant, expensive and time-consuming requirements related to clinical trials, pre-clinical studies or manufacturing. If a Complete Response Letter is issued, the applicant may either resubmit the NDA, addressing all of the deficiencies identified in the letter, withdraw the application or request a hearing. Even if such data and information is submitted, the FDA may ultimately decide that the NDA does not satisfy the criteria for approval. Data obtained from clinical trials are not always conclusive and the FDA may interpret data differently than we interpret the same data.

There is no assurance that the FDA will ultimately approve a drug product for marketing in the U.S. and we may encounter significant difficulties or costs during the review process. If a drug receives marketing approval, the approval may be significantly limited to specific diseases and dosages or the indications for use may otherwise be limited, which could restrict the commercial value of the drug. Further, the FDA may require that certain contraindications, warnings or precautions be included in the drug labeling or may condition the approval of the NDA on other changes to the proposed labeling, development of adequate controls and specifications, or a commitment to conduct post-market testing or clinical trials and surveillance to monitor the effects of approved drugs. For example, the FDA may require Phase 4 testing which involves clinical trials designed to further assess a drug's safety and effectiveness and may require testing and surveillance programs to monitor the safety of approved drugs that have been commercialized. The FDA may also place other conditions on approvals including the requirement for a Risk Evaluation and Mitigation Strategy, or REMS to assure the safe use of the drug. If the FDA concludes a REMS is needed, the sponsor of the NDA must submit a proposed REMS. The FDA will not approve the NDA without an approved REMS, if required. A REMS could include medication guides, physician communication plans, or elements to assure safe use, such as restricted distribution methods, patient registries and other risk minimization tools. Any of these limitations on approval or marketing could restrict the commercial promotion, distribution, prescription or dispensing of drugs. Drug approvals may be withdrawn for non-compliance with regulatory requirements or if problems occur following initial marketing.

Special FDA Expedited Review and Approval Programs

The FDA has various programs, including fast track designation, accelerated approval, priority review and breakthrough therapy designation, that are intended to expedite or simplify the process for the development and FDA review of drugs that are intended for the treatment of serious or life-threatening diseases or conditions and demonstrate the potential to address unmet medical needs. The purpose of these programs is to provide important new drugs to patients earlier than under standard FDA review procedures. To be eligible for fast track designation, the FDA must determine, based on the request of a sponsor, that a drug is intended to treat a serious or life-threatening disease or condition and based on pre-clinical or preliminary clinical data demonstrates the potential to address an unmet medical need. The FDA will determine that a product will fill an unmet medical need if it will provide a therapy where none exists or provide a therapy that may be potentially superior to existing therapy based on efficacy or safety factors.

The FDA may give a priority review designation to drugs that offer major advances in treatment or provide a treatment where no adequate therapy exists. A priority review means that the goal for the FDA to review an application is six months, rather than the standard review of ten months under current PDUFA guidelines. These six- and ten-month review periods are measured from the "filing" date rather than the receipt date for NDAs for new molecular entities, which typically adds approximately two months to the timeline for review and decision from the date of submission. Products that are eligible for fast track designation are also likely to be considered appropriate to receive a priority review.

In addition, drugs studied for their safety and effectiveness in treating serious or life-threatening illnesses and that provide meaningful therapeutic benefit over existing treatments may receive accelerated approval and may be

approved on the basis of adequate and well-controlled clinical trials establishing that the drug has an effect on a surrogate endpoint that is reasonably likely to predict clinical benefit, or on a clinical endpoint that can be measured earlier than irreversible morbidity or mortality, that is reasonably likely to predict an effect on irreversible morbidity or mortality or other clinical benefit, taking into account the severity, rarity or prevalence of the condition and the availability or lack of alternative treatments. As a condition of approval, the FDA may require a sponsor of a drug receiving accelerated approval to perform post-marketing studies to verify and describe the predicted effect on irreversible morbidity or mortality or other clinical endpoint, and the drug may be subject to accelerated withdrawal procedures.

Moreover, a sponsor can request designation of a drug candidate as a “breakthrough therapy.” A breakthrough therapy is defined as a drug that is intended, alone or in combination with one or more other drugs, to treat a serious or life-threatening disease or condition, and preliminary clinical evidence indicates that the drug may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints, such as substantial treatment effects observed early in clinical development. Drugs designated as breakthrough therapies are also eligible for accelerated approval and priority review. The FDA must take certain actions, such as holding timely meetings and providing advice, intended to expedite the development and review of an application for approval of a breakthrough therapy.

Even if a product qualifies for one or more of these programs, the FDA may later decide that the product no longer meets the conditions for qualification or decide that the time period for FDA review or approval will not be shortened. Furthermore, fast track designation, priority review, accelerated approval and breakthrough therapy designation, do not change the standards for approval and may not ultimately expedite the development or approval process.

Pediatric Trials

A sponsor who is planning to submit a marketing application for a drug that includes a new active ingredient, new indication, new dosage form, new dosing regimen or new route of administration must submit an initial Pediatric Study Plan, or PSP, within sixty days of an end-of-Phase 2 meeting or as may be agreed between the sponsor and FDA. The initial PSP must include an outline of the pediatric study or studies that the sponsor plans to conduct, including study objectives and design, age groups, relevant endpoints and statistical approach, or a justification for not including such detailed information, and any request for a deferral of pediatric assessments or a full or partial waiver of the requirement to provide data from pediatric studies along with supporting information. FDA and the sponsor must reach agreement on the PSP. A sponsor can submit amendments to an agreed-upon initial PSP at any time if changes to the pediatric plan need to be considered based on data collected from pre-clinical studies, early phase clinical trials, and/or other clinical development programs.

Post-Marketing Requirements

Following approval of a new drug, a pharmaceutical company and the approved drug are subject to continuing regulation by the FDA, including, among other things, monitoring and recordkeeping activities, reporting to the applicable regulatory authorities of adverse experiences with the drug, providing the regulatory authorities with updated safety and efficacy information, drug sampling and distribution requirements, and complying with promotion and advertising requirements, which include, among others, standards for direct-to-consumer advertising, restrictions on promoting drugs for uses or in patient populations that are not described in the drug’s approved labeling, which is known as “off-label use”, and requirements for promotional activities involving the internet. Although physicians may prescribe legally available drugs for off-label uses, manufacturers may not market or promote such off-label uses. Prescription drug promotional materials must be submitted to the FDA in conjunction with their first use. There are also limitations on industry-sponsored scientific and educational activities. Modifications or enhancements to the drug or its labeling or changes of the site of manufacture are often subject to the approval of the FDA and other regulators, which may or may not be received or may result in a lengthy review process. Any distribution of prescription drugs and pharmaceutical samples must comply with the U.S. Prescription Drug Marketing Act, or the PDMA, a part of the FDCA.

In the U.S., once a drug is approved, its manufacture is subject to comprehensive and continuing regulation by the FDA. The FDA regulations require that drugs be manufactured in specific approved facilities and in accordance with cGMP. We rely, and expect to continue to rely, on third parties for the production of clinical and commercial quantities

of our drugs in accordance with cGMP regulations. cGMP regulations require among other things, quality control and quality assurance as well as the corresponding maintenance of records and documentation and the obligation to investigate and correct any deviations from cGMP. Drug manufacturers and other entities involved in the manufacture and distribution of approved drugs are required to register their establishments with the FDA and certain state agencies and are subject to periodic unannounced inspections by the FDA and certain state agencies for compliance with cGMP and other laws. Accordingly, manufacturers must continue to expend time, money, and effort in the area of production and quality control to maintain cGMP compliance. These regulations also impose certain organizational, procedural and documentation requirements with respect to manufacturing and quality assurance activities. NDA holders using contract manufacturers, laboratories or packagers are responsible for the selection and monitoring of qualified firms, and, in certain circumstances, qualified suppliers to these firms. These firms and, where applicable, their suppliers are subject to inspections by the FDA at any time, and the discovery of violative conditions, including failure to conform to cGMP, could result in enforcement actions that interrupt the operation of any such facilities or the ability to distribute drugs manufactured, processed or tested by them. Discovery of problems with a drug after approval may result in restrictions on a drug, manufacturer, or holder of an approved NDA, including, among other things, recall or withdrawal of the drug from the market, and may require substantial resources to correct.

The FDA also may require post-approval commitments, which may include testing that are sometimes referred to as post-marketing studies or clinical studies, risk minimization action plans and post-marketing surveillance to monitor the effects of an approved drug or place conditions on an approval that could restrict the distribution or use of the drug. Discovery of previously unknown problems with a drug or the failure to comply with applicable FDA requirements can have negative consequences, including adverse publicity, judicial or administrative enforcement, untitled or warning letters from the FDA, mandated corrective advertising or communications with doctors, and civil or criminal penalties, among others. Newly discovered or developed safety or effectiveness data may require changes to a drug's approved labeling, including the addition of new warnings and contraindications, and also may require the implementation of other risk management measures. The distribution of pharmaceutical drugs is subject to additional requirements and regulations, including extensive record-keeping, licensing, storage and security requirements intended to prevent the unauthorized sale of pharmaceutical drugs.

Also, new government requirements, including those resulting from new legislation, may be established, or the FDA's policies may change, which could delay or prevent regulatory approval of our drugs under development.

Other Regulatory Matters

Manufacturing, sales, promotion and other activities following drug approval are also subject to regulation by numerous regulatory authorities in addition to the FDA, including, in the U.S., the Centers for Medicare & Medicaid Services, other divisions of the Department of Health and Human Services, the Drug Enforcement Administration for controlled substances, the Consumer Product Safety Commission, the Federal Trade Commission, the Occupational Safety & Health Administration, the Environmental Protection Agency and state and local governments. In the U.S., sales, marketing and scientific/educational programs must also comply with state and federal fraud and abuse laws. Pricing and rebate programs must comply with the Medicaid rebate requirements of the U.S. Omnibus Budget Reconciliation Act of 1990 and more recent requirements in the Patient Protection and Affordable Care Act as amended by the Health Care and Education Reconciliation Act of 2010, or collectively, the Affordable Care Act. If drugs are made available to authorized users of the Federal Supply Schedule of the General Services Administration, additional laws and requirements apply. The handling of any controlled substances must comply with the U.S. Controlled Substances Act and Controlled Substances Import and Export Act. Drugs must meet applicable child-resistant packaging requirements under the U.S. Poison Prevention Packaging Act. Manufacturing, sales, promotion and other activities are also potentially subject to federal and state consumer protection and unfair competition laws.

The failure to comply with regulatory requirements subjects firms to possible legal or regulatory action. Depending on the circumstances, failure to meet applicable regulatory requirements can result in criminal prosecution, fines or other penalties, injunctions, voluntary recalls, seizure of drugs, total or partial suspension of production, denial or withdrawal of product approvals, or refusal to allow a firm to enter into supply contracts, including government contracts. In addition, even if a firm complies with FDA and other requirements, new information regarding the safety or efficacy of a product could lead the FDA to modify or withdraw product approval. Prohibitions or restrictions on sales or withdrawal of future products marketed by us could materially affect our business in an adverse way.

Changes in regulations, statutes or the interpretation of existing regulations could impact our business in the future by requiring, for example: (i) changes to our manufacturing arrangements; (ii) additions or modifications to product labeling; (iii) the voluntary recall or discontinuation of our products; or (iv) additional record-keeping requirements. If any such changes were to be imposed, they could adversely affect the operation of our business.

U.S. Patent Term Restoration and Marketing Exclusivity

Depending upon the timing, duration and specifics of the FDA approval of our drug candidates, some of our U.S. patents may be eligible for limited patent term extension under the Drug Price Competition and Patent Term Restoration Act of 1984, commonly referred to as the Hatch-Waxman Amendments. The Hatch-Waxman Amendments permit a patent restoration term of up to five years as compensation for patent term lost during product development and the FDA regulatory review process. However, patent term restoration cannot extend the remaining term of a patent beyond a total of 14 years from the product's approval date. The patent term restoration period is generally one-half the time between the effective date of an IND and the submission date of an NDA plus the time between the submission date of an NDA and the approval of that application. Only one patent applicable to an approved drug is eligible for the extension and the application for the extension must be submitted prior to the expiration of the patent. The USPTO, in consultation with the FDA, reviews and approves the application for any patent term extension or restoration. In the future, we intend to apply for restoration of patent term for one of our currently owned or licensed patents to add patent life beyond its current expiration date, depending on the expected length of the clinical trials and other factors involved in the filing of the relevant NDA.

Marketing exclusivity provisions under the FDCA can also delay the submission or the approval of certain marketing applications. The FDCA provides a five-year period of non-patent marketing exclusivity within the U.S. to the first applicant to obtain approval of an NDA for a new chemical entity. A drug is a new chemical entity if the FDA has not previously approved any other new drug containing the same active moiety, which is the molecule or ion responsible for the action of the drug substance. During the exclusivity period, the FDA may not accept for review an abbreviated new drug application, or ANDA, or a 505(b)(2) NDA submitted by another company for another drug based on the same active moiety, regardless of whether the drug is intended for the same indication as the original innovator drug or for another indication, where the applicant does not own or have a legal right of reference to all the data required for approval. However, an application may be submitted after four years if it contains a certification of patent invalidity or non-infringement to one of the patents listed with the FDA by the innovator NDA holder. The FDCA also provides three years of marketing exclusivity for an NDA, or supplement to an existing NDA if new clinical investigations, other than bioavailability studies, that were conducted or sponsored by the applicant are deemed by the FDA to be essential to the approval of the application, for example new indications, dosages or strengths of an existing drug. This three-year exclusivity covers only the modification for which the drug received approval on the basis of the new clinical investigations and does not prohibit the FDA from approving ANDAs for drugs containing the active agent for the original indication or condition of use. Five-year and three-year exclusivity will not delay the submission or approval of a full NDA. However, an applicant submitting a full NDA would be required to conduct or obtain a right of reference to all of the pre-clinical studies and adequate and well-controlled clinical trials necessary to demonstrate safety and effectiveness. Orphan drug exclusivity, as described below, may offer a seven-year period of marketing exclusivity, except in certain circumstances. Pediatric exclusivity is another type of regulatory market exclusivity in the U.S. Pediatric exclusivity, if granted, adds six months to existing exclusivity periods and patent terms. This six-month exclusivity, which runs from the end of other exclusivity protection or patent term, may be granted based on the voluntary completion of a pediatric trial in accordance with an FDA-issued "Written Request" for such a trial.

Orphan Drug Designation

The FDA may grant orphan drug designation to drugs intended to treat a rare disease or condition that affects fewer than 200,000 individuals in the U.S., or if it affects more than 200,000 individuals in the U.S., there is no reasonable expectation that the cost of developing and marketing the drug for this type of disease or condition will be recovered from sales in the U.S. In the European Union, the European Commission, after receiving the opinion of the EMA's Committee for Orphan Medicinal Products, or COMP, grants medicinal product designation to promote the development of products that are intended for the diagnosis, prevention or treatment of a life-threatening or chronically debilitating conditions affecting not more than five in 10,000 persons in the European Union Community. In addition, designation is granted for products intended for the diagnosis, prevention or treatment of a life-threatening, seriously

debilitating or serious and chronic condition and when, without incentives, it is unlikely that sales of the drug in the European Union would be sufficient to justify the necessary investment in developing the drug or biological product.

In the U.S., orphan drug designation entitles a party to financial incentives such as opportunities for grant funding towards clinical trial costs, tax advantages and user-fee waivers. In addition, if a product receives the first FDA approval for the indication for which it has orphan designation, the product is entitled to orphan drug exclusivity, which means the FDA may not approve any other application to market the same drug for the same indication for a period of seven years, except in limited circumstances, such as a showing of clinical superiority over the product with orphan exclusivity.

In the European Union, medicinal product designation also entitles a party to financial incentives such as reduction of fees or fee waivers and ten years of market exclusivity is granted following drug or biological product approval. This period may be reduced to six years if the medicinal product designation criteria are no longer met, including where it is shown that the product is sufficiently profitable not to justify maintenance of market exclusivity.

Orphan drug designation must be requested before submitting an application for marketing approval. Orphan drug designation does not convey any advantage in, or shorten the duration of, the regulatory review and approval process.

Regulation of Diagnostic Tests

We expect that our drug candidates may require use of a diagnostic to identify appropriate patient populations for our products. These diagnostics, often referred to as companion diagnostic tests, are medical devices, often *in vitro* devices, which provide information that is essential for the safe and effective use of a corresponding drug. For example, we have entered into agreements with third parties to develop and commercialize companion diagnostic tests for avapritinib in order to identify GIST patients with the PDGFRA D842V mutation, pralsetinib in order to identify NSCLC patients with RET fusions and fisogatinib in order to identify HCC patients with FGFR4 pathway activation. In the U.S., the FDCA and its implementing regulations, and other federal and state statutes and regulations govern, among other things, medical device design and development, pre-clinical and clinical testing, premarket clearance or approval, establishment registration and device listing, manufacturing, labeling, storage, advertising and promotion, sales and distribution, export and import, and post-market surveillance. Unless an exemption applies, diagnostic tests require marketing clearance or approval from the FDA prior to commercial distribution. The two primary types of FDA marketing authorization applicable to a medical device are premarket notification, also called 510(k) clearance, and premarket approval, or PMA approval. We expect that any companion diagnostic test developed for our drug candidates will utilize the PMA pathway.

PMA applications must be supported by valid scientific evidence, which typically requires extensive data, including technical, pre-clinical, clinical and manufacturing data, to demonstrate to the FDA's satisfaction the safety and effectiveness of the device. For diagnostic tests, a PMA application typically includes data regarding analytical and clinical validation studies. As part of its review of the PMA, the FDA will conduct a pre-approval inspection of the manufacturing facility or facilities to ensure compliance with the Quality System Regulation, or QSR, which requires manufacturers to follow design, testing, control, documentation and other quality assurance procedures. FDA review of an initial PMA may require several years to complete. If the FDA evaluations of both the PMA application and the manufacturing facilities are favorable, the FDA will either issue an approval letter or an approvable letter, which usually contains a number of conditions that must be met in order to secure the final approval of the PMA. If the FDA's evaluation of the PMA or manufacturing facilities is not favorable, the FDA will deny approval of the PMA or issue a not approvable letter. A not approvable letter will outline the deficiencies in the application and, where practical, will identify what is necessary to make the PMA approvable. The FDA may also determine that additional clinical trials are necessary, in which case the PMA approval may be delayed for several months or years while the trials are conducted and then the data submitted in an amendment to the PMA. Once granted, PMA approval may be withdrawn by the FDA if compliance with post approval requirements, conditions of approval or other regulatory standards is not maintained or problems are identified following initial marketing.

On August 6, 2014, the FDA issued a final guidance document addressing the development and approval process for "In Vitro Companion Diagnostic Devices." According to the guidance, for novel drugs such as our drug candidates, a companion diagnostic test device and its corresponding drug should be approved or cleared

contemporaneously by FDA for the use indicated in the therapeutic product labeling. The guidance also explains that a companion diagnostic test device used to make treatment decisions in clinical trials of a drug generally will be considered an investigational device, unless it is employed for an intended use for which the device is already approved or cleared. If used to make critical treatment decisions, such as patient selection, the diagnostic device generally will be considered a significant risk device under the FDA's Investigational Device Exemption, or IDE, regulations. Thus, the sponsor of the diagnostic device will be required to comply with the IDE regulations. According to the guidance, if a diagnostic device and a drug are to be studied together to support their respective approvals, both products can be studied in the same investigational study, if the study meets both the requirements of the IDE regulations and the IND regulations. The guidance provides that depending on the details of the study plan and subjects, a sponsor may seek to submit an IND alone, or both an IND and an IDE.

In the European Economic Area, or EEA (which is comprised of the 27 Member States of the European Union plus Norway, Iceland and Liechtenstein), *in vitro* medical devices are required to conform with the essential requirements of the E.U. Directive on *in vitro* diagnostic medical devices (Directive No 98/79/EC, as amended). To demonstrate compliance with the essential requirements, the manufacturer must undergo a conformity assessment procedure. The conformity assessment varies according to the type of medical device and its classification. For low-risk devices, the conformity assessment can be carried out internally, but for higher risk devices it requires the intervention of an accredited EEA Notified Body. If successful, the conformity assessment concludes with the drawing up by the manufacturer of an EC Declaration of Conformity entitling the manufacturer to affix the CE mark to its products and to sell them throughout the EEA.

European Drug Development

In the European Union, our future drugs may also be subject to extensive regulatory requirements. As in the U.S., medicinal products can only be marketed if a marketing authorization from the competent regulatory agencies has been obtained.

Similar to the U.S., the various phases of pre-clinical and clinical research in the European Union are subject to significant regulatory controls. Although the current EU Clinical Trials Directive 2001/20/EC, or Clinical Trials Directive, has sought to harmonize the European Union clinical trials regulatory framework, setting out common rules for the control and authorization of clinical trials in the European Union, the European Union Member States have transposed and applied the provisions of the Directive differently. This has led to significant variations in the member state regimes. Under the current regime, before a clinical trial can be initiated it must be approved in each of the European Union countries where the trial is to be conducted by two distinct bodies: the National Competent Authority, or NCA, and one or more Ethics Committees, or ECs. Under the current regime all suspected unexpected serious adverse reactions to the investigated drug that occur during the clinical trial have to be reported to the NCA and ECs of the Member State where they occurred.

In April 2014, the European Union adopted a new Clinical Trials Regulation (EU) No 536/2014, or the Clinical Trials Regulation, which is set to replace the Clinical Trials Directive. It is expected that the new Clinical Trials Regulation (EU) No 536/2014 will apply following confirmation of full functionality of the Clinical Trials Information System (CTIS), the centralized European Union portal and database for clinical trials foreseen by the regulation, through an independent audit. The regulation becomes applicable six months after the European Commission publishes notice of this confirmation. The Clinical Trials Regulation will overhaul the current system of approvals for clinical trials in the European Union. Specifically, the new legislation, which will be directly applicable in all member states, aims at simplifying and streamlining the approval of clinical trials in the European Union. For instance, the new Clinical Trials Regulation provides for a streamlined application procedure via a single entry point and strictly defined deadlines for the assessment of clinical trial applications.

European Drug Review and Approval

In the United Kingdom and the EEA, medicinal products can only be commercialized after obtaining a Marketing Authorization, or MA. There are two types of marketing authorizations:

The Community MA, which is issued by the European Commission through the Centralized Procedure, based on the opinion of the Committee for Medicinal Products for Human Use, or CHMP, of the EMA and which is valid

throughout the entire territory of the EEA. The Centralized Procedure is mandatory for certain types of drugs, such as biotechnology medicinal drugs, orphan medicinal drugs, and medicinal drugs containing a new active substance indicated for the treatment of AIDS, cancer, neurodegenerative disorders, diabetes, auto-immune and viral diseases. The Centralized Procedure is optional for drugs containing a new active substance not yet authorized in the EEA, or for drugs that constitute a significant therapeutic, scientific or technical innovation or which are in the interest of public health in the European Union.

National MAs, which are issued by the competent authorities of the Member States of the EEA and only cover their respective territory, are available for drugs not falling within the mandatory scope of the Centralized Procedure. Where a drug has already been authorized for marketing in a Member State of the EEA, this National MA can be recognized in another Member State through the Mutual Recognition Procedure. If the drug has not received a National MA in any Member State at the time of application, it can be approved simultaneously in various Member States through the Decentralized Procedure. Under the Decentralized Procedure an identical dossier is submitted to the competent authorities of each of the Member States in which the MA is sought, one of which is selected by the applicant as the Reference Member State, or RMS. The competent authority of the RMS prepares a draft assessment report, a draft summary of the drug characteristics, or SPC, and a draft of the labeling and package leaflet, which are sent to the other Member States (referred to as the Member States Concerned) for their approval. If the Member States Concerned raise no objections, based on a potential serious risk to public health, to the assessment, SPC, labeling, or packaging proposed by the RMS, the drug is subsequently granted a national MA in all the Member States (i.e. in the RMS and the Member States Concerned).

Under the above described procedures, before granting the MA, the EMA or the competent authorities of the Member States of the EEA make an assessment of the risk-benefit balance of the drug on the basis of scientific criteria concerning its quality, safety and efficacy.

European Chemical Entity Exclusivity

In the European Union, new chemical entities, sometimes referred to as new active substances, qualify for eight years of data exclusivity upon marketing authorization and an additional two years of market exclusivity. This data exclusivity, if granted, prevents regulatory authorities in the European Union from referencing the innovator's data to assess a generic application for eight years, after which generic marketing authorization can be submitted, and the innovator's data may be referenced, but not approved for two years. The overall ten-year period will be extended to a maximum of 11 years if, during the first eight years of those ten years, the marketing authorization holder obtains an authorization for one or more new therapeutic indications which, during the scientific evaluation prior to their authorization, are held to bring a significant clinical benefit in comparison with existing therapies.

Rest of the World Regulation

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

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

Data Privacy and Security Laws

Pharmaceutical companies may be subject to U.S. federal and state health information privacy, security and data breach notification laws, which may govern the collection, use, disclosure and protection of health-related and other personal information. State laws may be more stringent, broader in scope or offer greater individual rights with respect to protected health information, or PHI, than HIPAA and state laws may differ from each other, which may complicate compliance efforts. Entities that are found to be in violation of HIPAA as the result of a breach of unsecured PHI, a complaint about privacy practices or an audit by the Department of Health and Human Services, or HHS, may be subject

to significant civil, criminal and administrative fines and penalties and/or additional reporting and oversight obligations if required to enter into a resolution agreement and corrective action plan with HHS to settle allegations of HIPAA non-compliance.

Many state laws govern the privacy of personal information in specified circumstances. For example, in California the California Consumer Protection Act, or CCPA, which went into effect on January 1, 2020, establishes a new privacy framework for covered businesses by creating an expanded definition of personal information, establishing new data privacy rights for consumers in the State of California, imposing special rules on the collection of consumer data from minors, and creating a new and potentially severe statutory damages framework for violations of the CCPA and for businesses that fail to implement reasonable security procedures and practices to prevent data breaches. While clinical trial data and information governed by HIPAA are currently exempt from the current version of the CCPA, other personal information may be applicable and possible changes to the CCPA may broaden its scope.

European Union member states, the United Kingdom, Switzerland and other jurisdictions have also adopted data protection laws and regulations, which impose significant compliance obligations. In the EEA and the United Kingdom, the collection and use of personal data, including clinical trial data, is governed by the provisions of the General Data Protection Regulation, or GDPR. The GDPR, together with national legislation, regulations and guidelines of the EU member states and the United Kingdom governing the processing of personal data, impose strict obligations and restrictions on the ability to collect, analyze and transfer personal data, including health data from clinical trials and adverse event reporting. In particular, these obligations and restrictions concern the consent of the individuals to whom the personal data relates, the information provided to the individuals, the transfer of personal data out of the EEA or the United Kingdom, security breach notifications, security and confidentiality of the personal data and imposition of substantial potential fines for breaches of the data protection obligations. European data protection authorities may interpret the GDPR and national laws differently and impose additional requirements, which add to the complexity of processing personal data in or from the EEA or United Kingdom. Guidance on implementation and compliance practices are often updated or otherwise revised.

Coverage and Reimbursement

Sales of our drugs will depend, in part, on the extent to which our drugs will be covered by third-party payors, such as government health programs, commercial insurance and managed healthcare organizations. In the U.S. and markets in other countries, patients who are prescribed treatments for their conditions and providers performing the prescribed services generally rely on third-party payors to reimburse all or part of the associated healthcare costs. Thus, even if a drug is approved, sales of the drug will depend, in part, on the extent to which third-party payors, including government health programs in the U.S. such as Medicare and Medicaid, commercial health insurers and managed care organizations, provide coverage, and establish adequate reimbursement levels for, the product. In the U.S., no uniform policy of coverage and reimbursement for drug products exists among third-party payors. Therefore, coverage and reimbursement for drug products can differ significantly from payor to payor. The process for determining whether a third-party payor will provide coverage for a product may be separate from the process for setting the price or reimbursement rate that the payor will pay for the product once coverage is approved. Third-party payors may limit coverage to specific products on an approved list, also known as a formulary, which might not include all of the approved products for a particular indication.

These third-party payors are increasingly reducing or restricting reimbursements for medical drugs and services. In addition, the containment of healthcare costs has become a priority of federal and state governments, and the prices of drugs have been a focus in this effort. The U.S. government, state legislatures and foreign governments have shown significant interest in implementing cost-containment programs, including price controls, restrictions on reimbursement and requirements for substitution of generic drugs. Adoption of price controls and cost-containment measures, and adoption of more restrictive policies in jurisdictions with existing controls and measures, could further limit our net revenue and results. Decreases in third-party reimbursement for our drug candidates, if approved, or a decision by a third-party payor to not cover our drug candidates could reduce physician usage of such drugs and have a material adverse effect on our sales, results of operations and financial condition.

The Medicare Prescription Drug, Improvement, and Modernization Act of 2003, or the MMA, established the Medicare Part D program to provide a voluntary prescription drug benefit to Medicare beneficiaries. Under Part D, Medicare beneficiaries may enroll in prescription drug plans offered by private entities that provide coverage of

outpatient prescription drugs. Unlike Medicare Part A and B, Part D coverage is not standardized. Part D prescription drug plan sponsors are not required to pay for all covered Part D drugs, and each drug plan can develop its own drug formulary that identifies which drugs it will cover and at what tier or level. However, Part D prescription drug formularies must include drugs within each therapeutic category and class of covered Part D drugs, though not necessarily all the drugs in each category or class. Any formulary used by a Part D prescription drug plan must be developed and reviewed by a pharmacy and therapeutic committee. Government payment for some of the costs of prescription drugs may increase demand for drugs for which we receive marketing approval. Any negotiated prices for our drugs covered by a Part D prescription drug plan may be lower than the prices we might otherwise obtain. Moreover, while the MMA applies only to drug benefits for Medicare beneficiaries, private payors often follow Medicare coverage policy and payment limitations in setting their own payment rates. Any reduction in payment that results from the MMA may result in a similar reduction in payments from non-governmental payors.

The American Recovery and Reinvestment Act of 2009 provides funding for the federal government to compare the effectiveness of different treatments for the same illness. The plan for the research was published in 2012 by the Department of Health and Human Services, the Agency for Healthcare Research and Quality and the National Institutes for Health, and periodic reports on the status of the research and related expenditures will be made to Congress. Although the results of the comparative effectiveness studies are not intended to mandate coverage policies for public or private payors, it is not clear what effect, if any, the research will have on the sales of our drug candidates, if any such drug or the condition that they are intended to treat is the subject of a trial. It is also possible that comparative effectiveness research demonstrating benefits in a competitor's drug could adversely affect the sales of our drug candidate. If third-party payors do not consider our drugs to be cost-effective compared to other available therapies, they may not cover our drugs after approval as a benefit under their plans or, if they do, the level of payment may not be sufficient to allow us to sell our drugs on a profitable basis.

The Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act of 2010, or collectively the Affordable Care Act, enacted in March 2010, has had a significant impact on the health care industry. The Affordable Care Act expanded coverage for the uninsured while at the same time containing overall healthcare costs. With regard to pharmaceutical products, the Affordable Care Act, among other things, addressed a new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for drugs that are inhaled, infused, instilled, implanted or injected, increased the minimum Medicaid rebates owed by manufacturers under the Medicaid Drug Rebate Program and extended the rebate program to individuals enrolled in Medicaid managed care organizations, established annual fees and taxes on manufacturers of certain branded prescription drugs, and a new Medicare Part D coverage gap discount program, in which manufacturers must agree to offer 50% point-of-sale discounts off negotiated prices of applicable brand drugs to eligible beneficiaries during their coverage gap period, as a condition for the manufacturer's outpatient drugs to be covered under Medicare Part D.

In addition, other legislative changes have been proposed and adopted in the U.S. since the Affordable Care Act was enacted. On August 2, 2011, the Budget Control Act of 2011 among other things, created measures for spending reductions by Congress. A Joint Select Committee on Deficit Reduction, tasked with recommending a targeted deficit reduction of at least \$1.2 trillion for the years 2013 through 2021, was unable to reach required goals, thereby triggering the legislation's automatic reduction to several government programs. This includes aggregate reductions to Medicare payments to providers of up to 2% per fiscal year, started in April 2013, and, due to subsequent legislative amendments, will stay in effect through 2029 unless additional Congressional action is taken. On January 2, 2013, then President Obama signed into law the American Taxpayer Relief Act of 2012, or the ATRA, which among other things, also reduced Medicare payments to several providers, including hospitals, imaging centers and cancer treatment centers, and increased the statute of limitations period for the government to recover overpayments to providers from three to five years. We expect that additional federal healthcare reform measures will be adopted in the future, any of which could limit the amounts that federal and state governments will pay for healthcare drugs and services, and in turn could significantly reduce the projected value of certain development projects and reduce our profitability.

The 2017 Tax Cuts and Jobs Act, or TJCA, includes a provision repealing the individual mandate, effective January 1, 2019. Further, on January 20, 2017, U.S. President Donald Trump signed an Executive Order directing federal agencies with authorities and responsibilities under the Affordable Care Act to waive, defer, grant exemptions from, or delay the implementation of any provision of the Affordable Care Act that would impose a fiscal burden on states or a cost, fee, tax, penalty or regulatory burden on individuals, healthcare providers, health insurers, or manufacturers of pharmaceuticals or medical devices. On October 13, 2017, President Trump signed an Executive Order

terminating the cost-sharing subsidies that reimburse insurers under the Affordable Care Act. Several state Attorneys General filed suit to stop the administration from terminating these subsidies, but on October 25, 2017, a federal judge in California denied their request for a restraining order. Further, on June 14, 2018, the U.S. Court of Appeals for the Federal Circuit ruled that the federal government was not required to pay more than \$12 billion in Affordable Care Act risk corridor payments to third-party payors who argued the payments were owed to them. On December 10, 2019, the U.S. Supreme Court heard arguments in *Moda Health Plan, Inc. v. United States*, which will determine whether the government must make risk corridor payments. The U.S. Supreme Court's decision will be released in the coming months, but we cannot predict how the U.S. Supreme Court will rule. In addition, the Centers for Medicare & Medicaid Services, the agency responsible for administering the Medicare program, or CMS, recently proposed regulations that would give states greater flexibility in setting benchmarks for insurers in the individual and small group marketplaces, which may have the effect of relaxing the health benefits required under the Affordable Care Act for plans sold through these marketplaces. There may be further action to repeal, replace or modify the Affordable Care Act. While any legislative and regulatory changes will likely take time to develop, and may or may not have an impact on the regulatory regime to which we are subject, we cannot predict the ultimate content, timing or effect of any healthcare reform legislation or the impact of potential legislation on us.

In addition, in some foreign countries, the proposed pricing for a drug must be approved before it may be lawfully marketed. The requirements governing drug pricing vary widely from country to country. For example, the European Union provides options for its member states to restrict the range of medicinal drugs for which their national health insurance systems provide reimbursement and to control the prices of medicinal drugs for human use. A member state may approve a specific price for the medicinal drug or it may instead adopt a system of direct or indirect controls on the profitability of the company placing the medicinal drug on the market. There can be no assurance that any country that has price controls or reimbursement limitations for pharmaceutical drugs will allow favorable reimbursement and pricing arrangements for any of our drugs. Historically, drugs launched in the European Union do not follow price structures of the U.S. and generally tend to be significantly lower.

Other Healthcare Laws

We may also be subject to healthcare regulation and enforcement by the federal government and the states and foreign governments where we may market our drug candidates, if approved. These laws include, without limitation, state and federal anti-kickback, fraud and abuse, false claims, privacy and security and physician sunshine laws and regulations.

The federal Anti-Kickback Statute prohibits, among other things, any person from knowingly and willfully offering, soliciting, receiving or paying remuneration, directly or indirectly, to induce either the referral of an individual, for an item or service or the purchasing or ordering of a good or service, for which payment may be made under federal healthcare programs such as the Medicare and Medicaid programs. The government has enforced the Anti-Kickback Statute to reach large settlements with healthcare companies based on sham consulting and other financial arrangements with physicians. A person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation. In addition, the government may assert that a claim including items or services resulting from a violation of the federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the federal False Claims Act. The majority of states also have anti-kickback laws, which establish similar prohibitions and, in some cases, may apply to items or services reimbursed by any third-party payor, including commercial insurers.

In addition, the civil False Claims Act prohibits, among other things, knowingly presenting or causing the presentation of a false, fictitious or fraudulent claim for payment to the U.S. government. Actions under the False Claims Act may be brought by the Attorney General or as a *qui tam* action by a private individual in the name of the government. Violations of the False Claims Act can result in very significant monetary penalties and treble damages. The federal government is using the False Claims Act, and the accompanying threat of significant liability, in its investigation and prosecution of pharmaceutical and biotechnology companies throughout the U.S., for example, in connection with the promotion of drug for unapproved uses and other sales and marketing practices. The government has obtained multi-million and multi-billion dollar settlements under the False Claims Act in addition to individual criminal convictions under applicable criminal statutes. Given the significant size of actual and potential settlements, it is expected that the government will continue to devote substantial resources to investigating healthcare providers' and manufacturers' compliance with applicable fraud and abuse laws.

The federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, also created new federal criminal statutes that prohibit among other actions, knowingly and willfully executing, or attempting to execute, a scheme to defraud any healthcare benefit program, including private third-party payors, knowingly and willfully embezzling or stealing from a healthcare benefit program, willfully obstructing a criminal investigation of a healthcare offense, and knowingly and willfully falsifying, concealing or covering up a material fact or making any materially false, fictitious or fraudulent statement in connection with the delivery of or payment for healthcare benefits, items or services. Similar to the federal Anti-Kickback Statute, a person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation.

There has also been a recent trend of increased federal and state regulation of payments made to physicians and other healthcare providers. The Affordable Care Act, among other things, imposes new reporting requirements on drug manufacturers for payments made by them to physicians and teaching hospitals, as well as ownership and investment interests held by physicians and their immediate family members. Failure to submit required information may result in civil monetary penalties for all payments, transfers of value or ownership or investment interests that are not timely, accurately and completely reported in an annual submission. Drug manufacturers are required to submit annual reports to the CMS, which publicly posts the data on its website. Certain states also mandate implementation of compliance programs, impose restrictions on drug manufacturer marketing practices and/or require the tracking and reporting of gifts, compensation and other remuneration to physicians.

We may also be subject to data privacy and security regulation by both the federal government and the states in which we conduct our business. HIPAA, as amended by the Health Information Technology and Clinical Health Act, or HITECH, and their respective implementing regulations, including the final omnibus rule published on January 25, 2013, imposes specified requirements relating to the privacy, security and transmission of individually identifiable health information. Among other things, HITECH makes HIPAA's privacy and security standards directly applicable to "business associates," defined as independent contractors or agents of covered entities that create, receive, maintain or transmit protected health information in connection with providing a service for or on behalf of a covered entity. HITECH also increased the civil and criminal penalties that may be imposed against covered entities, business associates and possibly other persons, and gave state attorneys general new authority to file civil actions for damages or injunctions in federal courts to enforce the federal HIPAA laws and seek attorney's fees and costs associated with pursuing federal civil actions. In addition, we may be subject to state law equivalents of each of the above federal laws, such as anti-kickback and false claims laws which may apply to items or services reimbursed by any third-party payor, including commercial insurers, and state laws governing the privacy and security of health information in certain circumstances, many of which differ from each other in significant ways, thus complicating compliance efforts.

Employees

As of January 31, 2020, we had 383 full-time employees, including 114 employees with M.D. or Ph.D. degrees. Of these full-time employees, 221 employees are engaged in research and development activities. None of our employees are represented by a labor union or covered by a collective bargaining agreement. We consider our relationship with our employees to be good.

Corporate Information

We were incorporated in the State of Delaware in October 2008 under the name ImmunoCo, Inc. In May 2010, we changed our name to Hoyle Pharmaceuticals, Inc., and in June 2011, we changed our name again to Blueprint Medicines Corporation. Our principal executive offices are located at 45 Sidney Street, Cambridge, Massachusetts 02139, and our telephone number is (617) 374-7580.

Information Available on the Internet

Our Internet website address is <http://www.blueprintmedicines.com>. The information contained on, or that can be accessed through, our website is not a part of or incorporated by reference in this Annual Report on Form 10-K. We have included our website address in this in this Annual Report on Form 10-K solely as an inactive textual reference. We make available free of charge through our website our Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and amendments to those reports filed or furnished pursuant to Sections 13(a) and 15(d) of the Exchange Act. We make these reports available through the “Investors—SEC Filings” section of our website as soon as reasonably practicable after we electronically file such reports with, or furnish such reports to, the Securities and Exchange Commission, or SEC. We also make available, free of charge on our website, the reports filed with the SEC by our executive officers, directors and 10% stockholders pursuant to Section 16 under the Exchange Act as soon as reasonably practicable after copies of those filings are provided to us by those persons. You can review our electronically filed reports and other information that we file with the SEC on the SEC’s website at <http://www.sec.gov>.

Investors and others should note that we announce material information to our investors using our corporate website (<https://www.blueprintmedicines.com/>), including without limitation the “Investors & Media” and “Presentations & Publications” sections, SEC filings, press releases, public conference calls and webcasts. We use these channels as well as social media to communicate with the public about our company, our business, our drug and drug candidates and other matters. It is possible that the information we post on social media could be deemed to be material information. Therefore, we encourage investors, the media, and others interested in our company to review the information we post on the social media channels listed on the “Investors & Media” section of our corporate website. The contents of our website and social media channels are not, however, a part of this Annual Report on Form 10-K.

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 1 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 Financial Position and Need for Additional Capital

We are a precision therapy company with a limited operating history. We have incurred significant operating losses since our inception and anticipate that we will incur continued losses for the foreseeable future.

We are a precision therapy company with a limited operating history on which investors can base an investment decision. Biopharmaceutical drug development is a highly speculative undertaking and involves a substantial degree of risk. We commenced operations in April 2011. Our operations to date have been limited primarily to organizing and staffing our company, business planning, raising capital, developing our technology, identifying potential drug candidates, undertaking pre-clinical studies and conducting clinical trials for our drug candidates and establishing a commercial infrastructure. In January 2020, the FDA granted approval of avapritinib under the brand name AYWAKIT for the treatment of adults with unresectable or metastatic gastrointestinal stromal tumors, or GIST, harboring a PDGFRA exon 18 mutation, including PDGFRA D842V mutations. We are also developing avapritinib for additional indications in the U.S. and other geographies. All of our drug candidates are still in pre-market preclinical and clinical development, with the exception of AYWAKIT.

We have not yet demonstrated our ability to successfully complete any large-scale or pivotal clinical trials. Typically, it takes many years to develop one new drug from the time it is discovered to when it is available for treating patients. Consequently, any predictions you make about our future success or viability may not be as accurate as they could be if we had a longer operating history. We are in the early stages of transitioning from a company with a research focus to a company capable of supporting commercial activities and we have not yet demonstrated our ability to conduct large-scale sales and marketing activities necessary for successful commercialization. We may not be successful in such a transition.

Since inception, we have focused substantially all of our efforts and financial resources on organizing and staffing our company, business planning, raising capital, establishing our intellectual property, building our discovery platform, including our proprietary compound library and new target discovery engine, identifying kinase drug targets and potential drug candidates, producing the active pharmaceutical ingredient, or API, drug substance and drug product material for use in pre-clinical studies and clinical trials, conducting pre-clinical studies and commencing clinical development, pre-commercial activities and the commercial launch of AYWAKIT. To date, we have financed our operations primarily through public offerings of our common stock, private placements of our convertible preferred stock, collaborations, a license agreement and a debt financing. Through December 31, 2019, we have received an aggregate of \$1.5 billion from such transactions, including \$1.2 billion in aggregate gross proceeds from the sale of common stock in our May 2015 initial public offering, or IPO, and December 2016, April 2017, December 2017 and April 2019 follow-on public offerings, \$115.1 million in gross proceeds from the issuance of convertible preferred stock, \$18.8 million in upfront and milestone payments under our former collaboration with Alexion Pharma Holding, or Alexion, \$63.0 million in upfront and milestone payments under our collaboration with F. Hoffmann-La Roche Ltd and Hoffmann-La Roche Inc., which we refer to collectively as Roche, \$50.0 million in upfront and milestone payments under our collaboration with CStone Pharmaceuticals, or CStone, a \$25.0 million in upfront payment under our license agreement with Clementia Pharmaceuticals, Inc., or Clementia, and \$10.0 million in gross proceeds from a debt financing. In addition, we received \$308.2 million in estimated net proceeds from our January 2020 follow-on public offering, after deducting underwriting discounts and commissions and estimated offering expenses payable by us.

Since inception, we have incurred significant operating losses. Our net losses were \$347.7 million, \$236.6 million, and \$148.1 million for the years ended December 31, 2019, 2018 and 2017, respectively. As of December 31, 2019, we had an accumulated deficit of \$945.2 million. Substantially all of our operating losses have resulted from costs incurred in connection with our research and development programs and from general and administrative costs associated with our operations. We expect to continue to incur significant expenses and operating losses over the next several years and for the foreseeable future. Our prior losses, combined with expected future losses, have had and will continue to have an adverse effect on our stockholders' equity and working capital. We expect our research and development expenses to significantly increase in connection with continuing our existing clinical trials and beginning additional clinical trials. In addition, we will incur significant sales, marketing and outsourced-manufacturing expenses in connection with the commercialization of any of our approved drugs. We have incurred and will continue to incur additional costs associated with operating as a public company. As a result, we expect to continue to incur significant and increasing operating losses for the foreseeable future. Because of the numerous risks and uncertainties associated with developing pharmaceuticals, we are unable to predict the extent of any future losses or when we will become profitable, if at all. Even if we do become profitable, we may not be able to sustain or increase our profitability on a quarterly or annual basis. Our ability to become profitable depends upon our ability to generate revenue.

To date, we have not generated substantial revenue from sales of AYWAKIT. We also have not obtained marketing approval for AYWAKIT outside of the U.S. or for any other indications, and we have not obtained marketing approval for any of our other drug candidates, which are in preclinical or clinical development stages. We do not expect to generate significant revenue from our drug candidates unless and until we obtain marketing approval of, and begin to sell, such drug candidates. Our ability to generate revenue depends on a number of factors, including, but not limited to, our ability to:

- initiate and successfully complete clinical trials that meet their clinical endpoints;
- initiate and successfully complete all safety studies required to obtain U.S. and foreign marketing approval for our drug candidates;
- continue to maintain and expand commercial manufacturing capabilities or make arrangements with third-party manufacturers for clinical supply and commercial manufacturing;
- establish and maintain a sales, marketing and distribution infrastructure to commercialize any medicines for which we have or may obtain marketing approval, including AYWAKIT; and
- achieve market acceptance of our drug candidates in the medical community and with third-party payors.

We expect to incur significant sales and marketing costs as we commercialize AYWAKIT and prepare to commercialize our drug candidates, if approved. Even if we initiate and successfully complete pivotal clinical trials of our drug candidates, and our drug candidates are approved for commercial sale, and despite expending these costs, our drug candidates may not be commercially successful. We may not achieve profitability soon after generating drug sales, if ever. If we are unable to generate drug revenue, we will not become profitable and may be unable to continue operations without continued funding.

We may need to raise substantial additional funding. If we are unable to raise capital when needed, we would be forced to delay, reduce or eliminate some of our drug development programs or commercialization efforts.

The development of pharmaceuticals is capital-intensive. We are currently advancing avapritinib, pralsetinib and fisogatinib through clinical development, and we plan to submit an investigational new drug, or IND, application for BLU-263 for indolent SM in the first half of 2020. We expect our expenses to increase in connection with our ongoing activities, particularly as we continue the research and development of, initiate or continue clinical trials of, and seek marketing approval for our drug candidates, including marketing approval for AYWAKIT for additional indications or in additional geographies. In addition, we expect to incur additional significant commercialization expenses for AYWAKIT and other drug candidates, if approved, related to drug sales, marketing, manufacturing and distribution to the extent that such sales, marketing, manufacturing and distribution are not the responsibility of potential collaborators or licensors. We may also need to raise additional funds sooner if we choose to pursue additional indications or geographies for any of our approved drugs or drug candidates or otherwise expand more rapidly than we presently anticipate. Accordingly, we will need to obtain substantial additional funding in connection with our continuing operations. If we are unable to raise capital when needed or on attractive terms, we would be forced to delay, reduce or eliminate certain of our research and development programs or future commercialization efforts.

As of December 31, 2019, we had cash, cash equivalents and investments of \$548.0 million. Based on our current operating plans, we believe that our existing cash, cash equivalents and investments including the \$308.2 million in estimated net proceeds from our January 2020 follow-on public offering, together with anticipated product revenues but excluding any additional potential option fees, milestone payments or other payments under our collaboration or license agreements, will be sufficient to enable us to fund our operating expenses and capital expenditure requirements into the second half of 2022. Our future capital requirements will depend on and could increase significantly as a result of many factors, including:

- the scope, progress, results and costs of drug discovery, pre-clinical development, laboratory testing and clinical trials for our approved drugs and drug candidates;
- the costs of securing manufacturing, packaging and labeling arrangements for development activities and commercial production, including API, drug substance and drug product material for use in pre-clinical studies, clinical trials, our compassionate use program and for use as commercial supply, as applicable;
- the costs, timing and outcome of regulatory review of marketing applications for our drug candidates, including avapritinib for additional indications or in additional geographies;
- the costs of maintaining, expanding or contracting for sales, marketing and distribution capabilities in connection with commercialization of any of our approved drugs;
- the success of our collaborations with Roche and CStone and our license agreement with Clementia, as well as our ability to establish and maintain additional collaborations, partnerships or licenses on favorable terms, if at all;
- the achievement of milestones or occurrence of other developments that trigger payments under our collaboration agreements with Roche and CStone or license agreement with Clementia, or any collaboration, partnership or license agreements that we may enter into in the future;
- the extent to which we are obligated to reimburse, or entitled to reimbursement of, clinical trial costs under future collaboration agreements, if any;

- the extent to which we acquire or in-license other drugs, drug candidates or technologies and the terms of any such arrangements;
- the success of our current or future collaborations for the development of companion diagnostic tests;
- the success of our commercialization efforts and market acceptance for AYVAKIT or any of our future approved drugs;
- the costs of preparing, filing and prosecuting patent applications, maintaining and enforcing our intellectual property rights and defending intellectual property-related claims; and
- the costs of continuing to expand our operations outside the U.S.

Identifying potential drug candidates and conducting pre-clinical development and 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 or results required to obtain additional marketing approvals, including for avapritinib in additional indications or geographies, and achieve sales for any of our drug candidates that receive marketing approval. In addition, our approved drugs and drug candidates, if approved, may not achieve commercial success. Accordingly, we will need to continue to rely on additional financing to achieve our business objectives. Adequate additional financing may not be available to us on acceptable terms, or at all.

Any additional fundraising efforts may divert our management from their day-to-day activities, which may adversely affect our ability to develop and commercialize any of our approved drugs or drug candidates. Dislocations in the financial markets have generally made equity and debt financing more difficult to obtain and may have a material adverse effect on our ability to meet our fundraising needs. We cannot guarantee that future financing will be available in sufficient amounts or on terms acceptable to us, if at all. Moreover, the terms of any financing may adversely affect the holdings or the rights of our stockholders and the issuance of additional securities, whether equity or debt, by us, or the possibility of such issuance, may cause the market price of our shares to decline. The sale of additional equity or convertible securities would dilute all of our stockholders. The incurrence of indebtedness would result in increased fixed payment obligations and we may be required to agree to certain restrictive covenants, such as limitations on our ability to incur additional debt, limitations on our ability to acquire, sell or license intellectual property rights and other operating restrictions that could adversely impact our ability to conduct our business. We could also be required to seek funds through collaborations, partnerships, licensing arrangements or otherwise at an earlier stage than would be desirable and we may be required to relinquish rights to some of our technologies, drugs or drug candidates or otherwise agree to terms unfavorable to us, any of which may have a material adverse effect on our business, operating results and prospects.

If we are unable to obtain funding on a timely basis, we may be required to significantly curtail, delay or discontinue one or more of our research or development programs or the commercialization of any of our approved drugs or be unable to expand our operations or otherwise capitalize on our business opportunities, as desired, which could materially affect our business, financial condition and results of operations.

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

Until such time, if ever, as we can generate substantial drug revenues, we expect to finance our cash needs primarily through a combination of public and private equity offerings, debt financings, collaborations, strategic alliances and licensing arrangements. We do not have any committed external source of funds, other than our collaborations with Roche and CStone and the license agreement with Clementia, which are limited in scope and duration and subject to the achievement of milestones or royalties on sales of licensed products, if any. To the extent that we raise additional capital through the sale of common stock or securities convertible or exchangeable into common stock, the ownership interest of our stockholders will be diluted, and the terms of these securities may include liquidation or other preferences that materially adversely affect the rights of our common stockholders. Debt financing, if available, would increase our fixed payment obligations and may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures or declaring dividends.

If we raise funds through additional collaborations, strategic alliances or licensing arrangements with third parties, we may have to relinquish valuable rights to our intellectual property, future revenue streams, research programs, drugs or drug candidates or to grant licenses on terms that may not be favorable to us. If we are unable to raise additional funds through equity or debt financings when needed, we may be required to delay, limit, reduce or terminate our drug development or future commercialization efforts or grant rights to develop and market drugs and drug candidates that we would otherwise prefer to develop and market ourselves.

Risks Related to Drug Development and Regulatory Approval

If we are unable to advance our drug candidates to clinical development, obtain regulatory approval for our drug candidates, including for avapritinib in additional indications or additional geographies, and ultimately commercialize them, or experience significant delays in doing so, our business will be materially harmed.

We have only three drug candidates in clinical development: avapritinib, pralsetinib and fisogatinib. All of our other drug candidates are currently in pre-clinical or earlier stages of development. We have invested significant efforts and financial resources in the identification and pre-clinical development of kinase inhibitors, including the development of our drugs and drug candidates. Our ability to generate drug revenues, if ever, will depend heavily on the successful development and commercialization of our drugs and drug candidates. Each of our drug candidates, including avapritinib for additional indications or in additional geographies, will require additional pre-clinical or clinical development, management of clinical, pre-clinical and manufacturing activities, regulatory approval in multiple jurisdictions, obtaining manufacturing supply, building of a commercial organization, substantial investment and significant marketing efforts before we generate any revenues from drug sales. Further clinical development, manufacturing and regulatory activities, and substantial investment will be required before we may obtain marketing approval for avapritinib in additional indications or geographies, if at all. In addition, for some of our drug candidates, in order to select patients most likely to respond to treatment and rapidly confirm mechanistic and clinical proof-of-concept, or to identify appropriate patients for any drug candidates for which we obtain approval, we may be required or we may seek to develop companion diagnostic tests, which are assays or tests to identify an appropriate patient population. For example, we have entered into agreements with third parties to develop and commercialize companion diagnostics for avapritinib in order to identify GIST patients with the PDGFRA D842V mutation, fisogatinib in order to identify HCC patients with FGFR4 pathway activation and pralsetinib in order to identify NSCLC patients with RET fusions. Companion diagnostic tests are subject to regulation as medical devices and must themselves be cleared or approved for marketing by the FDA or certain other foreign regulatory agencies before we may commercialize our drug candidates. The success of our approved drugs and drug candidates will depend on several factors, including the following:

- successful enrollment in, and completion of, clinical trials, including our current clinical trials for avapritinib, pralsetinib and fisogatinib;
- successful completion of pre-clinical studies for our other drug candidates;
- approval of INDs to commence future clinical trials for BLU-263 and our other drug candidates;
- successful development of any companion diagnostic tests for use with our current or future drug candidates;
- receipt of regulatory approvals from applicable regulatory authorities;
- establishing commercial manufacturing capabilities or making arrangements with third-parties for clinical supply and commercial manufacturing, packaging and labeling and the receipt by such third-party manufacturers of requisite approvals to supply commercial inventories of our approved drugs and drug candidates;
- obtaining and maintaining patent and trade secret protection or regulatory exclusivity for our drugs and drug candidates;
- successful commercialization of our approved drugs and drug candidates, if and when approved, whether alone or in collaboration with others;

- acceptance of our approved drugs and drug candidates, if and when approved, by patients, the medical community and third-party payors;
- effectively competing with other therapies;
- obtaining and maintaining healthcare coverage and adequate reimbursement;
- enforcing and defending intellectual property rights and claims; and
- maintaining a continued acceptable safety profile of our approved drugs and drug candidates following approval.

If we do not achieve one or more of these factors in a timely manner or at all, we could experience significant delays or an inability to successfully commercialize our drug candidates, which would materially harm our business. If we do not receive regulatory approvals for our drug candidates, we may not be able to continue our operations.

We do not know whether we will be able to develop any other drugs of commercial value.

Our scientific approach focuses on using our novel target discovery engine and our proprietary compound library to identify new kinase targets in disease indications. Our focus on using our novel target discovery engine to identify potential kinase targets in disease indications may not result in the discovery and development of commercially viable drugs for these diseases. The use of our proprietary compound library may not lead to the development of commercially viable drugs. Even if we are able to develop a drug candidate that successfully targets these kinases in pre-clinical studies, we may not succeed in demonstrating safety and efficacy of the drug candidate in clinical trials.

Clinical drug development involves a lengthy and expensive process, with an uncertain outcome. We may incur additional costs or experience delays in completing, or ultimately be unable to complete, the development and commercialization of our drug candidates.

Avapritinib is in clinical development for additional indications and all of our other drug candidates are in pre-clinical or clinical development. The risk of failure for preclinical and clinical development is high. It is impossible to predict when or if any of our drug candidates will prove effective and safe in humans or will receive regulatory approval. Before obtaining marketing approval from regulatory authorities for the sale of any drug candidate, we must complete pre-clinical studies and then conduct extensive clinical trials to demonstrate the safety and efficacy of our drug candidates in humans. Clinical testing is expensive, difficult to design and implement, can take many years to complete and is uncertain as to outcome. A failure of one or more clinical trials can occur at any stage of testing. The outcome of pre-clinical development testing and early clinical trials may not be predictive of the success of later clinical trials, interim results of a clinical trial do not necessarily predict final results, and results for one indication may not be predictive of the success in additional indications. Moreover, pre-clinical and clinical data are often susceptible to varying interpretations and analyses, and many companies that have believed their drug candidates performed satisfactorily in pre-clinical studies and clinical trials have nonetheless failed to obtain marketing approval of their drug candidates. Our pre-clinical studies, current clinical trials and future clinical trials may not be successful.

Successful completion of our clinical trials is a prerequisite to submitting a new drug application, or NDA, to the FDA and a marketing authorization application, or MAA, in the European Union for each drug candidate and, consequently, the ultimate approval and commercial marketing of our drug candidates, including avapritinib and pralsetinib. We do not know whether any of our clinical trials for additional indications for avapritinib or for our drug candidates will be completed on schedule, if at all, or will provide clinical data sufficient to support regulatory submissions for or approval of such additional indications or drug candidates.

We may experience delays in completing our pre-clinical studies and initiating or completing clinical trials, and we may experience numerous unforeseen events during, or as a result of, any current or future clinical trials that we

could conduct that could delay or prevent our ability to receive marketing approval or commercialize our drug candidates, including:

- regulators or institutional review boards, or IRBs, or ethics committees may not authorize us or our investigators to commence a clinical trial or conduct a clinical trial at a prospective trial site;
- we may experience delays in reaching, or fail to reach, agreement on acceptable terms with prospective trial sites and prospective contract research organizations, or CROs, the terms of which can be subject to extensive negotiation and may vary significantly among different CROs and trial sites;
- clinical trials of our drug candidates may produce negative or inconclusive results, and we may decide, or regulators may require us, to conduct additional pre-clinical studies or clinical trials or we may decide to abandon drug development programs;
- patients treated with our drug candidates may develop mutations that confer resistance to treatment, which may limit the market opportunity for our drug candidates or prevent us from completing our clinical trials, obtaining regulatory approval for or commercializing our drug candidates;
- the number of patients required for clinical trials of our drug candidates may be larger than we anticipate, enrollment in these clinical trials may be slower than we anticipate, or participants may drop out of these clinical trials or fail to return for post-treatment follow-up 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, or may deviate from the clinical trial protocol or drop out of the trial, which may require that we add new clinical trial sites or investigators;
- we may elect to, or regulators or IRBs or ethics committees may require that we or our investigators suspend or terminate clinical research for various reasons, including noncompliance with regulatory requirements or a finding that the participants are being exposed to unacceptable health risks;
- the cost of clinical trials may be greater than we anticipate;
- the supply or quality of our drug candidates or other materials necessary to conduct our clinical trials may be insufficient or inadequate;
- our drug candidates may have undesirable side effects or other unexpected characteristics, causing us or our investigators, regulators or IRBs or ethics committees to suspend or terminate the trials, or reports may arise from pre-clinical or clinical testing of other cancer therapies that raise safety or efficacy concerns about our drug candidates; and
- the FDA or other regulatory authorities may require us to submit additional data or impose other requirements before permitting us to initiate a clinical trial.

We could encounter delays if a clinical trial is suspended or terminated by us, by the IRBs of the institutions in which such trials are being conducted, by the Data Safety Monitoring Board, or DSMB, for such trial or by the FDA or other regulatory authorities. Such authorities may impose such a suspension or termination due to a number of factors, including failure to conduct the clinical trial in accordance with regulatory requirements or our clinical protocols, inspection of the clinical trial operations or trial site by the FDA or other regulatory authorities resulting in the imposition of a clinical hold, unforeseen safety issues or adverse side effects, failure to demonstrate a benefit from using a drug, changes in governmental regulations or administrative actions or lack of adequate funding to continue the clinical trial. Many of the factors that cause, or lead to, a delay in the commencement or completion of clinical trials may also ultimately lead to the denial of regulatory approval of additional indications for our approved drugs or for our drug candidates. Further, the FDA or other regulatory authorities may disagree with our clinical trial design and our interpretation of data from clinical trials, or the FDA or any other regulatory authority may change the requirements for approval even after it has reviewed and commented on the design for our clinical trials.

If we are required to conduct additional clinical trials or other testing of our drug candidates beyond those that we currently contemplate, if we are unable to successfully complete clinical trials of our drug 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 AYVAKIT for additional indications or in additional geographies, or be delayed in obtaining marketing approval for our drug candidates, if at all;
- obtain approval for indications or patient populations that are not as broad as intended or desired;
- be subject to post-marketing testing requirements; or
- fail to achieve market acceptance or have the drug removed from the market after obtaining marketing approval.

Our drug development costs will also increase if we experience delays in testing or regulatory approvals. We do not know whether any of our clinical trials will begin as planned, will need to be restructured or will be completed on schedule, or at all. Significant pre-clinical study or clinical trial delays also could shorten any periods during which we may have the exclusive right to commercialize our drug candidates or allow our competitors to bring products to market before we do and impair our ability to successfully commercialize our drug candidates and may harm our business and results of operations. Any delays in our pre-clinical or future clinical development programs may harm our business, financial condition and prospects significantly.

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

We may not be able to initiate or continue clinical trials for our drug candidates, including avapritinib for additional indications, if we are unable to locate and enroll a sufficient number of eligible patients to participate in these trials as required by the FDA or similar regulatory authorities outside the U.S. In particular, because we are focused on diseases in genomically defined patient populations, our ability to enroll eligible patients may be limited or may result in slower enrollment than we anticipate. In addition, some of our competitors have ongoing clinical trials for drug candidates that treat the same indications as AYVAKIT and our drug candidates, and patients who would otherwise be eligible for our clinical trials may instead enroll in clinical trials of our competitors' drug candidates.

Patient enrollment may be affected by other factors including:

- the severity of the disease under investigation;
- the size of the target patient population;
- the eligibility criteria for the clinical trial;
- the availability of an appropriate genomic screening test;
- the perceived risks and benefits of the drug candidate under study;
- the efforts to facilitate timely enrollment in clinical trials;
- the patient referral practices of physicians;
- the ability to monitor patients adequately during and after treatment; and
- the proximity and availability of clinical trial sites for prospective patients.

Because the target patient populations for AYWAKIT and our drug candidates are relatively small, it may be difficult to successfully identify patients, which could delay enrollment for our trials.

We focus our research and development on treatments for cancer and rare diseases, including genomically defined cancer and diseases driven by abnormal kinase activation. Because the target patient populations for AYWAKIT and our drug candidates are relatively small, it may be difficult to successfully identify patients. We have entered into agreements with third parties to develop a companion diagnostic test for avapritinib in order to identify GIST patients with the PDGFRA D842V mutation, figogatinib in order to identify HCC patients with FGFR4 pathway activation and pralsetinib in order to identify NSCLC patients with RET fusions, and we may engage third parties to develop companion diagnostic tests for use in some of our other current or future clinical trials. However, we may experience delays in reaching, or fail to reach, agreement on acceptable terms to develop companion diagnostic tests with third parties, and any third parties whom we engage to develop companion diagnostic tests may experience delays or may not be successful in developing such companion diagnostic tests, furthering the difficulty in identifying patients for our clinical trials. In addition, current commercially available diagnostic tests to identify appropriate patients for our clinical trials or any approved drug candidates may become unavailable in the future.

Our inability to enroll a sufficient number of patients in our clinical trials, or to identify patients appropriate for enrollment in our clinical trials, would result in significant delays and could require us to abandon one or more clinical trials altogether. Enrollment delays in our clinical trials may result in increased development costs for our drug candidates, which would cause the value of our company to decline and limit our ability to obtain additional financing. If we are unable to include patients with the driver of the disease, including the applicable genomic alteration for diseases in genomically defined patient populations, this could compromise our ability to seek participation in the FDA's expedited review and approval programs, including breakthrough therapy designation and fast track designation, or otherwise to seek to accelerate clinical development and regulatory timelines.

If we are not able to obtain, or if there are delays in obtaining, required regulatory approvals both for our drug candidates and for any related companion diagnostic tests, we will not be able to commercialize, or will be delayed in commercializing, such drug candidates, and our ability to generate revenue will be materially impaired.

Our drug candidates and any companion diagnostic tests related to our approved drugs or drug candidates, including the companion diagnostic tests that we are developing for AYWAKIT in order to identify GIST patients with the PDGFRA D842V mutation, pralsetinib in order to identify NSCLC patients with RET fusions and figogatinib in order to identify HCC patients with FGFR4 pathway activation, and the activities associated with their development and commercialization, including their design, testing, manufacture, safety, efficacy, recordkeeping, labeling, storage, approval, advertising, promotion, sale, distribution, import and export, are subject to comprehensive regulation by the FDA and other regulatory agencies in the U.S. and by comparable authorities in other countries. Before we can commercialize any of our drug candidates, we must obtain marketing approval. We may also need marketing clearance or approval for any related companion diagnostic tests, including the companion diagnostic tests that we are developing for avapritinib, pralsetinib and figogatinib. Except for AYWAKIT, we have not received regulatory authorization to market any of our drug candidates or related companion diagnostic tests from regulatory authorities in any jurisdiction, and it is possible that these current or future drug candidates or related companion diagnostic tests will ever obtain regulatory approval. We have only limited experience in filing and supporting the applications necessary to gain regulatory approvals and expect to rely on third-party CROs and/or regulatory consultants to assist us in this process. Securing regulatory approval requires the submission of extensive pre-clinical and clinical data and supporting information to the various regulatory authorities for each therapeutic indication to establish the drug candidate's safety and efficacy. Securing regulatory approval also requires the submission of information about the drug manufacturing process to, and inspection of manufacturing facilities by, the relevant regulatory authority. Our drug candidates may not be effective, may be only moderately effective or may prove to have undesirable or unintended side effects, toxicities or other characteristics that may preclude our obtaining marketing approval or prevent or limit commercial use.

The process of obtaining regulatory approvals, if approval is obtained at all, both in the U.S. and abroad is expensive, may take many years if additional clinical trials are required and can vary substantially based upon a variety of factors, including the type, complexity and novelty of the drug candidates involved. Changes in marketing approval policies during the development period, changes in or the enactment of additional statutes or regulations, or changes in regulatory review for each submitted NDA for a drug candidate, pre-market approval, or PMA, application for a companion diagnostic test or equivalent application types, may cause delays in the approval or rejection of an

application. The FDA and comparable authorities in other countries have substantial discretion in the approval process and may refuse to accept any application or may decide that our data are insufficient for approval and require additional pre-clinical, clinical or other studies. For example, the FDA is reviewing our NDA for avapritinib for the treatment of fourth-line GIST. As a part of the review, the FDA has requested top-line data from our VOYAGER trial. We expect to provide the top-line data to the FDA early in the second quarter of 2020.

Our drug candidates could be delayed in receiving, or fail to receive, regulatory approval for many reasons, including the following:

- the FDA or comparable foreign regulatory authorities may disagree with the design or implementation of our clinical trials;
- we may be unable to demonstrate to the satisfaction of the FDA or comparable foreign regulatory authorities that a drug candidate is safe and effective for its proposed indication or a related companion diagnostic test is suitable to identify appropriate patient populations;
- the results of clinical trials may not meet the level of statistical significance required by the FDA or comparable foreign regulatory authorities for approval;
- we may be unable to demonstrate that a drug candidate's clinical and other benefits outweigh its safety risks;
- the FDA or comparable foreign regulatory authorities may disagree with our interpretation of data from pre-clinical studies or clinical trials;
- the data collected from clinical trials of our drug candidates may not be sufficient to support the submission of an NDA or other submission or to obtain regulatory approval in the U.S. or elsewhere;
- the FDA or comparable foreign regulatory authorities may find deficiencies with or fail to approve the manufacturing processes or facilities of third-party manufacturers with which we contract for clinical and commercial supplies; and
- the approval policies or regulations of the FDA or comparable foreign regulatory authorities may significantly change in a manner rendering our clinical data insufficient for approval.

In addition, even if we were to obtain approval, regulatory authorities may approve any of our drug candidates for fewer or more limited indications than we request, may not approve the price we intend to charge for our drugs and related companion diagnostic tests, may grant approval contingent on the performance of costly post-marketing clinical trials or other post-marketing requirements, or may approve a drug candidate with a label that does not include the labeling claims necessary or desirable for the successful commercialization of that drug candidate. Any of the foregoing scenarios could materially harm the commercial prospects for our drug candidates.

If we experience delays in obtaining approval or if we fail to obtain approval of our drug candidates and companion diagnostic tests related to our approved drugs and drug candidates, the commercial prospects for our approved drugs or drug candidates may be harmed and our ability to generate revenues will be materially impaired.

Our drugs and drug candidates may cause undesirable side effects that could delay or prevent their regulatory approval, limit the commercial profile of an approved label, or result in significant negative consequences following marketing approval, if any.

Undesirable side effects caused by any of our approved drugs or drug candidates could cause us to interrupt, delay or halt pre-clinical studies or could cause us or regulatory authorities to interrupt, delay or halt clinical trials and could result in a more restrictive label or the delay or denial of regulatory approval by the FDA or other regulatory authorities. As is the case with all oncology drugs, it is likely that there may be side effects associated with the use of our approved drugs and drug candidates. Results of our trials could reveal a high and unacceptable severity and prevalence

of these or other side effects. In such an event, our trials could be suspended or terminated, and the FDA or comparable foreign regulatory authorities could order us to cease further development of or deny approval of our drugs or drug candidates for any or all targeted indications. The drug-related side effects could affect patient recruitment or the ability of enrolled patients to complete clinical trials or result in potential product liability claims. Any of these occurrences may harm our business, financial condition and prospects significantly.

Further, our approved drugs and drug candidates could cause undesirable side effects in pre-clinical studies or clinical trials related to on-target toxicity. For example, the FGF19/FGFR4 signaling axis has been shown to play a role in the regulation of de novo bile acid synthesis. Modulation of this signaling axis by treatment with a small molecule FGFR4 inhibitor could lead to the clinical symptoms that were observed with administration of an FGF19 antibody. If on-target toxicity is observed, or if our approved drugs or drug candidates have characteristics that are unexpected, we may need to abandon their development or limit development to more narrow uses or subpopulations in which the undesirable side effects or other characteristics are less prevalent, less severe or more acceptable from a risk-benefit perspective. Many compounds that initially showed promise in early stage testing for treating cancer have later been found to cause side effects that prevented further development of the compound.

Further, clinical trials by their nature utilize a sample of the potential patient population. With a limited number of patients and limited duration of exposure, rare and severe side effects of our drugs or drug candidates may only be uncovered with a significantly larger number of patients exposed to the drugs or drug candidate. If we or others identify undesirable side effects caused by any of our approved drugs or drug candidates (or any other similar drugs) after marketing approval, a number of potentially significant negative consequences could result, including:

- regulatory authorities may withdraw or limit their approval of such drug;
- regulatory authorities may require the addition of labeling statements, such as a “boxed” warning or a contraindication;
- we may be required to create a medication guide outlining the risks of such side effects for distribution to patients;
- we may be required to change the way such drug is distributed or administered, conduct additional clinical trials or change the labeling of such drug;
- regulatory authorities may require a Risk Evaluation and Mitigation Strategy, or REMS, plan to mitigate risks, which could include medication guides, physician communication plans, or elements to assure safe use, such as restricted distribution methods, patient registries and other risk minimization tools;
- we may be subject to regulatory investigations and government enforcement actions;
- we may decide to remove such drug from the marketplace;
- we could be sued and held liable for injury caused to individuals exposed to or taking our drugs and drug candidates; and
- our reputation may suffer.

We believe that any of these events could prevent us from achieving or maintaining market acceptance of the affected drugs or drug candidates and could substantially increase the costs of commercializing our approved drugs and drug candidates, if approved, and significantly impact our ability to successfully commercialize our approved drugs and drug candidates and generate revenues.

A breakthrough therapy designation by the FDA for our drug candidates, including avapritinib and pralsetinib, may not lead to a faster development or regulatory review or approval process, and it does not increase the likelihood that our drug candidates will receive marketing approval.

The FDA has granted breakthrough therapy designation to avapritinib for the treatment of patients with unresectable or metastatic GIST harboring the PDGFRA D842V mutation, and the FDA has granted breakthrough therapy designation to avapritinib for the treatment of advanced SM, including the subtypes of aggressive SM, SM with an associated hematologic neoplasm and mast cell leukemia. In addition, the FDA has granted breakthrough therapy designation to pralsetinib for the treatment of patients with RET-fusion positive NSCLC that has progressed following platinum-based chemotherapy and to pralsetinib for the treatment of patients with RET mutation-positive MTC that requires systemic treatment and for which there are no acceptable alternative treatments. We may also seek breakthrough therapy designation for some of our other drug candidates. A breakthrough therapy is defined as a drug that is intended, alone or in combination with one or more other drugs, to treat a serious or life-threatening disease or condition, and preliminary clinical evidence indicates that the drug may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints, such as substantial treatment effects observed early in clinical development. For drugs that have been designated as breakthrough therapies, interaction and communication between the FDA and the sponsor of the trial can help to identify the most efficient path for clinical development while minimizing the number of patients placed in ineffective control regimens.

Designation as a breakthrough therapy is within the discretion of the FDA. Accordingly, even if we believe one of our drug candidates meets the criteria for designation as a breakthrough therapy, the FDA may disagree and instead determine not to make such designation. In any event, the receipt of a breakthrough therapy designation for a drug candidate may not result in a faster development process, review or approval compared to other drugs and does not assure ultimate approval by the FDA. In addition, even if one or more of our drug candidates qualify as breakthrough therapies, the FDA may later decide that the drugs no longer meet the conditions for qualification.

A fast track designation by the FDA may not actually lead to a faster development or regulatory review or approval process for our drug candidates.

The FDA has granted fast track designation to avapritinib for (i) the treatment of patients with unresectable or metastatic GIST that progressed following treatment with imatinib and a second tyrosine kinase inhibitor and (ii) the treatment of patients with unresectable or metastatic GIST with the PDGFRA D842V mutation regardless of prior therapy. We may also seek fast track designation for some of our other drug candidates. If a drug is intended for the treatment of a serious or life-threatening condition and the drug demonstrates the potential to address unmet medical needs for this condition, the drug sponsor may apply for fast track designation. The FDA has broad discretion whether or not to grant this designation, so even if we believe a particular drug candidate is eligible for this designation, we cannot assure you that the FDA would decide to grant it. Even though we have received fast track designation for avapritinib for the treatment of patients with unresectable or metastatic GIST that progressed following treatment with imatinib and a second tyrosine kinase inhibitor and for the treatment of patients with unresectable or metastatic GIST with the PDGFRA D842V mutation regardless of prior therapy, or even if we receive fast track designation for our other drug candidates, we may not experience a faster development process, review or approval. The FDA may withdraw fast track designation if it believes that the designation is no longer supported by data from our clinical development program.

While we have received orphan drug designation for our drug candidates avapritinib, pralsetinib and fisogatinib for specified indications, we may seek orphan drug designation for some of our other drug candidates. However, we may be unsuccessful in obtaining or may be unable to maintain the benefits associated with orphan drug designation, including the potential for market exclusivity.

The FDA has granted orphan drug designation to avapritinib for the treatment of GIST and the treatment of mastocytosis, to pralsetinib for the treatment of RET-rearranged NSCLC, JAK1/2-positive NSCLC or TRKC-positive NSCLC and to fisogatinib for the treatment of HCC. In addition, the European Commission has granted medicinal product designation to avapritinib for the treatment of GIST and the treatment of mastocytosis. As part of our business strategy, we may seek orphan drug designation for some of our other drug candidates, and we may be unsuccessful. Regulatory authorities in some jurisdictions, including the U.S. and the European Union, may designate drugs for relatively small patient populations as orphan drugs. Under the Orphan Drug Act, the FDA may designate a drug as an orphan drug if it is a drug intended to treat a rare disease or condition, which is generally defined as a patient population

of fewer than 200,000 individuals annually in the U.S., or a patient population greater than 200,000 in the U.S. where there is no reasonable expectation that the cost of developing the drug will be recovered from sales in the U.S. In the U.S., orphan drug designation entitles a party to financial incentives such as opportunities for grant funding towards clinical trial costs, tax advantages and user-fee waivers.

Similarly, in the European Union, the European Commission grants medicinal product designation after receiving the opinion of the European Medicines Agency, or EMA, Committee for Orphan Medicinal Products on an orphan medicinal product designation application. Orphan medicinal product designation is intended to promote the development of drugs that are intended for the diagnosis, prevention or treatment of life-threatening or chronically debilitating conditions affecting not more than 5 in 10,000 persons in the European Union and for which no satisfactory method of diagnosis, prevention, or treatment has been authorized (or the drug would be a significant benefit to those affected). In addition, designation is granted for drugs intended for the diagnosis, prevention, or treatment of a life-threatening, seriously debilitating or serious and chronic condition and when, without incentives, it is unlikely that sales of the drug in the European Union would be sufficient to justify the necessary investment in developing the drug. In the European Union, orphan medicinal product designation entitles a party to financial incentives such as reduction of fees or fee waivers.

Generally, if a drug with an orphan drug designation subsequently receives the first marketing approval for the indication for which it has such designation, the drug is entitled to a period of marketing exclusivity, which precludes the EMA or the FDA from approving another marketing application for the same drug and indication for that time period, except in limited circumstances. The applicable period is seven years in the U.S. and ten years in the European Union. The European Union exclusivity period can be reduced to six years if a drug no longer meets the criteria for orphan drug designation or if the drug is sufficiently profitable so that market exclusivity is no longer justified.

Even if we obtain orphan drug exclusivity for a drug, that exclusivity may not effectively protect the designated drug from competition because different drugs can be approved for the same condition. Even after an orphan drug is approved, the FDA can subsequently approve the same drug for the same condition if the FDA concludes that the later drug is clinically superior in that it is shown to be safer, more effective or makes a major contribution to patient care. In addition, a designated orphan drug may not receive orphan drug exclusivity if it is approved for a use that is broader than the indication for which it received orphan designation. Moreover, orphan drug exclusive marketing rights in the U.S. may be lost if the FDA later determines that the request for designation was materially defective or if the manufacturer is unable to assure sufficient quantity of the drug to meet the needs of patients with the rare disease or condition. Orphan drug designation neither shortens the development time or regulatory review time of a drug nor gives the drug any advantage in the regulatory review or approval process. While we intend to continue seek orphan drug designation for our drug candidates, we may never receive such designations. Even if we receive orphan drug designation for any of our drug candidates, there is no guarantee that we will enjoy the benefits of those designations.

We will be subject to ongoing obligations and continued regulatory review of our approved drugs and drug candidates, even if we receive regulatory approval, which may result in significant additional expense. In addition, our drugs and drug candidates, if approved, could be subject to labeling and other restrictions and market withdrawal and we may be subject to penalties if we fail to comply with regulatory requirements or experience unanticipated problems with our drugs.

If the FDA or a comparable foreign regulatory authority approves any of our drug candidates, the manufacturing processes, labeling, packaging, distribution, adverse event reporting, storage, advertising, promotion and recordkeeping for the drug will be subject to extensive and ongoing regulatory requirements. These requirements include submissions of safety and other post-marketing information and reports, registration, as well as continued compliance with current Good Manufacturing Practices, or cGMPs, and Good Clinical Practices, or GCPs, for any clinical trials that we conduct post-approval. Any regulatory approvals that we receive for our drug candidates may also be subject to limitations on the approved indicated uses for which the drug may be marketed or to the conditions of approval, or contain requirements for potentially costly post-marketing testing, including Phase 4 clinical trials, and surveillance to monitor the safety and efficacy of the drug. Later discovery of previously unknown problems with a drug, including

adverse events of unanticipated severity or frequency, or with our third-party manufacturers or manufacturing processes, or failure to comply with regulatory requirements, may result in, among other things:

- restrictions on the marketing or manufacturing of the drug, withdrawal of the drug from the market, “dear doctor” letters or drug recalls;
- fines, warning letters or holds on clinical trials;
- refusal by the FDA to approve pending applications or supplements to approved applications filed by us, or suspension or revocation of marketing approvals;
- drug seizure or detention, or refusal to permit the import or export of drugs; and
- injunctions or the imposition of civil or criminal penalties.

The FDA’s policies may change and additional government regulations may be enacted that could prevent, limit or delay regulatory approval of our drug candidates. If we are slow or unable to adapt to changes in existing requirements or the adoption of new requirements or policies, or if we are not able to maintain regulatory compliance, we may lose any marketing approval that we may have obtained, which would adversely affect our business, prospects and ability to achieve or sustain profitability.

We may not be successful in our efforts to use and expand our discovery platform to build a pipeline of drug candidates.

A key element of our strategy is to use our novel target discovery engine to identify kinases that are drivers of diseases in genomically defined patient populations with high unmet medical need in order to build a pipeline of drug candidates. Although our research and development efforts to date have resulted in a pipeline of drug candidates, we may not be able to continue to identify novel kinase drivers and develop drug candidates. Even if we are successful in continuing to build our pipeline, the potential drug candidates that we identify may not be suitable for clinical development. For example, they may be shown to have harmful side effects or other characteristics that indicate that they are unlikely to be drugs that will be successful in clinical trials or receive marketing approval and achieve market acceptance. If we do not successfully develop and commercialize drug candidates based upon our approach, we will not be able to obtain drug revenues in future periods, which likely would result in significant harm to our financial position and adversely affect our stock price.

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

Because we have limited financial and managerial resources, we focus on research programs and drug candidates that we identify for specific indications. As a result, we may forego or delay pursuit of opportunities with other drug candidates or for other indications that later prove to have greater commercial potential. Our resource allocation decisions may cause us to fail to capitalize on viable commercial drugs or profitable market opportunities. Our spending on current and future research and development programs and drug candidates for specific indications may not yield any commercially viable drugs. If we do not accurately evaluate the commercial potential or target market for a particular drug candidate, we may relinquish valuable rights to that drug candidate through collaboration, licensing or other royalty arrangements in cases in which it would have been more advantageous for us to retain sole development and commercialization rights to such drug candidate.

We may choose not to develop a potential drug candidate, or we may suspend, deprioritize or terminate one or more discovery programs or pre-clinical drug candidates or programs.

At any time and for any reason, we may determine that one or more of our discovery programs or pre-clinical drug candidates or programs does not have sufficient potential to warrant the allocation of resources toward such program or drug candidate. Accordingly, we may choose not to develop a potential drug candidate or elect to suspend, deprioritize or terminate one or more of our discovery programs or pre-clinical drug candidates or programs. For

example, we have previously determined to suspend our discovery program for inhibitors of neurotrophic tyrosine receptor kinase, or NTRK, and predicted NTRK resistant mutants, and to deprioritize our discovery program targeting protein kinase cAMP-activated catalytic subunit alpha fusions for the treatment of fibrolamellar carcinoma. If we suspend, deprioritize or terminate a program or drug candidate in which we have invested significant resources, we will have expended resources on a program that will not provide a full return on our investment and may have missed the opportunity to have allocated those resources to potentially more productive uses, including existing or future programs or drug candidates.

Risks Related to Commercialization

We have limited experience as a commercial company and the marketing and sale of AYVAKIT or any future approved drugs may be unsuccessful or less successful than anticipated.

In January 2020, the FDA approved AYVAKIT for the treatment of adults with unresectable or metastatic GIST harboring a PDGFRA exon 18 mutation, including PDGFRA D842V mutations. While we have initiated the commercial launch of AYVAKIT in the U.S., we have limited experience as a commercial company and there is limited information about our ability to successfully overcome many of the risks and uncertainties encountered by companies commercializing drugs in the biopharmaceutical industry. Marketing applications for avapritinib for additional indications and for pralsetinib are currently under review or planned in the U.S. and Europe. To execute our business plan, in addition to successfully marketing and selling AYVAKIT, we will need to successfully:

- establish and maintain our relationships with healthcare providers who will be treating the patients who may receive our drugs and any future drugs;
- obtain adequate pricing and reimbursement for AYVAKIT and any future drugs;
- gain regulatory acceptance for the development and commercialization of the drug candidates in our pipeline;
- develop and maintain successful strategic alliances; and
- manage our spending as costs and expenses increase due to clinical trials, marketing approvals, and commercialization.

If we are unsuccessful in accomplishing these objectives, we may not be able to successfully develop drug candidates, commercialize AYVAKIT or any future drugs, raise capital, expand our business or continue our operations.

The commercial success of AYVAKIT, and of any future drugs, will depend upon the degree of market acceptance by physicians, patients, third-party payors and others in the medical community.

The commercial success of AYVAKIT and of any future drugs will depend in part on the medical community, patients, and third-party or governmental payors. AYVAKIT and any other drugs that we may bring to the market may not gain market acceptance by physicians, patients, third-party payors and others in the medical community. If these drugs do not achieve an adequate level of acceptance, we may not generate significant product revenue and may not become profitable. The degree of market acceptance of AYVAKIT and of any future drugs will depend on a number of factors, including:

- the potential efficacy and potential advantages over alternative treatments;
- the prevalence and severity of any side effects, including any limitations or warnings contained in a drug's approved labeling;
- relative convenience and ease of administration;
- the willingness of the target patient population to try new therapies and of physicians to prescribe these therapies;
- the length of time that patients who are prescribed our drugs remain on treatment;
- the pricing of our drugs and any future drugs;
- publicity concerning our current and future drugs, or competing products and treatments; and
- sufficient third-party insurance coverage or reimbursement.

Even if a potential drug displays a favorable efficacy and safety profile in preclinical and clinical studies, market acceptance of the drug will not be known until after it is launched. Our efforts to educate the medical community and third-party payors on the benefits of our drugs may require significant resources and may never be successful. Our efforts to educate the marketplace may require more resources than are required by the conventional technologies marketed by our competitors. Any of these factors may cause AYVAKIT, or any future drugs, to be unsuccessful or less successful than anticipated.

Although we have established our initial commercial infrastructure, we are continuing to build out our commercial capabilities and have limited sales and distribution experience and limited capabilities for marketing and market access. We expect to invest significant financial and management resources to establish these capabilities and infrastructure to support commercial operations for the sale of AYVAKIT. If we are unable to establish these additional commercial capabilities and infrastructure, we may be unable to generate sufficient revenue to sustain our business.

Although we have established our initial commercial infrastructure, we are continuing to build out our commercial capabilities and infrastructure and have limited sales and distribution experience and limited capabilities for marketing and market access. To successfully commercialize AYVAKIT and any other drugs that may result from our development programs, we will need to develop these capabilities and further expand our infrastructure to support commercial operations in the U.S., Europe and other regions, either on our own or with others. We may be competing with many companies that currently have extensive and well-funded marketing and sales operations. Without a significant internal team or the support of a third party to perform these functions, including marketing and sales functions, we may be unable to compete successfully against these more established companies.

We cannot be sure that we will be able to recruit, hire and retain a sufficient number of sales representatives or that they will be effective at promoting our drugs. In addition, we will need to commit significant additional management and other resources to maintain and grow our sales organization. We may not be able to achieve the necessary development and growth in a cost-effective manner or realize a positive return on our investment. We will also have to compete with other companies to recruit, hire, train and retain sales and marketing personnel. Factors that may inhibit our efforts to commercialize our drugs include:

- our inability to recruit, train and retain adequate numbers of sales and marketing personnel;
- the inability of sales personnel to obtain access to or to persuade adequate numbers of physicians to prescribe AYVAKIT; and
- unforeseen costs and expenses associated with maintaining an independent sales and marketing organization.

In the event that we are unable to effectively deploy our sales organization or distribution strategy on a timely and efficient basis, if at all, the commercialization of our drug candidates could be delayed which would negatively impact our ability to generate product revenues.

Our reliance on single-source third-party suppliers could harm our ability to commercialize AYVAKIT or any other drug candidates that may be approved in the future.

We do not currently own or operate manufacturing facilities for the production of AYVAKIT or any other drug candidates that may be approved in the future. We rely on single-source third-party suppliers to manufacture and supply AYVAKIT and expect to initially rely on single-source third-party supplies for commercial manufacture and supply of pralsetinib, if approved, which may not be able to produce sufficient inventory to meet commercial demand in a timely manner, or at all. Our third-party suppliers may not be required to provide us with any guaranteed minimum production levels or have dedicated capacity for our drugs. As a result, there can be no assurances that we will be able to obtain sufficient quantities of AYVAKIT or any other drug candidates that may be approved in the future, which could have a material adverse effect on our business as a whole.

The incidence and prevalence for target patient populations of our approved drugs and drug candidates have not been established with precision. If the market opportunities for our approved drugs or drug candidates are smaller than we estimate or if any approval that we obtain is based on a narrower definition of the patient population, our revenue and ability to achieve profitability will be adversely affected, possibly materially.

The precise incidence and/or prevalence for GIST, SM, RET-altered NSCLC and MTC, and HCC are unknown. Our projections of the number of people who have these diseases, the frequency of the genetic alterations targeted by our drug candidates and the subset of people with these diseases who have the potential to benefit from treatment with our drug candidates are based on estimates. We estimate that in the U.S., France, Germany, Italy, Spain, the United Kingdom and Japan, or the Major Markets, there are approximately: 75,000 patients with SM, including 3,750 patients with advanced SM and 71,250 patients with indolent SM or smoldering SM (regardless of severity of symptoms); 500 first-line patients with PDGFRA D842V mutant GIST (including resectable, metastatic and unresectable GIST); 7,500 second-line patients with GIST, including approximately 75%-80% of second-line patients with GIST who do not have a KIT V654A or T670I mutation; 7,400 third-line and later patients with GIST (regardless of alteration); 8,900 first- and second-line patients with RET-altered NSCLC; 1,300 patients with MTC (regardless of line of therapy or alteration); and 25,900 first- and second-line patients with FGFR4-activated HCC.

The total addressable market opportunity for avapritinib for the treatment of patients with GIST and SM, pralsetinib for the treatment of patients with RET-altered NSCLC and MTC and fisogatinib for the treatment of patients with advanced HCC will ultimately depend upon, among other things, the diagnosis criteria included in the final label for our current and future drugs for sale for these indications, acceptance by the medical community and patient access, drug pricing and reimbursement. The number of patients in the Major Markets and elsewhere, including the number of addressable patients in those markets, may turn out to be lower than expected, patients may not be otherwise amenable to treatment with our drugs, patients treated with our drugs and drug candidates may develop mutations that confer resistance to treatment or new patients may become increasingly difficult to identify or gain access to, all of which would adversely affect our results of operations and our business.

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

The development and commercialization of new drugs is highly competitive. We face competition with respect to our drugs and current clinical-stage drug candidates, and we will face competition with respect to any drugs and drug candidates that we may seek to develop or commercialize in the future, from major pharmaceutical companies, specialty pharmaceutical companies and biotechnology companies worldwide. There are a number of large pharmaceutical and biotechnology companies that currently market and sell drugs or are pursuing the development of therapies in the field of kinase inhibition for cancer and other diseases. Some of these competitive drugs and therapies are based on scientific approaches that are the same as or similar to our approach, and others are based on entirely different approaches. Potential competitors also include academic institutions, government agencies and other public and private research organizations that conduct research, seek patent protection and establish collaborative arrangements for research, development, manufacturing and commercialization.

Specifically, there are a large number of companies developing or marketing treatments for cancer, including many major pharmaceutical and biotechnology companies. If avapritinib receives marketing approval for advanced SM, it will face competition from Novartis AG's midostaurin, a multi-kinase inhibitor with KIT D816V inhibitory activity. In addition, if avapritinib is approved for advanced SM or if avapritinib or BLU-263 are approved for indolent SM, they may face competition from other drug candidates in development for these indications, including drug candidates being developed by AB Science S.A. and Allakos Inc.

If avapritinib receives marketing approval for third-line GIST, it will face competition from Bayer AG's regorafenib, and if avapritinib receives marketing approval for second-line GIST, it will face competition from Pfizer Inc.'s sunitinib. In addition, AYWAKIT may face competition from drug candidates in development for GIST, including PDGFRA D842V mutant GIST, including those being developed by AB Science S.A., ARIAD Pharmaceuticals, Inc., a wholly-owned subsidiary of Takeda Pharmaceutical Company Limited, AROG Pharmaceuticals, Inc., Celldex Therapeutics, Inc., Deciphera Pharmaceuticals, LLC, Exelixis, Inc., Ningbo Tai Kang Medical Technology Co. Ltd. and Xencor, Inc.

If pralsetinib receives marketing approval for patients with RET-driven cancers, it may face competition from other drug candidates in development, including those being developed by AstraZeneca plc, Boston Pharmaceuticals, Inc., Eisai Inc., Exelixis, Inc., GlaxoSmithKline plc, Loxo Oncology, Inc., a wholly-owned subsidiary of Eli Lilly and Company, Mirati Therapeutics, Inc., Novartis AG, Pfizer Inc. Roche, Stemline Therapeutics, Inc., and Turning Point Therapeutics, Inc., as well as several approved multi-kinase inhibitors with RET activity being evaluated in clinical trials, including alectinib, apatinib, cabozantinib, dovitinib, lenvatinib, sorafenib, sunitinib and vandetinib.

If fisogatinib receives marketing approval for patients with FGFR4-activated HCC, it will face competition from Bristol-Myers Squibb Company's nivolumab and Merck & Co., Inc.'s pembrolizumab, immune checkpoint inhibitors approved by the FDA for the treatment of HCC, as well as sorafenib, cabozantinib, regorafenib and lenvatinib, multi-kinase inhibitors approved for the treatment of HCC. In addition, fisogatinib may face competition from other drug candidates in development by Abbisko Therapeutics Co., Ltd, AstraZeneca plc, Bayer AG, Celgene Corporation, Eisai Inc., H3 Biomedicine Inc., Incyte Corporation, Johnson & Johnson, Novartis AG, Sanofi S.A., Taiho Pharmaceutical Co., Ltd., U3 Pharma GmbH, a wholly-owned subsidiary of Daiichi Sankyo Company, Limited, and Xoma Ltd.

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

Our commercial opportunity could be reduced or eliminated if our competitors develop and commercialize drugs that are safer, more effective, have fewer or less severe side effects, are more convenient or are less expensive than

any drugs that we or our collaborators may develop. Our competitors also may obtain FDA or other regulatory approval for their drugs more rapidly than we may obtain approval for ours, which could result in our competitors establishing a strong market position before we or our collaborators are able to enter the market. The key competitive factors affecting the success of all of our drug candidates, if approved, are likely to be their efficacy, safety, convenience, price, the effectiveness of any related companion diagnostic tests, the level of generic competition and the availability of reimbursement from government and other third-party payors.

Product liability lawsuits against us could cause us to incur substantial liabilities and could limit commercialization of any of our approved drugs or drug candidates that we may develop.

We face an inherent risk of product liability exposure related to the testing of our approved drugs and drug candidates in human clinical trials and use of our drug candidates through compassionate use programs, and an even greater risk in connection with our commercialization of our current and future drugs. If we cannot successfully defend ourselves against claims that any of our approved drugs or drug candidates caused injuries, we could incur substantial liabilities. Regardless of merit or eventual outcome, liability claims may result in:

- decreased demand for any of our approved drugs or drug candidates that we may develop and commercialize;
- injury to our reputation and significant negative media attention;
- withdrawal of clinical trial participants;
- significant costs to defend the related litigation;
- substantial monetary awards to trial participants or patients;
- loss of revenue; and
- the inability to commercialize any of approved drugs or drug candidates that we may develop.

Although we maintain product liability insurance coverage, it may not be adequate to cover all liabilities that we may incur. We anticipate that we may need to further increase our insurance coverage as we begin additional clinical trials or if we successfully commercialize additional drug candidates. 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 liability that may arise.

If we or our collaborators are unable to successfully develop and commercialize companion diagnostic tests for our drugs and drug candidates, or experience significant delays in doing so we may not realize the full commercial potential of our drugs and drug candidates.

Because we are focused on precision medicine, in which predictive biomarkers will be used to identify the right patients for our drugs and drug candidates, we believe that our success may depend, in part, on the development and commercialization of companion diagnostic tests. There has been limited success to date industrywide in developing and commercializing these types of companion diagnostic tests. To be successful, we need to address a number of scientific, technical and logistical challenges. We have entered into agreements to develop and commercialize companion diagnostic tests with third parties for AYVAKIT in order to identify GIST patients with the PDGFRA D842V mutation, fisogatinib in order to identify HCC patients with FGFR4 pathway activation and pralsetinib in order to identify NSCLC patients with RET fusions. If we decide to initiate a planned Phase 3 clinical trial in second-line GIST, prior to initiation we will need to enter into an agreement with a third party to develop a companion diagnostic test for avapritinib in order to select patients with PDGFRA- and KIT-driven second-line GIST who do not test positive for the KIT V654A or T670I mutations. We have not yet initiated commercialization of these companion diagnostic tests or development and commercialization of companion diagnostic tests for any of our other programs. We have little experience in the development and commercialization of companion diagnostic tests and may not be successful in developing and commercializing appropriate companion diagnostic tests to pair with any of our approved drugs or drug candidates that

receive marketing approval. In addition, current commercially available diagnostic tests may become unavailable in the future. Companion diagnostic tests are subject to regulation by the FDA and similar regulatory authorities outside the U.S. as medical devices and require separate regulatory clearance or approval prior to commercialization. Given our limited experience in developing and commercializing companion diagnostic tests, we are relying on third parties to design, manufacture, obtain regulatory clearance or approval for and commercialize the companion diagnostic tests for avapritinib, pralsetinib and fisogatinib, and we expect to rely in whole or in part on third parties to design, manufacture, obtain regulatory clearance or approval for and commercialize any other companion diagnostic tests for our drugs and drug candidates. We and our collaborators may encounter difficulties in developing and obtaining clearance or approval for the companion diagnostic tests, including issues relating to selectivity/specificity, analytical validation, reproducibility, or clinical validation. In addition, our collaborators for any companion diagnostic test that we may seek to develop:

- may not perform their respective obligations as expected or as required under our agreements with them;
- may not pursue commercialization of a companion diagnostic test even if it receives any required regulatory clearances or approvals;
- may elect not to continue the development of a companion diagnostic test based on changes in their or other third parties' strategic focus or available funding, or external factors, such as an acquisition, that divert resources or create competing priorities;
- may not commit sufficient resources to the marketing and distribution of a companion diagnostic test; and
- may terminate their relationship with us.

Any delay or failure by us or our collaborators to develop or obtain regulatory clearance or approval of the companion diagnostic tests could delay or prevent approval of our drug candidates. If we, or any third parties that we have engaged or may in the future engage to assist us are unable to successfully develop and commercialize companion diagnostic tests for our drugs and drug candidates, or experience delays in doing so:

- the development of our approved drugs and drug candidates may be adversely affected if we are unable to appropriately select patients for enrollment in our clinical trials;
- our drug candidates may not receive marketing approval if safe and effective use of a therapeutic drug candidate depends on an in vitro diagnostic;
- regulatory authorities may impose post-marketing requirements regarding the development and commercialization of companion diagnostic tests for our drugs and drug candidates; and
- we may not realize the full commercial potential of any of our approved drugs or drug candidates that receive marketing approval if, among other reasons, we are unable to appropriately select patients who are likely to benefit from treatment with our drugs.

As a result, our business would be harmed, possibly materially.

In addition, third party collaborators may encounter production difficulties that could constrain the supply of the companion diagnostic tests, and both they and we may have difficulties gaining acceptance of the use of the companion diagnostic tests in the clinical community. If such companion diagnostic tests fail to gain market acceptance, it would have an adverse effect on our ability to derive revenues from sales of our current and future drugs. In addition, the diagnostic company with whom we contract may decide to discontinue selling or manufacturing the companion diagnostic test that we anticipate using in connection with development and commercialization of our approved drugs and drug candidates or our relationship with such diagnostic company may otherwise terminate. We may not be able to enter into arrangements with another diagnostic company to obtain supplies of an alternative diagnostic test for use in connection with the development and commercialization of our drugs and drug candidates or do so on commercially

reasonable terms, which could adversely affect and/or delay the development or commercialization of our drugs and drug candidates.

Even if we are able to commercialize any of our approved drugs or drug candidates, if approved, such drug or drug candidate may become subject to unfavorable pricing regulations or third-party coverage and reimbursement policies, which would harm our business.

The regulations that govern regulatory approvals, pricing and reimbursement for new drugs vary widely from country to country. Some countries require approval of the sale price of a drug before it can be marketed. In many countries, the pricing review period begins after marketing approval is granted. In some foreign markets, prescription pharmaceutical pricing remains subject to continuing governmental control even after initial approval is granted. As a result, we might obtain marketing approval for a drug candidate in a particular country, but then be subject to price regulations that delay our commercial launch of the drug candidate, possibly for lengthy time periods, and negatively impact the revenues we are able to generate from the sale of the drug candidate in that country. Adverse pricing limitations may hinder our ability to recoup our investment in one or more drug candidates, even if our drug candidates obtain marketing approval.

Our ability to commercialize any drug candidates successfully also will depend in part on the extent to which coverage and reimbursement for these drug candidates and related treatments will be available from government authorities, private health insurers and other organizations. In the U.S. and markets in other countries, patients generally rely on third-party payors to reimburse all or part of the costs associated with their treatment. Adequate coverage and reimbursement from governmental healthcare programs, such as Medicare and Medicaid, and commercial payors is critical to new product acceptance. Our ability to successfully commercialize our products will depend in part on the extent to which coverage and adequate reimbursement for these products and related treatments will be available from government health administration authorities, private health insurers and other organizations. Government authorities and third-party payors, such as private health insurers and health maintenance organizations, decide which medications they will pay for and establish reimbursement levels. The availability of coverage and extent of reimbursement by governmental and private payors is essential for most patients to be able to afford treatments. Sales of these or other products that we may identify will depend substantially, both domestically and abroad, on the extent to which the costs of our products will be paid by health maintenance, managed care, pharmacy benefit and similar healthcare management organizations, or reimbursed by government health administration authorities, private health coverage insurers and other third-party payors. If coverage and adequate reimbursement is not available, or is available only to limited levels, we may not be able to successfully commercialize our products. Even if coverage is provided, the approved reimbursement amount may not be high enough to allow us to establish or maintain pricing sufficient to realize a sufficient return on our investment. A primary trend in the U.S. healthcare industry and elsewhere is cost containment. Government authorities and third-party payors have attempted to control costs by limiting coverage and the amount of reimbursement for particular drugs. Increasingly, third-party payors are requiring that drug companies provide them with predetermined discounts from list prices and are challenging the prices charged for drugs. We cannot be sure that coverage will be available for any drug candidate that we commercialize and, if coverage is available, the level of reimbursement. Reimbursement may impact the demand for, or the price of, any drug candidate for which we obtain marketing approval. If reimbursement is not available or is available only to limited levels, we may not be able to successfully commercialize any drug candidate for which we obtain marketing approval.

There may be significant delays in obtaining reimbursement for newly approved drugs, and coverage may be more limited than the purposes for which the drug is approved by the FDA or similar regulatory authorities outside the U.S. Moreover, eligibility for reimbursement does not imply that any drug will be paid for in all cases or at a rate that covers our costs, including research, development, manufacture, sale and distribution. Interim reimbursement levels for new drugs, if applicable, may also not be sufficient to cover our costs and may not be made permanent. Reimbursement rates may vary according to the use of the drug and the clinical setting in which it is used, may be based on reimbursement levels already set for lower-cost drugs and may be incorporated into existing payments for other services. Net prices for drugs may be reduced by mandatory discounts or rebates required by government healthcare programs or private payors and by any future relaxation of laws that presently restrict imports of drugs from countries where they may be sold at lower prices than in the U.S. Third-party payors often rely upon Medicare coverage policy and payment limitations in setting their own reimbursement policies. Our inability to promptly obtain coverage and profitable payment rates from both government-funded and private payors for any approved drugs that we develop could have a

material adverse effect on our operating results, our ability to raise capital needed to commercialize drugs and our overall financial condition.

Healthcare legislative reform measures may have a material adverse effect on our business and results of operations.

In the U.S., there have been and continue to be a number of legislative initiatives to contain healthcare costs. For example, in March 2010, the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act, or the Affordable Care Act, was passed, which substantially changes the way health care is financed by both governmental and private insurers, and significantly impacts the U.S. pharmaceutical industry. The Affordable Care Act, among other things, subjects biologic products to potential competition by lower-cost biosimilars, addresses a new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for drugs that are inhaled, infused, instilled, implanted or injected, increases the minimum Medicaid rebates owed by manufacturers under the Medicaid Drug Rebate Program and extends the rebate program to individuals enrolled in Medicaid managed care organizations, establishes annual fees and taxes on manufacturers of certain branded prescription drugs, and a new Medicare Part D coverage gap discount program, in which manufacturers must agree to offer 50% point-of-sale discounts (increased to 70% by the Bipartisan Budget Act of 2018, effective January 1, 2019) off negotiated prices of applicable brand drugs to eligible beneficiaries during their coverage gap period, as a condition for the manufacturer's outpatient drugs to be covered under Medicare Part D.

In addition, other legislative changes have been proposed and adopted in the U.S. since the Affordable Care Act was enacted. On August 2, 2011, the Budget Control Act of 2011 among other things, created measures for spending reductions by Congress. A Joint Select Committee on Deficit Reduction, tasked with recommending a targeted deficit reduction of at least \$1.2 trillion for the years 2013 through 2021, was unable to reach required goals, thereby triggering the legislation's automatic reduction to several government programs. This includes aggregate reductions of Medicare payments to providers of 2% per fiscal year. These reductions went into effect on April 1, 2013 and, due to subsequent legislative amendments to the statute, will remain in effect through 2029 unless additional Congressional action is taken. On January 2, 2013, the American Taxpayer Relief Act of 2012 was signed into law, which, among other things, further reduced Medicare payments to several types of providers.

Moreover, payment methodologies may be subject to changes in healthcare legislation and regulatory initiatives. For example, the Middle Class Tax Relief and Job Creation Act of 2012 required that the Centers for Medicare and Medicaid Services, or CMS, reduce the Medicare clinical laboratory fee schedule by 2% in 2013, which served as a base for 2014 and subsequent years. In addition, effective January 1, 2014, CMS also began bundling the Medicare payments for certain laboratory tests ordered while a patient received services in a hospital outpatient setting. We expect that additional state and federal healthcare reform measures will be adopted in the future, any of which could limit the amounts that federal and state governments will pay for healthcare products and services, which could result in reduced demand for our drug candidates or companion diagnostic tests or additional pricing pressures.

Since its enactment, some of the provisions of the Affordable Care Act have yet to be fully implemented, while certain provisions have been subject to judicial, congressional, and executive challenges. Since January 2017, President Trump has signed two executive orders and other directives designed to delay the implementation of certain provisions of the Affordable Care Act. Concurrently, Congress has considered legislation that would repeal or repeal and replace all or part of the Affordable Care Act. While Congress has not passed repeal legislation to date, it has enacted laws that modify certain provisions of the Affordable Care Act. The Tax Cuts and Jobs Act of 2017, or TCJA, included a provision which repealed, effective January 1, 2019, the tax-based shared responsibility payment imposed by the Affordable Care Act on certain individuals who fail to maintain qualifying health coverage for all or part of a year that is commonly referred to as the "individual mandate". On December 14, 2018, a U.S. District Court judge in the Northern District of Texas ruled that the individual mandate portion of the Affordable Care Act is an essential and inseparable feature of the Affordable Care Act, and therefore because the mandate was repealed as part of the TCJA, the remaining provisions of the Affordable Care Act are invalid as well. On December 18, 2019, the Fifth Circuit U.S. Court of Appeals held that the individual mandate is unconstitutional, and remanded the case to the lower court to reconsider its earlier invalidation of the full Affordable Care Act. Pending review, the Affordable Care Act remains in effect, but it is unclear at this time what effect the latest ruling will have on the status of the Affordable Care Act. Litigation and legislation over the Affordable Care Act are likely to continue, with unpredictable and uncertain results. We will continue to evaluate the effect that the Affordable Care Act and its possible repeal and replacement has on our business.

Further, on January 20, 2017, U.S. President Donald Trump signed an Executive Order directing federal agencies with authorities and responsibilities under the Affordable Care Act to waive, defer, grant exemptions from, or delay the implementation of any provision of the Affordable Care Act that would impose a fiscal burden on states or a cost, fee, tax, penalty or regulatory burden on individuals, healthcare providers, health insurers, or manufacturers of pharmaceuticals or medical devices. On October 13, 2017, President Trump signed an Executive Order terminating the cost-sharing subsidies that reimburse insurers under the Affordable Care Act. Several state Attorneys General filed suit to stop the administration from terminating these subsidies, but on October 25, 2017, a federal judge in California denied their request for a restraining order. On June 14, 2018, U.S. Court of Appeals for the Federal Circuit ruled that the federal government was not required to pay more than \$12 billion in Affordable Care Act risk corridor payments to third-party payors who argued were owed to them. On December 10, 2019, the U.S. Supreme Court heard arguments in *Moda Health Plan, Inc. v. United States*, which will determine whether the government must make risk corridor payments. The U.S. Supreme Court's decision will be released in the coming months, but we cannot predict how the U.S. Supreme Court will rule. The effects of this gap in reimbursement on third-party payors, the viability of the Affordable Care Act marketplace, providers, and potentially our business, are not yet known.

Moreover, on January 22, 2018, President Trump signed a continuing resolution on appropriations for fiscal year 2018 that delayed the implementation of certain Affordable Care Act-mandated fees, including the so called "Cadillac" tax on certain high cost employer-sponsored insurance plans, the annual fee imposed on certain health insurance providers based on market share. However, on December 20, 2019, President Trump signed into law the Further Consolidated Appropriations Act (H.R. 1865), which repeals the Cadillac tax, the health insurance provider tax, and the medical device excise tax. In July 2018, CMS published a final rule permitting further collections and payments to and from certain Affordable Care Act qualified health plans and health insurance issuers under the Affordable Care Act risk adjustment program in response to the outcome of federal district court litigation regarding the method CMS uses to determine this risk adjustment. In addition, CMS published regulations that would give states greater flexibility in setting benchmarks for insurers in the individual and small group marketplaces, which may have the effect of relaxing the health benefits required under the Affordable Care Act for plans sold through these marketplaces.

There has been increasing legislative and enforcement interest in the U.S. with respect to drug pricing practices. Specifically, there have been several recent U.S. Congressional inquiries and proposed federal and state legislation designed to, among other things, bring more transparency to drug pricing, reduce the cost of prescription drugs under Medicare, review the relationship between pricing and manufacturer patient programs, and reform government program reimbursement methodologies for drugs. At the federal level, the Trump administration's budget proposal for fiscal year 2020 contains further drug price control measures that could be enacted during the budget process or in other future legislation, including, for example, measures to permit Medicare Part D plans to negotiate the price of certain drugs under Medicare Part B, to allow some states to negotiate drug prices under Medicaid, and to eliminate cost sharing for generic drugs for low-income patients. While some proposed measures may require additional authorization to become effective, Congress and the Trump administration have each indicated that it will continue to seek new legislative and/or administrative measures to control drug costs. For example, on September 25, 2019, the Senate Finance Committee introduced the Prescription Drug Pricing Reduction Act of 2019, a bill intended to reduce Medicare and Medicaid prescription drug prices. The proposed legislation would restructure the Part D benefit, modify payment methodologies for certain drugs, and impose an inflation cap on drug price increases. An even more restrictive bill, the Lower Drug Costs Now Act of 2019, was introduced in the House of Representatives on September 19, 2019, and would require the Department of Health and Human Services, or HHS, to directly negotiate drug prices with manufacturers. The Lower Drug Costs Now Act of 2019 has passed out of the House and was delivered to the Senate on December 16, 2019. However, it is unclear whether either of these bills will make it through both chambers and be signed into law, and if either is enacted, what effect it would have on our business.

Additionally, the Trump administration released a "blueprint" to lower drug prices and reduce out of pocket costs of drugs that contains additional proposals to increase drug manufacturer competition, increase the negotiating power of certain federal healthcare programs, incentivize manufacturers to lower the list price of their products, and reduce the out of pocket costs of drug products paid by consumers. HHS has already started the process of soliciting feedback on some of these measures and, at the same time, is immediately implementing others under its existing authority. For example, in May 2019, CMS issued a final rule to allow Medicare Advantage Plans the option of using step therapy for Part B drugs beginning January 1, 2020. This final rule codified CMS's policy change that was effective January 1, 2019. Congress and the Trump administration will likely continue to consider subsequent legislation and further action to repeal, replace or modify the Affordable Care Act. It is unclear what impact any changes to the Affordable Care Act will have on the availability of healthcare and containing or lowering the cost of healthcare. We

plan to continue to evaluate the effect that the Affordable Care Act and its possible repeal and replacement may have on our business.

In addition, individual states have also become increasingly active in passing legislation and implementing regulations designed to control pharmaceutical product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures and, in some cases, to encourage importation from other countries and bulk purchasing.

Healthcare reforms stemming from the repeal of, and potential replacement for, the Affordable Care Act may result in more rigorous coverage criteria and lower reimbursement among regulated third-party payors, and in additional downward pressure on the prices that we receive for sales of our current and future drugs. Any reduction in reimbursement from Medicare or other government-funded federal programs, including the Veterans Health Administration, or state healthcare programs could lead to a similar reduction in payments from private commercial payors. The implementation of cost containment measures or other healthcare reforms may thus prevent us from being able to generate revenue or attain profitability.

Beyond challenges to the Affordable Care Act, other legislative measures have also been enacted that may impose additional pricing and product development pressures on our business. For example, on May 30, 2018, the Right to Try Act, was signed into law. Among other things, this law provides a federal framework for certain patients to access certain investigational new drug products that have completed a Phase 1 clinical trial and that are undergoing investigation for FDA approval. Under certain circumstances, eligible patients can seek treatment without enrolling in clinical trials and without obtaining FDA permission under the FDA expanded access program. There is no obligation for a drug manufacturer to make its drug products available to eligible patients as a result of the Right to Try Act, but the manufacturer must develop an internal policy and respond to patient requests according to that policy. We expect that additional foreign, federal and state healthcare reform measures will be adopted in the future, any of which could limit the amounts that federal and state governments will pay for healthcare products and services, which could result in limited coverage and reimbursement and reduced demand for our drugs and drug candidates, if approved, or additional pricing pressures.

Additionally, on December 18, 2019, President Trump, the U.S. Department of Health and Human Services, and the FDA issued a notice of proposed rulemaking that, if finalized, would allow for the importation of certain prescription drugs from Canada. FDA also issued a Draft Guidance document outlining a potential pathway for manufacturers to obtain an additional National Drug Code, or NDC, for an FDA-approved drug that was originally intended to be marketed in a foreign country and that was authorized for sale in that foreign country. The regulatory and market implications of the notice of proposed rulemaking and Draft Guidance are unknown at this time, but legislation, regulations or policies allowing the reimportation of drugs, if enacted and implemented, could decrease the price we receive for our products and adversely affect our future revenues and prospects for profitability.

The delivery of healthcare in the European Union, including the establishment and operation of health services and the pricing and reimbursement of medicines, is almost exclusively a matter for national, rather than EU, law and policy. National governments and health service providers have different priorities and approaches to the delivery of health care and the pricing and reimbursement of products in that context. In general, however, the healthcare budgetary constraints in most EU member states have resulted in restrictions on the pricing and reimbursement of medicines by relevant health service providers. Coupled with ever-increasing EU and national regulatory burdens on those wishing to develop and market products, this could prevent or delay marketing approval of our drug candidates, restrict or regulate post-approval activities and affect our ability to commercialize any of our approved drugs or drug candidates for which we obtain marketing approval.

We are currently unable to predict what additional legislation or regulation, if any, relating to the health care industry may be enacted in the future or what effect recently enacted federal legislation or any such additional legislation or regulation would have on our business. The pendency or approval of such proposals or reforms could result in a decrease in our stock price or limit our ability to raise capital or to enter into collaboration agreements for the further development and commercialization of our approved drugs and drug candidates.

If, in the future, we are unable to maintain sales and marketing capabilities or enter into agreements with third parties to sell and market our drugs and drug candidates, we may not be successful in commercializing our drugs and drug candidates if and when they are approved, and we may not be able to generate any revenue.

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

If we enter into arrangements with third parties to perform sales, marketing and distribution services, our drug revenues or the profitability of these drug revenues to us are likely to be lower than if we were to market and sell any current or future drugs ourselves. In addition, we may not be successful in entering into arrangements with third parties to sell and market our current and future drugs or may be unable to do so on terms that are favorable to us. We likely will have little control over such third parties, and any of them may fail to devote the necessary resources and attention to sell and market our drugs effectively. If we do not establish sales and marketing capabilities successfully, either on our own or in collaboration with third parties, we will not be successful in commercializing our drugs and drug candidates, if approved. Further, our business, results of operations, financial condition and prospects will be materially adversely affected.

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

We are subject to additional healthcare statutory and regulatory requirements and enforcement by the federal government and the states and foreign governments in which we conduct our business. Healthcare providers, physicians and third-party payors play a primary role in the recommendation and prescription of any of our approved drugs and drug candidates for which we obtain marketing approval. Our future arrangements with third-party payors and customers may expose us to broadly applicable fraud and abuse and other healthcare laws and regulations that may constrain the business or financial arrangements and relationships through which we market, sell and distribute our drugs and drug candidates for which we obtain marketing approval. Restrictions under applicable federal and state healthcare laws and regulations include the following:

- the federal Anti-Kickback Statute prohibits, among other things, persons from knowingly and willfully soliciting, offering, receiving or providing remuneration, directly or indirectly, overtly or covertly, in cash or in kind, to induce or reward either the referral of an individual for, or the purchase, order or recommendation of, any good or service, for which payment may be made under federal and state healthcare programs such as Medicare and Medicaid. A person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation;
- the federal False Claims Act imposes civil penalties, including through civil whistleblower or qui tam actions, against individuals or entities for, among other things, knowingly presenting, or causing to be presented, to the federal government, claims for payment that are false or fraudulent or making a false statement to avoid, decrease or conceal an obligation to pay money to the federal government. In addition, the government may assert that a claim including items and services resulting from a violation of the federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the False Claims Act. Manufacturers can be held liable under the False Claims Act even when they do not submit claims directly to government payors if they are deemed to “cause” the submission of false or fraudulent claims;
- the federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, imposes criminal and civil liability for executing a scheme to defraud any healthcare benefit program regardless of the payor (e.g., public or private), or knowingly and willfully falsifying, concealing or covering up a material fact or making any materially false statement in connection with the delivery of or payment

for healthcare benefits, items or services; similar to the federal Anti-Kickback Statute, a person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation;

- the federal physician payment transparency requirements, sometimes referred to as the “Sunshine Act” under the Affordable Care Act require manufacturers of drugs, devices, biologics and medical supplies that are reimbursable under Medicare, Medicaid, or the Children’s Health Insurance Program to report to the Department of Health and Human Services information related to physician payments and other transfers of value and the ownership and investment interests of such physicians and their immediate family members. Effective January 1, 2022, these reporting obligations will extend to include transfers of value made to certain non-physician providers such as physician assistants and nurse practitioners;
- HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act of 2009, or HITECH, and its implementing regulations, which also imposes obligations on certain covered entity healthcare providers, health plans, and healthcare clearinghouses as well as their business associates that perform certain services involving the use or disclosure of individually identifiable health information, including mandatory contractual terms, with respect to safeguarding the privacy, security and transmission of individually identifiable health information. HITECH also created new tiers of civil monetary penalties, amended HIPAA to make civil and criminal penalties directly applicable to business associates, and gave state attorneys general new authority to file civil actions for damages or injunctions in federal courts to enforce the federal HIPAA laws and seek attorneys’ fees and costs associated with pursuing federal civil actions;
- the federal false statements statute, which prohibits knowingly and willfully falsifying, concealing, or covering up a material fact or making any materially false statement in connection with the delivery of or payment for healthcare benefits, items, or services (similar to the federal Anti-Kickback Statute, a person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation);
- federal consumer protection and unfair competition laws, which broadly regulate marketplace activities and activities that potentially harm consumers; and
- analogous state laws and regulations, such as state anti-kickback and false claims laws that may apply to sales or marketing arrangements and claims involving healthcare items or services reimbursed by non-governmental third-party payors, including private insurers; and some state laws require pharmaceutical companies to comply with the pharmaceutical industry’s voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government in addition to requiring drug manufacturers to report information related to payments to physicians and other health care providers or marketing expenditures, and state laws governing the privacy and security of health information in certain circumstances, many of which differ from each other in significant ways and often are not preempted by HIPAA, thus complicating compliance efforts.

In the U.S., to help patients afford our drug, we have a patient assistance program. Patient assistance programs have received some negative publicity related to allegations regarding their use to promote branded pharmaceutical products over other less costly alternatives. In recent years, pharmaceutical manufacturers were named in class action lawsuits challenging the legality of their patient assistance programs under a variety of federal and state laws. In addition, patient assistance programs have become the subject of enhanced government and regulatory scrutiny. If we or our vendors are deemed to fail to comply with relevant laws, regulations or evolving government guidance in the operation of these programs, we could be subject to damages, fines, penalties or other criminal, civil or administrative sanctions or enforcement actions. We cannot ensure that our compliance controls, policies and procedures will be sufficient to protect against acts of our employees, business partners or vendors that may violate the laws or regulations of the jurisdictions in which we operate. Regardless of whether we have complied with the law, a government investigation could impact our business practices, harm our reputation, divert the attention of management, increase our expenses and reduce the availability of assistance to our patients.

Ensuring that our future business arrangements with third parties comply with applicable healthcare laws and regulations could involve substantial costs. It is possible that governmental authorities will conclude that our business practices do not comply with current or future statutes, regulations or case law involving applicable fraud and abuse or other healthcare laws and regulations. If our operations, including anticipated activities to be conducted by our sales team, were to be found to be in violation of any of these laws or any other governmental regulations that may apply to us, we may be subject to significant civil, criminal and administrative penalties, damages, fines, exclusion from government-funded healthcare programs, such as Medicare and Medicaid, and the curtailment or restructuring of our operations. If any of the physicians or other providers or entities with whom we expect to do business is found to be not in compliance with applicable laws, they may be subject to criminal, civil or administrative sanctions, including exclusions from government-funded healthcare programs.

Our future growth may depend, in part, on our ability to penetrate foreign markets, where we would be subject to additional regulatory burdens and other risks and uncertainties.

Our future profitability may depend, in part, on our ability to commercialize our drug candidates in foreign markets for which we may rely on collaboration with third parties. We are not permitted to market or promote any of our drug candidates before we receive regulatory approval from the applicable regulatory authority in that foreign market, and we may never receive such regulatory approval for any of our drug candidates. To obtain separate regulatory approval in many other countries we must comply with numerous and varying regulatory requirements of such countries regarding safety and efficacy and governing, among other things, clinical trials, manufacturing, commercial sales, pricing and distribution of our drug candidates, and we cannot predict success in these jurisdictions. If we seek to develop our drug candidates or obtain approval of our drug candidates and ultimately commercialize our drug candidates in foreign markets, we would be subject to additional risks and uncertainties, including:

- our customers' ability to obtain reimbursement for our drug candidates in foreign markets;
- our inability to directly control commercial activities because we are relying on third parties;
- the burden of complying with complex and changing foreign regulatory, tax, accounting and legal requirements, including the European General Data Protection Regulation 2016/679, commonly referred to as GDPR;
- different medical practices and customs in foreign countries affecting acceptance in the marketplace;
- import or export licensing requirements;
- longer accounts receivable collection times;
- longer lead times for shipping;
- language barriers for technical training;
- reduced protection of intellectual property rights in some foreign countries;
- the existence of additional potentially relevant third-party intellectual property rights;
- foreign currency exchange rate fluctuations; and
- the interpretation of contractual provisions governed by foreign laws in the event of a contract dispute.

Foreign sales of our drug candidates could also be adversely affected by the imposition of governmental controls, political and economic instability, trade restrictions and changes in tariffs.

Governments outside the U.S. tend to impose strict price controls, which may adversely affect our revenues, if any.

In some countries, particularly countries in the European Union, the pricing of prescription pharmaceuticals is subject to governmental control. In these countries, pricing negotiations with governmental authorities can take considerable time after the receipt of marketing approval for a drug. To obtain reimbursement or pricing approval in some countries, we may be required to conduct a clinical trial that compares the cost-effectiveness of our drug candidate to other available therapies. If reimbursement of our drugs is unavailable or limited in scope or amount, or if pricing is set at unsatisfactory levels, our business could be materially harmed. In addition, in 2016, the United Kingdom referendum on its membership in the European Union resulted in a majority of United Kingdom voters voting to exit the European Union, often referred to as Brexit. Brexit has already and may continue to adversely affect European and/or worldwide regulatory conditions. Brexit could lead to legal uncertainty and potentially divergent national laws and regulations, including those related to the pricing of prescription pharmaceuticals, as the United Kingdom determines which European Union laws to replicate or replace. If the United Kingdom were to significantly alter its regulations affecting the pricing of prescription pharmaceuticals, we could face significant new costs. As a result, Brexit could impair our ability to transact business in the European Union and the United Kingdom.

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

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

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

Risks Related to Our Dependence on Third Parties

We may seek to establish additional collaborations and licensing arrangements, and, if we are not able to establish them on commercially reasonable terms, we may have to alter our development and commercialization plans.

Our drug development programs and the commercialization of any of our approved drugs and drug candidates will require substantial additional cash to fund expenses. We may decide to collaborate with additional pharmaceutical and biotechnology companies for the development and commercialization of certain approved drugs or drug candidates or to license the development and commercialization rights of certain approved drugs or drug candidates to third parties.

We face significant competition in seeking appropriate collaborators and licensing partners. Whether we reach a definitive agreement for a collaboration or license will depend, among other things, upon our assessment of the collaborator's or licensing partner's resources and expertise, the terms and conditions of the proposed agreement and the proposed partner's evaluation of a number of factors. Those factors may include the design or results of clinical trials, the likelihood of approval by the FDA or similar regulatory authorities outside the U.S., the potential market for the subject drug or drug candidate, the costs and complexities of manufacturing and delivering such drug or drug candidate to patients, the potential of competing drugs, the existence of uncertainty with respect to our ownership of technology, which can exist if there is a challenge to such ownership without regard to the merits of the challenge and industry and market conditions generally. The collaborator or licensing partner may also consider alternative drug candidates or technologies for similar indications that may be available to collaborate on and whether such a collaboration or licensing arrangement could be more attractive than the one with us for our drug candidate. The terms of any additional collaborations, licenses or other arrangements that we may establish may not be favorable to us. We may also be restricted under our collaboration agreements with Roche and CStone and our license agreement with Clementia from

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

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

In addition, our collaborations with Roche and CStone and our license agreement with Clementia, as well as any future collaborations or licenses that we enter into, may not be successful. The success of these arrangements will depend heavily on the efforts and activities of our collaborators and licensing partners. Collaborators generally have significant discretion in determining the efforts and resources that they will apply to these collaborations. Disagreements between parties to a collaboration arrangement regarding clinical development and commercialization matters can lead to delays in the development process or commercializing the applicable drug candidate and, in some cases, termination of the collaboration arrangement. These disagreements can be difficult to resolve if neither of the parties has final decision-making authority. Licensors generally have sole discretion in determining the efforts and resources that they will apply to the licensed products. Collaborations and licenses with pharmaceutical or biotechnology companies and other third parties often are terminated or allowed to expire by the other party. For example, in the fourth quarter of 2017, Alexion terminated our collaboration related to fibrodysplasia ossificans progressiva for convenience following a strategic review by Alexion of its research and development portfolio. Any termination or expiration of our collaboration agreements with Roche and CStone, our license agreement with Clementia or any future collaboration or license agreement could adversely affect us financially or harm our business reputation.

We rely on third parties to conduct our clinical trials for our approved drugs and drug candidates. If these third parties do not successfully carry out their contractual duties, comply with regulatory requirements or meet expected deadlines, we may not be able to obtain regulatory approval for or commercialize our approved drugs and drug candidates and our business could be substantially harmed.

We do not have the ability to independently conduct clinical trials. We rely on medical institutions, clinical investigators, CROs, contract laboratories and other third parties to conduct or otherwise support clinical trials for our approved drugs and drug candidates. We rely heavily on these parties for execution of clinical trials for our drugs and drug candidates and control only certain aspects of their activities. Nevertheless, we are responsible for ensuring that each of our clinical trials is conducted in accordance with the applicable protocol, legal and regulatory requirements and scientific standards, and our reliance on CROs will not relieve us of our regulatory responsibilities. For any violations of laws and regulations during the conduct of our clinical trials, we could be subject to warning letters or enforcement action that may include civil penalties up to and including criminal prosecution.

We and our CROs are required to comply with regulations, including GCPs, for conducting, monitoring, recording and reporting the results of clinical trials to ensure that the data and results are scientifically credible and accurate, and that the trial patients are adequately informed of the potential risks of participating in clinical trials and their rights are protected. These regulations are enforced by the FDA, the Competent Authorities of the Member States of the European Economic Area and comparable foreign regulatory authorities for any drugs in clinical development. The FDA enforces GCP regulations through periodic inspections of clinical trial sponsors, principal investigators and trial sites. If we or our CROs fail to comply with applicable GCPs, the clinical data generated in our clinical trials may be deemed unreliable, and the FDA or comparable foreign regulatory authorities may require us to perform additional clinical trials before approving our marketing applications. We cannot assure you that, upon inspection, the FDA will determine that our current or future clinical trials comply with GCPs. In addition, our clinical trials must be conducted with drug candidates produced under cGMPs regulations. Our failure or the failure of our CROs to comply with these regulations may require us to repeat clinical trials, which would delay the regulatory approval process and could also subject us to enforcement action. We also are required to register ongoing clinical trials and post the results of completed

clinical trials on a government-sponsored database, ClinicalTrials.gov, within certain timeframes. Failure to do so can result in fines, adverse publicity and civil and criminal sanctions.

Although we intend to design the clinical trials for our approved drugs and drug candidates, CROs will conduct all of the clinical trials. As a result, many important aspects of our development programs, including their conduct and timing, will be outside of our direct control. Our reliance on third parties to conduct current or future clinical trials will also result in less direct control over the management of data developed through clinical trials than would be the case if we were relying entirely upon our own staff. Communicating with outside parties can also be challenging, potentially leading to mistakes as well as difficulties in coordinating activities. Outside parties may:

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

These factors may materially adversely affect the willingness or ability of third parties to conduct our clinical trials and may subject us to unexpected cost increases that are beyond our control. If the CROs do not perform clinical trials in a satisfactory manner, breach their obligations to us or fail to comply with regulatory requirements, the development, regulatory approval and commercialization of our approved drugs for additional indications and our drug candidates may be delayed, we may not be able to obtain regulatory approval and commercialize our drug candidates, or our development program materially and irreversibly harmed. If we are unable to rely on clinical data collected by our CROs, we could be required to repeat, extend the duration of, or increase the size of any clinical trials we conduct and this could significantly delay commercialization and require significantly greater expenditures.

If any of our relationships with these third-party CROs terminate, we may not be able to enter into arrangements with alternative CROs. If CROs do not successfully carry out their contractual duties or obligations or meet expected deadlines, if they need to be replaced or if the quality or accuracy of the clinical data they obtain is compromised due to the failure to adhere to our clinical protocols, regulatory requirements or for other reasons, any clinical trials such CROs are associated with may be extended, delayed or terminated, and we may not be able to obtain regulatory approval for or successfully commercialize our drug for additional indications or our drug candidates. As a result, we believe that our financial results and the commercial prospects for our drugs or our drug candidates in the subject indication would be harmed, our costs could increase and our ability to generate revenue could be delayed.

We contract with third parties for the manufacture of our drug candidates for pre-clinical development and clinical trials, and for the manufacture of AYVAKIT for commercialization. This reliance on third parties increases the risk that we will not have sufficient quantities of our drugs or drug candidates or such quantities at an acceptable cost, which could delay, prevent or impair our development or commercialization efforts.

We do not currently own or operate, nor do we have any plans to establish in the future, any manufacturing facilities or personnel. We rely, and expect to continue to rely, on third parties for the manufacture of our drug candidates for pre-clinical development and clinical testing, as well as for the commercial manufacture of our current and future drugs. This reliance on third parties increases the risk that we will not have sufficient quantities of our drugs or drug candidates or such quantities at an acceptable cost or quality, which could delay, prevent or impair our development or commercialization efforts.

The facilities used by our contract manufacturers to manufacture our drugs and drug candidates must be approved by the FDA pursuant to inspections that will be conducted after we submit our marketing applications to the FDA. We do not control the manufacturing process of, and will be completely dependent on, our contract manufacturers for compliance with cGMPs in connection with the manufacture of our drugs and drug candidates. If our contract manufacturers cannot successfully manufacture material that conforms to our specifications and the strict regulatory

requirements of the FDA or others, they will not be able to secure and/or maintain regulatory approval for their manufacturing facilities. In addition, we have no control over the ability of our contract manufacturers to maintain adequate quality control, quality assurance and qualified personnel. If the FDA or a comparable foreign regulatory authority does not approve these facilities for the manufacture of our drugs and drug candidates or if it withdraws any such approval in the future, we may need to find alternative manufacturing facilities, which would significantly impact our ability to develop, obtain regulatory approval for or market our drug candidates, if approved. Further, our failure, or the failure of our third-party manufacturers, to comply with applicable regulations could result in sanctions being imposed on us, including clinical holds, fines, injunctions, civil penalties, delays, suspension or withdrawal of approvals, license revocation, seizures or recalls of drug candidates or drugs, if approved, operating restrictions and criminal prosecutions, any of which could significantly and adversely affect our business and supplies of our drugs and drug candidates.

We do not have any long-term supply agreements with our contract manufacturers, and we purchase our required drug supply, including the API, drug product and drug substance used in our drug candidates, on a purchase order basis. In addition, we may be unable to establish or maintain any agreements with third-party manufacturers or to do so on acceptable terms. Even if we are able to establish and maintain agreements with third-party manufacturers, reliance on third-party manufacturers entails additional risks, including:

- reliance on the third party for regulatory compliance and quality assurance;
- the possible breach of the manufacturing agreement by the third party;
- the possible misappropriation of our proprietary information, including our trade secrets and know-how; and
- the possible termination or nonrenewal of the agreement by the third party at a time that is costly or inconvenient for us.

Any of our approved drugs and drug candidates that we may develop may compete with other approved drugs and drug candidates for access to manufacturing facilities. There are a limited number of manufacturers that operate under cGMP regulations and that might be capable of manufacturing for us.

Any performance failure on the part of our existing or future manufacturers could delay clinical development or marketing approval. We do not currently have arrangements in place for redundant supply for bulk drug substances. If our current contract manufacturers cannot perform as agreed, we may be required to replace such manufacturers. Although we believe that there are several potential alternative manufacturers who could manufacture our approved drugs and drug candidates, we may incur added costs and delays in identifying and qualifying any such replacement.

Our current and anticipated future dependence upon others for the manufacture of our drugs or drug candidates could result in significant delays or gaps in availability of such drugs or drug candidates and may adversely affect our future profit margins and our ability to commercialize any drugs that receive marketing approval on a timely and competitive basis.

The third parties upon whom we rely for the supply of the API, drug substance and drug product used in avapritinib and pralsetinib are our sole source of supply, and the loss of any of these suppliers could significantly harm our business.

The API, drug substance and drug product used in avapritinib and pralsetinib are currently supplied to us from single-source suppliers. Our ability to successfully develop our drug candidates, supply our drug candidates for clinical trials and to ultimately supply our commercial drugs in quantities sufficient to meet the market demand, depends in part on our ability to obtain the API, drug substance and drug product for these drugs in accordance with regulatory requirements and in sufficient quantities for clinical testing and commercialization. Although we have entered into arrangements to establish redundant or second-source supply of some of the API, drug product or drug substance for avapritinib and pralsetinib, if any of our suppliers ceases its operations for any reason or is unable or unwilling to supply

API, drug product or drug substance in sufficient quantities or on the timelines necessary to meet our needs, it could significantly and adversely affect our business, the supply of our drug candidates and our financial condition.

For all of our drug candidates, we intend to identify and qualify additional manufacturers to provide such API, drug substance and drug product prior to submission of an NDA to the FDA and/or an MAA to the EMA. We are not certain, however, that our single-source suppliers will be able to meet our demand for their products, either because of the nature of our agreements with those suppliers, our limited experience with those suppliers or our relative importance as a customer to those suppliers. It may be difficult for us to assess their ability to timely meet our demand in the future based on past performance. While our suppliers have generally met our demand for their products on a timely basis in the past, they may subordinate our needs in the future to their other customers.

Establishing additional or replacement suppliers for the API, drug substance and drug product used in our drug candidates, if required, may not be accomplished quickly. If we are able to find a replacement supplier, such replacement supplier would need to be qualified and may require additional regulatory approval, which could result in further delay. While we seek to maintain adequate inventory of the API, drug substance and drug product used in our drug candidates, any interruption or delay in the supply of components or materials, or our inability to obtain such API, drug substance and drug product from alternate sources at acceptable prices in a timely manner could impede, delay, limit or prevent our development efforts, which could harm our business, results of operations, financial condition and prospects.

Certain of our research and development, clinical trials and manufacturing and supply for certain raw materials used in AYWAKIT and our drug candidates takes place in China through third-party CROs, collaborators or manufacturers. A significant disruption in the operation of those CROs, collaborators or manufacturers, could materially adversely affect our business, financial condition and results of operations.

We have relied on certain third parties located in China to manufacture and supply certain raw materials used in AYWAKIT and our drug candidates, and we expect to continue to use such third party manufacturers for such purposes. In addition, certain of our drug candidates are being evaluated at clinical trial sites in China under our collaboration with CStone and through CROs located in China. A natural disaster, epidemic or pandemic disease outbreaks, including the recent 2019 novel coronavirus outbreak, trade war, political unrest or other events could disrupt the business or operations of CROs, collaborators, manufacturers or other third parties with whom we conduct business now or in the future. Any disruption in China that significantly impacts such third parties, including services provided by CROs for our research and development programs, clinical trial operations conducted by CROs or our collaborators, or our manufacturers ability to produce raw materials in adequate quantities to meet our needs could impair our ability to operate our business on a day-to-day basis and impede, delay, limit or prevent the research, development or commercialization of our current and future approved drugs or drug candidates. In addition, for any activities conducted in China, we are exposed to the possibility of product supply disruption and increased costs in the event of changes in the policies of the U.S. or Chinese governments, political unrest or unstable economic conditions in China, and we may be exposed to fluctuations in the value of the local currency in China for goods and services. Our costs for any of these services or activities could also increase as a result of future appreciation of the local currency in China or increased labor costs if the demand for skilled laborers increases in China and the availability of skilled labor declines in China.

Risks Related to Intellectual Property

If we are unable to adequately protect our proprietary technology or obtain and maintain patent protection for our technology and drugs or if the scope of the patent protection obtained is not sufficiently broad, our competitors could develop and commercialize technology and drugs similar or identical to ours, and our ability to successfully commercialize our technology and drugs may be impaired.

Our commercial success depends in part on our ability to obtain and maintain proprietary or intellectual property protection in the U.S. and other countries for our drugs and drug candidates, including avapritinib and pralsetinib, and our core technologies, including our novel target discovery engine and our proprietary compound library and other know-how. We seek to protect our proprietary and intellectual property position by, among other methods, filing patent applications in the U.S. and abroad related to our proprietary compounds, technologies, inventions and improvements that are important to the development and implementation of our business. We also rely on copyright, trade secrets, know-how and continuing technological innovation to develop and maintain our proprietary and intellectual property position.

We own patents and patent applications that relate to the composition of matter for avapritinib, pralsetinib, fisogatinib and BLU-263. We also own applications relating to composition of matter for KIT and PDGFRA inhibitors with multiple compound families, composition of matter for FGFR4 inhibitors with multiple compound families, and composition of matter for inhibitors of RET, including predicted RET resistance mutations, as well as methods of use for these novel compounds. The issued U.S. patent directed to avapritinib composition of matter has a statutory expiration date in 2034, the issued U.S. patent directed to pralsetinib composition of matter has a statutory expiration date in 2036, and the issued U.S. patent directed to fisogatinib composition of matter has a statutory expiration date in 2034. Patent term adjustments or patent term extensions could result in later expiration dates.

As of January 31, 2020, we owned nine issued U.S. patents, 10 issued foreign patents, including one European patent validated in 38 countries, two pending U.S. non-provisional patent applications, seven pending U.S. provisional patent applications, one pending PCT international application and 21 pending foreign patent applications directed to our KIT and PDGFRA program, including avapritinib and BLU-263. The patents that have issued or will issue covering our KIT and PDGFRA program will have a statutory expiration date between 2034 and 2040. Patent term adjustments or patent term extensions could result in later expiration dates for avapritinib or BLU-263.

As of January 31, 2020, we owned five issued U.S. patents, four pending U.S. non-provisional patent applications, two pending PCT international applications and 30 pending foreign patent applications directed to our RET program, including pralsetinib. The patents that have issued or will issue covering our RET program will have a statutory expiration date between 2036 and 2039. Patent term adjustments or patent term extensions could result in later expiration dates.

As of January 31, 2020, we owned eight issued U.S. patents, three pending U.S. non-provisional patent applications, one pending PCT international application, 22 issued foreign patents and 31 pending foreign patent applications directed to our FGFR4 program, including fisogatinib. The patents that have issued or will issue covering our FGFR4 program will have a statutory expiration date between 2033 and 2039. Patent term adjustments or patent term extensions could result in later expiration dates.

The intellectual property portfolio directed to our platform includes patent applications directed to novel gene fusions and the uses of these fusions for detecting and treating conditions implicated with these fusions. As of January 31, 2020, we owned six issued U.S. patents, seven pending U.S. non-provisional patent applications, seven pending European Union patent applications and five issued European patents directed to this technology. Any U.S. or ex-U.S. patent issuing from the pending applications directed to this technology, if issued, will have statutory expiration dates ranging from 2034 to 2035.

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.

The degree of patent protection we require to successfully commercialize any of our approved drugs and drug candidates may be unavailable or severely limited in some cases and may not adequately protect our rights or permit us to gain or keep any competitive advantage. We cannot provide any assurances that any of our patents have, or that any of our pending patent applications that mature into issued patents will include, claims with a scope sufficient to protect avapritinib, pralsetinib, fisogatinib or BLU-263. In addition, the laws of foreign countries may not protect our rights to the same extent as the laws of the U.S. Furthermore, patents have a limited lifespan. In the U.S., the natural expiration of a patent is generally twenty years after it is filed. Various extensions may be available; however, the life of a patent, and the protection it affords, is limited. Given the amount of time required for the development, testing and regulatory review of new drug candidates, patents protecting such candidates might expire before or shortly after such candidates are commercialized. As a result, our owned patent portfolio may not provide us with adequate and continuing patent protection sufficient to exclude others from commercializing drugs similar or identical to our drugs and drug candidates, including generic versions of such drugs or drug candidates.

Other parties have developed technologies that may be related or competitive to our own, and such parties may have filed or may file patent applications, or may have received or may receive patents, claiming inventions that may overlap or conflict with those claimed in our own patent applications or issued patents, with respect to either the same methods or formulations or the same subject matter, in either case, that we may rely upon to dominate our patent position in the market. Publications of discoveries in the scientific literature often lag behind the actual discoveries, and

patent applications in the U.S. and other jurisdictions are typically not published until 18 months after filing, or in some cases not at all. Therefore, we cannot know with certainty whether we were the first to make the inventions claimed in our owned or licensed patents or pending patent applications, or that we were the first-to-file for patent protection of such inventions. As a result, the issuance, scope, validity, enforceability and commercial value of our patent rights cannot be predicted with any certainty. For example, we are aware of patents owned by third parties that have generic composition of matter, method of inhibition and method of treatment claims that may cover fisogatinib or generic method of treatment claims that may cover pralsetinib. If the claims of any of these third-party patents are asserted against us, we do not believe fisogatinib, pralsetinib or our proposed activities related to such compounds would be found to infringe any valid claim of these patents. While we may decide to initiate proceedings to challenge the validity of these patents in the future, we may be unsuccessful, and courts or patent offices in the U.S. and abroad could uphold the validity of any such patents. If we were to challenge the validity of any issued U.S. patent in court, we would need to overcome a statutory presumption of validity that attaches to every U.S. patent. This means that in order to prevail, we would have to present clear and convincing evidence as to the invalidity of the patent's claims.

In addition, the patent prosecution 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. Patent prosecution is a lengthy process, during which the scope of the claims initially submitted for examination by the U.S. Patent and Trademark Office, or USPTO, have been significantly narrowed by the time they issue, if at all. 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. Moreover, in some circumstances, we do not have the right to control the preparation, filing and prosecution of patent applications, or to maintain the patents, covering technology that we license from third parties. Therefore, these patents and applications may not be prosecuted and enforced in a manner consistent with the best interests of our business.

Even if we acquire patent protection that we expect should enable us to maintain such competitive advantage, third parties may challenge the validity, enforceability or scope thereof, which may result in such patents being narrowed, invalidated or held unenforceable. The issuance of a patent is not conclusive as to its inventorship, scope, validity or enforceability, and our owned and licensed patents may be challenged in the courts or patent offices in the U.S. and abroad. For example, we may be subject to a third-party submission of prior art to the USPTO challenging the priority of an invention claimed within one of our patents, which submissions may also be made prior to a patent's issuance, precluding the granting of any of our pending patent applications. We may become involved in opposition, derivation, reexamination, inter partes review, post-grant review or interference proceedings challenging our patent rights or the patent rights of others from whom we have obtained licenses to such rights. Competitors may claim that they invented the inventions claimed in our issued patents or patent applications prior to us or may file patent applications before we do. Competitors may also claim that we are infringing on their patents and that we therefore cannot practice our technology as claimed under our patents, if issued. Competitors may also contest our patents, if issued, by showing the patent examiner that the invention was not original, was not novel or was obvious. In litigation, a competitor could claim that our patents, if issued, are not valid for a number of reasons. If a court agrees, we would lose our rights to those challenged patents.

In addition, we may in the future be subject to claims by our former employees, consultants, advisors, and other third parties who have access to our proprietary know-how asserting an ownership right in our patents or patent applications, as a result of the work they performed on our behalf. Although we generally require all of our employees, consultants and advisors and any other third parties who have access to our proprietary know-how, information or technology to assign or grant similar rights to their inventions to us, we cannot be certain that we have executed such agreements with all parties who may have contributed to our intellectual property, nor can we be certain that our agreements with such parties will be upheld in the face of a potential challenge, or that they will not be breached, for which we may not have an adequate remedy.

An adverse determination in any such submission or proceeding may result in loss of exclusivity or freedom to operate or in patent claims being narrowed, invalidated or held unenforceable, in whole or in part, which could limit our ability to stop others from using or commercializing similar or identical technology and drugs, without payment to us, or could limit the duration of the patent protection covering our technology, drugs and drug candidates. Such challenges may also result in our inability to manufacture or commercialize our drugs or drug candidates, if approved, without infringing third-party patent rights. In addition, if the breadth or strength of protection provided by our patents and patent

applications is threatened, it could dissuade companies from collaborating with us to license, develop or commercialize current or future drugs and drug candidates.

Even if they are unchallenged, our issued patents and our pending patents, if issued, may not provide us with any meaningful protection or prevent competitors from designing around our patent claims to circumvent our owned or licensed patents by developing similar or alternative technologies or drugs in a non-infringing manner. For example, a third party may develop a competitive drug that provides benefits similar to one or more of our drugs and drug candidates but that has a different composition that falls outside the scope of our patent protection. If the patent protection provided by the patents and patent applications we hold or pursue with respect to our drugs and drug candidates is not sufficiently broad to impede such competition, our ability to successfully commercialize our drugs or drug candidates, if approved, could be negatively affected, which would harm our business.

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 current and future drugs and use our proprietary technologies without infringing the proprietary rights and intellectual property of third parties. The biotechnology and pharmaceutical industries are characterized by extensive and frequent litigation regarding patents and other intellectual property rights. We may in the future become party to, or threatened with, adversarial proceedings or litigation regarding intellectual property rights with respect to our drugs, drug candidates and technology, including interference proceedings before the USPTO. Our competitors or other third parties may assert infringement claims against us, alleging that our drugs are covered by their patents. Given the vast number of patents in our field of technology, we cannot be certain that we do not infringe existing patents or that we will not infringe patents that may be granted in the future. Many companies have filed, and continue to file, patent applications related to kinase inhibitors. Some of these patent applications have already been allowed or issued, and others may issue in the future. For example, we are aware of patents owned by third parties that have generic composition of matter, method of inhibition and method of treatment claims that may cover fisogatinib or generic method of treatment claims that may cover pralsetinib. If the claims of any of these third-party patents are asserted against us, we do not believe fisogatinib, pralsetinib or our proposed activities related to such compounds would be found to infringe any valid claim of these patents. While we may decide to initiate proceedings to challenge the validity of these patents in the future, we may be unsuccessful, and courts or patent offices in the U.S. and abroad could uphold the validity of any such patents. If we were to challenge the validity of any issued U.S. patent in court, we would need to overcome a statutory presumption of validity that attaches to every U.S. patent. This means that in order to prevail, we would have to present clear and convincing evidence as to the invalidity of the patent's claims.

Since this area is competitive and of strong interest to pharmaceutical and biotechnology companies, there will likely be additional patent applications filed and additional patents granted in the future, as well as additional research and development programs expected in the future. Furthermore, because patent applications can take many years to issue and may be confidential for 18 months or more after filing, and because pending patent claims can be revised before issuance, there may be applications now pending which may later result in issued patents that may be infringed by the manufacture, use or sale of our drugs and drug candidates. If a patent holder believes any of our approved drugs or drug candidate infringes on its patent, the patent holder may sue us even if we have received patent protection for our drugs, drug candidates and technology. Moreover, we may face patent infringement claims from non-practicing entities that have no relevant drug revenue and against whom our own patent portfolio may thus have no deterrent effect.

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 drug candidates 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 such a license, it could be granted on non-exclusive terms, thereby providing our competitors and other third parties access to the same technologies licensed to us. Without such a license, we could be forced, including by court order, to cease developing and commercializing the infringing technology, drugs or drug candidates. In addition, we could be found liable for monetary damages, including treble damages and attorneys' fees if we are found to have willfully infringed such third-party patent rights. A finding of infringement could prevent us from commercializing our current and future drugs or force us to cease some of our business operations, which could materially harm our business.

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

Competitors and other third parties may infringe, misappropriate or otherwise violate our patents and other intellectual property rights. To counter infringement or unauthorized use, we may be required to file infringement claims. A court may disagree with our allegations, however, and may refuse to stop the other party from using the technology at issue on the grounds that our patents do not cover the third-party technology in question. Further, such third parties could counterclaim that we infringe their intellectual property or that a patent we have asserted against them is invalid or unenforceable. In patent litigation in the U.S., defendant counterclaims challenging the validity, enforceability or scope of asserted patents are commonplace. In addition, third parties may initiate legal proceedings against us to assert such challenges to our intellectual property rights. The outcome of any such proceeding is generally unpredictable. Grounds for a validity challenge could be an alleged failure to meet any of several statutory requirements, including lack of novelty, obviousness or non-enablement. Patents may be unenforceable if someone connected with prosecution of the patent withheld relevant information from the USPTO or made a misleading statement during prosecution. It is possible that prior art of which we and the patent examiner were unaware during prosecution exists, which could render our patents invalid. Moreover, it is also possible that prior art may exist that we are aware of but do not believe is relevant to our current or future patents, but that could nevertheless be determined to render our patents invalid.

An adverse result in any litigation proceeding could put one or more of our patents at risk of being invalidated or interpreted narrowly. If a defendant were to prevail on a legal assertion of invalidity or unenforceability of our patents covering any of our approved drugs or drug candidates, we would lose at least part, and perhaps all, of the patent protection covering such drug or drug candidate. Competing drugs may also be sold in other countries in which our patent coverage might not exist or be as strong. If we lose a foreign patent lawsuit, alleging our infringement of a competitor's patents, we could be prevented from marketing our drugs in one or more foreign countries. Any of these outcomes would have a materially adverse effect on our business.

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

Litigation or other legal proceedings relating to intellectual property claims, with or without merit, is unpredictable and generally expensive and time-consuming and is likely to divert significant resources from our core business, including distracting our technical and management personnel from their normal responsibilities. 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. 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 the resources available for development activities or any future sales, marketing or distribution 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 greater financial resources and more mature and developed intellectual property portfolios. Accordingly, despite our efforts, we may not be able to prevent third parties from infringing upon or misappropriating or from successfully challenging our intellectual property rights. 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.

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

The USPTO and various foreign governmental patent agencies require compliance with a number of procedural, documentary, fee payment and other similar provisions during the patent application process. In addition, periodic maintenance fees on issued patents often must be paid to the USPTO and foreign patent agencies over the lifetime of the patent. While an unintentional lapse can in many cases be cured by payment of a late fee or by other means in accordance with the applicable rules, there are situations in which noncompliance can result in abandonment or

lapse of the patent or patent application, resulting in partial or complete loss of patent rights in the relevant jurisdiction. Non-compliance events that could result in abandonment or lapse of a patent or patent application include, but are not limited to, failure to respond to official actions within prescribed time limits, non-payment of fees and failure to properly legalize and submit formal documents. If we fail to maintain the patents and patent applications covering our drugs or procedures, we may not be able to stop a competitor from marketing drugs that are the same as or similar to our drugs or drug candidates, which would have a material adverse effect on our business.

We may not be able to effectively enforce our intellectual property rights throughout the world.

Filing, prosecuting and defending patents on our drugs and drug candidates in all countries throughout the world would be prohibitively expensive. The requirements for patentability may differ in certain countries, particularly in developing countries. Moreover, our ability to protect and enforce our intellectual property rights may be adversely affected by unforeseen changes in foreign intellectual property laws. In addition, the patent laws of some foreign countries do not afford intellectual property protection to the same extent as the laws of the U.S. Many companies have encountered significant problems in protecting and defending intellectual property rights in certain foreign jurisdictions. The legal systems of some countries, particularly developing countries, do not favor the enforcement of patents and other intellectual property rights. This could make it difficult for us to stop the infringement of our patents or the misappropriation of our other intellectual property rights. For example, many foreign countries have compulsory licensing laws under which a patent owner must grant licenses to third parties. Consequently, we may not be able to prevent third parties from practicing our inventions in all countries outside the U.S. Competitors may use our technologies in jurisdictions where we have not obtained patent protection to develop their own drugs and, further, may export otherwise infringing drugs to territories where we have patent protection, if our ability to enforce our patents to stop infringing activities is inadequate. These drugs may compete with our drugs and drug candidates, and our patents or other intellectual property rights may not be effective or sufficient to prevent them from competing.

Proceedings to enforce our patent rights in foreign jurisdictions, whether or not successful, could result in substantial costs and divert our efforts and resources from other aspects of our business. Furthermore, while we intend to protect our intellectual property rights in the major markets for our drugs and drug candidates, we cannot ensure that we will be able to initiate or maintain similar efforts in all jurisdictions in which we may wish to market our drug candidates. Accordingly, our efforts to protect our intellectual property rights in such countries may be inadequate.

Changes to the patent law in the U.S. and other jurisdictions could diminish the value of patents in general, thereby impairing our ability to protect our drugs and drug candidates.

As is the case with other biopharmaceutical companies, our success is heavily dependent on intellectual property, particularly patents. Obtaining and enforcing patents in the biopharmaceutical industry involve both technological and legal complexity and is therefore costly, time-consuming and inherently uncertain. Recent patent reform legislation in the U.S. and other countries, including the Leahy-Smith America Invents Act, or Leahy-Smith Act, signed into law on September 16, 2011, could increase those uncertainties and costs. The Leahy-Smith Act includes a number of significant changes to U.S. patent law. These include provisions that affect the way patent applications are prosecuted, redefine prior art and provide more efficient and cost-effective avenues for competitors to challenge the validity of patents. In addition, the Leahy-Smith Act has transformed the U.S. patent system into a “first-to-file” system. The first-to-file provisions, however, only became effective on March 16, 2013. Accordingly, it is not yet clear what, if any, impact the Leahy-Smith Act will have on the operation of our business. However, the Leahy-Smith Act and its implementation could make it more difficult to obtain patent protection for our inventions and increase the uncertainties and costs surrounding the prosecution of our patent applications and the enforcement or defense of our issued patents, all of which could harm our business, results of operations and financial condition.

The U.S. Supreme Court has ruled on several patent cases in recent years, either narrowing the scope of patent protection available in certain circumstances or weakening the rights of patent owners in certain situations. In addition, there have been recent proposals for additional changes to the patent laws of the U.S. and other countries that, if adopted, could impact our ability to obtain patent protection for our proprietary technology or our ability to enforce our proprietary technology. Depending on future actions by the U.S. Congress, the U.S. courts, the USPTO and the relevant law-making bodies in other countries, the laws and regulations governing patents could change in unpredictable ways that would weaken our ability to obtain new patents or to enforce our existing patents and patents that we might obtain in the future.

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

In addition to the protection afforded by patents, we rely upon unpatented trade secret protection, unpatented know-how and continuing technological innovation to develop and maintain our competitive position. With respect to the building of our proprietary compound library, we consider trade secrets and know-how to be our primary intellectual property. We seek to protect our proprietary technology and processes, in part, by entering into confidentiality agreements with our collaborators, scientific advisors, employees and consultants, and invention assignment agreements with our consultants and employees. We may not be able to prevent the unauthorized disclosure or use of our technical know-how or other trade secrets by the parties to these agreements, however, despite the existence generally of confidentiality agreements and other contractual restrictions. Monitoring unauthorized uses and disclosures is difficult, and we do not know whether the steps we have taken to protect our proprietary technologies will be effective. If any of the collaborators, scientific advisors, employees and consultants who are parties to these agreements breaches or violates the terms of any of these agreements, we may not have adequate remedies for any such breach or violation, and we could lose our trade secrets as a result. Enforcing a claim that a third party illegally obtained and is using our trade secrets, like patent litigation, is expensive and time-consuming, and the outcome is unpredictable. In addition, courts outside the U.S. are sometimes less willing to protect trade secrets.

Our trade secrets could otherwise become known or be independently discovered by our competitors. Competitors could purchase our drugs and drug candidates and attempt to replicate some or all of the competitive advantages we derive from our development efforts, willfully infringe our intellectual property rights, design around our protected technology or develop their own competitive technologies that fall outside of our intellectual property rights. If any of our trade secrets were to be lawfully obtained or independently developed by a competitor, we would have no right to prevent them, or those to whom they communicate it, from using that technology or information to compete with us. If our trade secrets are not adequately protected so as to protect our market against competitors' drugs, our competitive position could be adversely affected, as could our business.

We may be subject to damages resulting from claims that we or our employees have wrongfully used or disclosed alleged trade secrets of our competitors or are in breach of non-competition or non-solicitation agreements with our competitors.

We could in the future be subject to claims that we or our employees have inadvertently or otherwise used or disclosed alleged trade secrets or other proprietary information of former employers or competitors. Although we try to ensure that our employees and consultants do not use the intellectual property, proprietary information, know-how or trade secrets of others in their work for us, we may in the future be subject to claims that we caused an employee to breach the terms of his or her non-competition or non-solicitation agreement, or that we or these individuals have, inadvertently or otherwise, used or disclosed the alleged trade secrets or other proprietary information of a former employer or competitor. Litigation may be necessary to defend against these claims. Even if we are successful in defending against these claims, litigation could result in substantial costs and could be a distraction to management. If our defenses to these claims fail, in addition to requiring us to pay monetary damages, a court could prohibit us from using technologies or features that are essential to our drug candidates if such technologies or features are found to incorporate or be derived from the trade secrets or other proprietary information of the former employers. An inability to incorporate such technologies or features would have a material adverse effect on our business and may prevent us from successfully commercializing our drugs and drug candidates, if approved. In addition, we may lose valuable intellectual property rights or personnel as a result of such claims. Moreover, any such litigation or the threat thereof may adversely affect our ability to hire employees or contract with independent sales representatives. A loss of key personnel or their work product could hamper or prevent our ability to commercialize our drugs and drug candidates, if approved, which would have an adverse effect on our business, results of operations and financial condition.

Risks Related to Employee Matters, Managing Growth and Other Risks Related to Our Business

Our future success depends on our ability to retain key executives and to attract, retain and motivate qualified personnel.

We are highly dependent on the research and development, clinical, business development, financial and legal expertise of Jeffrey W. Albers, our President and Chief Executive Officer, Anthony L. Boral, our Chief Medical Officer,

Marion Dorsch, our Chief Scientific Officer, Kathryn Haviland, our Chief Operating Officer, Michael Landsittel, our Chief Financial Officer, Tracey McCain, our Chief Legal and Compliance Officer, Debra Durso-Bumpus, our Chief People Officer, Christopher Murray, our Senior Vice President of Technical Operations, and Christina Rossi, our Chief Commercial Officer, as well as the other principal members of our management, scientific and clinical team. Although we have entered into employment agreements with our executive officers, each of our executive officers may terminate their employment with us at any time. In addition, insurance coverage is increasingly expensive, including with respect to directors and officers liability insurance, or D&O insurance. We may not be able to maintain D&O insurance at a reasonable cost or in an amount adequate to satisfy any liability that may arise. An inability to secure and maintain D&O insurance may make it difficult for us to retain and attract talented and skilled directors and officers to serve our company, which could adversely affect our business. We do not maintain “key person” insurance for any of our executives or other employees.

In addition, we rely on consultants and advisors, including scientific and clinical advisors, to assist us in formulating our research and development and commercialization strategy. Our consultants and advisors may be employed by employers other than us and may have commitments under consulting or advisory contracts with other entities that may limit their availability to us. If we are unable to continue to attract and retain high quality personnel, our ability to pursue our growth strategy will be limited.

We expect to continue hiring qualified development personnel. Recruiting and retaining qualified scientific, clinical, regulatory, manufacturing and sales and marketing personnel is critical to our success. The loss of the services of our executive officers or other key employees could impede the achievement of our research, development and commercialization objectives and seriously harm our ability to successfully implement our business strategy. Furthermore, replacing key employees and executive officers may be difficult and may take an extended period of time because of the limited number of individuals in our industry with the breadth of skills and experience required to successfully develop, gain regulatory approval of and commercialize drugs. Competition to hire from this limited pool is intense, and we may be unable to hire, train, retain or motivate these key personnel on acceptable terms given the competition among numerous pharmaceutical and biotechnology companies for similar personnel. We also experience competition for the hiring of scientific and clinical personnel from universities and research institutions. Failure to succeed in clinical trials may make it more challenging to recruit and retain qualified scientific personnel.

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

As of January 31, 2020, we had 383 full-time employees, and we expect to continue to increase our number of employees and expand the scope of our operations. To manage our anticipated future growth, we must continue to implement and improve our managerial, operational and financial systems, expand our facilities and continue to recruit and train additional qualified personnel. Also, our management may need to divert a disproportionate amount of its attention away from its day-to-day activities and devote a substantial amount of time to managing these development activities. Due to our limited resources, we may not be able to effectively manage the expansion of our operations or recruit and train additional qualified personnel. This may result in weaknesses in our infrastructure, give rise to operational mistakes, loss of business opportunities, loss of employees and reduced productivity among remaining employees. Physical expansion of our operations in the future may lead to significant costs, including capital expenditures, and may divert financial resources from other projects, such as the development of our drug candidates. If our management is unable to effectively manage our expected development and expansion, our expenses may increase more than expected, our ability to generate or increase our revenue could be reduced and we may not be able to implement our business strategy. Our future financial performance and our ability to commercialize our drug candidates, if approved, and compete effectively will depend, in part, on our ability to effectively manage the future development and expansion of our company.

Unfavorable global economic conditions could adversely affect our business, financial condition or results of operations.

Our results of operations could be adversely affected by general conditions in the global economy and in the global financial markets. For example, the global financial crisis caused extreme volatility and disruptions in the capital and credit markets. A severe or prolonged economic downturn, such as the global financial crisis, could result in a variety of risks to our business, including, weakened demand for our drug candidates and our ability to raise additional

capital when needed on acceptable terms, if at all. A weak or declining economy could also strain our suppliers, possibly resulting in supply disruption, or cause our customers to delay making payments for our services.

On June 23, 2016, the electorate in the United Kingdom voted in favor of leaving the European Union, commonly referred to as Brexit. Thereafter, on March 29, 2017, the country formally notified the European Union of its intention to withdraw pursuant to Article 50 of the Lisbon Treaty. The United Kingdom formally left the European Union on January 31, 2020. A transition period began on February 1, 2020, during which European Union pharmaceutical law remains applicable to the United Kingdom. This transition period is due to end on December 31, 2020. Since the regulatory framework for pharmaceutical products in the United Kingdom covering quality, safety and efficacy of pharmaceutical products, clinical trials, marketing authorization, commercial sales and distribution of pharmaceutical products is derived from European Union directives and regulations, Brexit could materially impact the future regulatory regime which applies to drugs and the approval of drug candidates in the United Kingdom. It remains to be seen how, if at all, Brexit will impact regulatory requirements for product candidates and products in the United Kingdom. Given the lack of comparable precedent, it is unclear what financial, trade and legal implications the withdrawal of the United Kingdom from the European Union, especially in the case of a “hard” Brexit, would have and how such withdrawal would affect us. The long-term impact of Brexit, including on our business and our industry, will depend on the terms that are negotiated in relation to the United Kingdom’s future relationship with the European Union, and we are closely monitoring the Brexit developments in order to determine, quantify and proactively address changes as they become clear.

For example, Brexit could result in the United Kingdom or the European Union significantly altering its regulations affecting the clearance or approval of our drug candidates that are developed in the United Kingdom. Any new regulations could add time and expense to the conduct of our business, as well as the process by which our drug candidates receive regulatory approval in the United Kingdom, the European Union and elsewhere. In addition, the announcement of Brexit and the withdrawal of the United Kingdom from the European Union have had and may continue to have a material adverse effect on global economic conditions and the stability of global financial markets, and may significantly reduce global market liquidity and restrict the ability of key market participants to operate in certain financial markets. Any of these effects of Brexit, among others, could adversely affect our business, our results of operations, liquidity and financial condition.

We or the third parties upon whom we depend may be adversely affected by earthquakes or other natural disasters and our business continuity and disaster recovery plans may not adequately protect us from a serious disaster.

Earthquakes or other natural disasters could severely disrupt our operations, and have a material adverse effect on our business, results of operations, financial condition and prospects. If a natural disaster, power outage or other event occurred that prevented us from using all or a significant portion of our headquarters, that damaged critical infrastructure, such as clinical trial sites or the manufacturing facilities of our third-party contract manufacturers, or that otherwise disrupted operations, it may be difficult or, in certain cases, impossible for us to continue our business for a substantial period of time. The disaster recovery and business continuity plans we have in place may prove inadequate in the event of a serious disaster or similar event. We may incur substantial expenses as a result of the limited nature of our disaster recovery and business continuity plans, which, could have a material adverse effect on our business.

Our internal computer systems, or those of our third-party collaborators, service providers, contractors or consultants, may fail or suffer security breaches, which could result in a material disruption of our drugs’ and drug candidates’ development programs and have a material adverse effect on our reputation, business, financial condition or results of operations.

Our internal computer systems and those of our current or future third-party collaborators, service providers, contractors and consultants are vulnerable to damage from computer viruses, unauthorized access, natural disasters, terrorism, war and telecommunication and electrical failures. Attacks on information technology systems are increasing in their frequency, levels of persistence, sophistication and intensity, and they are being conducted by increasingly sophisticated and organized groups and individuals with a wide range of motives and expertise. In addition to extracting sensitive information, such 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. The prevalent use of mobile devices also increases the risk of data security incidents. While we have not experienced any material system failure, accident or security breach to date, if such an event were to occur

and cause interruptions in our operations or the operations of third-party collaborators, service providers, contractors and consultants, it could result in a material disruption of our drugs' and drug candidates' development programs and significant reputational, financial, legal, regulatory, business or operational harm. For example, the loss of clinical trial data for our drugs or drug candidates could result in delays in our regulatory approval efforts and significantly increase our costs to recover or reproduce the data. To the extent that any disruption or security breach results in a loss of or damage to our data or applications or other data or applications relating to our technology or drug candidates, or inappropriate disclosure of confidential or proprietary information, we could incur liabilities and the further development of our drug candidates could be delayed. In addition, our liability insurance may not be sufficient in type or amount to cover us against claims related to security breaches, cyberattacks and other related breaches.

Any failure or perceived failure by us or any third-party collaborators, service providers, contractors or consultants to comply with our privacy, confidentiality, data security or similar obligations to third parties, or any data security incidents or other security breaches that result in the unauthorized access, release or transfer of sensitive information, including physician data, patient data, or any personally identifiable information, may result in governmental investigations, enforcement actions, regulatory fines, litigation or public statements against us, could cause third parties to lose trust in us or could result in claims by third parties asserting that we have breached our privacy, confidentiality, data security or similar obligations, any of which could have a material adverse effect on our reputation, business, financial condition or results of operations. Moreover, data security incidents and other security breaches can be difficult to detect, and any delay in identifying them may lead to increased harm. While we have implemented data security measures intended to protect our information technology systems and infrastructure, there can be no assurance that such measures will successfully prevent service interruptions or data security incidents.

Interruptions in the availability of server systems or communications with Internet or cloud-based services, or failure to maintain the security, confidentiality, accessibility or integrity of data stored on such systems, could harm our business.

We rely upon a variety of Internet service providers, third-party hosting facilities and cloud computing platform providers to support our business. Failure to maintain the security, confidentiality, accessibility or integrity of data stored on such systems could damage our reputation in the market, cause us to lose revenue or market share, increase our service costs, cause us to incur substantial costs, subject us to liability for damages and/or fines and divert our resources from other tasks, any one of which could materially adversely affect our business, financial condition, results of operations and prospects. Any damage to, or failure of, such systems, or communications to and between such systems, could result in interruptions in our operations. If our security measures or those of our third-party data center hosting facilities, cloud computing platform providers, or third-party service partners, are breached, and unauthorized access is obtained to our data or our information technology systems, we may incur significant legal and financial exposure and liabilities.

We do not have control over the operations of the facilities of our cloud service providers and our third party providers may be vulnerable to damage or interruption from natural disasters, cybersecurity attacks, terrorist attacks, power outages and similar events or acts of misconduct. In addition, any changes in our cloud service providers' service levels may adversely affect our ability to meet our requirements and operate our business.

Compliance with global privacy and data security requirements could result in additional costs and liabilities to us or inhibit our ability to collect and process data globally, and the failure to comply with such requirements could have a material adverse effect on our business, financial condition or results of operations.

Privacy and data security have become significant issues in the U.S., Europe and in many other jurisdictions where we conduct or may in the future conduct our operations. The regulatory framework for the collection, use, safeguarding, sharing and transfer of information worldwide is rapidly evolving and is likely to remain uncertain for the foreseeable future. Globally, virtually every jurisdiction in which we operate has established its own data security and privacy frameworks with which we must comply. On May 25, 2018, the European General Data Protection Regulation 2016/679, which is commonly referred to as GDPR, took effect. The GDPR applies to any company established in the European Union as well as any company outside the European Union that collects or otherwise processes personal data in connection with the offering goods or services to individuals in the European Union or the monitoring of their behavior. The GDPR enhances data protection obligations for processors and controllers of personal data, including, for example, expanded disclosures about how personal information is to be used, limitations on retention of information,

mandatory data breach notification requirements and onerous new obligations on services providers. The GDPR imposes additional obligations and risk upon our business and substantially increase the penalties to which we could be subject in the event of any non-compliance, including fines of up to €20 million or 4% of total worldwide annual turnover, whichever is higher. Given the breadth and depth of changes in data protection obligations, preparing for and complying with the GDPR requirements has required and will continue to require significant time, resources and a review of our technologies, systems and practices, as well as those of any third-party collaborators, service providers, contractors or consultants that process or transfer personal data collected in the European Union. If enacted, we will be subject to the EU ePrivacy Regulation, which is a proposed regulation of privacy and electronic communications. In addition, we will be subject to the California Consumer Privacy Act, which took effect on January 1, 2020 and imposes sweeping privacy and security obligations on many companies doing business in California and provides for substantial fines for non-compliance and, in some cases, a private right of action to consumers who are victims of data breaches involving their unredacted or unencrypted personal information. While there is currently an exception for protected health information that is subject to HIPAA and clinical trial regulations, as currently written, the CCPA may impact our business activities. The California Attorney General has proposed draft regulations (which have not been finalized to date) and will commence enforcement actions against violators beginning July 1, 2020. The GDPR and other changes in laws or regulations associated with the enhanced protection of certain types of sensitive data, such as healthcare data or other personal information from our clinical trials, could lead to government enforcement actions and significant penalties against us and could have a material adverse effect on our business, financial condition or results of operations.

Our employees, principal investigators, CROs and consultants may engage in misconduct or other improper activities, including non-compliance with regulatory standards and requirements and insider trading.

We are exposed to the risk that our employees, principal investigators, CROs and consultants may engage in fraudulent conduct or other illegal activity. Misconduct by these parties could include intentional, reckless and/or negligent conduct or disclosure of unauthorized activities to us that violate the regulations of the FDA and other regulatory authorities, including those laws requiring the reporting of true, complete and accurate information to such authorities; healthcare fraud and abuse laws and regulations in the U.S. and abroad; or laws that require the reporting of financial information or data accurately. In particular, sales, marketing and business arrangements in the healthcare industry are subject to extensive laws and regulations intended to prevent fraud, misconduct, kickbacks, self-dealing and other abusive practices. These laws and regulations may restrict or prohibit a wide range of pricing, discounting, marketing and promotion, sales commission, customer incentive programs and other business arrangements. Activities subject to these laws also involve the improper use of information obtained in the course of clinical trials or creating fraudulent data in our pre-clinical studies or clinical trials, which could result in regulatory sanctions and cause serious harm to our reputation. We have adopted a code of conduct applicable to all of our employees, but it is not always possible to identify and deter misconduct by employees and other third parties, and the precautions we take to detect and prevent this activity may not be effective in controlling unknown or unmanaged risks or losses or in protecting us from governmental investigations or other actions or lawsuits stemming from a failure to comply with these laws or regulations. In addition, we are subject to the risk that a person could allege such fraud or other misconduct, even if none occurred. If any such actions are instituted against us, and we are not successful in defending ourselves or asserting our rights, those actions could have a significant impact on our business, including the imposition of civil, criminal and administrative penalties, damages, monetary fines, possible exclusion from participation in Medicare, Medicaid and other federal healthcare programs, contractual damages, reputational harm, diminished profits and future earnings, and curtailment of our operations, any of which could adversely affect our ability to operate our business and our results of operations.

We may acquire or in-license businesses or drugs, or form strategic alliances, in the future, and we may not realize the benefits of such acquisitions.

We may acquire or in-license additional businesses or drugs, form strategic alliances or create joint ventures with third parties that we believe will complement or augment our existing business. If we acquire businesses with promising markets or technologies, we may not be able to realize the benefit of acquiring such businesses if we are unable to successfully integrate them with our existing operations and company culture. We may encounter numerous difficulties in developing, manufacturing and marketing any new drugs resulting from a strategic alliance or acquisition that delay or prevent us from realizing their expected benefits or enhancing our business. We cannot assure you that, following any such acquisition, we will achieve the expected synergies to justify the transaction.

We may be subject to adverse legislative or regulatory tax changes that could negatively impact our financial condition.

The rules dealing with U.S. federal, state and local income taxation are constantly under review by persons involved in the legislative process and by the IRS and the U.S. Treasury Department. Changes to tax laws (which changes may have retroactive application) could adversely affect our stockholders or us. In recent years, many such changes have been made and changes are likely to continue to occur in the future. We cannot predict whether, when, in what form, or with what effective dates, tax laws, regulations and rulings may be enacted, promulgated or decided, which could result in an increase in our, or our stockholders', tax liability or require changes in the manner in which we operate in order to minimize increases in our tax liability.

On December 22, 2017, TCJA was enacted. The TCJA significantly reforms the Internal Revenue Code of 1986, as amended. The TCJA, among other things, includes changes to U.S. federal tax rates, imposes significant additional limitations on the deductibility of interest and net operating loss carryforwards and allows for the expensing of capital expenditures. Our net deferred tax assets and liabilities were revalued as of December 31, 2017 at the newly enacted U.S. corporate rate, and the impact was recognized in our tax expense in the year of enactment but was offset by a corresponding reduction to the valuation allowance. We continue to examine the impact this tax reform legislation may have on our business. The impact of this tax reform is uncertain and could be adverse.

Risks Related to Our Common Stock

The price of our common stock has been and may in the future be volatile and fluctuate substantially.

Our stock price has been and may in the future be subject to substantial volatility. In addition, the stock market in general, and Nasdaq listed and biopharmaceutical companies in particular, have experienced extreme price and volume fluctuations that have often been unrelated or disproportionate to the operating performance of these companies. For example, our stock traded within a range of a high price of \$109.00 and a low price of \$13.04 per share for the period beginning on April 30, 2015, our first day of trading on The Nasdaq Global Select Market, through February 13, 2020. As a result of this volatility, our stockholders could incur substantial losses. In addition, the market price for our common stock may be influenced by many factors, including:

- the success of commercialization of our drugs and drug candidates, if approved;
- the success of competitive drugs or technologies;
- results of clinical trials of our drug candidates or those of our competitors;
- regulatory or legal developments in the U.S. and other countries;
- developments or disputes concerning patent applications, issued patents or other proprietary rights;
- the recruitment or departure of key personnel;
- the level of expenses related to any of our drug candidates or clinical development programs;
- the results of our efforts to discover, develop, acquire or in-license additional drug candidates or drugs;
- actual or anticipated changes in estimates as to financial results, development timelines or recommendations by securities analysts;
- 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;
- general economic, industry and market conditions; and
- the other factors described in this “Risk Factors” section.

These and other market and industry factors may cause the market price and demand for our common stock to fluctuate substantially, regardless of our actual operating performance, which may limit or prevent investors from readily selling their shares of common stock and may otherwise negatively affect the liquidity of our common stock. In the past, when the market price of a stock has been volatile, holders of that stock have instituted securities class action litigation against the company that issued the stock. If any of our stockholders brought a lawsuit against us, we could incur substantial costs defending the lawsuit. Such a lawsuit could also divert the time and attention of our management.

An active trading market for our common stock may not be sustained, and investors may not be able to resell their shares at or above the price they paid.

Although we have listed our common stock on The Nasdaq Global Select Market, an active trading market for our shares may not be sustained. In the absence of an active trading market for our common stock, investors may not be able to sell their common stock at or above the price at which they acquired their shares or at the time that they would like to sell. An inactive trading market may also impair our ability to raise capital to continue to fund operations by

selling shares and may impair our ability to acquire other companies or technologies by using our shares as consideration.

If equity research analysts publish negative evaluations of or downgrade our common stock, the price of our common stock could decline.

The trading market for our common stock relies in part on the research and reports that equity research analysts publish about us or our business. We do not control these analysts. If one or more of the analysts covering our business downgrade their evaluations of our common stock, the price of our common stock could decline. If one or more of these analysts cease to cover our common stock, we could lose visibility in the market for our common stock, which in turn could cause our common stock price to decline.

Our executive officers, directors, principal stockholders and their affiliates maintain the ability to exercise significant influence over our company and all matters submitted to stockholders for approval.

Our executive officers, directors and stockholders who own more than 5% of our outstanding common stock, together with their affiliates and related persons, beneficially own shares of common stock representing a significant percentage of our capital stock. As a result, if these stockholders were to choose to act together, they would be able to influence our management and affairs and the outcome of matters submitted to our stockholders for approval, including the election of directors and any sale, merger, consolidation, or sale of all or substantially all of our assets. This concentration of voting power could delay or prevent an acquisition of our company on terms that other stockholders may desire. In addition, this concentration of ownership might adversely affect the market price of our common stock by:

- delaying, deferring or preventing a change of control of us;
- impeding a merger, consolidation, takeover or other business combination involving us; or
- discouraging a potential acquiror from making a tender offer or otherwise attempting to obtain control of us.

Anti-takeover provisions in our 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 amended and restated certificate of incorporation and amended and restated bylaws may delay or prevent an acquisition of us or a change in our management. These provisions include a classified board of directors, a prohibition on actions by written consent of our stockholders and the ability of our board of directors to issue preferred stock without stockholder approval. In addition, because we are incorporated in Delaware, we are governed by the provisions of Section 203 of the Delaware General Corporation Law, which limits the ability of stockholders owning in excess of 15% of our outstanding voting stock to merge or combine with us. Although we believe these provisions collectively provide for an opportunity to obtain greater value for stockholders by requiring potential acquirors to negotiate with our board of directors, they would apply even if an offer rejected by our board were considered beneficial by some stockholders. 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, which is responsible for appointing the members of our management.

Future sales of our common stock, including by us or our directors and executive officers or shares issued upon the exercise of currently outstanding options, could cause our stock price to decline.

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 or

impair our ability to raise adequate capital through the sale of additional equity securities. 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. These 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 number, timing or size of future issuances or the effect, if any, that any future issuances may have on the market price for our common stock.

We have incurred and will continue to incur increased costs as a result of operating as a public company, and our management is required to devote substantial time to new compliance initiatives and corporate governance practices.

As a public company, we have incurred and expect to continue to incur significant legal, accounting and other expenses. In addition, the Sarbanes-Oxley Act of 2002 and rules subsequently implemented by the Securities and Exchange Commission, or SEC, and Nasdaq have imposed various requirements on public companies, including establishment and maintenance of effective disclosure and financial controls and corporate governance practices. Our management and other personnel will need to devote a substantial amount of time to these compliance initiatives. Moreover, these rules and regulations will increase our legal and financial compliance costs and make some activities more time-consuming and costlier.

Pursuant to Section 404 of the Sarbanes-Oxley Act of 2002, or Section 404, we are required to furnish an annual report by our management on our internal control over financial reporting. To achieve compliance with Section 404 within the prescribed period, we have been and will continue to be engaged in a process to document and evaluate our internal control over financial reporting, which is both costly and challenging. In this regard, we will need to continue to dedicate internal resources, potentially engage outside consultants and adopt a detailed work plan to assess and document the adequacy of internal control over financial reporting, continue steps to improve control processes as appropriate, validate through testing that controls are functioning as documented and implement a continuous reporting and improvement process for internal control over financial reporting.

Despite our efforts, there is a risk that in the future neither we nor our independent registered public accounting firm will be able to conclude within the prescribed timeframe that our internal control over financial reporting is effective as required by Section 404 or that we will not be able to comply with the requirements of Section 404 in a timely manner. If this were to occur, the market price of our stock could decline and we could be subject to sanctions or investigations by the SEC or other regulatory authorities, which would require additional financial and management resources. Furthermore, investor perceptions of our company may suffer if deficiencies are found, and this could cause a decline in the market price of our stock. Irrespective of compliance with Section 404, any failure of our internal control over financial reporting could have a material adverse effect on our stated operating results and harm our reputation. If we are unable to implement these requirements effectively or efficiently, it could harm our operations, financial reporting, or financial results and could result in an adverse opinion on our internal control over financial reporting from our independent registered public accounting firm.

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

We have never declared or paid cash dividends on our capital stock. We currently intend to retain all of our future earnings, if any, to finance the growth and development of our business. In addition, the terms of any future debt agreements may preclude us from paying dividends. As a result, capital appreciation, if any, of our common stock will be the sole source of gain for our stockholders for the foreseeable future.

Our ability to utilize our net operating loss carryforwards and certain other tax attributes may be limited.

Under Section 382 of the Internal Revenue Code of 1986, as amended, if a corporation undergoes an “ownership change” (generally defined as a greater than 50% change (by value) in the ownership of its equity over a three-year period), the corporation’s ability to use its pre-change net operating loss carryforwards and certain other pre-change tax attributes to offset its post-change income may be limited. We may have experienced such ownership changes in the past, and we may experience ownership changes in the future as a result of shifts in our stock ownership, some of which are outside our control. As of December 31, 2019, we had federal net operating loss carryforwards of approximately \$802.1 million, and our ability to utilize those net operating loss carryforwards could be limited by an “ownership change” as described above, which could result in increased tax liability to us. In addition, pursuant to the TCJA, we may not use net operating loss carry-forwards to reduce our taxable income in any year by more than 80%, and we may not carry back any net operating losses to prior years. These new rules apply regardless of the occurrence of an ownership change.

Item 1B. Unresolved Staff Comments.

None.

Item 2. Properties.

Our headquarters are located at 45 Sidney Street in Cambridge, Massachusetts where we occupy approximately 99,833 rentable square feet of office and laboratory space under a lease that commenced on October 1, 2017 and will expire on November 30, 2029. On September 19, 2018, we entered into an amendment to the lease agreement to expand the rentable square footage from approximately 99,833 square feet to approximately 139,216 square feet. The initial term of the lease with respect to the expansion premises commenced on March 1, 2019 and will expire on November 30, 2029, unless terminated sooner. Pursuant to the lease amendment, the rent commencement date for the expansion premises was July 1, 2019.

We also lease our former corporate headquarters at 38 Sidney Street in Cambridge, Massachusetts under a lease that will expire on October 31, 2022. The lease agreement provides us with an option to extend the lease for five additional years. In the first quarter of 2018, we fully subleased these premises through October 31, 2020. The sublessee has the option to extend the sublease through October 31, 2022, subject to specified exceptions under the sublease agreement.

We believe that our existing office and laboratory space is sufficient to meet our needs for the foreseeable future and that suitable additional space will be available as and when needed.

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.

Certain Information Regarding the Trading of Our Common Stock

Our common stock trades under the symbol “BPMC” on the Nasdaq Global Select Market and has been publicly traded since April 30, 2015.

Holders

As of January 31, 2020, there were approximately 16 holders of record of our common stock. This number does not include beneficial owners whose shares are held by nominees in street name.

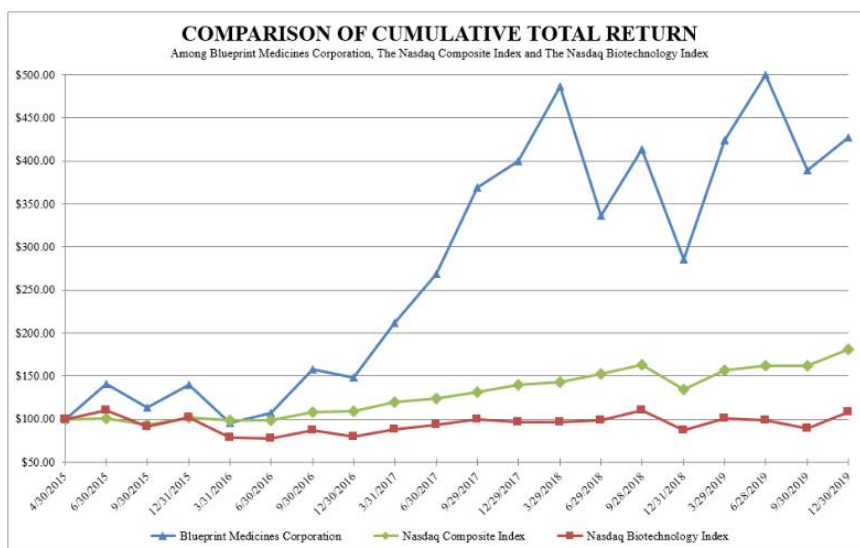
Dividends

We have never declared or paid cash dividends on our capital stock. We currently intend to retain all available funds and any future earnings, if any, to fund the development and expansion of our business, and we do not anticipate paying any cash dividends in the foreseeable future. Any future determination to pay dividends will be made at the discretion of our board of directors and will depend on various factors, including applicable laws, our results of operations, financial condition, future prospects and any other factors deemed relevant by our board of directors. Investors should not purchase our common stock with the expectation of receiving cash dividend.

Stock Performance Graph

The following performance graph and related information shall not be deemed to be “soliciting material” or to be “filed” with the Securities and Exchange Commission, or SEC, for purposes of Section 18 of the Securities Exchange Act of 1934, as amended, or the Exchange Act, nor shall such information be incorporated by reference into any future filing under the Exchange Act or Securities Act of 1933, as amended, or the Securities Act, except to the extent that we specifically incorporate it by reference into such filing.

The following performance graph compares the performance of our common stock to the Nasdaq Composite Index and to the Nasdaq Biotechnology Index from April 30, 2015 (the first date that shares of our common stock were publicly traded) through December 31, 2019. The comparison assumes \$100 was invested in our common stock and in each of the foregoing indices after the market closed on April 30, 2015, and it assumes reinvestment of dividends, if any. The stock price performance included in this graph is not necessarily indicative of, nor is it intended to forecast, future stock price performance.



Item 6. Selected Financial Data.

You should read the following selected consolidated financial data together with our financial statements and the related notes appearing at the end of this Annual Report on Form 10-K and Item 7 “Management’s Discussion and Analysis of Financial Condition and Results of Operations” section of this Annual Report on Form 10-K. We have derived the consolidated statement of operations data for the years ended December 31, 2019, 2018 and 2017 and the consolidated balance sheet data as of December 31, 2019 and 2018 from our audited consolidated financial statements included elsewhere in this Annual Report on Form 10-K. We have derived the consolidated statement of operations data for the year ended December 31, 2016 and 2015 and the consolidated balance sheet data as of December 31, 2017, 2016 and 2015 from our audited consolidated financial statements and related notes not included in this Annual Report on Form 10-K. The selected historical financial information in this section is not intended to replace our financial statements and the related notes thereto. Our historical results for any prior period are not necessarily indicative of results to be expected in any future period.

	Year Ended December 31,				
	2019	2018	2017	2016	2015
	(in thousands, except per share data)				
Statements of Operations Data:					
Collaboration revenue	\$ 66,512	\$ 44,521	\$ 21,426	\$ 27,772	\$ 11,400
Operating expenses:					
Research and development	331,450	243,621	144,687	81,131	48,588
General and administrative	96,388	47,928	27,986	19,218	14,456
Total operating expenses	427,838	291,549	172,673	100,349	63,044
Other income (expense):					
Interest income (expense), net	13,732	10,566	3,204	187	(581)
Other income (expense), net	(100)	(180)	(76)	(105)	(544)
Total other income (expense)	13,632	10,386	3,128	82	(1,125)
Net loss	\$ (347,694)	\$ (236,642)	\$ (148,119)	\$ (72,495)	\$ (52,769)
Convertible preferred stock dividends	—	—	—	—	(3,153)
Net loss applicable to common stockholders	\$ (347,694)	\$ (236,642)	\$ (148,119)	\$ (72,495)	\$ (55,922)
Net loss per share applicable to common stockholders — basic and diluted(1)	\$ (7.27)	\$ (5.39)	\$ (3.92)	\$ (2.64)	\$ (3.07)
Weighted-average number of common shares used in net loss per share applicable to common stockholders — basic and diluted(1)	47,829	43,867	37,793	27,492	18,236

(1) See Note 11, “Net Loss per Share” in the accompanying notes to our audited consolidated financial statements appearing elsewhere in this Annual Report on Form 10-K for further details on the calculation of basic and diluted net loss per share applicable to common stockholders.

	As of December 31,				
	2019	2018	2017	2016	2015 (1)
	(in thousands)				
Balance Sheet Data:					
Cash and cash equivalents	\$ 113,938	\$ 68,064	\$ 400,304	\$ 52,069	\$ 162,707
Investments	434,022	425,948	273,052	216,149	—
Working capital(2)	410,304	439,464	642,615	191,913	151,776
Total assets	707,694	540,124	715,737	282,795	178,898
Deferred revenue	46,073	46,167	35,373	47,235	13,640
Total stockholders’ equity (deficit)	464,359	419,009	623,970	213,078	143,979

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- (1) Upon the closing of our initial public offering in May 2015, all outstanding shares of our convertible preferred stock were converted into 15,467,479 shares of common stock, and warrants exercisable for convertible preferred stock were automatically converted into warrants exercisable for 42,423 shares of common stock.
- (2) We define working capital as current assets less current liabilities.

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

The following discussion and analysis of our financial condition and results of operations should be read in conjunction with our audited consolidated financial statements and related notes appearing elsewhere in this Annual Report on Form 10-K. Some of the information contained in this discussion and analysis or set forth elsewhere in this Annual Report on Form 10-K, including information with respect to our plans and strategy for our business, includes forward-looking statements that involve risks and uncertainties. As a result of many factors, including those factors set forth in the "Risk Factors" section of this Annual Report on Form 10-K, our actual results or timing of certain events could differ materially from the results or timing described in, or implied by, these forward-looking statements.

Overview

We are a precision therapy company focused on genomically defined cancers, rare diseases and cancer immunotherapy. Our approach is to leverage our novel target discovery engine to systematically and reproducibly identify kinases that are drivers of diseases and to craft highly selective and potent therapies that may provide significant and durable clinical responses for patients without adequate treatment options. This integrated biology and chemistry approach enables us to identify, characterize and design drug candidates to inhibit novel kinase targets that have been difficult to selectively inhibit. We believe that our uniquely targeted, scalable approach empowers the rapid design and development of new treatments and increases the likelihood of success. We have one precision therapy approved by the U.S. Food and Drug Administration, or FDA, and are currently advancing multiple investigational medicines in clinical development, along with multiple research programs.

Avapritinib and BLU-263 — Systemic Mastocytosis and other Mast Cell Disorders

Avapritinib

We are developing avapritinib for the treatment of systemic mastocytosis, or SM, a rare disorder that causes an overproduction of mast cells and the accumulation of mast cells in the bone marrow and other organs, which can lead to a wide range of debilitating symptoms and organ dysfunction and failure. Nearly all cases of SM are driven by the KIT D816V mutation, which aberrantly activates mast cells.

We are currently evaluating avapritinib in an ongoing registration-enabling Phase 1 clinical trial in advanced SM, which we refer to as our EXPLORER trial, an ongoing registration-enabling Phase 2 clinical trial in advanced SM, which we refer to as our PATHFINDER trial, and an ongoing registration-enabling Phase 2 clinical trial in indolent and smoldering SM, which we refer to as our PIONEER trial. We plan to present updated data from the EXPLORER and PATHFINDER trials in the second half of 2020. In December 2019, we reported initial data from the dose-finding portion (part 1) of the PIONEER trial at the 61st American Society of Hematology Annual Meeting and Exposition, or ASH annual meeting. We plan to report updated data from part 1 of the PIONEER trial in a late-breaking oral presentation on March 14, 2020 at the annual meeting for the American Academy of Allergy, Asthma & Immunology, or AAAAI annual meeting. Based on these data, we expect to initiate patient screening in part 2 of the PIONEER trial in the second quarter of 2020 and complete enrollment by the end of 2020.

We plan to submit a supplemental new drug application, or NDA, to the FDA for avapritinib for the treatment of advanced SM in the second half of 2020, which we anticipate will be focused on data from patients in the EXPLORER and PATHFINDER trials who were treated with avapritinib at a starting dose of 200 mg once daily, or QD, supported by pooled data from all doses. The FDA has granted orphan drug designation to avapritinib for the treatment of mastocytosis, and the European Commission has granted orphan medicinal product designation to avapritinib for the treatment of mastocytosis. In addition, the FDA has granted breakthrough therapy designation to avapritinib for the treatment of advanced SM, including the subtypes of aggressive SM, SM with an associated hematologic neoplasm and mast cell leukemia.

BLU-263

We are developing BLU-263 for the treatment of indolent SM and other mast cell disorders. BLU-263 is an investigational, orally available, potent and highly selective KIT inhibitor currently in the discovery stage. BLU-263 is

designed to have equivalent potency as avapritinib, improved selectivity for KIT, with low off-target activity, and lower penetration of the central nervous system relative to avapritinib based on preclinical data, which we believe will enable development of BLU-263 in a broad population of patients with indolent SM, including patients with lower disease burden requiring potentially life-long chronic therapy, as well as patients with other KIT-driven mast cell disorders. We plan to submit an investigational new drug application, or IND, for BLU-263 for indolent SM and initiate a Phase 1 trial in healthy volunteers in the first half of 2020.

Pralsetinib — RET-altered Cancers

We are developing pralsetinib for the treatment of RET-altered non-small cell lung cancer, or NSCLC, medullary thyroid carcinoma, or MTC, and other solid tumors. Pralsetinib is an investigational, orally available, potent and highly selective inhibitor that targets RET, a receptor tyrosine kinase. Pralsetinib is designed to inhibit the activating RET fusions and mutations that drive cancer growth and remain active in the presence of resistance mutations that we predict will arise from treatment with first generation therapies. RET activating fusions and mutations drive disease in subsets of patients with NSCLC, and cancers of the thyroid, including MTC and papillary thyroid cancer, or PTC, and our research suggests that RET may drive disease in subsets of patients with colon cancer, breast cancer, pancreatic cancer and other cancers.

We are currently evaluating pralsetinib in an ongoing registration-enabling Phase 1/2 clinical trial in patients with RET-altered NSCLC, MTC and other advanced solid tumors, which we refer to as our ARROW trial. In January 2020, we reported top-line data from the ARROW trial in RET fusion-positive NSCLC patients treated with pralsetinib at 400 mg QD. We plan to report top-line data from the ARROW trial in RET-mutant MTC patients in the second quarter of 2020. In addition, we plan to present the registration data from the ARROW trial of pralsetinib in RET fusion-positive NSCLC and RET-mutant MTC in 2020. We recently announced the activation of the first trial site for our Phase 3 clinical trial evaluating pralsetinib in patients with first-line RET fusion-positive NSCLC, which we refer to as our AcceleRET Lung trial, and we plan to initiate a Phase 3 clinical trial of pralsetinib in first-line RET-mutant MTC in the second half of 2020.

In January 2020, we initiated the submission of a rolling NDA to the FDA for the treatment of patients with RET fusion-positive NSCLC, and we expect to complete the submission in the first quarter of 2020. We plan to submit an NDA to the FDA for pralsetinib for the treatment of patients with MTC previously treated with an approved multi-kinase inhibitor in the second quarter of 2020. In addition, we plan to submit a marketing authorization application, or MAA, to the European Medicines Agency, or EMA, for pralsetinib for RET fusion-positive NSCLC in the second quarter of 2020.

The FDA has granted orphan drug designation to pralsetinib for the treatment of RET-rearranged NSCLC, JAK1/2-positive NSCLC or TRKC-positive NSCLC, and the FDA has granted breakthrough therapy designation to pralsetinib for the treatment of patients with RET-fusion positive NSCLC that has progressed following platinum-based chemotherapy and to pralsetinib for the treatment of patients with RET mutation-positive MTC that requires systemic treatment and for which there are no acceptable alternative treatments.

Avapritinib — Gastrointestinal Stromal Tumors

We are also developing avapritinib for the treatment of gastrointestinal stromal tumors, or GIST, a rare disease that is a sarcoma, or tumor of bone or connective tissue, of the gastrointestinal tract. Avapritinib is an orally available, potent and highly selective inhibitor that targets KIT and PDGFRA mutations. These mutations abnormally activate receptor tyrosine kinases that are drivers of GIST.

In January 2020, the FDA granted approval of avapritinib under the brand name AYWAKIT for the treatment of adults with unresectable or metastatic GIST harboring a PDGFRA exon 18 mutation, including PDGFRA D842V mutations. The efficacy of AYWAKIT was established from 43 patients in the NAVIGATOR trial with unresectable or metastatic GIST harboring PDGFRA exon 18 mutations, including 38 patients with PDGFRA D842V mutations. The safety of AYWAKIT in patients with unresectable or metastatic GIST was evaluated in 204 patients who received 300 mg QD or 400 mg QD dosing in the NAVIGATOR trial.

We are also developing avapritinib for the treatment of third-line and later GIST (including fourth-line GIST). We are currently evaluating avapritinib for the treatment of GIST in an ongoing registration-enabling global, randomized Phase 3 clinical trial comparing avapritinib to regorafenib in third-line GIST, which we refer to as our VOYAGER trial. The FDA is currently reviewing our NDA for avapritinib for the treatment of fourth-line GIST, and this application has a Prescription Drug User Fee Act, or PDUFA, action date of May 14, 2020. As part of the review, the FDA has requested top-line data from our VOYAGER trial. We expect to provide the top-line data to the FDA early in the second quarter of 2020 to enable the FDA to take action by the PDUFA action date and we also expect to report the top-line data in the second quarter of 2020.

Based on data from the VOYAGER trial, we plan to submit a supplemental NDA to the FDA for avapritinib for the treatment of third-line GIST in the second half of 2020. In addition, the EMA is currently reviewing our MAA for the treatment of adult patients with PDGFRA D842V mutant GIST, regardless of prior therapy, and we anticipate a decision from the European Commission in the third quarter of 2020. We plan to pursue an MAA for third-line and later GIST (including fourth-line GIST) based on data from our VOYAGER trial.

The FDA has granted breakthrough therapy designation to avapritinib for the treatment of patients with unresectable or metastatic GIST harboring the PDGFRA D842V mutation. The FDA has also granted orphan drug designation to avapritinib for the treatment of GIST and fast track designation to avapritinib for (i) the treatment of patients with unresectable or metastatic GIST that progressed following treatment with imatinib and a second tyrosine kinase inhibitor and (ii) the treatment of patients with unresectable or metastatic GIST with the PDGFRA D842V mutation regardless of prior therapy. In addition, the European Commission has granted orphan medicinal product designation to avapritinib for the treatment of GIST.

Fisogatinib — Hepatocellular Carcinoma

We are developing fisogatinib for the treatment of advanced hepatocellular carcinoma, or HCC. Fisogatinib is an investigational, orally available, potent and highly selective inhibitor that targets FGFR4, a kinase that is aberrantly activated in a defined subset of patients with HCC, the most common type of liver cancer. We are currently evaluating fisogatinib in an ongoing Phase 1 clinical trial in patients with advanced HCC. As part of our collaboration with CStone Pharmaceuticals, or CStone, we are also evaluating fisogatinib in combination with CS1001, a clinical-stage anti-PDL1 immunotherapy being developed by CStone, for the treatment of locally advanced or metastatic HCC in an ongoing Phase 1b/2 trial conducted in multiple clinical sites in China. The FDA has granted orphan drug designation to fisogatinib for the treatment of HCC.

Discovery Platform

We plan to continue to leverage our discovery platform to systematically and reproducibly identify kinases that are drivers of diseases in genomically defined patient populations and craft drug candidates that potently and selectively target these kinases. In January 2020, we announced the nomination of a development candidate for the treatment of EGFR Exon 19/L858R+T790M+C797S, which we refer to as resistant EGFR-positive triple mutant NSCLC. Following this nomination, we currently have five wholly-owned discovery programs, consisting of the following: BLU-263; the development candidate for the treatment of resistant EGFR-positive triple mutant NSCLC; a pre-development candidate program targeting EGFR Exon 19/L858R+C797S, which we refer to as resistant EGFR-positive double mutant NSCLC; and two pre-development candidate programs for undisclosed kinase targets. EGFR Exon 19/L858R+T790M+C797S and EGFR Exon 19/L858R+C797S are acquired resistance mutations in NSCLC patients following treatment with osimertinib. We plan to nominate up to two additional development candidates by the end of 2020.

Development and Commercialization Rights

We currently have worldwide development and commercialization rights to avapritinib, pralsetinib and fisogatinib, other than the rights licensed to CStone for these drug candidates in Mainland China, Hong Kong, Macau and Taiwan, or the CStone territory. We currently have worldwide development and commercialization rights to all of our discovery programs, other than the discovery-stage cancer immunotherapy programs under collaboration with F.

Hoffmann-La Roche Ltd and Hoffmann-La Roche Inc., which we collectively refer to as Roche, and BLU-782, which is licensed to Clementia Pharmaceuticals, Inc., or Clementia, a wholly-owned subsidiary of Ipsen S.A .

Collaborations and Licenses

Roche. We entered into a collaboration with Roche in March 2016. Under our collaboration agreement with Roche, we are working with Roche to discover, develop and commercialize up to four small molecule therapeutics targeting kinases believed to be important in cancer immunotherapy, as single products or possibly in combination with other therapeutics. In the fourth quarter of 2019, we and Roche announced one of the kinase targets under the collaboration, MAP4K1, which is believed to play a role in T cell regulation.

CStone. We entered into a collaboration with CStone in June 2018. Under our collaboration agreement with CStone, we are seeking to develop and commercialize avapritinib, pralsetinib and fisogatinib, including back-up forms and certain other forms, in the CStone territory either as a monotherapy or as part of a combination therapy.

Clementia. In October 2019, we entered into a license agreement with Clementia, a wholly-owned subsidiary of Ipsen S.A., and granted an exclusive, worldwide, royalty-bearing license to Clementia to develop and commercialize BLU-782, as well as specified other compounds related to the BLU-782 program. BLU-782 is an investigational, orally available, potent and highly selective inhibitor that targets mutant activin-like kinase 2, or ALK2, in development for the treatment of fibrodysplasia ossificans progressiva, or FOP. Clementia is planning to commence a potentially pivotal Phase 2 trial of BLU-782 for the treatment of FOP in 2020 as a monotherapy. The FDA has granted a rare pediatric disease designation, orphan drug designation and fast track designation to BLU-782, each for the treatment of FOP.

We will continue to evaluate additional collaborations, partnerships and licenses that could maximize the value for our programs and allow us to leverage the expertise of strategic collaborators, partners and licensors, including in additional geographies where we may not have current operations or expertise. We are also focused on engaging in collaborations, partnerships and license agreements to capitalize on our discovery platform outside of our primary strategic focus area of cancer and rare diseases.

To date, we have financed our operations primarily through public offerings of our common stock, private placements of our convertible preferred stock, collaborations and a debt financing. Through December 31, 2019, we have received an aggregate of \$1.5 billion from such transactions, including \$1.2 billion in aggregate gross proceeds from the sale of common stock in our May 2015 initial public offering, or IPO, and December 2016, April 2017, December 2017 and April 2019 follow-on public offerings, \$115.1 million in gross proceeds from the issuance of convertible preferred stock, \$18.8 million in upfront and milestone payments under our former collaboration with Alexion Pharma Holding, or Alexion, \$63.0 million in upfront and milestone payments under our collaboration with Roche, \$50.0 million upfront and milestone payments under our collaboration with CStone, a \$25.0 million upfront payment under our license agreement with Clementia and \$10.0 million in gross proceeds from a debt financing. In addition, we received \$308.2 million in estimated net proceeds from our January 2020 follow-on public offering, after deducting underwriting discounts and commissions and estimated offering expenses payable by us.

Since inception, we have incurred significant operating losses. Our net losses were \$347.6 million, \$236.6 million and \$148.1 million for the years ended December 31, 2019, 2018 and 2017, respectively. As of December 31, 2019, we had an accumulated deficit of \$945.2 million. We expect to continue to incur significant expenses and operating losses over the next several years. We anticipate that our expenses will increase significantly in connection with our ongoing activities, particularly as we:

- continue to advance and initiate clinical development activities for avapritinib, pralsetinib, fisogatinib and BLU-263;
- seek marketing approval for avapritinib in additional geographies and indications and marketing approvals for other drug candidates;
- maintain and expand our sales, marketing and distribution infrastructure to commercialize any medicines for which we may obtain marketing approval;

- continue to manufacture increasing quantities of drug substance and drug product material for use in pre-clinical studies, clinical trials and commercialization;
- continue to discover, validate and develop additional drug candidates;
- conduct research and development activities under our collaborations with Roche and CStone;
- conduct development and commercialization activities for companion diagnostic tests for AYVAKIT and current or future drug candidates;
- maintain, expand and protect our intellectual property portfolio;
- acquire or in-license other drug, drug candidates or technologies;
- hire additional research, clinical, quality, manufacturing, regulatory, commercial and general and administrative personnel; and
- incur additional costs associated with operating as a public company.

Financial Operations Overview

Revenue

As of December 31, 2019, our revenue consists of collaboration revenue under our collaborations with Roche and CStone, including amounts that are recognized related to upfront payments, milestone payments and amounts due to us for research and development services, and license revenue under our license agreement with Clementia.

In January 2020, the FDA granted approval of avapritinib under the brand name AYVAKIT for the treatment of adults with unresectable or metastatic GIST harboring a PDGFRA exon 18 mutation, including PDGFRA D842V mutations, and we have commenced the sale of AYVAKIT in the U.S. As a result, we will generate revenue from sales of AYVAKIT in 2020. In the future, we expect to generate revenue from a combination of sales of our approved drugs, royalties on drug sales and cost reimbursements, as well as upfront, milestone, royalty and other payments, if any, under any current or future collaborations and licenses, including revenues related to the supply of our drug candidates or approved drugs to CStone for development and commercialization activities in the CStone territory. We expect that any revenue we generate will fluctuate from quarter to quarter as a result of the timing and amount of product sales, license fees, research and development services and related reimbursements, payments for manufacturing services, and option fees, milestone payments or other payments under our collaboration or license agreements, if any.

Expenses

Research and Development Expenses

Research and development expenses consist primarily of costs incurred for our research and development activities, including our drug discovery efforts, and the development of our drug candidates, which include:

- employee-related expenses including salaries, benefits, and stock-based compensation expense;
- expenses incurred under agreements with third parties that conduct research and development, pre-clinical activities, clinical activities and manufacturing on our behalf;
- expenses incurred under agreements with third parties for the development and commercialization of companion diagnostic tests;
- the cost of consultants;

- the cost associated with regulatory quality assurance and quality control operations;
- the cost of lab supplies and acquiring, developing and manufacturing pre-clinical study materials, clinical trial materials and commercial supply materials; and
- facilities, depreciation, and other expenses, which include direct and allocated expenses for rent and maintenance of facilities, insurance, and other operating costs in support of research and development activities.

Research and development costs are expensed as incurred. Costs for certain activities are recognized based on an evaluation of the progress to completion of specific tasks. Nonrefundable advance payments for goods or services to be received in the future for use in research and development activities are capitalized. The capitalized amounts are expensed as the related goods are delivered or the services are performed.

The successful development of our drug candidates is highly uncertain. As such, at this time, we cannot reasonably estimate or know the nature, timing and estimated costs of the efforts that will be necessary to complete the remainder of the development of these drug candidates. We are also unable to predict when, if ever, material net cash inflows will commence from our drug candidates. This is due to the numerous risks and uncertainties associated with developing drugs, including the uncertainty of:

- establishing an appropriate safety profile with IND-enabling toxicology studies;
- successful enrollment in, and completion of clinical trials;
- receipt of marketing approvals from applicable regulatory authorities;
- establishing commercial manufacturing capabilities or making arrangements with third-party manufacturers;
- obtaining and maintaining patent and trade secret protection and regulatory exclusivity for AYVAKIT and our drug candidates;
- commercializing AYVAKIT and our drug candidates, if and when approved, whether alone or in collaboration with others;
- market acceptance of AYVAKIT and any future drug we may commercialize; and
- continued acceptable safety profile of the drugs following approval.

A change in the outcome of any of these variables with respect to the development of any of our drug candidates would significantly change the costs and timing associated with the development of that drug candidate.

Research and development activities are central to our business model. Drug candidates in later stages of clinical development generally have higher development costs than those in earlier stages of clinical development, primarily due to the increased size and duration of later-stage clinical trials. We expect research and development costs to increase significantly for the foreseeable future as our drug candidate development programs progress. However, we do not believe that it is possible at this time to accurately project total program-specific expenses through commercialization. There are numerous factors associated with the successful commercialization of any of our drug candidates, including future trial design and various regulatory requirements, many of which cannot be determined with accuracy at this time based on our stage of development. In addition, future commercial and regulatory factors beyond our control will impact our clinical development programs and plans.

A significant portion of our research and development expenses have been external expenses, which we track on a program-by-program basis following nomination as a development candidate. Our internal research and development expenses are primarily personnel-related expenses, including stock-based compensation expense. Except

for internal research and development expenses related to collaboration agreements, we do not track our internal research and development expenses on a program-by-program basis as they are deployed across multiple projects under development.

The following table summarizes our external research and development expenses by program for the years ended December 31, 2019, 2018 and 2017. Other development and pre-development candidate expenses, unallocated expenses and internal research and development expenses have been classified separately.

	Year Ended December 31,		
	2019	2018	2017
	(in thousands)		
Avapritinib external expenses	\$ 98,146	\$ 83,417	\$ 46,851
Pralsetinib external expenses	78,689	44,099	13,512
Fisogatinib external expenses	6,496	10,167	15,078
BLU-263 external expenses	4,575	—	—
Other development and pre-development candidate expenses and unallocated expenses	68,138	56,709	41,095
Internal research and development expenses	75,406	49,230	28,151
Total research and development expenses	<u>\$ 331,450</u>	<u>\$ 243,621</u>	<u>\$ 144,687</u>

We expect that our research and development expenses will increase in future periods as we expand our operations and incur additional costs in connection with our clinical trials and preparing regulatory filings. These increases will likely include the costs related to the implementation and expansion of clinical trial sites and related patient enrollment, monitoring, program management and manufacturing expenses for API, drug product and drug substance for current and future clinical trials and commercial inventory. In addition, we expect that our research and development expenses will increase in future periods as we incur additional costs in connection with research and development activities under our collaboration with Roche, development activities under our collaboration with CStone and development activities for companion diagnostic tests for current and future drug candidates.

General and Administrative Expenses

General and administrative expenses consist primarily of salaries and other related costs, including stock-based compensation, for personnel in executive, finance, accounting, commercial, business development, information technology, legal and human resources functions. Other significant costs include facility costs not otherwise included in research and development expenses, pre-commercial development activities, legal fees related to intellectual property and corporate matters and fees for accounting and consulting services.

We expect that our general and administrative expenses will continue to increase in the future to support additional research and development activities and commercialization activities, including expanding our sales, marketing and distribution infrastructure to commercialize any drugs for which we may obtain marketing approval in additional indications or geographies and expanding our operations in the U.S. and outside the U.S. These increases will likely include increased costs related to the hiring of additional personnel, legal, auditing and filing fees and general compliance and consulting expenses, among other expenses. We have incurred and will continue to incur additional costs associated with operating as a public company and expanding the scope of our operations.

Interest Income (Expense), net

Interest income (expense), net consists primarily of income earned on cash equivalents and investments.

Other Income (Expense), net

Other income (expense), net consists primarily of foreign currency transaction gains or losses.

Critical Accounting Policies and Estimates

Our management's discussion and analysis of our financial condition and results of operations are based on our consolidated financial statements, which have been prepared in accordance with U.S. generally accepted accounting principles. The preparation of these consolidated financial statements requires us to make judgments and estimates that affect the reported amounts of assets, liabilities, revenues, and expenses and the disclosure of contingent assets and liabilities in our consolidated financial statements. We base our estimates on historical experience, known trends and events, and various other factors that are believed to be reasonable under the circumstances. Actual results may differ from these estimates under different assumptions or conditions. On an ongoing basis, we evaluate our judgments and estimates in light of changes in circumstances, facts and experience. The effects of material revisions in estimates, if any, will be reflected in the consolidated financial statements prospectively from the date of change in estimates.

Our critical accounting policies are those policies that require the most significant judgments and estimates in the preparation of our financial statements. Management has determined that our most critical accounting policies are those relating to revenue recognition, accrued research and development expenses, available-for-sale investments, stock-based compensation and leases.

Revenue Recognition

Effective January 1, 2018, we adopted Accounting Standards Codification, or ASC, Topic 606, *Revenue from Contracts with Customers*, which we refer to as ASC 606, using the modified retrospective transition method. Under this method, results for reporting periods beginning after January 1, 2018 are presented under ASC 606, while prior period amounts are not adjusted and continue to be reported in accordance with ASC Topic 605, *Revenue Recognition*. We only applied the modified retrospective transition method to contracts that were not completed as January 1, 2018, the effective date of adoption for ASC 606. This standard applies to all contracts with customers, except for contracts that are within the scope of other standards, such as leases, insurance, collaboration arrangements and financial instruments. Under ASC 606, an entity recognizes revenue when its customer obtains control of promised goods or services, in an amount that reflects the consideration which the entity expects to receive in exchange for those goods or services. To determine revenue recognition for arrangements that an entity determines are within the scope of ASC 606, the entity performs the following five steps: (i) identify the contract(s) with a customer; (ii) identify the performance obligations in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to the performance obligations in the contract; and (v) recognize revenue when (or as) the entity satisfies a performance obligation. We only apply the five-step model to contracts when it is probable that we will collect the consideration we are entitled to in exchange for the goods or services we transfer to the customer. At contract inception, once the contract is determined to be within the scope of ASC 606, we assess the goods or services promised within each contract and determine those that are performance obligations and assess whether each promised good or service is distinct. We then recognize as revenue the amount of the transaction price that is allocated to the respective performance obligation when (or as) the performance obligation is satisfied.

We enter into licensing agreements that are within the scope of ASC 606, under which we may exclusively license rights to research, develop, manufacture and commercialize our drug and drug candidates to third parties. The terms of these arrangements typically include payment of one or more of the following: non-refundable, upfront license fees; reimbursement of certain costs; customer option exercise fees; development, regulatory and commercial milestone payments; and royalties on net sales of licensed products.

In determining the appropriate amount of revenue to be recognized as we fulfill our obligations under our agreements, we perform the following steps: (i) identification of the promised goods or services in the contract; (ii) determination of whether the promised goods or services are performance obligations including whether they are distinct in the context of the contract; (iii) measurement of the transaction price, including the constraint on variable consideration; (iv) allocation of the transaction price to the performance obligations; and (v) recognition of revenue when (or as) we satisfy each performance obligation. As part of the accounting for these arrangements, we must use significant judgment to determine: (a) the number of performance obligations based on the determination under step (ii) above; (b) the transaction price under step (iii) above; and (c) the stand-alone selling price for each performance obligation identified in the contract for the allocation of transaction price in step (iv) above. We use judgment to determine whether milestones or other variable consideration, except for royalties and sales-based milestones, should be included in the transaction price as described further below. The transaction price is allocated to each performance

obligation on a relative stand-alone selling price basis, for which we recognize revenue as or when the performance obligations under the contract are satisfied.

Amounts received prior to revenue recognition are recorded as deferred revenue. Amounts expected to be recognized as revenue within the 12 months following the balance sheet date are classified as current portion of deferred revenue in the accompanying consolidated balance sheets. Amounts not expected to be recognized as revenue within the 12 months following the balance sheet date are classified as deferred revenue, net of current portion.

Exclusive Licenses. If the license to our intellectual property is determined to be distinct from the other promises or performance obligations identified in the arrangement, we recognize revenue from non-refundable, upfront fees allocated to the license when the license is transferred to the customer and the customer is able to use and benefit from the license. In assessing whether a promise or performance obligation is distinct from the other promises, we consider factors such as the research, development, manufacturing and commercialization capabilities of the collaboration partner and the availability of the associated expertise in the general marketplace. In addition, we consider whether the collaboration partner can benefit from a promise for its intended purpose without the receipt of the remaining promise, whether the value of the promise is dependent on the unsatisfied promise, whether there are other vendors that could provide the remaining promise, and whether it is separately identifiable from the remaining promise. For licenses that are combined with other promises, we utilize judgment to assess the nature of the combined performance obligation to determine whether the combined performance obligation is satisfied over time or at a point in time and, if over time, the appropriate method of measuring progress for purposes of recognizing revenue. We evaluate the measure of progress each reporting period and, if necessary, adjusts the measure of performance and related revenue recognition. The measure of progress, and thereby periods over which revenue should be recognized, are subject to estimates by management and may change over the course of the research and development and licensing agreement. Such a change could have a material impact on the amount of revenue we record in future periods.

Research and Development Services. The promises under our collaboration agreements may include research and development services to be performed by our employees on behalf of the partner. Payments or reimbursements resulting from our research and development efforts are recognized as the services are performed and presented on a gross basis because we are the principal for such efforts. Reimbursements from and payments to the partner that are the result of a collaborative relationship with the partner, instead of a customer relationship, such as co-development activities, are recorded as a reduction to research and development expense.

Customer Options. If an arrangement is determined to contain customer options that allow the customer to acquire additional goods or services, the goods and services underlying the customer options that are not determined to be material rights are not considered to be performance obligations at the outset of the arrangement, as they are contingent upon option exercise. We evaluate the customer options for material rights, or options to acquire additional goods or services for free or at a discount. If the customer options are determined to represent a material right, the material right is recognized as a separate performance obligation at the outset of the arrangement. We allocate the transaction price to material rights based on the relative standalone selling price, which is determined based on the identified discount and the probability that the customer will exercise the option. Amounts allocated to a material right are not recognized as revenue until, at the earliest, the option is exercised.

Milestone Payments. At the inception of each arrangement that includes research or development milestone payments, we evaluate whether the milestones are considered probable of being achieved and estimate the amount to be included in the transaction price using the most likely amount method. If it is probable that a significant revenue reversal would not occur, the associated milestone value is included in the transaction price. Milestone payments that are not within our control or the licensee, such as regulatory approvals, are not considered probable of being achieved until those approvals are received. We evaluate factors such as the scientific, clinical, regulatory, commercial, and other risks that must be overcome to achieve the particular milestone in making this assessment. There is considerable judgment involved in determining whether it is probable that a significant revenue reversal would not occur. At the end of each subsequent reporting period, we reevaluate the probability of achievement of all milestones subject to constraint and, if necessary, adjusts its estimate of the overall transaction price. Any such adjustments are recorded on a cumulative catch-up basis, which would affect revenues and earnings in the period of adjustment.

Royalties. For arrangements that include sales-based royalties, including milestone payments upon first commercial sales and milestone payments based on a level of sales, which are the result of a customer-vendor

relationship and for which the license is deemed to be the predominant item to which the royalties relate, we recognize revenue at the later of (i) when the related sales occur, or (ii) when the performance obligation to which some or all of the royalty has been allocated has been satisfied or partially satisfied. To date, we have not recognized any royalty revenue resulting from any of our licensing arrangements.

Collaborative Arrangements. We analyze our collaboration arrangements to assess whether such arrangements involve joint operating activities performed by parties that are both active participants in the activities and exposed to significant risks and rewards dependent on the commercial success of such activities and therefore within the scope of ASC 808, *Collaborative Arrangements*, which we refer to as ASC 808. This assessment is performed throughout the life of the arrangement based on changes in the responsibilities of all parties in the arrangement. For collaboration arrangements within the scope of ASC 808 that contain multiple elements, we first determine which elements of the collaboration are deemed to be within the scope of ASC 808 and which elements of the collaboration are more reflective of a vendor-customer relationship and therefore within the scope of ASC 606. For elements of collaboration arrangements that are accounted for pursuant to ASC 808, an appropriate recognition method is determined and applied consistently, generally by analogy to ASC 606. Amounts that are owed to collaboration partners are recognized as an offset to collaboration revenues as such amounts are incurred by the collaboration partner. Where amounts owed to a collaboration partner exceed our collaboration revenues in each quarterly period, such amounts are classified as research and development expense. For those elements of the arrangement that are accounted for pursuant to ASC 606, we apply the five-step model described above under ASC 606.

Accrued Research and Development Expenses

As part of the process of preparing our consolidated financial statements, we are required to estimate our accrued expenses as of each balance sheet date. This process involves reviewing open contracts and purchase orders, communicating with our personnel to identify services that have been performed on our behalf and estimating the level of service performed and the associated cost incurred for the service when we have not yet been invoiced or otherwise notified of the actual cost. The majority of our service providers invoice us monthly in arrears for services performed or when contractual milestones are met. We make estimates of our accrued expenses as of each balance sheet date based on facts and circumstances known to us at that time. We periodically confirm the accuracy of our estimates with the service providers and make adjustments if necessary. The significant estimates in our accrued research and development expenses include the costs incurred for services performed by our vendors in connection with research and development activities for which we have not yet been invoiced.

We base our expenses related to research and development activities on our estimates of the services received and efforts expended pursuant to quotes and contracts with vendors that conduct research and development on our behalf. The financial terms of these agreements are subject to negotiation, vary from contract to contract and may result in uneven payment flows. There may be instances in which payments made to our vendors will exceed the level of services provided and result in a prepayment of the research and development expense. In accruing service fees, we estimate the time period over which services will be performed and the level of effort to be expended in each period. If the actual timing of the performance of services or the level of effort varies from our estimate, we adjust the accrual or prepaid accordingly. Non-refundable advance payments for goods and services that will be used in future research and development activities are expensed when the activity has been performed or when the goods have been received rather than when the payment is made.

Although we do not expect our estimates to be materially different from amounts actually incurred, if our estimates of the status and timing of services performed differ from the actual status and timing of services performed, it could result in us reporting amounts that are too high or too low in any particular period. To date, there have been no material differences between our estimates of such expenses and the amounts actually incurred.

Available-for-Sale Investments

We classify marketable securities with a remaining maturity when purchased of greater than three months as available-for-sale. Marketable securities with a remaining maturity date greater than one year are classified as non-current. Available-for-sale securities are maintained by an investment manager and may consist of U.S. Treasury securities and U.S. government agency securities. Available-for-sale securities are carried at fair value with the unrealized gains and losses included in other comprehensive income (loss) as a component of stockholders' equity until

realized. Any premium or discount arising at purchase is amortized and/or accreted to interest income and/or expense over the life of the instrument. Realized gains and losses are determined using the specific identification method and are included in other income (expense). If any adjustment to fair value reflects a decline in value of the investment, we consider all available evidence to evaluate the extent to which the decline is “other-than-temporary” and, if so, mark the investment to market through a charge to our consolidated statement of operations and comprehensive loss.

Stock-Based Compensation

We account for stock-based compensation awards in accordance with ASC 718, *Compensation – Stock Compensation*, which we refer to as ASC 718. We expense the fair value of stock-based awards granted to employees and members of the board of directors over the requisite service period, which is typically the vesting period. Compensation cost for stock-based awards issued to employees is measured using the estimated fair value at the grant date and is adjusted to reflect actual forfeitures. We estimate the fair value of options granted to employees at the date of grant using the Black-Scholes option-pricing model that requires management to apply judgment and make estimates, including:

- expected volatility, which is calculated based on reported volatility data for a representative group of publicly traded companies for which historical information is available. For these analyses, we select companies with comparable characteristics to ours including enterprise value, risk profiles, position within the industry, and with historical share price information sufficient to meet the expected life of the stock-based awards. We compute the historical volatility data using the daily closing prices for the selected companies’ shares during the equivalent period of the calculated expected term of our stock-based awards. We intend to consistently apply this process using representative companies until a sufficient amount of historical information regarding the volatility of our own share price becomes available;
- risk-free interest rate, which is based on the U.S. Treasury yield curve in effect at the time of grant commensurate with the expected term assumption;
- expected term, which we calculate using the simplified method, as prescribed by the Securities and Exchange Commission Staff Accounting Bulletin No. 107, *Share-Based Payment*, as we have insufficient historical information regarding our stock options to provide a basis for an estimate. Under this approach, the weighted-average expected life is presumed to be the average of the contractual term of ten years and the weighted-average vesting term of the stock options, taking into consideration multiple vesting tranches;
- dividend yield, which is zero based on the fact that we never paid cash dividends and do not expect to pay any cash dividends in the foreseeable future.

Stock-based awards issued to non-employees, including directors for non-board-related services, are accounted for based on the fair value of such services received or of the intrinsic value of equity instruments issued, whichever is more reliably measured. The measurement date for non-employee awards is the date of grant. Stock-based awards subject to service-based vesting conditions are expensed on a straight-line basis over the vesting period.

The purchase price of common stock under our 2015 employee stock purchase plan, as amended, or 2015 ESPP, is equal to 85% of the lesser of (i) the fair market value per share of the common stock on the first business day of an offering period and (ii) the fair market value per share of the common stock on the purchase date. The fair value of the discounted purchases made under our 2015 ESPP is calculated using the Black-Scholes valuation model. The fair value of the look-back provision plus the 15% discount is recognized as compensation expense over the 180-day purchase period.

Leases

On January 1, 2019, we adopted *ASU No. 2016-02, Leases (Topic 84)*, which we refer to as ASC 842, which requires the recognition of the right-of-use assets and related operating and finance lease liabilities on the balance sheet.

We adopted ASC 842 using a modified retrospective approach for all leases existing at January 1, 2019. The adoption of ASC 842 had a substantial impact on our consolidated balance sheet and no impact to our consolidated statements of operations. Upon adoption of ASC 842, we recognized an adjustment of \$54.2 million and \$74.1 million to operating lease right-of-use assets and the related lease liabilities, respectively. The operating lease liabilities are based on the present value of the remaining minimum lease payments discounted using our secured incremental borrowing rate at the effective date of January 1, 2019.

For contracts entered into on or after the effective date, at the inception of a contract, we assess whether the contract is, or contains, a lease. The assessment is based on: (1) whether the contract involves the use of a distinct identified asset, (2) whether we obtain the right to substantially all the economic benefit from the use of the asset throughout the period, and (3) whether we have the right to direct the use of the asset. At inception of a lease, we allocate the consideration in the contract to each lease component based on its relative stand-alone price to determine the lease payments.

Leases are classified as either finance leases or operating leases. A lease is classified as a finance lease if any one of the following criteria are met: the lease transfers ownership of the asset by the end of the lease term, the lease contains an option to purchase the asset that is reasonably certain to be exercised, the lease term is for a major part of the remaining useful life of the asset or the present value of the lease payments equals or exceeds substantially all of the fair value of the asset. A lease is classified as an operating lease if it does not meet any of these criteria.

For all leases at the lease commencement date, a right-of-use asset and a lease liability are recognized. The right-of-use asset represents the right to use the leased asset for the lease term. The lease liability represents the present value of the lease payments under the lease.

The right-of-use asset is initially measured at cost, which primarily comprises the initial amount of the lease liability, plus any initial direct costs incurred if any, less any lease incentives received. All right-of-use assets are reviewed for impairment. The lease liability is initially measured at the present value of the lease payments, discounted using the interest rate implicit in the lease or, if that rate cannot be readily determined, our secured incremental borrowing rate for the same term as the underlying lease.

Lease payments included in the measurement of the lease liability comprise the following: the fixed noncancelable lease payments, payments for optional renewal periods where it is reasonably certain the renewal period will be exercised, and payments for early termination options unless it is reasonably certain the lease will not be terminated early.

Lease cost for operating leases consists of the lease payments plus any initial direct costs, primarily brokerage commissions, and is recognized on a straight-line basis over the lease term. Included in lease cost are any variable lease payments incurred in the period that are not included in the initial lease liability and lease payments incurred in the period for any leases with an initial term of 12 months or less. Lease cost for finance leases consists of the amortization of the right-of-use asset on a straight-line basis over the lease term and interest expense determined on an amortized cost basis. The lease payments are allocated between a reduction of the lease liability and interest expense.

We made an accounting policy election to not recognize leases with an initial term of 12 months or less within our consolidated balance sheets and to recognize those lease payments on a straight-line basis in our consolidated statements of income over the lease term.

Results of Operations

Comparison of Years Ended December 31, 2019 and 2018

The following table summarizes our results of operations for the years ended December 31, 2019 and 2018, together with the changes in those items in dollars and as a percentage:

	Year Ended December 31,		Dollar Change	% Change
	2019	2018		
	(in thousands)			
Collaboration revenue	\$ 66,512	\$ 44,521	\$ 21,991	49 %
Operating expenses:				
Research and development	331,450	243,621	87,829	36
General and administrative	96,388	47,928	48,460	101
Total operating expenses	427,838	291,549	136,289	47
Other income (expense):				
Interest income (expense), net	13,732	10,566	3,166	30
Other income (expense), net	(100)	(180)	(80)	(44)
Total other income (expense)	13,632	10,386	3,246	31
Net loss	<u>\$ (347,694)</u>	<u>\$ (236,642)</u>	<u>\$ 111,052</u>	<u>47 %</u>

Collaboration Revenue

Collaboration revenue increased by \$22.0 million from \$44.5 million for the year ended December 31, 2018 to \$66.5 million for the year ended December 31, 2019. Collaboration revenue for the year ended December 31, 2019 was related to the CStone, Roche and Clementia agreements. Collaboration revenue for the year ended December 31, 2018 was related to the CStone and Roche agreements. We recorded \$12.1 million and \$40.0 million revenue under the CStone agreement for the years ended December 31, 2019 and 2018, respectively. Collaboration revenue related to the CStone agreement for the year ended December 31, 2019 consisted of \$12.0 million in milestone revenue related to several development and regulatory milestones that were achieved during the year and \$0.1 million related to drug supply for territory specific trials. Collaboration revenue related to the CStone agreement for the year ended December 31, 2018 consisted of a \$40.0 million upfront payment was recognized upon the execution of the CStone collaboration agreement. We recorded \$8.2 million and \$4.5 million revenue under the Roche agreement for the years ended December 31, 2019 and 2018, respectively, primarily related to amortization of the total upfront and milestone payments received as of such periods. We recorded \$46.2 million revenue under the Clementia license agreement for the year ended December 31, 2019, which consisted of a \$25.0 million upfront payment received, a \$20.0 million cash milestone payment due in the third quarter of 2020 and a \$1.2 million inventory transfer.

Research and Development Expense

Research and development expense increased by \$87.8 million from \$243.6 million for the year ended December 31, 2018 to \$331.5 million for the year ended December 31, 2019. The increase in research and development expense was primarily related to the following:

- approximately \$35.3 million in increased expenses for external clinical activities related to avapritinib, pralsetinib and BLU-782;
- approximately \$31.3 million in increased personnel expense, primarily due to an increase in headcount, which was driven by growth in the clinical and manufacturing organizations and an increase of \$11.6 million in stock-based compensation expense;
- approximately \$15.1 million in increased expenses associated with clinical and commercial manufacturing activities; and

- approximately \$6.1 million in increased expenses associated with continuing to build our discovery platform and advance our discovery pipeline.

General and Administrative Expense

General and administrative expense increased by \$48.5 million from \$47.9 million for the year ended December 31, 2018 to \$96.4 million for the year ended December 31, 2019. The increase in general and administrative expense was primarily related to increased costs and personnel expenses, including an increase of \$12.5 million in stock-based compensation expense, associated with building our commercial infrastructure and to support the overall growth of our business.

Interest Income (Expense), Net

Interest income (expense), net increased by \$3.2 million from \$10.6 million for the year ended December 31, 2018 to \$13.7 million for the year ended December 31, 2019. The increase was primarily related to higher average investment balances and a higher rate of return on investments.

Other Income (Expense), Net

Other income (expense), net, decreased by less than \$0.1 million from \$0.2 million for the year ended December 31, 2018 to \$0.1 million for the year ended December 31, 2019. The decrease was primarily related to changes in foreign currency exchange rates.

Comparison of Years Ended December 31, 2018 and 2017

The following table summarizes our results of operations for the years ended December 31, 2018 and 2017, together with the changes in those items in dollars and as a percentage:

	Year Ended December 31,		Dollar Change	% Change
	2018	2017		
	(in thousands)			
Collaboration revenue	\$ 44,521	\$ 21,426	\$ 23,095	108 %
Operating expenses:				
Research and development	243,621	144,687	98,934	68
General and administrative	47,928	27,986	19,942	71
Total operating expenses	291,549	172,673	118,876	69
Other income (expense):				
Interest income (expense), net	10,566	3,204	7,362	230
Other income (expense), net	(180)	(76)	104	137
Total other income (expense)	10,386	3,128	7,258	232
Net loss	<u>\$ (236,642)</u>	<u>\$ (148,119)</u>	<u>\$ 88,523</u>	<u>60 %</u>

Collaboration Revenue

Collaboration revenue increased by \$23.1 million from \$21.4 million for the year ended December 31, 2017 to \$44.5 million for the year ended December 31, 2018. Collaboration revenue for the year ended December 31, 2018 was related to the CStone and Roche agreements. Collaboration revenue for the year ended December 31, 2017 was related to the Roche and Alexion agreements. We entered into the CStone agreement on June 1, 2018 and recorded collaboration revenue of \$40.0 million under the CStone agreement for the year ended December 31, 2018. We recorded \$4.5 million and \$5.2 million in collaboration revenue under the Roche agreement for the years ended December 31, 2018 and December 31, 2017, respectively. The decrease was primarily due to the adoption of ASC 606 on January 1, 2018 and the resulting change in the revenue recognition pattern. We recorded collaboration revenue of

\$16.2 million under the Alexion agreement for the year ended December 31, 2017. As a result of the termination of the Alexion agreement during 2017, we did not recognize any revenue under the Alexion agreement for the year ended December 31, 2018.

Research and Development Expense

Research and development expense increased by \$98.9 million from \$144.7 million for the year ended December 31, 2017 to \$243.6 million for the year ended December 31, 2018. The increase in research and development expense was primarily related to the following:

- approximately \$35.3 million in increased expenses for external clinical activities related to avapritinib and pralsetinib;
- approximately \$27.5 million in increased personnel expense, primarily due to an increase in headcount, which was driven by growth in the clinical and manufacturing organizations as we advance our drug candidates and an increase of \$10.7 million in stock-based compensation expense;
- approximately \$27.3 million in increased expenses associated with clinical and commercial manufacturing activities;
- approximately \$5.6 million in increased expenses associated with continuing to build our discovery platform and advance our discovery pipeline; and
- approximately \$2.8 million in increased toxicology studies, including expenses associated with pre-clinical studies, including IND-enabling studies, related to BLU-782.

General and Administrative Expense

General and administrative expense increased by \$19.9 million from \$28.0 million for the year ended December 31, 2017 to \$47.9 million for the year ended December 31, 2018. The increase in general and administrative expense was primarily related to the following:

- approximately \$11.1 million in increased personnel expenses, primarily due to an increase in general and administrative headcount to support our overall growth and including an increase of \$7.3 million in stock-based compensation expense;
- approximately \$6.1 million in increased professional fees, including pre-commercial planning activities; and
- approximately \$2.1 million in increased facility costs related to our new headquarters in 2018.

Interest Income (Expense), Net

Interest income (expense), net increased by \$7.4 million from \$3.2 million for the year ended December 31, 2017 to \$10.6 million for the year ended December 31, 2018. The increase was primarily related to higher average investment balances and a higher rate of return on investments.

Other Income (Expense), Net

Other income (expense), net, increased by \$0.1 million from \$0.1 million of expense for the year ended December 31, 2017 to \$0.2 million of expense for the year ended December 31, 2018.

Liquidity and Capital Resources

Sources of Liquidity

To date, we have financed our operations primarily through public offerings of our common stock, private placements of our convertible preferred stock, collaborations, a license agreement and a debt financing.

Through December 31, 2019, we have received an aggregate of \$1.5 billion from such transactions, including \$1.2 billion in aggregate gross proceeds from the sale of common stock in our May 2015 IPO and December 2016, April 2017, December 2017 and April 2019 follow-on public offerings, \$115.1 million in gross proceeds from the issuance of convertible preferred stock, \$18.8 million in upfront and milestone payments from Alexion, \$63.0 million in upfront and milestone payments from Roche, \$50.0 million in upfront and milestone payments from CStone, a \$25.0 million in upfront payment from Clementia and \$10.0 million in gross proceeds from a debt financing.

As of December 31, 2019, we had cash, cash equivalents and investments of \$548.0 million. In addition, we received \$308.2 million in estimated net proceeds from our January 2020 follow-on public offering, after deducting underwriting discounts and commissions and estimated offering expenses payable by us.

Cash Flows

The following table provides information regarding our cash flows for the years ended December 31, 2019, 2018 and 2017:

(in thousands)	Year Ended December 31,		
	2019	2018	2017
Net cash used in operating activities	\$ (278,015)	\$ (175,009)	\$ (119,865)
Net cash used in investing activities	(16,466)	(161,088)	(72,347)
Net cash provided by financing activities	340,638	4,454	543,948
Net increase (decrease) in cash and cash equivalents	\$ 46,157	\$ (331,643)	\$ 351,736

Net Cash Used in Operating Activities. For the year ended December 31, 2019, compared to the same period in 2018, the \$103.0 million increase in net cash used in operating activities was primarily due to the increase in net loss during this period of \$110.0 million, which was driven by increased payroll and payroll-related expenses and spending on pre-clinical, clinical and pre-commercial activities, partially offset by upfront and milestone payments received during year ended December 31, 2019. The net cash flows provided by operating activities for year ended December 31, 2019 reflect a \$25.0 million upfront payment received under the Clementia agreement, an aggregate of \$10.0 million in milestone payments received under the CStone agreement and an \$8.0 million milestone payment received under the Roche agreement.

For the year ended December 31, 2018, compared to the same period in 2017, the \$55.1 million increase in net cash used in operating activities was primarily due to the increase in net loss during this period of \$88.5 million, which was driven by increased payroll and payroll-related expenses and spending on pre-clinical, clinical and pre-commercial activities, partially offset by upfront and milestone payments received during year ended December 31, 2018. The net cash flows provided by operating activities for year ended December 31, 2018 reflect a \$40.0 million upfront payment received under the CStone agreement and a \$10.0 million milestone payment received under the Roche agreement. We did not receive any upfront payments or milestones during year ended December 31, 2017.

Net Cash Used in Investing Activities. For the year ended December 31, 2019, compared to the same period in 2018, the \$144.6 million decrease in net cash used in investing activities was primarily due to a decrease in net purchases of available-for-sale investments.

For the year ended December 31, 2018, compared to the same period in 2017, the \$88.7 million increase in net cash used in investing activities was primarily due to an increase in net purchases of available-for-sale investments.

Net Cash Provided by Financing Activities. For the year ended December 31, 2019, compared to the same period in 2018, the \$336.2 million increase in net cash provided by financing activities was primarily due to a \$327.5 million increase in net proceeds received from our April 2019 follow-on public offering, after deducting underwriting discounts and commissions and offering expenses paid by us, and a \$6.9 million increase in proceeds received from stock option exercises.

For the year ended December 31, 2018, compared to the same period in 2017, the \$539.5 million decrease in net cash provided by financing activities was primarily due to a total of \$541.5 million decrease in net proceeds received from our April 2017 and December 2017 follow-on public offerings, after deducting underwriting discounts and commissions and offering expenses paid by us, partially offset by proceeds received from stock option exercises.

Borrowings

In May 2013, we entered into the loan and security agreement with Silicon Valley Bank. Under the terms of the loan and security agreement, we borrowed \$5.0 million. Loan advances under the loan and security agreement accrue interest at a fixed rate of 2.0% above the prime rate. In November 2014, we amended the loan and security agreement and borrowed an additional \$5.0 million. Each loan advance included an interest-only payment period. During the years ended December 31, 2018 and 2017, we paid principal payments of \$1.5 million and \$2.6 million, respectively, on the \$10.0 million of advances. We were required to pay a fee of 4% of the total loan advances at the end of the term of the loan. There were no financial covenants associated with the loan and security agreement. As of December 31, 2019 and 2018, we had no outstanding principal and interest under the loan and security agreement.

See Note 9, "Term Loan," in the accompanying notes to our audited consolidated financial statements for additional information.

Funding Requirements

We expect our expenses to increase in connection with our ongoing activities, particularly as we continue the research and development of, initiate or continue clinical trials of, and seek marketing approval for our drug candidates, including marketing approval for AYWAKIT for additional indications or in additional geographies. In addition, we expect to incur additional significant commercialization expenses for AYWAKIT and other drug candidates, if approved, related to drug sales, marketing, manufacturing and distribution to the extent that such sales, marketing, manufacturing and distribution are not the responsibility of potential collaborators or licensors. We may also need to raise additional funds sooner if we choose to pursue additional indications or geographies for any of our approved drugs or drug candidates or otherwise expand more rapidly than we presently anticipate. Accordingly, we will need to obtain substantial additional funding in connection with our continuing operations. If we are unable to raise capital when needed or on attractive terms, we would be forced to delay, reduce or eliminate certain of our research and development programs or future commercialization efforts.

As of December 31, 2019, we had cash, cash equivalents and investments of \$548.0 million. Based on our current plans, we believe that our existing cash, cash equivalents and investments including the \$308.2 million in estimated net proceeds from our January 2020 follow-on public offering, together with anticipated product revenues but excluding any additional potential option fees, milestone payments or other payments under our collaboration or license agreements, will be sufficient to enable us to fund our operating expenses and capital expenditure requirements into the second half of 2022. Our future capital requirements will depend on many factors, including:

- the scope, progress, results and costs of drug discovery, pre-clinical development, laboratory testing and clinical trials for our approved drugs and drug candidates;
- the costs of securing manufacturing, packaging and labeling arrangements for development activities and commercial production, including active pharmaceutical ingredient, or API, drug substance and

drug product material for use in pre-clinical studies, clinical trials, our compassionate use program and for use as commercial supply, as applicable;

- the costs, timing and outcome of regulatory review of marketing applications for our drug candidates, including avapritinib for additional indications or in additional geographies;
- the costs of maintaining, expanding or contracting for sales, marketing and distribution capabilities in connection with commercialization of any of our approved drugs;
- the success of our collaborations with Roche and CStone and our license agreement with Clementia, as well as our ability to establish and maintain additional collaborations, partnerships or licenses on favorable terms, if at all;
- the achievement of milestones or occurrence of other developments that trigger payments under our collaboration agreements with Roche and CStone or license agreement with Clementia, or any collaboration, partnership or license agreements that we may enter into in the future;
- the extent to which we are obligated to reimburse, or entitled to reimbursement of, clinical trial costs under future collaboration agreements, if any;
- the extent to which we acquire or in-license other drugs, drug candidates or technologies and the terms of any such arrangements;
- the success of our current or future collaborations for the development of companion diagnostic tests;
- the success of our commercialization efforts and market acceptance for AYVAKIT or any of our future approved drugs;
- the costs of preparing, filing and prosecuting patent applications, maintaining and enforcing our intellectual property rights and defending intellectual property-related claims; and
- the costs of continuing to expand our operations outside the U.S.

Identifying potential drug candidates, conducting pre-clinical development and testing and clinical trials and, for any drug candidates that receive marketing approval, establishing and maintaining commercial infrastructure is a time-consuming, expensive and uncertain process that takes years to complete, and we may never generate the necessary data or results required to obtain additional marketing approvals, including for avapritinib in additional indications or geographies, and achieve substantial revenues for any of our drugs that receive marketing approval, including for AYVAKIT in the U.S. In addition, AYVAKIT and any other drug candidates that receive marketing approvals, including AYVAKIT for additional indications or in additional geographies, may not achieve commercial success. Accordingly, we will need to continue to rely on additional financing to achieve our business objectives. Adequate additional financing may not be available to us on acceptable terms, or at all.

Until such time, if ever, as we can generate substantial drug revenues, we expect to finance our cash needs primarily through a combination of public and private equity offerings, debt financings, collaborations, strategic alliances and licensing arrangements. We do not have any committed external source of funds, other than our collaborations with Roche and CStone and the license agreement with Clementia, which are limited in scope and duration and subject to the achievement of milestones or royalties on sales of licensed products, if any. To the extent that we raise additional capital through the sale of common stock or securities convertible or exchangeable into common stock, the ownership interest of our stockholders will be diluted, and the terms of these securities may include liquidation or other preferences that materially adversely affect the rights of our common stockholders. Debt financing, if available, would increase our fixed payment obligations and may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures or declaring dividends.

If we raise funds through additional collaborations, strategic alliances or licensing arrangements with third parties, we may have to relinquish valuable rights to our intellectual property, future revenue streams, research

programs, drugs or drug candidates or to grant licenses on terms that may not be favorable to us. If we are unable to raise additional funds through equity or debt financings when needed, we may be required to delay, limit, reduce or terminate our drug development or future commercialization efforts or grant rights to develop and market drug and drug candidates that we would otherwise prefer to develop and market ourselves.

Contractual Obligations

The following table summarizes our significant contractual obligations as of payment due date by period at December 31, 2019:

(in thousands)	Payments Due by Period				
	Total	Less than 1 Year	1 to 3 Years	3 to 5 Years	More than 5 Years
Operating lease obligations (1)	\$ 137,616	\$ 11,916	\$ 29,483	\$ 25,867	\$ 70,350
Total	\$ 137,616	\$ 11,916	\$ 29,483	\$ 25,867	\$ 70,350

(1) Represents future minimum lease payments under our non-cancelable operating leases, net of payments under our sublease for the office and laboratory space located at 38 Sidney Street, Cambridge, Massachusetts. The minimum lease payments above do not include any related common area maintenance charges or real estate taxes.

In the normal course of business, we enter into agreements with contract research organizations for clinical trials and clinical supply manufacturing and with vendors for pre-clinical research studies, synthetic chemistry and other services and products for operating purposes. We have not included these payments in the table of contractual obligations above since the contracts are generally cancelable at any time by us upon less than 180 days' prior written notice. Certain of these agreements require us to pay milestones to such third parties upon achievement of certain development, regulatory or commercial milestones. Amounts related to contingent milestone payments are not considered contractual obligations as they are contingent on the successful achievement of certain development, regulatory approval and commercial milestones, which may not be achieved.

We also have obligations to make future payments to third parties that become due and payable on the achievement of certain milestones, including future payments to third parties with whom we have entered into agreements to develop and commercialize companion diagnostic tests for certain of our drug candidates. We have not included these commitments on our balance sheet or in the table above because the achievement and timing of these milestones is not fixed and determinable.

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 applicable SEC rules.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk.

As of December 31, 2019 and 2018, we had cash, cash equivalents and investments of \$548.0 million and \$494.0 million, respectively, consisting primarily of money market funds and investments in U.S. government agency and treasury obligations.

Our primary exposure to market risk is interest rate sensitivity, which is affected by changes in the general level of U.S. 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, we believe an immediate 10% change in interest rates would not have a material effect on the fair market value of our investment portfolio. We have the ability 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 change in market interest rates on our investment portfolio.

We are also exposed to market risk related to changes in foreign currency exchange rates. From time to time, we contract with vendors that are located in Asia and Europe, which are denominated in foreign currencies. We are subject to fluctuations in foreign currency rates in connection with these agreements. We do not currently hedge our

foreign currency exchange rate risk. As of December 31, 2019 and 2018, we had minimal or no liabilities denominated in foreign currencies.

Inflation generally affects us by increasing our cost of labor, clinical trial and manufacturing costs. We do not believe that inflation had a material effect on our business, financial condition or results of operations during the years ended December 31, 2019 and 2018.

Item 8. Financial Statements and Supplementary Data.

The financial statements required to be filed pursuant to this Item 8 are appended to this Annual Report on Form 10-K. An index of those financial statements is found in Item 15 of this Annual Report on Form 10-K.

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

None.

Item 9A. Controls and Procedures

Management's Evaluation of our Disclosure Controls and Procedures

We maintain "disclosure controls and procedures," as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended, or the Exchange Act, that are designed to ensure that information required to be disclosed in the reports that we file or submit under the Exchange Act is (1) recorded, processed, summarized and reported, within the time periods specified in the Securities and Exchange Commission's rules and forms and (2) accumulated and communicated to our management, including our principal executive and principal financial officer, as appropriate to allow timely decisions regarding required disclosure. Our management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives and our management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures. Our disclosure controls and procedures are designed to provide reasonable assurance of achieving their control objectives.

Our management, with the participation of our Chief Executive Officer and Chief Financial Officer (our principal executive officer and principal financial officer, respectively), evaluated the effectiveness of our disclosure controls and procedures as of December 31, 2019. Based upon such evaluation, our Chief Executive Officer and Chief Financial Officer have concluded that, as of December 31, 2019, our disclosure controls and procedures were effective at the reasonable assurance level.

Management's Annual Report on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting. Internal control over financial reporting is defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act as a process designed by, or under the supervision of, a company's principal executive officer and principal financial officer, or persons performing similar functions, and effected by a 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 generally accepted accounting principles 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 a company's assets;
- provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that a company's receipts and expenditures are being made only in accordance with authorizations of the company's management and directors; and
- provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of our assets that could have a material effect on the financial statements.

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

Under the supervision of and with the participation of our principal executive officer and principal financial officer, our management assessed the effectiveness of our internal control over financial reporting as of December 31, 2019 based on the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission in Internal Control—Integrated Framework (2013 framework). Based on this assessment, management concluded that our internal control over financial reporting was effective as of December 31, 2019.

Our independent registered public accounting firm has issued an attestation report of our internal control over financial reporting. This report appears below.

Report of Independent Registered Public Accounting Firm

The Board of Directors and Stockholders Blueprint Medicines Corporation

Opinion on Internal Control Over Financial Reporting

We have audited Blueprint Medicines Corporation’s internal control over financial reporting as of December 31, 2019, based on criteria established in Internal Control—Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 Framework) (the COSO criteria). In our opinion, Blueprint Medicines Corporation (the Company) maintained, in all material respects, effective internal control over financial reporting as of December 31, 2019, based on the COSO criteria.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets of Blueprint Medicines Corporation as of December 31, 2019 and 2018, the related consolidated statements of operations and comprehensive loss, stockholders’ equity, and cash flows for each of the three years in the period ended December 31, 2019, and the related notes and our report dated February 13, 2020 expressed an unqualified opinion thereon.

Basis for Opinion

The Company’s management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting included in the accompanying Management’s Annual 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 included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control Over Financial Reporting

A company’s internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company’s internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions

are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

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

/s/ Ernst & Young LLP
Boston, Massachusetts
February 13, 2020

Changes in Internal Control over Financial Reporting

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 three months 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 Accounting 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

The following documents are included on pages F-1 through F-38 attached hereto and are filed as part of this Annual Report on Form 10-K.

Report of Independent Registered Public Accounting Firm	F-2
Consolidated Balance Sheets	F-5
Consolidated Statements of Operations and Comprehensive Loss	F-6
Consolidated Statements of Stockholders' Equity	F-7
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- (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	Incorporated by Reference			Filing Date
		Form	File No.	Exhibit Number	
3.1	Fifth Amended and Restated Certificate of Incorporation of the Registrant	10-Q	001-37359	3.1	November 9, 2015
3.2	Amended and Restated Bylaws of the Registrant	10-Q	001-37359	3.2	November 9, 2015
4.1	Specimen Common Stock Certificate	S-1/A	333-202938	4.1	April 20, 2015
4.2	Second Amended and Restated Investors' Rights Agreement, dated as of November 7, 2014, by and among the Registrant and the Investors listed therein	S-1	333-202938	4.4	March 23, 2015
4.3	Description of the Registrant's securities registered pursuant to Section 12 of the Securities and Exchange Act of 1934, as amended				*
10.1#	2011 Stock Option and Grant Plan, as amended, and forms of award agreements thereunder	S-1	333-202938	10.1	March 23, 2015
10.2#	2015 Stock Option and Incentive Plan and forms of award agreements thereunder				*
10.3#	2015 Employee Stock Purchase Plan				*
10.4	Lease Agreement, dated February 11, 2015, by and between the Registrant and 38 Sidney Street Limited Partnership	S-1	333-202938	10.4	March 23, 2015
10.5	First Amendment to Lease Agreement, dated January 26, 2018, by and between the Registrant and 38 Sidney Street Limited Partnership	10-K	001-37359	10.5	February 26, 2019
10.6	Lease Agreement, dated April 28, 2017, by and between the Registrant and UP 45/75 Sidney Street, LLC	10-Q	001-37359	10.1	May 3, 2017

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Exhibit Number	Description of Exhibit	Incorporated by Reference			Filing Date
		Form	File No.	Exhibit Number	
10.7	First Amendment of Lease, dated September 19, 2018, between Blueprint Medicines Corporation and UP 45/75 Sidney Street, LLC	8-K	001-37359	10.1	September 25, 2018
10.8#	Employment Agreement, dated November 6, 2015, by and between the Registrant and Jeffrey W. Albers	10-Q	001-37359	10.2	November 9, 2015
10.9#	Employment Agreement, dated November 6, 2015, by and between the Registrant and Anthony L. Boral	10-Q	001-37359	10.4	November 9, 2015
10.10#	Employment Agreement, dated March 10, 2016, by and between the Registrant and Kathryn Haviland	10-K	001-37359	10.9	March 11, 2016
10.11#	First Amendment to Employment Agreement, dated January 30, 2019, by and between the Registrant and Kathryn Haviland	8-K	001-37359	10.2	February 5, 2019
10.12#	Employment Agreement, dated September 6, 2016, by and between the Registrant and Tracey L. McCain	10-Q	001-37359	10.3	November 10, 2016
10.13#	Employment Agreement, dated November 9, 2016, by and between the Registrant and Marion Dorsch	8-K	001-37359	10.1	November 14, 2016
10.14#	Employment Agreement, dated October 10, 2017, by and between the Registrant and Christopher Murray	10-Q	001-37359	10.1	October 31, 2017
10.15#	Employment Agreement, dated November 22, 2017, by and between the Registrant and Michael Landsittel	8-K	001-37359	10.1	November 22, 2017
10.16#	First Amendment to Employment Agreement, dated January 30, 2019, by and between the Registrant and Michael Landsittel	8-K	001-37359	10.1	February 5, 2019
10.17#	Employment Agreement, dated October 29, 2018, by and between the Registrant and Christina Rossi	8-K	001-37359	10.1	October 29, 2018
10.18#	Employment Agreement, dated March 6, 2019, by and between the Registrant and Ariel Hurley	8-K	001-37359	10.1	March 8, 2019
10.19#	Employment Agreement, dated November 22, 2017, by and between the Registrant and Debra Durso-Bumpus, as amended by the First Amendment to Employment Agreement, dated February 10, 2020, by and between the Registrant and Debra Durso-Bumpus				*
10.20†	Collaboration and License Agreement, effective March 14, 2016, by and among F. Hoffmann-La Roche Ltd, Hoffmann-La Roche Inc. and the Registrant, as amended by Amendment to Collaboration and License Agreement, effective April 15, 2016	10-Q/A	001-37359	10.2	July 22, 2016
10.21†	Second Amendment to Collaboration and License Agreement, effective April 27, 2016, by and among F. Hoffmann-La Roche Ltd, Hoffmann-La Roche Inc. and the Registrant	10-Q	001-37359	10.1	August 9, 2016

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Exhibit Number	Description of Exhibit	Incorporated by Reference			Filing Date
		Form	File No.	Exhibit Number	
10.22	Third Amendment to Collaboration and License Agreement, effective August 4, 2016, by and among F. Hoffmann-La Roche Ltd, Hoffmann-La Roche Inc. and the Registrant	10-Q	001-37359	10.1	November 10, 2016
10.23†	Fourth Amendment to Collaboration and License Agreement, effective February 25, 2019, by and among F. Hoffmann-La Roche Ltd, Hoffmann-La Roche Inc. and the Registrant	10-K	001-37359	10.26	February 26, 2019
10.24††	Fifth Amendment to Collaboration and License Agreement, effective June 28, 2019, by and among F. Hoffmann-La Roche Ltd, Hoffmann-La Roche Inc. and the Registrant	8-K	001-37359	10.1	July 3, 2019
10.25††	Sixth Amendment to Collaboration and License Agreement, effective November 1, 2019, by and among F. Hoffmann-La Roche Ltd, Hoffmann-La Roche Inc. and the Registrant	10-Q	001-37359	10.2	November 5, 2019
10.26††	Seventh Amendment to Collaboration and License Agreement, effective December 17, 2019, by and among F. Hoffmann-La Roche Ltd, Hoffmann-La Roche Inc. and the Registrant	8-K	001-37359	10.1	December 20, 2019
10.27†	License and Collaboration Agreement, dated June 1, 2018, between the Registrant and CStone Pharmaceuticals	10-Q	001-37359	10.1	August 1, 2018
10.28††	License Agreement, effective October 15, 2019, by and between the Registrant and Clementia Pharmaceuticals, Inc.	10-Q	001-37359	10.1	November 5, 2019
10.29	Form of Indemnification Agreement entered into between the Registrant and its directors	S-1	333-202938	10.11	March 23, 2015
10.30	Form of Indemnification Agreement entered into between the Registrant and its officers	S-1	333-202938	10.12	March 23, 2015
10.31	Senior Executive Cash Incentive Bonus Plan	10-K	001-37359	10.15	March 11, 2016
21.1	Subsidiaries of the Registrant				*
23.1	Consent of Ernst & Young LLP				*
31.1	Certification of Principal Executive Officer pursuant to Rule 13a-14(a) or Rule 15d-14(a) of the Exchange Act, 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 Exchange Act, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002				*
32.1+	Certifications of Principal Executive Officer and Principal Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002				+

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Exhibit Number	Description of Exhibit	Incorporated by Reference			
		Form	File No.	Exhibit Number	Filing Date
101.INS	XBRL Instance Document				*
101.SCH	XBRL Taxonomy Extension Schema Document				*
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document				*
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document				*
101.LAB	XBRL Taxonomy Extension Label Linkbase Document				*
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document				*
104	Cover Page Interactive Data File (formatted as inline XBRL with applicable taxonomy extension information contained in Exhibits 101.*)				

Indicates management contract or compensatory plan or arrangement.

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

†† Certain portions of the exhibit have been omitted pursuant to Regulation S-K Item 601(b) because it is both (i) not material to investors and (ii) likely to cause competitive harm to the Company if publicly disclosed.

* Filed herewith.

+ The certifications furnished in Exhibit 32.1 hereto are deemed to be furnished with this Annual Report on Form 10-K and will not be deemed to be “filed” for purposes of Section 18 of the Exchange Act. Such certifications will not be deemed to be incorporated by reference into any filing under the Securities Act or the Exchange Act, except to the extent that the Registrant specifically incorporates it by reference.

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.

BLUEPRINT MEDICINES CORPORATION

Date: February 13, 2020

By: /s/ Jeffrey W. Albers
Jeffrey W. Albers
President and Chief Executive
Officer

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

<u>Signature</u>	<u>Title</u>	<u>Date</u>
<u>/s/ Jeffrey W. Albers</u> Jeffrey W. Albers	President, Chief Executive Officer and Director <i>(Principal Executive Officer)</i>	February 13, 2020
<u>/s/ Michael Landsittel</u> Michael Landsittel	Chief Financial Officer <i>(Principal Financial Officer)</i>	February 13, 2020
<u>/s/ Ariel Hurley</u> Ariel Hurley	Vice President, Finance and Controller <i>(Principal Accounting Officer)</i>	February 13, 2020
<u>/s/ Daniel S. Lynch</u> Daniel S. Lynch	Chairman of the Board	February 13, 2020
<u>/s/ Nicholas Lydon</u> Nicholas Lydon, Ph.D.	Director	February 13, 2020
<u>/s/ Alexis Borisy</u> Alexis Borisy	Director	February 13, 2020
<u>/s/ Mark Goldberg</u> Mark Goldberg, M.D.	Director	February 13, 2020
<u>/s/ Charles A. Rowland, Jr.</u> Charles A. Rowland, Jr.	Director	February 13, 2020
<u>/s/ George Demetri</u> George Demetri, M.D.	Director	February 13, 2020
<u>/s/ Lonnel Coats</u> Lonnel Coats	Director	February 13, 2020
<u>/s/ Lynn Seely</u> Lynn Seely, M.D.	Director	February 13, 2020

Blueprint Medicines Corporation

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Report of Independent Registered Public Accounting Firm

To the Board of Directors and Stockholders of Blueprint Medicines Corporation

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Blueprint Medicines Corporation as of December 31, 2019 and 2018, the related consolidated statements of operations and comprehensive loss, stockholders' equity, and cash flows for each of the three years in the period ended December 31, 2019, and 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 at December 31, 2019 and 2018, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2019, in conformity with U.S. generally accepted accounting principles.

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 criteria established in Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) and our report dated February 13, 2020 expressed an unqualified opinion thereon.

Adoption of ASC 606

As discussed in Note 2 to the consolidated financial statements, the Company changed its method of accounting for revenue effective January 1, 2018 due to the adoption of Accounting Standards Update (ASU) No. 2014-09, Revenue from Contracts with Customers (Topic 606), and the related amendments.

Adoption of ASC 842

As discussed in Note 2 to the consolidated financial statements, the Company changed its method of accounting for leases effective January 1, 2019 due to the adoption of Accounting Standards Update (ASU) 2016-02, Leases (Topic 842), and the related amendments.

Basis for Opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

Critical Audit Matters

The critical audit matters communicated below are matters arising from the current period audit of the financial statements that were communicated or required to be communicated to the audit committee and that: (1) relate to accounts or disclosures that are material to the financial statements and (2) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matters below, providing separate opinions on the critical audit matters or on the accounts or disclosures to which they relate.

License Agreement with Clementia

Description of the Matter As discussed in Note 8 to the consolidated financial statements, the Company recognized \$46.2 million in revenue under the license agreement with Clementia Pharmaceuticals, Inc. (“Clementia”) in the fourth quarter of 2019. The Company determined that there were three distinct performance obligations in the Clementia agreement: (i) the combination of the License, Technology Transfer, and Manufacturing Technology Transfer; (ii) delivery of the Existing Manufacturing Inventory; and (iii) delivery of the In-Process Manufacturing Inventory.

Auditing management’s identification of the performance obligations was challenging as the contract includes implicit and explicit goods and services. Significant judgment was required in the evaluation of the identification of the performance obligations and in the evaluation of whether the identified promised goods and services meet the criteria of being distinct and capable of being distinct within the context of the contract.

How We Addressed the Matter in Our Audit We obtained an understanding of, evaluated the design and tested the operating effectiveness of internal controls that addressed the identified risks related to the Company’s process for identifying performance obligations in its contracts with customers.

To test the identification of performance obligations, we assessed, among other things, the stated terms of the Company’s arrangement with Clementia. We also conducted meetings with various personnel at the Company responsible for negotiating the contract and overseeing the delivery of the performance obligations in order to understand the nature of the explicit and implicit promised goods and services as well as understand whether promises were capable of being distinct and distinct in the context of the contract. Finally, we assessed the Company’s analyses to support their conclusion of the amount of revenue to recognize in 2019 upon delivery of certain performance obligations.

Accrued Clinical Trial Expenses

Description of the Matter As discussed in Note 2 to the consolidated financial statements, the Company records costs for clinical trial activities based upon estimates of costs incurred through the balance sheet date that have yet to be invoiced by the contract research organizations and other vendors.

Auditing the Company’s accruals for clinical trials is challenging due to the fact that information necessary to estimate the accruals is accumulated from multiple sources. In addition, in certain circumstances, the determination of the nature and level of services that have been received during the reporting period requires judgment because the timing and pattern of vendor invoicing does not correspond to the level of services provided and there may be delays in invoicing from clinical study sites and other vendors.

How We Addressed the Matter in Our Audit We obtained an understanding of, evaluated the design and tested the operating effectiveness of internal controls that addressed the identified risks related to the Company’s process for recording accrued clinical expenses.

To evaluate the accrual for clinical expenses, our audit procedures included, among others, testing the completeness and accuracy of the underlying data used in the estimates and evaluating the significant assumptions including, but not limited to, expected patient enrollment, costs per

patient, site activation and estimated project duration, that are used by management to estimate the recorded accruals. To assess the reasonableness of the significant assumptions, we corroborated the progress of clinical trials with the Company's clinical team and obtained information directly from third parties related to active patient sites and currently enrolled patients. We also tested subsequent invoicing received from such third parties and inspected the Company's contracts with third parties and any pending change orders to assess the impact to the accrual through the balance sheet date and compared that to the Company's estimates.

/s/ Ernst & Young LLP

We have served as the Company's auditor since 2011.

Boston, Massachusetts
February 13, 2020

Blueprint Medicines Corporation
Consolidated Balance Sheets
(in thousands, except share and per share data)

	December 31, 2019	December 31, 2018
Assets		
Current assets:		
Cash and cash equivalents	\$ 113,938	\$ 68,064
Investments, available-for-sale	369,616	425,948
Accounts receivable	663	64
Unbilled accounts receivable	22,749	151
Prepaid expenses and other current assets	9,820	5,560
Total current assets	516,786	499,787
Investments, available-for-sale	64,406	—
Property and equipment, net	38,361	29,627
Operating lease right-of-use assets, net	72,753	—
Restricted cash	5,166	5,154
Other assets	10,222	5,556
Total assets	<u>\$ 707,694</u>	<u>\$ 540,124</u>
Liabilities and stockholders' equity		
Current liabilities:		
Accounts payable	4,793	3,298
Accrued expenses	88,706	51,711
Current portion of operating lease liabilities	6,823	—
Current portion of deferred revenue	6,160	3,600
Current portion of lease incentive obligation	—	1,714
Total current liabilities	106,482	60,323
Deferred rent, net of current portion	—	5,130
Operating lease liabilities, net of current portion	89,126	—
Deferred revenue, net of current portion	39,913	42,567
Lease incentive obligation, net of current portion	—	12,903
Other long-term liabilities	7,814	192
Total liabilities	243,335	121,115
Commitments (Note 16)		
Stockholders' equity:		
Preferred stock, \$0.001 par value; 5,000,000 shares authorized; no shares issued and outstanding	—	—
Common stock, \$0.001 par value; 120,000,000 shares authorized; 49,272,223 and 44,037,026 shares issued and outstanding at December 31, 2019 and December 31, 2018, respectively	49	44
Additional paid-in capital	1,412,083	1,016,690
Accumulated other comprehensive loss	(2,535)	(180)
Accumulated deficit	(945,238)	(597,545)
Total stockholders' equity	464,359	419,009
Total liabilities and stockholders' equity	<u>\$ 707,694</u>	<u>\$ 540,124</u>

Blueprint Medicines Corporation
Consolidated Statements of Operations and Comprehensive Loss
(in thousands, except per share data)

	2019	Year Ended December 31, 2018	2017
Collaboration revenue	\$ 66,512	\$ 44,521	\$ 21,426
Operating expenses:			
Research and development	331,450	243,621	144,687
General and administrative	96,388	47,928	27,986
Total operating expenses	427,838	291,549	172,673
Other income (expense):			
Interest income (expense), net	13,732	10,566	3,204
Other income (expense), net	(100)	(180)	(76)
Total other income (expense)	13,632	10,386	3,128
Net loss	<u>\$ (347,694)</u>	<u>\$ (236,642)</u>	<u>\$ (148,119)</u>
Other comprehensive loss:			
Unrealized gain (losses) on pension benefit obligations	(2,985)	—	—
Unrealized gain (losses) on available-for-sale investments	671	105	(251)
Currency translation adjustments	(40)	(16)	—
Comprehensive loss	<u>\$ (350,048)</u>	<u>\$ (236,553)</u>	<u>\$ (148,370)</u>
Net loss per share — basic and diluted	<u>\$ (7.27)</u>	<u>\$ (5.39)</u>	<u>\$ (3.92)</u>
Weighted-average number of common shares used in net loss per share — basic and diluted	<u>47,829</u>	<u>43,867</u>	<u>37,793</u>

Blueprint Medicines Corporation
Consolidated Statements of Stockholders' Equity
(in thousands)

	Common Stock		Additional Paid-in Capital	Accumulated Other	Accumulated Deficit	Stockholders' Equity
	Shares	Amount		Comprehensive Loss		
Balance at December 31, 2016	33,123,354	\$ 33	\$ 420,533	\$ (18)	\$ (207,470)	\$ 213,078
Follow on offering, net of issuance costs	10,009,259	10	541,366	—	—	541,376
Issuance of common stock under stock plan	428,210	—	4,887	—	—	4,887
Purchase of common stock under ESPP	16,703	—	476	—	—	476
Stock-based compensation expense	—	—	12,523	—	—	12,523
Unrealized loss on available-for-sale securities	—	—	—	(251)	—	(251)
Net loss	—	—	—	—	(148,119)	(148,119)
Balance at December 31, 2017	43,577,526	\$ 43	\$ 979,785	\$ (269)	\$ (355,589)	\$ 623,970
Issuance of common stock under stock plan	445,622	1	5,586	—	—	5,587
Purchase of common stock under ESPP	13,878	—	750	—	—	750
Stock-based compensation expense	—	—	30,534	—	—	30,534
Adoption of new accounting standard	—	—	—	—	(5,314)	(5,314)
Unrealized gain on available-for-sale securities	—	—	—	105	—	105
Cumulative translation adjustment	—	—	—	(16)	—	(16)
Other	—	—	35	—	—	35
Net loss	—	—	—	—	(236,642)	(236,642)
Balance at December 31, 2018	44,037,026	\$ 44	\$ 1,016,690	\$ (180)	\$ (597,545)	\$ 419,009
Issuance of common stock under stock plan	552,311	1	12,130	—	—	12,131
Purchase of common stock under ESPP	20,724	—	1,148	—	—	1,148
Stock-based compensation expense	—	—	54,653	—	—	54,653
Follow on offering, net of issuance costs	4,662,162	4	327,462	—	—	327,466
Unrealized loss on pension benefit obligation	—	—	—	(2,985)	—	(2,985)
Unrealized gain on available-for-sale securities	—	—	—	671	—	671
Cumulative translation adjustment	—	—	—	(40)	—	(40)
Net loss	—	—	—	—	(347,694)	(347,694)
Balance at December 31, 2019	49,272,223	\$ 49	\$ 1,412,083	\$ (2,534)	\$ (945,239)	\$ 464,359

Blueprint Medicines Corporation
Consolidated Statements of Cash Flows
(in thousands)

	Year Ended December 31,		
	2019	2018	2017
Cash flows from operating activities			
Net loss	\$ (347,694)	\$ (236,642)	\$ (148,119)
Adjustments to reconcile net loss to net cash used in operating activities:			
Depreciation and amortization	5,259	4,246	1,578
Noncash lease expense	4,991	—	—
Stock-based compensation	54,653	30,534	12,523
Accretion of premiums and discounts on investments	(4,949)	(4,381)	(320)
Other	—	(6)	32
Changes in assets and liabilities:			
Accounts receivable	(599)	349	(413)
Unbilled accounts receivable	(22,597)	(151)	3,577
Prepaid expenses and other current assets	(3,338)	6,086	(6,853)
Other assets	20	(4,242)	(458)
Accounts payable	1,448	(445)	1,532
Accrued expenses	36,980	24,804	14,597
Deferred revenue	(94)	5,479	(11,861)
Deferred rent	—	(640)	14,320
Operating lease liabilities	(2,095)	—	—
Net cash used in operating activities	(278,015)	(175,009)	(119,865)
Cash flows from investing activities			
Purchases of property and equipment	(14,013)	(12,677)	(15,512)
Purchases of investments	(738,387)	(801,236)	(360,835)
Maturities of investments	735,934	652,825	304,000
Net cash used in investing activities	(16,466)	(161,088)	(72,347)
Cash flows from financing activities			
Principal payments on loan payable	—	(1,528)	(2,583)
Payment of offering costs	(284)	(281)	(965)
Proceeds from public offerings of common stock, net of commissions and underwriting discounts	327,750	—	542,225
Proceeds from issuance of common stock	13,288	6,425	5,271
Other financing activities	(116)	(162)	—
Net cash provided by financing activities	340,638	4,454	543,948
Net increase (decrease) in cash, cash equivalents, and restricted cash	46,157	(331,643)	351,736
Cash, cash equivalents and restricted cash at beginning of period	73,429	405,072	53,336
Effect of exchange rate changes on cash, cash equivalents and restricted cash	18	—	—
Cash, cash equivalents and restricted cash at end of period	<u>\$ 119,604</u>	<u>\$ 73,429</u>	<u>\$ 405,072</u>
Supplemental cash flow information			
Public offering costs incurred but unpaid at period end	<u>\$ —</u>	<u>\$ —</u>	<u>\$ 317</u>
Property and equipment purchases unpaid at period end	<u>\$ 958</u>	<u>\$ 912</u>	<u>\$ 3,947</u>
Cash paid for interest	<u>\$ 5</u>	<u>\$ 267</u>	<u>\$ 151</u>
Cash paid for taxes, net	<u>\$ 185</u>	<u>\$ 123</u>	<u>\$ 37</u>

The following table provides a reconciliation of cash, cash equivalents, and restricted cash reported within the consolidated balance sheets that sum to the total of the same such amounts shown in the consolidated statements of cash flows.

	December 31, 2019	December 31, 2018	December 31, 2017
Cash and cash equivalents	113,938	68,064	400,304
Restricted cash included in prepaid expenses and other current assets	500	211	213
Restricted cash	5,166	5,154	4,555
Total cash, cash equivalents, and restricted cash shown in consolidated statements of cash flows	<u>119,604</u>	<u>73,429</u>	<u>405,072</u>

Blueprint Medicines Corporation
Notes to Consolidated Financial Statements

1. Nature of Business

Blueprint Medicines Corporation (the Company), a Delaware corporation incorporated on October 14, 2008, is a precision therapy company focused on genomically defined cancers, rare diseases and cancer immunotherapy. The Company's approach is to leverage its novel target discovery engine to systematically and reproducibly identify kinases that are drivers of diseases and to craft highly selective and potent drug candidates that may provide significant and durable clinical responses for patients without adequate treatment options.

The Company is devoting substantially all of its efforts to research and development, initial market development and raising capital. The Company is subject to a number of risks similar to those of other early stage companies, including dependence on key individuals; establishing safety and efficacy in clinical trials for its drug candidates; the need to develop commercially viable drug candidates; competition from other companies, many of which are larger and better capitalized; and the need to obtain adequate additional financing to fund the development of its drug candidates. If the Company is unable to raise capital when needed or on attractive terms, it would be forced to delay, reduce, eliminate or out-license certain of its research and development programs or future commercialization efforts.

On April 2, 2019, the Company closed a follow-on public offering of 4,662,162 shares of its common stock at a price to the public of \$74.00 per share, including 608,108 shares of common stock sold by the Company pursuant to the exercise in full by the underwriters of their option to purchase additional shares in connection with the offering. The Company received net proceeds of \$327.5 million, after deducting underwriting discounts and commissions and offering expenses.

On January 27, 2020, the Company closed a follow-on public offering of 4,710,144 shares of its common stock at a price to the public of \$69.00 per share and received estimated net proceeds of \$308.2 million, after deducting underwriting discounts and commissions and estimated offering expenses payable by the Company. The Company has also granted the underwriters a 30-day option to purchase up to an additional 706,521 shares of its common stock at the public offering price, less underwriting discounts and commissions.

As of December 31, 2019, the Company had cash, cash equivalents and investments of \$548.0 million. Based on the Company's current operating plans, the Company believes that its existing cash, cash equivalents and investments including the \$308.2 million in estimated net proceeds from its January 2020 follow-on public offering, together with anticipated product revenues but excluding any additional potential option fees, milestone payments or other payments under its collaboration or license agreements, will be sufficient to enable it to fund its current operations for at least the next twelve months from the issuance of the financial statements.

2. Summary of Significant Accounting Policies and Recent Accounting Pronouncements

Basis of Presentation

The audited consolidated financial statements of the Company included herein have been prepared in accordance with accounting principles generally accepted in the U.S. (GAAP) as found in the Accounting Standards Codification (ASC) and Accounting Standards Update (ASU) of the Financial Accounting Standards Board (FASB) and the rules and regulations of the Securities and Exchange Commission (SEC).

The accompanying consolidated financial statements include the accounts of the Company and its wholly-owned subsidiaries, Blueprint Medicines Security Corporation, which is a Massachusetts subsidiary created to buy, sell and hold securities, and Blueprint Medicines (Switzerland) GmbH, Blueprint Medicines (Netherlands) B.V., Blueprint Medicines (UK) Ltd, Blueprint Medicines (Germany) GmbH, Blueprint Medicines (Spain) S.L., Blueprint Medicines (France) SAS and Blueprint Medicines (Italy) S.r.L. All intercompany transactions and balances have been eliminated.

Due to the follow-on public offering completed in April 2019, there was a significant increase in shares outstanding in the year ended December 31, 2019, which impacts the year-over-year comparability of the Company's net loss per share calculations.

Use of Estimates

The preparation of financial statements in conformity with GAAP requires the Company's management to make estimates and assumptions that affect the amounts reported in the financial statements and accompanying notes. Actual results could differ from those estimates. Management considers many factors in selecting appropriate financial accounting policies and in developing the estimates and assumptions that are used in the preparation of the financial statements. Management must apply significant judgment in this process. Management's estimation process often may yield a range of potentially reasonable estimates and management must select an amount that falls within that range of reasonable estimates. Estimates are used in the following areas, among others: revenue recognition, operating lease right-of-use assets, operating lease liabilities, stock-based compensation expense, accrued expenses, and income taxes.

Revenue Recognition

Effective January 1, 2018, the Company adopted ASC Topic 606, *Revenue from Contracts with Customers* (ASC 606), using the modified retrospective transition method. Under this method, results for reporting periods beginning after January 1, 2018 are presented under ASC 606, while prior period amounts are not adjusted and continue to be reported in accordance with ASC Topic 605, *Revenue Recognition* (ASC 605). The Company only applied the modified retrospective transition method to contracts that were not completed as of January 1, 2018, the effective date of adoption for ASC 606. This standard applies to all contracts with customers, except for contracts that are within the scope of other standards, such as leases, insurance, collaboration arrangements and financial instruments. Under ASC 606, an entity recognizes revenue when its customer obtains control of promised goods or services, in an amount that reflects the consideration which the entity expects to receive in exchange for those goods or services. To determine revenue recognition for arrangements that an entity determines are within the scope of ASC 606, the entity performs the following five steps: (i) identify the contract(s) with a customer; (ii) identify the performance obligations in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to the performance obligations in the contract; and (v) recognize revenue when (or as) the entity satisfies a performance obligation. The Company only applies the five-step model to contracts when it is probable that the Company will collect the consideration it is entitled to in exchange for the goods or services it transfers to the customer. At contract inception, once the contract is determined to be within the scope of ASC 606, the Company assesses the goods or services promised within each contract and determines those that are performance obligations, and assesses whether each promised good or service is distinct. The Company then recognizes as revenue the amount of the transaction price that is allocated to the respective performance obligation when (or as) the performance obligation is satisfied.

The Company enters into licensing agreements that are within the scope of ASC 606, under which it may exclusively license rights to research, develop, manufacture and commercialize its drug candidates to third parties. The terms of these arrangements typically include payment to the Company of one or more of the following: non-refundable, upfront license fees; reimbursement of certain costs; customer option exercise fees; development, regulatory and commercial milestone payments; and royalties on net sales of licensed products.

In determining the appropriate amount of revenue to be recognized as it fulfills its obligations under its agreements, the Company performs the following steps: (i) identification of the promised goods or services in the contract; (ii) determination of whether the promised goods or services are performance obligations including whether they are distinct in the context of the contract; (iii) measurement of the transaction price, including the constraint on variable consideration; (iv) allocation of the transaction price to the performance obligations; and (v) recognition of revenue when (or as) the Company satisfies each performance obligation. As part of the accounting for these arrangements, the Company must use significant judgment to determine: (a) the performance obligations based on the determination under step (ii) above; (b) the transaction price under step (iii) above; and (c) the stand-alone selling price for each performance obligation identified in the contract for the allocation of transaction price in step (iv) above. The Company uses judgment to determine whether milestones or other variable consideration, except for royalties and sales-based milestones, should be included in the transaction price as described further below. The transaction price is allocated to each performance obligation on a relative stand-alone selling price basis, for which the Company recognizes revenue as or when the performance obligations under the contract are satisfied.

Amounts received prior to revenue recognition are recorded as deferred revenue. Amounts expected to be recognized as revenue within the 12 months following the balance sheet date are classified as current portion of deferred revenue in the accompanying consolidated balance sheets. Amounts not expected to be recognized as revenue within the 12 months following the balance sheet date are classified as deferred revenue, net of current portion. If the Company

performs by transferring goods or services to a customer before the customer pays consideration or before payment is due, the Company records a contract asset, excluding any amounts presented as accounts receivable. The Company includes contract assets as unbilled accounts receivable on the consolidated balance sheets. The Company records accounts receivables for amounts billed to the customer for which the Company has an unconditional right to consideration. The Company assesses contract assets and accounts receivable for impairment and, to date, no impairment losses have been recorded.

Exclusive Licenses. If the license to the Company's intellectual property is determined to be distinct from the other promises or performance obligations identified in the arrangement, the Company recognizes revenue from non-refundable, upfront fees allocated to the license when the license is transferred to the customer and the customer is able to use and benefit from the license. In assessing whether a promise or performance obligation is distinct from the other promises, the Company considers factors such as the research, development, manufacturing and commercialization capabilities of the collaboration partner and the availability of the associated expertise in the general marketplace. In addition, the Company considers whether the collaboration partner can benefit from a promise for its intended purpose without the receipt of the remaining promise, whether the value of the promise is dependent on the unsatisfied promise, whether there are other vendors that could provide the remaining promise, and whether it is separately identifiable from the remaining promise. For licenses that are combined with other promises, the Company utilizes judgment to assess the nature of the combined performance obligation to determine whether the combined performance obligation is satisfied over time or at a point in time and, if over time, the appropriate method of measuring progress for purposes of recognizing revenue. The Company evaluates the measure of progress each reporting period and, if necessary, adjusts the measure of performance and related revenue recognition. The measure of progress, and thereby periods over which revenue should be recognized, are subject to estimates by management and may change over the course of the research and development and licensing agreement. Such a change could have a material impact on the amount of revenue the Company records in future periods.

Research and Development Services. The promises under the Company's collaboration agreements may include research and development services to be performed by the Company on behalf of the partner. Payments or reimbursements resulting from the Company's research and development efforts are recognized as the services are performed and presented on a gross basis because the Company is the principal for such efforts. Reimbursements from and payments to the partner that are the result of a collaborative relationship with the partner, instead of a customer relationship, such as co-development activities, are recorded as a reduction to research and development expense.

Customer Options. If an arrangement is determined to contain customer options that allow the customer to acquire additional goods or services, the goods and services underlying the customer options that are not determined to be material rights are not considered to be performance obligations at the outset of the arrangement, as they are contingent upon option exercise. The Company evaluates the customer options for material rights, or options to acquire additional goods or services for free or at a discount. If the customer options are determined to represent a material right, the material right is recognized as a separate performance obligation at the outset of the arrangement. The Company allocates the transaction price to material rights based on the relative standalone selling price, which is determined based on the identified discount and the probability that the customer will exercise the option. Amounts allocated to a material right are not recognized as revenue until, at the earliest, the option is exercised.

Milestone Payments. At the inception of each arrangement that includes research or development milestone payments, the Company evaluates whether the milestones are considered probable of being achieved and estimates the amount to be included in the transaction price using the most likely amount method. If it is probable that a significant revenue reversal would not occur, the associated milestone value is included in the transaction price. Milestone payments that are not within the control of the Company or the licensee, such as regulatory approvals, are not considered probable of being achieved until those approvals are received. The Company evaluates factors such as the scientific, clinical, regulatory, commercial, and other risks that must be overcome to achieve the particular milestone in making this assessment. There is considerable judgment involved in determining whether it is probable that a significant revenue reversal would not occur. At the end of each subsequent reporting period, the Company reevaluates the probability of achievement of all milestones subject to constraint and, if necessary, adjusts its estimate of the overall transaction price. Any such adjustments are recorded on a cumulative catch-up basis, which would affect revenues and earnings in the period of adjustment.

Royalties. For arrangements that include sales-based royalties, including milestone payments upon first commercial sales and milestone payments based on a level of sales, which are the result of a customer-vendor

relationship and for which the license is deemed to be the predominant item to which the royalties relate, the Company recognizes revenue at the later of (i) when the related sales occur, or (ii) when the performance obligation to which some or all of the royalty has been allocated has been satisfied or partially satisfied. To date, the Company has not recognized any royalty revenue resulting from any of its licensing arrangements.

For a complete discussion of accounting for collaboration revenues, see Note 8, *Collaboration and License Agreement*.

Prior to January 1, 2018, the Company recognized revenue from license and collaboration agreements in accordance with ASC Topic 605, *Revenue Recognition* (ASC 605). Accordingly, revenue was recognized when all of the following criteria were met:

- (1) persuasive evidence of an arrangement exists;
- (2) delivery has occurred or services have been rendered;
- (3) the seller's price to the buyer is fixed or determinable; and
- (4) collectability is reasonably assured.

Amounts received prior to satisfying the revenue recognition criteria were recognized as deferred revenue in the Company's balance sheets. Amounts expected to be recognized as revenue within the 12 months following the balance sheet date were classified as deferred revenue, current portion. Amounts not expected to be recognized as revenue within the 12 months following the balance sheet date were classified as deferred revenue, net of current portion.

When evaluating multiple element arrangements, the Company considered whether the deliverables under the arrangement represented separate units of accounting. This evaluation required subjective determinations and required management to make judgments about the individual deliverables and whether such deliverables were separable from the other aspects of the contractual relationship. In determining the units of accounting, management evaluated certain criteria, including whether the deliverables have standalone value, based on the consideration of the relevant facts and circumstances for each arrangement. The consideration received was allocated among the separate units of accounting using the relative selling price method, and the applicable revenue recognition criteria were applied to each of the separate units. Deliverables were considered separate units of accounting provided that: (i) the delivered item(s) has value to the customer on a stand-alone basis and (ii) if the arrangement includes a general right of return relative to the delivered item(s), delivery or performance of the undelivered item(s) is considered probable and substantially in the control of the Company. In assessing whether an item had stand-alone value, the Company considered factors such as the research, manufacturing and commercialization capabilities of the collaboration partner and the availability of the associated expertise in the general marketplace. In addition, the Company considered whether the collaboration partner could use the deliverable(s) for their intended purpose without the receipt of the remaining element(s), whether the value of the deliverable is dependent on the undelivered item(s) and whether there were other vendors that can provide the undelivered element(s). The Company's collaboration agreements with Alexion and Roche do not contain a general right of return relative to the delivered item(s).

Arrangement consideration that is fixed or determinable was allocated among the separate units of accounting using the relative selling price method. Then, the applicable revenue recognition criteria in ASC 605-25 were applied to each of the separate units of accounting in determining the appropriate period and pattern of recognition. The Company determined the selling price of a unit of accounting following the hierarchy of evidence prescribed by ASC 605-25. Accordingly, the Company determined the estimated selling price for units of accounting within each arrangement using vendor-specific objective evidence (VSOE) of selling price, if available, third-party evidence (TPE) of selling price if VSOE is not available, or best estimate of selling price (BESP) if neither VSOE nor TPE is available. The Company typically used BESP to estimate the selling price, since it generally did not have VSOE or TPE of selling price for its units of accounting. Determining the BESP for a unit of accounting required significant judgment. In developing the BESP for a unit of accounting, the Company considered applicable market conditions and relevant entity-specific factors, including factors that were contemplated in negotiating the agreement with the customer and estimated costs. The Company validated the BESP for units of accounting by evaluating whether changes in the key assumptions used to determine the BESP would have a significant effect on the allocation of arrangement consideration between multiple units of accounting.

In the event that an element of a multiple element arrangement did not represent a separate unit of accounting, the Company recognized revenue from the combined element over the period over which it expected to fulfill its performance obligations or as undelivered items were delivered, as appropriate, if all of the other revenue recognition criteria in ASC 605-25 were met. If the pattern of performance in which the service was provided to the customer could be determined and objectively measurable performance measures existed, then the Company recognized revenue under the arrangement using the proportional performance method. If there was no discernible pattern of performance and/or objectively measurable performance measures did not exist, then the Company recognized revenue under the arrangement on a straight-line basis over the period the Company was expected to complete its performance obligations. Revenue recognized was limited to the lesser of the cumulative amount of payments received or the cumulative amount of revenue earned, as determined using the straight-line method or proportional performance method, as applicable, as of the period ending date.

The Company's multiple-element revenue arrangements may include the following:

Exclusive Licenses

The deliverables under the Company's collaboration agreements may include exclusive licenses to research, develop, manufacture and commercialize licensed products. To account for this element of an arrangement, management evaluated whether an exclusive license had stand-alone value from the undelivered elements based on the consideration of the relevant facts and circumstances of the arrangement, including the research and development capabilities of the collaboration partner. The Company recognized the arrangement consideration allocated to licenses upon delivery of the license if facts and circumstances indicated that the license had stand-alone value from the undelivered elements, which generally included research and development services. The Company deferred arrangement consideration allocated to licenses if facts and circumstances indicated that the delivered license did not have stand-alone value from the undelivered elements.

When management believed a license did not have stand-alone value from the other deliverables to be provided in the arrangement, the Company recognized revenue attributed to the license on a proportional basis over the Company's contractual or estimated performance period, which was typically the term of the Company's research and development obligations. If management could not reasonably estimate when the Company's performance obligation ends, then revenue was deferred until management could reasonably estimate when the performance obligation ended. The periods over which revenue should be recognized were subject to estimates by management and could change over the course of the research and development and licensing agreement.

Research and Development Services

The deliverables under the Company's collaboration agreements may include research and development services to be performed by the Company on behalf of the partner. Payments or reimbursements resulting from the Company's research and development efforts were recognized as the services were performed and presented on a gross basis because the Company was the principal for such efforts, so long as there was persuasive evidence of an arrangement, the fee was fixed or determinable, and collection of the related amount was reasonably assured.

Milestone Revenue

The Company's collaboration agreements may include contingent milestone payments related to specified pre-clinical milestones, development milestones and sales-based commercial milestones.

At the inception of an arrangement that includes milestone payments, the Company evaluated whether each milestone was substantive and at risk to both parties on the basis of the contingent nature of the milestone. This evaluation included an assessment of whether:

- the consideration was commensurate with either the Company's performance to achieve the milestone or the enhancement of the value of the delivered item(s) as a result of a specific outcome resulting from the Company's performance to achieve the milestone;
- the consideration related solely to past performance; and

- the consideration was reasonable relative to all of the deliverables and payment terms within the arrangement.

The Company evaluated factors such as the scientific, clinical, regulatory, commercial and other risks that must be overcome to achieve the respective milestone and the level of effort and investment required to achieve the respective milestone in making this assessment. There was considerable judgment involved in determining whether a milestone satisfied all of the criteria required to conclude that a milestone was substantive. Milestones that were not considered substantive were accounted for as license payments and recognized over the remaining period of performance from the date of achievement of the milestone. Milestones that were considered substantive were recognized in their entirety upon successful accomplishment of the milestone with a cumulative catch up adjustments, assuming all other revenue recognition criteria were met.

Collaborative Arrangements

The Company analyzes its collaboration arrangements to assess whether such arrangements involve joint operating activities performed by parties that are both active participants in the activities and exposed to significant risks and rewards dependent on the commercial success of such activities and therefore within the scope of ASC Topic 808, *Collaborative Arrangements* (ASC 808). This assessment is performed throughout the life of the arrangement based on changes in the responsibilities of all parties in the arrangement. For collaboration arrangements within the scope of ASC 808 that contain multiple elements, the Company first determines which elements of the collaboration are deemed to be within the scope of ASC 808 and which elements of the collaboration are more reflective of a vendor-customer relationship and therefore within the scope of ASC 606. For elements of collaboration arrangements that are accounted for pursuant to ASC 808, an appropriate recognition method is determined and applied consistently, generally by analogy to ASC 606. Amounts that are owed to collaboration partners are recognized as an offset to collaboration revenues as such amounts are incurred by the collaboration partner. Where amounts owed to a collaboration partner exceed the Company's collaboration revenues in each quarterly period, such amounts are classified as research and development expense. For those elements of the arrangement that are accounted for pursuant to ASC 606, the Company applies the five-step model described above under ASC 606.

For a complete discussion of accounting for collaboration revenues, see Note 8, *Collaboration and License Agreement*.

Fair Value Measurements

The Company has certain financial assets and liabilities recorded at fair value which have been classified as Level 1, 2 or 3 within the fair value hierarchy as described in the accounting standards for fair value measurements.

- Level 1 — Fair values are determined utilizing quoted prices (unadjusted) in active markets for identical assets or liabilities that the Company has the ability to access;
- Level 2 — Fair values are determined by utilizing quoted prices for identical or similar assets and liabilities in active markets or other market observable inputs such as interest rates, yield curves and foreign currency spot rates; and
- Level 3 — inputs are unobservable inputs that reflect the Company's own assumptions about the assumptions market participants would use in pricing the asset or liability. Financial assets and liabilities are classified in their entirety based on the lowest level of input that is significant to the fair value measurement.

The Company's financial assets, which include cash equivalents and marketable securities, have been initially valued at the transaction price, and subsequently revalued at the end of each reporting period, utilizing third-party pricing services. The pricing services utilize industry standard valuation models, including both income and market based approaches, to determine value.

There have been no changes to the valuation methods during the years ended December 31, 2019 and 2018.

Cash and cash equivalents

The Company considers all highly liquid investments purchased with original maturities of 90 days or less from the date of purchase to be cash equivalents. As of December 31, 2019 and 2018, cash equivalents were comprised of money market funds and other debt securities with maturities less than 90 days from the date of purchase. Cash equivalents are reported at fair value.

Available-for-Sale Investments

The Company classifies marketable securities with a remaining maturity when purchased of greater than three months as available-for-sale. Marketable securities with a remaining maturity date greater than one year are classified as non-current. Available-for-sale securities are maintained by an investment manager and may consist of U.S. Treasury securities and U.S. government agency securities. Available-for-sale securities are carried at fair value with the unrealized gains and losses included in other comprehensive income (loss) as a component of stockholders' equity until realized. Any premium or discount arising at purchase is amortized and/or accreted to interest income and/or expense over the life of the instrument. Realized gains and losses are determined using the specific identification method and are included in other income (expense). If any adjustment to fair value reflects a decline in value of the investment, the Company considers all available evidence to evaluate the extent to which the decline is "other-than-temporary" and, if so, will mark the investment to market through a charge to the Company's statement of operations and comprehensive loss.

Comprehensive Income (Loss)

Comprehensive income (loss) is defined as the change in equity of a business enterprise during a period from transactions and other events and circumstances from non-owner sources. Other comprehensive income (loss) consisted of foreign currency translation adjustments, unrealized gains and losses on available-for-sale investments and unrealized gains and losses on pension benefit obligations.

Research and Development Costs

Expenditures relating to research and development are expensed in the period incurred. Research and development expenses consist of both internal and external costs associated with the development of the Company's selective cancer therapies and building of its discovery platform. As part of the process of preparing the consolidated financial statements, the Company accrues costs for clinical trial activities based upon estimates of the services received and related expenses incurred that have yet to be invoiced by the contract research organizations or other clinical trial vendors that perform the activities.

In certain circumstances, the Company is required to make nonrefundable advance payments to vendors for goods or services that will be received in the future for use in research and development activities. In such circumstances, the nonrefundable advance payments are deferred and capitalized, even when there is no alternative future use for the research and development, until related goods or services are provided. In circumstances where amounts have been paid in excess of costs incurred, the Company records a prepaid expense.

Property and Equipment, Net

Property and equipment consists of lab equipment, furniture and fixtures, computer equipment, software, and leasehold improvements, all of which is stated at cost. Expenditures for maintenance and repairs are recorded to expense as incurred, whereas major betterments are capitalized as additions to property and equipment. Depreciation is recognized over the estimated useful lives of the assets using the straight-line method.

Impairment of Long-Lived Assets

The Company continually evaluates whether events or circumstances have occurred that indicate that the estimated remaining useful life of its long-lived assets may warrant revision or that the carrying value of these assets may be impaired. The Company has not recognized any impairment charges through December 31, 2019.

Stock-Based Compensation Expense

Stock-based compensation awards are accounted for in accordance with ASC Topic 718, *Compensation – Stock Compensation* (ASC 718). The Company expenses the fair value of stock awards granted to employees and members of the board of directors over the requisite service period, which is typically the vesting period. Compensation cost for stock-based awards issued to employees is measured using the estimated fair value at the grant date and is adjusted to reflect actual forfeitures. Fair value of options granted to employees at the date of grant are estimated using the Black-Scholes option-pricing model that requires management to apply judgment and make estimates, including:

- expected volatility, which is calculated based on reported volatility data for a representative group of publicly traded companies for which historical information is available. For these analyses, the Company selects companies with comparable characteristics to itself including enterprise value, risk profiles, position within the industry, and with historical share price information sufficient to meet the expected life of the stock-based awards. The Company computes the historical volatility data using the daily closing prices for the selected companies' shares during the equivalent period of the calculated expected term of its stock-based awards. The Company intends to consistently apply this process using representative companies until a sufficient amount of historical information regarding the volatility of its own share price becomes available;
- risk-free interest rate, which is based on the U.S. Treasury yield curve in effect at the time of grant commensurate with the expected term assumption;
- expected term, which is calculated using the simplified method, as prescribed by the Securities and Exchange Commission Staff Accounting Bulletin No. 107, *Share-Based Payment*, as the Company has insufficient historical information regarding its stock options to provide a basis for an estimate. Under this approach, the weighted-average expected life is presumed to be the average of the contractual term of ten years and the weighted-average vesting term of the stock options, taking into consideration multiple vesting tranches;
- dividend yield, which is zero based on the fact that the Company never paid cash dividends and does not expect to pay any cash dividends in the foreseeable future.

Stock-based awards issued to non-employees, including directors for non-board-related services, are accounted for based on the fair value of such services received or of the intrinsic value of equity instruments issued, whichever is more reliably measured. The measurement date for non-employee awards is the date of grant. Stock-based awards subject to service-based vesting conditions are expensed on a straight-line basis over the vesting period.

The purchase price of common stock under the Company's 2015 employee stock purchase plan (as amended, the 2015 ESPP) is equal to 85% of the lesser of (i) the fair market value per share of the common stock on the first business day of an offering period and (ii) the fair market value per share of the common stock on the purchase date. The fair value of the discounted purchases made under 2015 ESPP is calculated using the Black-Scholes valuation model. The fair value of the look-back provision plus the 15% discount is recognized as compensation expense over the 180-day purchase period.

Income Taxes

The Company recognizes deferred tax assets and liabilities for the expected future tax consequences of events that have been recognized in the Company's financial statements or tax returns. Under this method, deferred tax assets and liabilities are determined based on differences between the financial statement carrying amounts and the tax bases of the assets and liabilities using the enacted tax rates in effect in the years in which the differences are expected to reverse. A valuation allowance against deferred tax assets is recorded if, based on the weight of the available evidence, it is more likely than not that some or all of the deferred tax assets will not be realized. The Company accounts for uncertain tax positions using a more-likely-than-not threshold for recognizing and resolving uncertain tax positions. The evaluation of uncertain tax positions is based on factors including, but not limited to, changes in the law, the measurement of tax positions taken or expected to be taken in tax returns, the effective settlement of matters subject to audit, new audit activity, and changes in facts or circumstances related to a tax position.

Foreign currency translation

The financial statements of each of the Company's subsidiaries with a functional currency other than the U.S. dollar are translated into U.S. dollars using period-end exchange rates for assets and liabilities, historical exchange rates for stockholders' equity and weighted average exchange rates for operating results. Translation gains and losses are included in accumulated other comprehensive income (loss) in stockholders' equity. Foreign currency transaction gains and losses are included in other (expense) income, net in the results of operations.

Reclassifications

Certain items in the prior year's consolidated financial statements have been reclassified to conform to the current presentation.

Concentrations of Credit Risk and Off-Balance-Sheet Risk

The Company has no significant off-balance-sheet risk such as foreign exchange contracts, option contracts, or other foreign hedging arrangements. Financial instruments that potentially expose the Company to concentrations of credit risk primarily consist of cash and cash equivalents, investments, accounts receivable and unbilled account receivables.

The Company maintains its cash, cash equivalents and investments in a custodian account at high quality financial institutions, and as of December 31, 2019 and 2018, substantially all the Company's cash, cash equivalents and investments were invested in money market funds and U.S. government agency and treasury obligations, and consequently, the Company believes that such funds are subject to minimal credit risk. The Company has adopted an investment policy that limits the amounts the Company may invest in any one type of investment. The Company has not experienced any credit losses and does not believe it is exposed to any significant credit risk on these funds.

Accounts receivables and unbilled accounts receivables represent amounts due from the Company's collaboration partners. The Company monitors economic conditions to identify facts or circumstances that may indicate that its receivables is at risk of collection.

Segment and Geographic Information

Operating segments are identified as components of an enterprise about which separate discrete financial information is available for evaluation by the chief operating decision maker, or decision-making group, in making decisions on how to allocate resources and assess performance. The Company's chief operating decision maker is the chief executive officer. The Company and the chief operating decision maker view the Company's operations and manage its business as one operating segment. The Company operates in the U.S. and Europe. All material long-lived assets of the Company reside in the U.S.

New Accounting Pronouncements

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 below, the Company does not believe that the adoption of recently issued standards have or may have a material impact on its consolidated financial statements and disclosures.

Leases

In February 2016, the FASB issued ASU No. 2016-02, *Leases (Topic 842)* (ASU 2016-02), a new standard issued to increase transparency and comparability among organizations related to their leasing activities. This standard established a right-of-use model that requires all lessees to recognize right-of-use assets and lease liabilities on their balance sheet that arise from leases as well as provide disclosures with respect to certain qualitative and quantitative

information related to a company's leasing arrangements to meet the objective of allowing users of financial statements to assess the amount, timing and uncertainty of cash flows arising from leases.

The FASB subsequently issued the following amendments to ASU 2016-02 that have the same effective date and transition date: ASU No. 2018-01, *Leases (Topic 842): Land Easement Practical Expedient for Transition to Topic 842*, ASU No. 2018-10, *Codification Improvements to Topic 842, Leases*, ASU No. 2018-11, *Leases (Topic 842): Targeted Improvements*, ASU No. 2018-20, *Narrow-Scope Improvement for Lessors*, and ASU No. 2019-01, *Leases (Topic 842): Codification Improvements*. The Company adopted these amendments with ASU 2016-02 (collectively, the new leasing standards, or ASC 842) effective January 1, 2019.

As permitted by the new leasing standards, the Company elected to adopt ASC 842 using the modified retrospective transition approach, with no restatement of prior periods or cumulative adjustment to retained earnings, and therefore, the consolidated balance sheet prior to January 1, 2019 continues to be reported under ASC Topic 840, *Leases*, (ASC 840), which did not require the recognition of operating lease liabilities on the balance sheet, and is not comparative.

Upon adoption of the new leasing standards under ASC 842, the Company elected the package of transition practical expedients, which allowed it to carry forward prior conclusions related to whether any expired or existing contracts are or contain leases, the lease classification for any expired or existing leases and initial direct costs for existing leases. The leases that were classified as operating leases under ASC 840 were classified as operating leases under ASC 842, and the accounting for finance leases (capital leases) was substantially unchanged. The Company elected to apply the practical expedient not to separate lease and non-lease components for new and modified leases commencing after adoption. The Company also made an accounting policy election to not recognize leases with an initial term of 12 months or less within the consolidated balance sheets and to recognize those lease payments on a straight-line basis in the consolidated statements of operations over the lease term.

Impact of Adoption of ASC 842

Upon adoption of the new leasing standards under ASC 842, the Company recognized an adjustment of \$54.2 million and \$74.1 million to operating lease right-of-use assets and the related lease liabilities, respectively. The operating lease liabilities are based on the present value of the remaining minimum lease payments discounted using the Company's secured incremental borrowing rate at the effective date of January 1, 2019. The adoption of the new leasing standards did not have an impact on the Company's consolidated statements of operations.

The impact of the adoption of ASC 842 on the consolidated balance sheet was as follows:

	Impact of ASC 842 Adoption on Consolidated Balance Sheet as of January 1, 2019		
	Balances without adoption of ASC 842	ASC 842 Adjustment	Balances with adoption of ASC 842
(in thousands)			
Operating lease right-of-use assets, net	\$ —	\$ 54,245	\$ 54,245
Total assets	540,124	54,245	594,369
Accrued expenses	51,711	(125)	51,586
Current portion of operating lease liabilities	—	4,730	4,730
Current portion of lease incentive obligation	1,714	(1,714)	—
Total current liabilities	60,323	2,891	63,214
Deferred rent, net of current portion	5,130	(5,130)	—
Operating lease liabilities, net of current portion	—	69,387	69,387
Lease incentive obligation, net of current portion	12,903	(12,903)	—
Total liabilities	121,115	54,245	175,360

Leases Accounting Policy

For contracts entered into on or after the effective date, at the inception of a contract, the Company assesses whether the contract is, or contains, a lease. The assessment is based on: (1) whether the contract involves the use of a distinct identified asset, (2) whether the Company obtains the right to substantially all the economic benefit from the use of the asset throughout the period, and (3) whether the Company has the right to direct the use of the asset. At inception of a lease, the Company allocates the consideration in the contract to each lease component based on its relative stand-alone price to determine the lease payments.

Leases are classified as either finance leases or operating leases. A lease is classified as a finance lease if any one of the following criteria are met: the lease transfers ownership of the asset by the end of the lease term, the lease contains an option to purchase the asset that is reasonably certain to be exercised, the lease term is for a major part of the remaining useful life of the asset or the present value of the lease payments equals or exceeds substantially all of the fair value of the asset. A lease is classified as an operating lease if it does not meet any of these criteria.

For all leases at the lease commencement date, a right-of-use asset and a lease liability are recognized. The right-of-use asset represents the right to use the leased asset for the lease term. The lease liability represents the present value of the lease payments under the lease.

The right-of-use asset is initially measured at cost, which primarily comprises the initial amount of the lease liability, plus any initial direct costs incurred if any, less any lease incentives received. All right-of-use assets are reviewed for impairment. The lease liability is initially measured at the present value of the lease payments, discounted using the interest rate implicit in the lease or, if that rate cannot be readily determined, the secured incremental borrowing rate for the same term as the underlying lease.

Lease payments included in the measurement of the lease liability comprise the following: the fixed noncancelable lease payments, payments for optional renewal periods where it is reasonably certain the renewal period will be exercised, and payments for early termination options unless it is reasonably certain the lease will not be terminated early.

Lease cost for operating leases consists of the lease payments plus any initial direct costs, primarily brokerage commissions, and is recognized on a straight-line basis over the lease term. Included in lease cost are any variable lease payments incurred in the period that are not included in the initial lease liability and lease payments incurred in the period for any leases with an initial term of 12 months or less. Lease cost for finance leases consists of the amortization of the right-of-use asset on a straight-line basis over the lease term and interest expense determined on an amortized cost basis. The lease payments are allocated between a reduction of the lease liability and interest expense.

Credit Losses

In June 2016, the FASB issued ASU No. 2016-13, *Financial Instruments - Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments* (ASU 2016-13). The FASB has subsequently issued amendments to ASU 2016-13, which have the same effective date and transition date of January 1, 2020. These standards require that credit losses be reported using an expected losses model rather than the incurred losses model that is currently used, and establish additional disclosures related to credit risks. For available-for-sale debt securities with unrealized losses, these standards now require allowances to be recorded instead of reducing the amortized cost of the investment.

The Company adopted the new standard on January 1, 2020 and has substantially completed the assessment of the standard based on the composition of its portfolio of financial instruments and current and forecasted economic conditions as of January 1, 2020. The Company has substantially completed its calculations for credit losses and established processes and internal controls that are required to comply with the new credit loss standard and related disclosure requirements. The Company does not expect the adoption of this standard to have a significant impact on its consolidated financial position and results of operations.

Debt Securities

In March 2017, the FASB issued ASU No. 2017-08, *Receivables - Nonrefundable Fees and Other Costs (Subtopic 310-20): Premium Amortization on Purchased Callable Debt Securities*. This standard amends the amortization period for certain purchased callable debt securities held at a premium by shortening the amortization period to the earliest call date. This standard became effective for the Company on January 1, 2019, and was adopted using a modified retrospective transition approach. The adoption of this standard did not result in a significant adjustment to the Company's marketable debt securities.

Fair Value Measurements

In August 2018, the FASB issued ASU No. 2018-13, *Fair Value Measurement (Topic 820): Disclosure Framework Changes to the Disclosure Requirements for Fair Value Measurement*. This standard modifies certain disclosure requirements on fair value measurements. This standard was effective for the Company on January 1, 2020. The Company does not expect that the adoption of this standard to have a material impact on the disclosures of its consolidated financial statements.

Collaborative Arrangements

In November 2018, the FASB issued ASU No. 2018-18, *Collaborative Arrangements (Topic 808): Clarifying the Interaction between Topic 808 and Topic 606*. This standard makes targeted improvements for collaborative arrangements as follows:

- Clarifies that certain transactions between collaborative arrangement participants should be accounted for as revenue under ASC 606, when the collaborative arrangement participant is a customer in the context of a unit of account. In those situations, all the guidance in ASC 606 should be applied, including recognition, measurement, presentation and disclosure requirements;
- Adds unit-of-account guidance to ASC 808, to align with the guidance in ASC 606 (that is, a distinct good or service) when an entity is assessing whether the collaborative arrangement or a part of the arrangement is within the scope of ASC 606; and
- Requires that in a transaction with a collaborative arrangement participant that is not directly related to sales to third parties, presenting that transaction together with revenue recognized under ASC 606 is precluded if the collaborative arrangement participant is not a customer.

The standard is effective for interim and annual periods beginning after December 15, 2019, with early adoption permitted. A retrospective transition approach is required for either all contracts or only for contracts that are not completed at the date of initial application of ASC 606, with a cumulative adjustment to opening retained earnings. The Company adopted the new standard on January 1, 2020 and does not expect the adoption of this standard to have a significant impact on its consolidated financial position and results of operations.

Internal-Use Software

In August 2018, the FASB issued ASU No. 2018-15, *Intangibles-Goodwill and Other-Internal-Use Software (Subtopic 350-40): Customer's Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement That Is a Service Contract*, which clarifies the accounting for implementation costs in cloud computing arrangements. The standard is effective for interim and annual periods beginning after December 15, 2019, with early adoption permitted, and can be adopted prospectively or retrospectively.

The Company adopted the new standard on January 1, 2020 on a prospective basis and is continuing to establish new processes and internal controls that may be required to comply with the new cloud computing standard. The Company does not expect the adoption of this standard to have a significant impact on its consolidated financial position and results of operations; however, the adoption of this standard will result in an increase in capitalized assets related to qualifying cloud computing arrangement implementation costs incurred after the adoption date.

3. Cash Equivalents and Investments

Cash equivalents and investments, available-for-sale, consisted of the following at December 31, 2019 and December 31, 2018 (in thousands):

	Amortized Cost	Unrealized Gain	Unrealized Losses	Fair Value
December 31, 2019				
Cash equivalents:				
Money market funds	\$ 113,938	\$ —	\$ —	\$ 113,938
Investments, available-for-sale:				
U.S. government agency securities	128,156	160	(4)	128,312
U.S. treasury bills	305,360	358	(8)	305,710
Total	<u>\$ 547,454</u>	<u>\$ 518</u>	<u>\$ (12)</u>	<u>\$ 547,960</u>
	Amortized Cost	Unrealized Gain	Unrealized Losses	Fair Value
December 31, 2018				
Cash equivalents:				
Money market funds	\$ 68,064	\$ —	\$ —	\$ 68,064
Investments, available-for-sale:				
U.S. government agency securities	99,940	—	(80)	99,860
U.S. treasury bills	326,172	—	(84)	326,088
Total	<u>\$ 494,176</u>	<u>\$ —</u>	<u>\$ (164)</u>	<u>\$ 494,012</u>

At December 31, 2019 and 2018, the Company held 11 and 54 securities, respectively, that were in an unrealized loss position. The aggregate fair value of securities held by the Company in an unrealized loss position for less than twelve months as of December 31, 2019 and 2018 were \$82.1 million and \$397.5 million, respectively, and there were no securities held by the Company in an unrealized loss position for more than twelve months. The Company has the intent and ability to hold such securities until recovery. The Company determined that there was no material change in the credit risk of the above investments. As a result, the Company determined it did not hold any investments with an other-than-temporary impairment as of December 31, 2019 and 2018.

As of December 31, 2019, 9 securities with an aggregate fair value of \$64.4 million had remaining maturities greater than one year. No available-for-sale securities held as of December 31, 2018 had remaining maturities greater than one year.

4. Fair Value of Financial Instruments

The following table summarizes the Company's cash equivalents and marketable securities measured at fair value on a recurring basis as of December 31, 2019 (in thousands):

Description	December 31, 2019	Active Markets (Level 1)	Observable Inputs (Level 2)	Unobservable Inputs (Level 3)
Financial Assets				
Cash equivalents:				
Money market funds	\$ 113,938	\$ 113,938	\$ —	\$ —
Investments, available-for-sale:				
U.S. government agency securities	128,312	—	128,312	—
U.S. treasury bills	305,710	305,710	—	—
Total	<u>\$ 547,960</u>	<u>\$ 419,648</u>	<u>\$ 128,312</u>	<u>\$ —</u>

The following table summarizes the Company's cash equivalents and marketable securities measured at fair value on a recurring basis as of December 31, 2018 (in thousands):

Description	December 31, 2018	Active Markets (Level 1)	Observable Inputs (Level 2)	Unobservable Inputs (Level 3)
Financial Assets				
Cash equivalents:				
Money market funds	\$ 68,064	\$ 68,064	\$ —	\$ —
Investments, available-for-sale:				
U.S. government agency securities	99,860	99,860	—	—
U.S. treasury bills	326,088	326,088	—	—
Total	<u>\$ 494,012</u>	<u>\$ 494,012</u>	<u>\$ —</u>	<u>\$ —</u>

5. Restricted Cash

At December 31, 2019 and 2018, respectively, \$5.7 million and \$5.4 million, of the Company's cash is restricted by a bank primarily related to security deposits for the lease agreements for the Company's current and former corporate headquarters.

For additional information on these security deposits, see Note 14, *Leases*.

6. Property and Equipment, Net

Property and equipment and related accumulated depreciation are as follows (in thousands):

	Estimated Useful Life (Years)	As of December 31,	
		2019	2018
Lab equipment	5	\$ 8,975	\$ 6,232
Furniture and fixtures	4	3,512	2,369
Computer equipment	3	1,558	1,805
Leasehold improvements	Term of lease	36,627	26,640
Software	3	417	280
Construction-in-progress		956	956
		<u>52,045</u>	<u>38,282</u>
Less: accumulated depreciation and amortization		<u>(13,684)</u>	<u>(8,655)</u>
Total property and equipment, net		<u>\$ 38,361</u>	<u>\$ 29,627</u>

Property, plant and equipment are recorded at historical cost, net of accumulated depreciation. Depreciation expense for the years ended December 31, 2019, 2018 and 2017 was \$5.3 million, \$4.2 million and \$1.6 million, respectively.

7. Accrued Expenses

Accrued expenses consist of the following (in thousands):

	As of December 31,	
	2019	2018
External research and development	\$ 59,420	\$ 36,213
Employee compensation	13,519	8,071
Accrued professional fees	12,042	4,423
Property and equipment costs	906	912
Other	2,819	2,092
	<u>\$ 88,706</u>	<u>\$ 51,711</u>

8. Collaboration and License Agreement

Clementia

On October 15, 2019, the Company entered into a license agreement (the Clementia agreement) with Clementia Pharmaceuticals, Inc. (Clementia), a wholly-owned subsidiary of Ipsen S.A. Under the Clementia agreement, the Company granted an exclusive, worldwide, royalty-bearing license to Clementia to develop and commercialize BLU-782, the Company's oral, highly selective investigational ALK2 inhibitor in Phase 1 clinical development for the treatment of fibrodysplasia ossificans progressive (FOP), as well as specified other compounds related to the BLU-782 program.

The Company received an upfront cash payment of \$25.0 million, and subject to the terms of the Clementia agreement, the Company will be eligible to receive up to \$510.0 million in milestone and other payments, including a \$20.0 million cash milestone payment due in the third quarter of 2020 and up to \$490.0 million in other payments and potential development, regulatory and sales-based milestone payments for licensed products. In addition, Clementia is obligated to pay to the Company royalties on aggregate annual worldwide net sales of licensed products at tiered percentage rates ranging from the low- to mid-teens, subject to adjustment in specified circumstances under the Clementia agreement, and to purchase specified manufacturing inventory from the Company for a total of \$1.5 million.

Unless earlier terminated in accordance with the terms of the Clementia agreement, the agreement will expire on a country-by-country, licensed product-by-licensed product basis on the date when no royalty payments are or will become due. Clementia may terminate the agreement at any time on or after the second anniversary of the effective date

of the agreement upon at least 12 months' prior written notice to the Company, which cannot be delivered before the first anniversary of the effective date. Either party may terminate the agreement for the other party's uncured material breach or insolvency and in certain other circumstances agreed to by the parties. In certain termination circumstances, the Company is entitled to retain specified licenses to be able to continue to exploit the Clementia licensed products.

The Company evaluated the Clementia agreement under ASC 606 as the agreement represented a transaction with a customer. The Company identified the following material promises under the agreement: (1) the exclusive license to develop, manufacture and commercialize BLU-782; (2) the technology transfer of BLU-782 program; (3) the transfer of existing manufacturing inventory; and (4) the transfer of in-process manufacturing inventory. In addition, the Company determined that the exclusive license and technology transfer were not distinct from each other, as exclusive license has limited value without the corresponding technology transfer. As such, for the purposes of ASC 606, the Company determined that these four material promises, described above, should be combined into three performance obligations: (1) the exclusive license and the technology transfer; (2) the transfer of existing manufacturing inventory; and (3) the transfer of in-process manufacturing inventory.

The Company determined that the transaction price as of the outset of the arrangement was \$46.5 million, which consists of the upfront amount of \$25.0 million, the \$20.0 million cash milestone payment due in the third quarter of 2020, the purchase of existing manufacturing inventory of \$1.2 million and the purchase of in-process manufacturing inventory of \$0.3 million. The other potential milestone payments that the Company is eligible to receive were excluded from the transaction price, as all milestone amounts were fully constrained based on the probability of achievement. The transaction price was allocated to the three performance obligation on a relative stand-alone selling price basis. The Company satisfies the performance obligations upon delivery of the license and completion of the technology transfer and inventory transfers.

As of December 31, 2019, the Company completed the delivery of the license, the technology transfer and the transfer of existing manufacturing inventory and recognized a total of \$46.2 million as revenue, of which \$20.0 million cash milestone payment due in the third quarter of 2020 was recorded as unbilled accounts receivable. There was no revenue deferred as a contract liability associated with the Clementia agreement as of December 31, 2019 and 2018.

CStone Pharmaceuticals

On June 1, 2018, the Company entered into a collaboration and license agreement (the CStone agreement) with CStone Pharmaceuticals (CStone) pursuant to which the Company granted CStone exclusive rights to develop and commercialize the Company's drug candidates avapritinib, pralsetinib and fisogatinib, including back-up forms and certain other forms thereof, in Mainland China, Hong Kong, Macau and Taiwan (each, a CStone region and collectively, the CStone territory), either as a monotherapy or as part of a combination therapy. The Company retains exclusive rights to the licensed products outside the CStone territory.

The Company received an upfront cash payment of \$40.0 million, and subject to the terms of the CStone agreement, will be eligible to receive up to approximately \$346.0 million in milestone payments, including \$118.5 million related to development and regulatory milestones and \$227.5 million related to sales-based milestones. In addition, CStone will be obligated to pay the Company tiered percentage royalties on a licensed product-by-licensed product basis ranging from the mid-teens to low twenties on annual net sales of each licensed product in the CStone territory, subject to adjustment in specified circumstances. CStone will be responsible for costs related to the development of the licensed products in the CStone territory, other than specified costs related to the development of fisogatinib as a combination therapy in the CStone territory that will be shared by the Company and CStone.

Pursuant to the terms of the CStone agreement, CStone will be responsible for conducting all development and commercialization activities in the CStone territory related to the licensed products, and the Company and CStone have initiated a clinical trial in China evaluating fisogatinib in combination with CS1001, a clinical-stage anti-programmed death ligand-1 immunotherapy being developed by CStone, as a first-line therapy for the treatment of patients with hepatocellular carcinoma.

The CStone agreement will continue on a licensed product-by-licensed product and CStone region-by-CStone region basis until the later of (i) 12 years after the first commercial sale of a licensed product in a CStone region in the CStone territory and (ii) the date of expiration of the last valid patent claim related to the Company's patent rights or any joint collaboration patent rights for the licensed product that covers the composition of matter, method of use or method

of manufacturing such licensed product in such region. Subject to the terms of the CStone agreement, CStone may terminate the CStone agreement in its entirety or with respect to one or more licensed products for convenience by providing written notice to the Company after June 1, 2019, and CStone may terminate the CStone agreement with respect to a licensed product for convenience at any time by providing written notice to the Company following the occurrence of specified events. In addition, the Company may terminate the CStone agreement under specified circumstances if CStone or certain other parties challenges the Company's patent rights or any joint collaboration patent rights or if CStone or its affiliates do not conduct any material development or commercialization activities with respect to one or more licensed products for a specified period of time, subject to specified exceptions. Either party may terminate the CStone agreement for the other party's uncured material breach or insolvency. In certain termination circumstances, the parties are entitled to retain specified licenses to be able to continue to exploit the licensed products, and in the event of termination by CStone for the Company's uncured material breach, the Company will be obligated to pay CStone a low single digit percentage royalty on a licensed product-by-licensed product basis on annual net sales of such licensed product in the CStone territory, subject to a cap and other specified exceptions.

The Company evaluated the CStone agreement to determine whether it is a collaborative arrangement for purposes of ASC 808. The Company determined that there were two material components of the CStone agreement: (i) the CStone territory-specific license and related activities in the CStone territory, and (ii) the parties' participation in global development of the licensed products. The Company concluded that the CStone territory-specific license and related activities in the CStone territory are not within the scope of ASC 808 because the Company is not exposed to significant risks and rewards. The Company concluded that CStone is a customer with regard to the component that includes the CStone territory-specific license and related activities in CStone territory, which include manufacturing. For the parties' participation in global development of the licensed products, the Company concluded that the research and development activities and cost-sharing payments related to such activities are within the scope of ASC 808 as both parties are active participants exposed to the risk of the activities under the CStone agreement. The Company concluded that CStone is not a customer with regard to the global development component in the context of the CStone agreement. Therefore, payments received by the Company for global development activities under the CStone agreement, including manufacturing, will be accounted for as a reduction of related expenses.

A summary of manufacturing services related to the global development activities during the years ended December 31, 2019 and 2018 is as follows (in thousands):

	Year Ended December 31,	
	2019	2018
Manufacturing services related to global development activities	\$ 3,286	\$ 496

The Company evaluated the CStone territory-specific license and related activities in the CStone territory under ASC 606 as these transactions are considered transactions with a customer. The Company identified the following material promises under the arrangement: (1) the three exclusive licenses granted in the CStone territory to develop, manufacture and commercialize the three licensed products; (2) the initial know-how transfer for each licensed product; (3) manufacturing activities related to development and commercial supply of the licensed products; (4) participation in the joint steering committee (JSC) and joint project teams (JPT); (5) regulatory responsibilities; and (6) manufacturing technology and continuing know-how transfers. The Company determined that each licensed product is distinct from the other licensed products. In addition, the Company determined that the exclusive licenses and initial know-how transfers for each licensed product were not distinct from each other, as each exclusive license has limited value without the corresponding initial know-how transfer. For purposes of ASC 606, the Company determined that that participation on the JSC and JPTs, the regulatory responsibilities and the manufacturing technology and continuing know-how transfers are qualitatively and quantitatively immaterial in the context of the CStone agreement and therefore are excluded from performance obligations. As such, the Company determined that these six material promises, described above, should be combined into one performance obligation for each of the three candidates.

The Company evaluated the provision of manufacturing activities related to development and commercial supply of the licensed products as an option for purposes of ASC 606 to determine whether these manufacturing activities provide CStone with any material rights. The Company concluded that the manufacturing activities were not issued at a significant and incremental discount, and therefore do not provide CStone with any material rights. As such, the manufacturing activities are excluded as performance obligations at the outset of the arrangement.

Based on these assessments, the Company identified three distinct performance obligations at the outset of the CStone agreement, which consists of the following for each licensed product: (1) the exclusive license and (2) the initial know-how transfer.

Under the CStone agreement, in order to evaluate the transaction price for purposes of ASC 606, the Company determined that the upfront amount of \$40.0 million constituted the entirety of the consideration to be included in the transaction price as of the outset of the arrangement, which was allocated to the three performance obligations. The potential milestone payments that the Company is eligible to receive were excluded from the transaction price, as all milestone amounts were fully constrained based on the probability of achievement. The Company satisfied the performance obligations upon delivery of the licenses, initial know-how transfers and product trademark and recognized the upfront payment of \$40.0 million as revenue during the second quarter of 2018.

The Company will reevaluate the transaction price at the end of each reporting period and as uncertain events are resolved or other changes in circumstances occur, and if necessary, the Company will adjust its estimate of the transaction price, and any addition to the transaction price would be recognized as revenue when it becomes probable that inclusion would not lead to a significant revenue reversal. During the year ended December 31, 2019, several development and regulatory milestones were achieved and the associated aggregate cash consideration of \$12.0 million for such milestones was added to the estimated transaction price for the CStone agreement.

A summary of revenue recognized under the CStone agreement during the years ended December 31, 2019 and 2018 is as follows (in thousands):

	Year Ended December 31,	
	2019	2018
License milestone revenue	\$ 12,000	\$ 40,000
Manufacturing services related to territory-specific activities	144	—
Total CStone collaboration revenue	<u>\$ 12,144</u>	<u>\$ 40,000</u>

The following table presents the receivables including the contract assets associated with the CStone agreement as of December 31, 2019 and 2018 (in thousands):

	As of December 31,	
	2019	2018
Accounts receivables	\$ 663	\$ —
Unbilled accounts receivables	\$ 2,749	\$ 151

There was no revenue deferred as a contract liability associated with the CStone agreement as of December 31, 2019 and 2018.

Roche

In March 2016, the Company entered into a collaboration and license agreement (as amended, Roche agreement) with F. Hoffmann-La Roche Ltd and Hoffmann-La Roche Inc. (collectively, Roche) for the discovery, development and commercialization of small molecule therapeutics targeting kinases believed to be important in cancer immunotherapy, as single products or possibly in combination with other therapeutics. As a result of an amendment to the Roche agreement in the fourth quarter of 2019, the parties are currently conducting activities for up to four programs under the collaboration.

Under the Roche agreement, Roche was initially granted up to five option rights to obtain an exclusive license to exploit products derived from the collaboration programs in the field of cancer immunotherapy. Such option rights are triggered upon the achievement of Phase 1 proof-of-concept. For up to two collaboration programs, if Roche exercises its option, Roche will receive worldwide, exclusive commercialization rights for the licensed products. For up to two collaboration programs, if Roche exercises its option, the Company will retain commercialization rights in the U.S. for

the licensed products, and Roche will receive commercialization rights outside of the U.S. for the licensed products. The Company will also retain worldwide rights to any products for which Roche elects not to exercise its applicable option.

Prior to Roche's exercise of an option, the Company will have the lead responsibility for drug discovery and pre-clinical development of all collaboration programs. In addition, the Company will have the lead responsibility for the conduct of all Phase 1 clinical trials other than those Phase 1 clinical trials for any product in combination with Roche's portfolio of therapeutics, for which Roche will have the right to lead the conduct of such Phase 1 clinical trials. Pursuant to the Roche agreement, the parties will share the costs of Phase 1 development for each collaboration program. In addition, Roche will be responsible for post-Phase 1 development costs for each licensed product for which it retains global commercialization rights, and the Company and Roche will share post-Phase 1 development costs for each licensed product for which the Company retains commercialization rights in the U.S.

The Company received an upfront cash payment of \$45.0 million in March 2016 upon execution of the Roche agreement, and subject to the terms of the Roche agreement, the Company will be eligible to receive up to approximately \$940.0 million in contingent option fees and milestone payments related to specified research, pre-clinical, clinical, regulatory and sales-based milestones. Of the total contingent payments, up to approximately \$190.0 million are for option fees and milestone payments for research, pre-clinical and clinical development events prior to licensing across all four potential collaboration programs.

In addition, for any licensed product for which Roche retains worldwide commercialization rights, the Company will be eligible to receive tiered royalties ranging from low double-digits to high-teens on future net sales of the licensed product. For any licensed product for which the Company retains commercialization rights in the U.S., the Company and Roche will be eligible to receive tiered royalties ranging from mid-single-digits to low double-digits on future net sales in the other party's respective territories in which it commercializes the licensed product. The upfront cash payment and any payments for milestones, option fees and royalties are non-refundable, non-creditable and not subject to set-off.

The Roche agreement will continue until the date when no royalty or other payment obligations are or will become due, unless earlier terminated in accordance with the terms of the Roche agreement. Prior to its exercise of its first option, Roche may terminate the Roche agreement at will, in whole or on a collaboration target-by-collaboration target basis, upon 120 days' prior written notice to the Company. Following its exercise of an option, Roche may terminate the Roche agreement at will, in whole, on a collaboration target-by-collaboration target basis, on a collaboration program-by-collaboration program basis or, if a licensed product has been commercially sold, on a country-by-country basis, (i) upon 120 days' prior written notice if a licensed product has not been commercially sold or (ii) upon 180 days' prior written notice if a licensed product has been commercially sold. Either party may terminate the Roche agreement for the other party's uncured material breach or insolvency and in certain other circumstances agreed to by the parties. In certain termination circumstances, the Company is entitled to retain specified licenses to be able to continue to exploit the licensed products.

The Company assessed this arrangement in accordance with ASC 606 upon the adoption of the new standard on January 1, 2018, and concluded that the contract counterparty, Roche, is a customer prior to the exercise, if any, of an option by Roche. The Company identified the following material promises under the arrangement: (1) a non-transferable, sub-licensable and non-exclusive license to use the Company's intellectual property and collaboration compounds to conduct research activities; (2) research and development activities through Phase 1 clinical trials under the research plan; (3) five option rights for licenses to develop, manufacture, and commercialize the collaboration targets; (4) participation on a joint research committee (JRC) and joint development committee (JDC); and (5) regulatory responsibilities under Phase 1 clinical trials. The Company determined that the license and research and development activities were not distinct from another, as the license has limited value without the performance of the research and development activities. Participation on the JRC and JDC to oversee the research and development activities was determined to be quantitatively and qualitatively immaterial and therefore is excluded from performance obligations. The regulatory responsibilities related to filings and obtaining approvals related to the drugs that may result from each program do not represent separate performance obligations based on their dependence on the research and development efforts. As such, the Company determined that these promises should be combined into a single performance obligation.

The Company evaluated the option rights for licenses to develop, manufacture, and commercialize the collaboration targets to determine whether it provides Roche with any material rights. The Company concluded that the

options were not issued at a significant and incremental discount, and therefore do not provide material rights. As such, they are excluded as performance obligations at the outset of the arrangement.

Based on these assessments, the Company identified one performance obligation at the outset of the Roche agreement, which consists of: (1) the non-exclusive license; (2) the research and development activities through Phase 1; and (3) regulatory responsibilities under Phase 1 clinical trials.

Under the Roche agreement, in order to evaluate the appropriate transaction price, the Company determined that as of January 1, 2018, the upfront amount of \$45.0 million constituted the entirety of the consideration to be included in the transaction price as of the outset of the arrangement, which was allocated to the single performance obligation. The option exercise payments that may be received are excluded from the transaction price until each customer option is exercised as it was determined that the options are not material rights. The potential milestone payments that the Company is eligible to receive prior to the exercise of the options were initially excluded from the transaction price, as all milestone amounts were fully constrained based on the probability of achievement. The Company will reevaluate the transaction price at the end of each reporting period and as uncertain events are resolved or other changes in circumstances occur, and, if necessary, adjust its estimate of the transaction price.

In June 2018 and October 2019, the Company achieved a \$10.0 million research and milestone payment and an \$8.0 million research milestone payment under the Roche agreement. These amounts were added to the estimated transaction price and allocated to the existing performance obligation as it became probable that a significant reversal of cumulative revenue would not occur for each of the research milestones achieved.

The Company recognizes revenue associated with the performance obligation as the research and development services are provided using an input method, according to the costs incurred as related to the research and development activities on each program and the costs expected to be incurred in the future to satisfy the performance obligation. The transfer of control occurs over this time period and, in management's judgment, is the best measure of progress towards satisfying the performance obligation. The amounts received that have not yet been recognized as revenue are deferred as a contract liability on the Company's consolidated balance sheet and will be recognized over the remaining research and development period until the performance obligation is satisfied.

During the year ended December 31, 2019, as a result of an amendment to the Roche agreement, a reduction in the costs expected to be incurred in the future to satisfy certain performance obligations under the collaboration became probable, and accordingly, the Company recorded a cumulative catch-up of \$1.6 million to revenue; In addition, due to the achievement of the \$8.0 million research milestone in October 2019, the Company recognized another cumulative catch-up of \$1.6 million to revenue.

A summary of revenue recognized under the Roche agreement during the years ended December 31, 2019 and 2018 is as follows (in thousands):

	Year Ended December 31,	
	2019	2018
Roche collaboration research and development services revenue	\$ 8,165	\$ 4,521

During the years ended December 31, 2019 and 2018, the Company recognized the following revenue due to the changes in the contract liability balances (in thousands):

	Year Ended December 31,	
	2019	2018
Amounts included in the contract liability at the beginning of the period	\$ 4,578	\$ 4,277

As of December 31, 2019, the Company had revenue deferred as a contract liability related to the Roche agreement of \$46.1 million, of which \$6.2 million was included in current liabilities, and the research and development services related to the performance obligation are expected to be performed over a remaining period of approximately 5.3 years. As of December 31, 2018, the Company had revenue deferred as a contract liability related to the Roche agreement of \$46.2 million, of which \$3.6 million was included in current liabilities.

Alexion

In March 2015, the Company entered into a research, development and commercialization agreement (Alexion agreement) with Alexion to research, develop and commercialize one or more drug candidates targeting the ALK2 kinase for the treatment of FOP. Since the Alexion agreement was terminated in October 2017, the Company recognized revenue from the agreement in accordance with ASC 605.

Prior to the termination, the Company had received an aggregate amount of \$18.8 million in upfront and milestone payments, which consisted of a \$15.0 million non-refundable upfront payment upon execution of the Alexion agreement and an aggregate amount of \$3.8 million in pre-clinical milestone payments. The Company was not entitled to receive payment from Alexion for any research and development expenses incurred after October 24, 2017 and as a result, the Company did not recognize any revenue under the Alexion agreement for the year ended December 31, 2018.

During the year ended December 31, 2017, the Company recognized \$16.2 million revenue under the Alexion agreement, of which \$9.5 million related to reimbursable research and development costs and \$6.7 million related to the remaining portion of the upfront and milestone payments previously received.

9. Term Loan

In May 2013, the Company entered into a loan and security agreement with Silicon Valley Bank, which provided for up to \$5.0 million in funding, to be made available in three tranches. Loan advances accrue interest at a fixed rate of 2% above the prime rate. In November 2014, the Company amended the loan to allow the Company to borrow an additional \$5.0 million. The Company accounted for the amendment as a modification to the existing 2013 loan. The Company immediately drew the additional \$5.0 million and was required to make interest-only payments until December 1, 2015, and consecutive monthly payments of principal, plus accrued interest, over the remaining term through November 2018. The Company was required to pay a fee of 4% of the total loan advances at the end of the term of each of the loan. The fee had been accreted to interest expense over the term of the loan. As of December 31, 2019 and 2018, the Company had no outstanding principal and interest under the loan and security agreement.

10. Stock-based Compensation

2015 Stock Option and Incentive Plan

In 2015, the Company's board of directors and stockholders approved the 2015 Stock Option and Incentive Plan (the 2015 Plan), which replaced the Company's 2011 Stock Option and Grant Plan, as amended (the 2011 Plan). The 2015 Plan includes incentive stock options, nonstatutory stock options, stock appreciation rights, restricted stock, restricted stock units, unrestricted stock, performance share awards and cash-based awards. The Company initially reserved a total of 1,460,084 shares of common stock for the issuance of awards under the 2015 Plan. The 2015 Plan provides that the number of shares reserved and available for issuance under the 2015 Plan will be cumulatively increased on January 1 of each calendar year by 4% of the number of shares of common stock issued and outstanding on the immediately preceding December 31 or such lesser amount as specified by the compensation committee of the board of directors. For the calendar years beginning January 1, 2019 and 2020, the number of shares reserved for issuance under the 2015 Plan was increased by 1,761,481 and 1,970,888 shares, respectively. In addition, the total number of shares reserved for issuance is subject to adjustment in the event of a stock split, stock dividend or other change in the Company's capitalization. At December 31, 2019, there were 1,364,378 shares available for future grant under the 2015 Plan.

Stock-based Compensation Expense

The Company recognized stock-based compensation expense totaling \$54.7 million, \$30.5 million and \$12.5 million for the year ended December 31, 2019, 2018 and 2017, respectively.

Stock-based compensation expense by award type included within the consolidated statements of operations and comprehensive loss was as follows (in thousands):

Year Ended

	December 31,		
	2019	2018	2017
Stock options	\$ 47,726	\$ 30,095	\$ 12,317
Restricted stock units	6,445	167	—
Restricted stock awards	—	—	2
Employee stock purchase plan	482	272	204
Total stock-based compensation expense	<u>\$ 54,653</u>	<u>\$ 30,534</u>	<u>\$ 12,523</u>

Stock-based compensation expense by classification within the consolidated statements of operations and comprehensive loss is as follows (in thousands):

	Year Ended December 31,		
	2019	2018	2017
Research and development	\$ 28,596	\$ 17,019	\$ 6,296
General and administrative	26,057	13,515	6,227
Total stock-based compensation expense	<u>\$ 54,653</u>	<u>\$ 30,534</u>	<u>\$ 12,523</u>

At December 31, 2019, there was \$160.6 million of total unrecognized compensation cost related to non-vested stock awards, which is expected to be recognized over a weighted-average period of 2.9 years. Due to an operating loss, the Company does not record tax benefits associated with stock-based compensation or option exercises. Tax benefit will be recorded when realized.

Stock Options

Stock options granted by the Company generally vest ratably over four years, with a one-year cliff for new employee awards and are exercisable from the date of grant for a period of ten years. The fair value of each option issued to employees was estimated at the date of grant using the Black-Scholes option pricing model with the following weighted-average assumptions:

	Year Ended December 31,		
	2019	2018	2017
Risk-free interest rate	2.21 %	2.77 %	2.07 %
Expected dividend yield	— %	— %	— %
Expected term (years)	6.0	6.0	6.0
Expected stock price volatility	63.83 %	69.08 %	74.58 %

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

	Shares	Weighted-Average Exercise Price	Remaining Contractual Life (in Years)	Aggregate Intrinsic Value(1) (in thousands)
Outstanding at December 31, 2018	4,557,800	\$ 44.64	7.96	\$ 86,675
Granted	2,063,081	82.20		
Exercised	(544,065)	22.30		
Canceled	(281,106)	71.24		
Outstanding at December 31, 2019	5,795,710	\$ 58.82	7.69	\$ 134,409
Exercisable at December 31, 2019	2,755,865	\$ 40.20	6.56	\$ 111,895

- (1) Intrinsic value represents the amount by which the fair market value as of December 31, 2019 of the underlying common stock exceeds the exercise price of the option.

The weighted-average grant date fair value of options granted in the years ended December 31, 2019, 2018 and 2017 was \$48.96, \$49.40 and \$28.04, respectively. The total intrinsic value of options exercised in the years ended December 31, 2019, 2018, and 2017 was \$33.8 million, \$29.4 million, and \$17.8 million, respectively.

At December 31, 2019, the total unrecognized compensation expense related to unvested stock option awards was \$132.0 million, which is expected to be recognized over a weighted-average period of approximately 2.8 years.

Restricted stock units

Restricted stock units granted by the Company generally vest ratably over four years. The following table summarizes the restricted stock units activity for the year ended December 31, 2019:

	Shares	Weighted-Average Grant Date Fair Value
Unvested shares at December 31, 2018	36,868	\$ 66.28
Granted	413,499	83.58
Vested	(8,246)	66.55
Forfeited	(22,366)	81.57
Unvested shares at December 31, 2019	419,755	\$ 82.50

The Company started to grant restricted stock units to employees in June 2018. The total fair value of restricted stock units vested during the year ended December 31, 2019 was \$0.7 million and there were no restricted stock units vested during the year ended December 31, 2018. At December 31, 2019, the total unrecognized compensation expense related to unvested restricted stock units was \$28.6 million, which is expected to be recognized over a weighted-average period of approximately 3.2 years.

Restricted Stock Awards

Restricted stock awards granted by the Company generally vest ratably over four years. The Company did not grant restricted stock awards to any employees or directors during the years ended December 31, 2019 or 2018. Outstanding restricted stock awards previously granted to employees and directors were fully vested as of December 31,

2017. The total fair value of restricted stock awards that vested during the years ended December 31, 2017 was \$0.1 million.

2015 Employee Stock Purchase Plan

In 2015, the Company's board of directors and stockholders approved the 2015 ESPP, which became effective upon the closing of the IPO in May 2015. The Company initially reserved a total of 243,347 shares of common stock for issuance under the 2015 ESPP. The 2015 ESPP provides that the number of shares reserved and available for issuance under the 2015 ESPP will be cumulatively increased on January 1 of each calendar years by 1% of the number of shares of common stock issued and outstanding on the immediately preceding December 31 or such lesser amount as specified by the compensation committee of the board of directors. For the calendar years beginning January 1, 2019 and 2020, the number of shares reserved for issuance under the 2015 ESPP was increased by 440,370 and 492,722 shares, respectively. The Company issued 20,724, 13,878, and 16,703 shares under the ESPP during the years ended December 31, 2019, 2018 and 2017, respectively.

11. Net Loss per Share

Basic net loss per share is calculated by dividing net loss by the weighted average shares outstanding during the period, without consideration for common stock equivalents. Diluted net loss per share is calculated by adjusting weighted average shares outstanding for the dilutive effect of common stock equivalents outstanding for the period. For purposes of the diluted net loss per share calculation, stock options, unvested restricted stock units and ESPP shares are considered to be common stock equivalents but are excluded from the calculation of diluted net loss per share, as their effect would be anti-dilutive; therefore, basic and diluted net loss per share were the same for all periods presented as a result of the Company's net loss.

The following common stock equivalents were excluded from the calculation of diluted net loss per share for the periods indicated because including them would have had an anti-dilutive effect.

	Year Ended		
	December 31,		
	2019	2018	2017
Stock options	5,795,710	4,557,800	3,304,166
Restricted stock units	419,755	36,868	—
ESPP shares	13,621	10,275	5,663
Total	<u>6,229,086</u>	<u>4,604,943</u>	<u>3,309,829</u>

12. Convertible Preferred Stock

Under the Company's certificate of incorporation, the board of directors is authorized, without action by the stockholders, to designate and issue up to an aggregate of 5,000,000 shares of preferred stock in one or more series. The board of directors can designate the rights, preferences and privileges of the shares of each series and any of its qualifications, limitations or restrictions. No shares of preferred stock were issued and outstanding during years ended December 31, 2019, 2018 and 2017.

13. Income Taxes

A reconciliation of the U.S. statutory income tax rate to the Company's effective tax rate is as follows for the years ended December 31, 2019, 2018 and 2017.

	Year Ended		
	December 31,		
	2019	2018	2017
Federal income tax (benefit) at statutory rate	21.00 %	21.00 %	34.00 %
Permanent differences	1.11	1.71	0.49

Federal research and development credits	0.77	1.79	0.97
Federal orphan drug credits	6.90	18.06	6.40
State income tax, net of federal benefit	7.46	7.08	5.40
Other	2.13	0.04	0.83
Foreign rate differential	(0.03)	—	—
Deferred rate change	(0.08)	—	(27.58)
Change in valuation allowance	(39.26)	(49.68)	(20.54)
Effective income tax rate	—%	—%	(0.03)%

The Company had net losses in all periods presented and therefore has not recognized any federal or state income tax expense.

During 2018, the Company completed a detailed study of its research and development credits and orphan drug credit carryforwards. As a result, the Company adjusted its deferred tax asset balances and the impacts are included on the Federal research and developmental credit and Federal orphan drug credit lines in the effective rate reconciliation above. The impacts of the increases in the deferred tax asset balances have been completely offset by an increase in the Company's valuation allowance which is included in the change in valuation allowance line on the reconciliation above.

The Company's deferred tax assets and liabilities consist of the following:

	Year Ended		
	December 31,		
	2019	2018	2017
Deferred tax assets:			
Net operating loss carryforwards	\$ 219,935	\$ 127,421	\$ 78,829
Research and development credit carryforwards	19,240	13,714	5,950
Orphan drug credit carryforwards	92,538	68,536	14,574
Accrued expenses and other	25,842	12,248	4,660
Deferred revenue	10,971	10,320	9,664
Deferred lease incentive	—	3,993	4,462
Deferred rent	26,196	1,436	1,142
Total gross deferred tax asset	394,722	237,668	119,281
Deferred tax liability			
Depreciation	(4,474)	(4,162)	(4,801)
Right of use assets	(19,869)	—	—
Debt discount	—	—	(2)
Valuation allowance	(370,379)	(233,506)	(114,478)
Net deferred tax asset	\$ —	\$ —	\$ —

Management has evaluated the positive and negative evidence bearing upon the realizability of its deferred tax assets and has determined that it is more likely than not that the Company will not recognize the benefits of its federal and state deferred tax assets, and as a result, a valuation allowance of \$370.4 million, \$233.5 million and \$114.5 million has been established at December 31, 2019, 2018 and 2017, respectively. The change in the valuation allowance was \$136.9 million, \$119.0 million and \$30.4 million for the years ended December 31, 2019, 2018 and 2017, respectively. The Company has incurred net operating losses (NOL) since inception. At December 31, 2019, the Company had federal and state NOL carryforwards of \$802.1 million and \$817.4 million, respectively, which expire beginning in 2030. As of December 31, 2019, the Company had federal and state research and development tax credit carryforwards of \$11.2 million and \$9.4 million, respectively, which expire beginning in 2027. As of December 31, 2019, the Company had federal orphan drug credits of \$92.5 million, which expire beginning in 2035 and state investment tax credits of \$0.8 million, which expire beginning in 2021.

The Internal Revenue Code of 1986, as amended (the Code), provides for a limitation of the annual use of net operating losses and other tax attributes (such as research and development tax credit carryforwards) following certain

ownership changes (as defined by the Code) that could limit the Company's ability to utilize these carryforwards. At this time, the Company has not completed a study to assess whether an ownership change under Section 382 of the Code has occurred, or whether there have been multiple ownership changes since the Company's formation. The Company may have experienced ownership changes, as defined by the Code, as a result of past financing transactions. Accordingly, the Company's ability to utilize the aforementioned carryforwards may be limited. In addition, U.S. tax laws limit the time during which these carryforwards may be applied against future taxes. Therefore, the Company may not be able to take full advantage of these carryforwards for federal or state income tax purposes.

Interest and penalty charges, if any, related to unrecognized tax benefits would be classified as income tax expense in the accompanying statements of operations and comprehensive loss. As of December 31, 2019 and 2018, the Company has no accrued interest related to uncertain tax positions. As of December 31, 2018, the Company was open to examination in the U.S. federal and certain state jurisdictions for all of the Company's tax years since the net operating losses may potentially be utilized in future years to reduce taxable income. Since the Company is in a loss carryforward position, it is generally subject to examination by the U.S. federal, state, and local income tax authorities for all tax years in which a loss carryforward is available.

On December 22, 2017, H.R.1, known as the Tax Cuts and Jobs Act, was enacted. This new law did not have a significant impact on the Company's consolidated financial statements for the year ended December 31, 2017 because it maintains a valuation allowance on the majority of its net operating losses and other deferred tax assets. However, the reduction of the U.S. federal corporate tax rate from 35% to 21% resulted in increases to the amounts reflected in "Deferred rate change" in the Company's tax reconciliation table above for the year ended December 31, 2017 compared to the year ended December 31, 2016. The change in the U.S. federal corporate tax rate, which was effective January 1, 2018, was also reflected in the Company's deferred tax table above.

As permitted by SEC Staff Accounting Bulletin 118, Income Tax Accounting Implications of the Tax Cuts and Jobs Act, the Company recorded provisional estimates during the year ended December 31, 2018, and has subsequently finalized its accounting analysis based on the guidance, interpretations, and data available as of December 31, 2019. Adjustments made in the fourth quarter of 2018 upon finalization of its accounting analysis were not material to the Company's consolidated financial statements.

14. Leases

38 Sidney Street

On February 12, 2015, the Company entered into a lease for approximately 38,500 rentable square feet of office and laboratory space at 38 Sidney Street in Cambridge, Massachusetts, which the Company gained control over on June 15, 2015, and occupancy commenced in October 2015. The initial term of the lease agreement will expire on October 31, 2022, unless terminated sooner. The Company has an option to extend the lease for five additional years. The lease has a total commitment of \$17.8 million over the initial seven-year term. The Company has agreed to pay an initial annual base rent of approximately \$2.3 million, which rises periodically until it reaches approximately \$2.8 million. The lease provided the Company with an allowance for leasehold improvements of \$4.3 million. Prior to adoption of ASC 842, the Company recorded rent expense on a straight-line basis through the end of the lease term and the associated deferred rent on the consolidated balance sheet. The Company also recorded the leasehold improvement incentives as a reduction to rent expense ratably over the lease term, and the balance from the leasehold improvement incentives was included in lease incentive obligations on the consolidated balance sheet as of December 31, 2018. The lease agreement required the Company to pay a security deposit of \$1.3 million, of which \$0.2 million was released in February 2018 and February 2019, respectively. The remaining \$0.9 million is recorded in restricted cash on the Company's consolidated balance sheet as of December 31, 2019.

In the first quarter of 2018, the Company subleased its former corporate headquarters at 38 Sidney Street, Cambridge, Massachusetts through October 31, 2020. Subject to the terms of the sublease agreement and the master lease agreement, including a right of recapture by the Company, the sublessee has the option to extend the sublease through October 31, 2022. The sublease includes a total commitment by the sublessee of \$8.2 million over the 32 month term of the sublease agreement. During the 32 month term, the Company will be responsible for total rental payments of \$6.9 million and an additional \$0.7 million in total payments related to the Company's profit on the sublease income which are payable by the Company to the landlord. As of December 31, 2019, the remaining minimum sublease rental commitment by the sublessee was \$2.6 million.

45 Sidney Street

On April 28, 2017, the Company entered into a lease agreement for approximately 99,833 rentable square feet of office and laboratory space located at 45 Sidney Street in Cambridge, Massachusetts. The initial term of the lease agreement commenced on October 1, 2017 and will expire on November 30, 2029, unless terminated sooner. The lease agreement also provides the Company with an option to extend the lease agreement for two consecutive five-year periods at the then fair market annual rent, as defined in the lease agreement.

During the initial term of the lease agreement, the Company has agreed to pay an initial annual base rent of approximately \$7.7 million, which increases annually until it reaches approximately \$10.6 million in the last year of the initial term. The lease provided the Company with a tenant improvement allowance of approximately \$14.2 million for improvements to be made to the premises. Prior to adoption of ASC 842, the Company recorded rent expense on a straight-line basis through the end of the lease term and the associated deferred rent on the consolidated balance sheet. The Company also recorded the leasehold improvement incentives as a reduction to rent expense ratably over the lease term, and the balance from the leasehold improvement incentives was included in lease incentive obligations on the consolidated balance sheet as of December 31, 2018. The lease agreement required the Company to pay a security deposit of \$3.5 million, of which \$3.0 million is recorded in restricted cash on the Company's consolidated balance sheet as of December 31, 2019, and \$0.5 million was recorded in prepaid and other current assets, which was subsequently released in January 2020.

On September 19, 2018, the Company entered into an amendment to the lease agreement for its office and laboratory space located at 45 Sidney Street in Cambridge, Massachusetts to expand the rentable square footage from approximately 99,833 square feet to approximately 139,216 square feet. The initial term of the lease with respect to the expansion premises commenced on March 1, 2019 and will expire on November 30, 2029, unless terminated sooner. Pursuant to the lease amendment, the rent commencement date for the expansion premises was July 1, 2019.

The Company has agreed to pay an initial annual base rent of approximately \$3.2 million for the expansion premises, which increases annually until it reaches approximately \$4.2 million in the last year of the initial term for the expansion premises. Pursuant to the lease amendment, the landlord has also agreed to provide the Company with a tenant improvement allowance of approximately \$3.2 million for improvements to be made to the expansion premises. The lease amendment required the Company to pay an additional security deposit of \$0.8 million to the landlord for the expansion premises, which is recorded in restricted cash on the Company's consolidated balance sheet as of December 31, 2019.

The lease agreements do not contain residual value guarantees and the components of lease cost for the year ended December 31, 2019 were as follows (in thousands):

	Year Ended December 31, 2019
Operating leases:	
Lease cost	\$ 16,162
Sublease income	(2,834)
Net lease cost	<u>\$ 13,328</u>

For the years ended December 31, 2018 and 2017 rent expenses under ASC 840, net of sublease income, was \$7.3 million and \$6.3 million, respectively.

The Company has not entered into any material short-term leases or financing leases as of December 31, 2019.

Supplemental cash flow information related to leases for the year ended December 31, 2019 was as follows (in thousands):

	Year Ended December 31, 2019
Cash paid for amounts included in the measurement of lease liabilities:	\$ 12,247
Lease liabilities arising from obtaining right-of-use assets:	

Operating leases \$ 23,300

The weighted average remaining lease term and weighted average discount rate of the operating leases are as follows:

Weighted average remaining lease term in years	9.30
Weighted average discount rate	8.2%

Future minimum lease payments under non-cancellable leases as of December 31, 2019 were as follows (in thousands):

2020	14,341
2021	14,764
2022	14,719
2023	12,746
2024	13,121
Thereafter	70,350
Total future minimum lease payments (1)	140,041
Less imputed interest	(44,093)
Total	\$ 95,948

- (1) Minimum lease payments have not been reduced by minimum sublease rentals of \$2.4 million due in the future under the Company's non-cancelable sublease for the office and laboratory space located at 38 Sidney Street, Cambridge, Massachusetts. The minimum lease payments above do not include any related common area maintenance charges or real estate taxes.

15. Employee Benefit Plans

The Company sponsors various retirement and pension plans. The estimates of liabilities and expenses for these plans incorporate a number of assumptions, including expected rates of return on plan assets and interest rates used to discount future benefits.

401(k) Savings Plan

The Company maintains a 401(k) plan for employees (the 401(k) Plan). The 401(k) Plan is intended to qualify under Section 401(k) of the Code, so that contributions to the 401(k) Plan by employees or by the Company, and the investment earnings on contributions, are not taxable to the employees until withdrawn from the 401(k) Plan, and so that contributions by the Company, if any, will be deductible by the Company when made. Under the 401(k) Plan, employees may elect to reduce their current compensation by up to the statutorily prescribed annual limit and to have the amount of such reduction contributed to the 401(k) Plan. The 401(k) Plan permits the Company to make contributions up to the limits allowed by law on behalf of all eligible employees. Effective September 1, 2015, the Company instituted an employer match of 50% of eligible contributions up to 6% of employee contributions. For the years ended December 31, 2019, 2018 and 2017, the Company contributed \$1.3 million, \$0.8 million and \$0.5 million, respectively, to the 401(k) Plan.

Switzerland Defined Benefit Plan

The Company maintains a pension plan covering employees of its Swiss subsidiary, Blueprint Medicines (Switzerland) GmbH (the "Swiss Plan"). The Swiss Plan is a government-mandated retirement fund that provides employees with a minimum benefit. Employer and employee contributions are made to the Swiss Plan based on various percentages of salary and wages that vary according to employee age and other factors. The Company's contributions to the Swiss Plan for the year ended December 31, 2019 were \$0.2 million. The Company's expected contributions for the year ended December 31, 2020 are \$0.4 million.

As is customary with Swiss pension plans, the assets of the Swiss Plan are invested in a collective fund with multiple employers. The Company has no investment authority over the assets of the Swiss Plan, which are held and invested by a Swiss insurance company. The investment strategy of the Swiss Plan is managed by an independent asset manager with the objective of achieving a consistent long-term return which will provide sufficient funding for future pension obligations while limiting risk. As of December 31, 2019, the Swiss Plan had an unfunded net pension obligation of \$3.0 million, plan assets of \$4.7 million and accumulated benefit obligation of \$6.5 million. The expected rate of return on plan assets is 2.6%. During the year ended December 31, 2019, the Company recorded \$0.2 million expenses related to the Swiss Plan.

16. Commitments

The Company has no other commitments other than the minimum lease payments commitment as disclosed in Note 14, *Leases*.

17. Selected Quarterly Financial Data (unaudited)

The following table contains selected quarterly financial information for 2019 and 2018. The Company believes that the following information reflects all normal recurring adjustments necessary for a fair statement of the information for the periods presented. The operating results for any quarter are not necessarily indicative of results for any future period.

	Three Months Ended			
	March 31, 2019	June 30, 2019	September 30, 2019	December 31, 2019
	(in thousands, except per share data)			
Total revenue	\$ 730	\$ 5,110	\$ 9,139	\$ 51,533
Total operating expenses	90,803	109,024	107,100	120,911
Total other income	2,666	4,233	3,686	3,047
Net loss	<u>\$ (87,407)</u>	<u>\$ (99,681)</u>	<u>\$ (94,275)</u>	<u>\$ (66,331)</u>
Net loss per share — basic and diluted	<u>\$ (1.98)</u>	<u>\$ (2.04)</u>	<u>\$ (1.92)</u>	<u>\$ (1.35)</u>

	Three Months Ended			
	March 31, 2018	June 30, 2018	September 30, 2018	December 31, 2018
	(in thousands, except per share data)			
Total revenue	\$ 954	\$ 41,439	\$ 1,095	\$ 1,033
Total operating expenses	59,865	70,906	76,603	84,175
Total other income	2,362	2,419	2,785	2,820
Net loss	<u>\$ (56,549)</u>	<u>\$ (27,048)</u>	<u>\$ (72,723)</u>	<u>\$ (80,322)</u>
Net loss per share — basic and diluted	<u>\$ (1.29)</u>	<u>\$ (0.62)</u>	<u>\$ (1.66)</u>	<u>\$ (1.83)</u>

18. Subsequent Events

On January 9, 2020, the FDA granted approval of AYWAKIT (avapritinib) for the treatment of adults with unresectable or metastatic gastrointestinal stromal tumor harboring a PDGFRA exon 18 mutation, including PDGFRA D842V mutations, and the Company has commenced the sale of AYWAKIT in the U.S.

On January 27, 2020, the Company closed a follow-on public offering of 4,710,144 shares of its common stock at a price to the public of \$69.00 per share and received estimated net proceeds of \$308.2 million, after deducting underwriting discounts and commissions and estimated offering expenses payable by the Company. The Company has also granted the underwriters a 30-day option to the underwriters to purchase up to an additional 706,521 shares of its common stock at the public offering price, less underwriting discounts and commissions.

**Description of the Registrant’s Securities Registered Pursuant to
Section 12 of the Securities Exchange Act of 1934, as amended**

The summary of the general terms and provisions of the registered securities of Blueprint Medicines Corporation (“Blueprint,” “we,” or “our”) set forth below does not purport to be complete and is subject to and qualified in its entirety by reference to our Fifth Amended and Restated Certificate of Incorporation (our “certificate of incorporation”) and our Amended and Restated By-laws (our “by-laws” and, together with our certificate of incorporation, our “Charter Documents”), each of which is incorporated by reference as an exhibit to our most recent Annual Report on Form 10-K filed with the Securities and Exchange Commission. We encourage you to read our Charter Documents and the applicable provisions of the General Corporation Law of the State of Delaware (the “DGCL”) for additional information.

General

Our authorized capital stock consists of 120,000,000 shares of common stock, \$0.001 par value per share, and 5,000,000 shares of preferred stock, \$0.001 par value per share.

Common Stock

Only our common stock is registered under Section 12 of the Securities Exchange Act of 1934, as amended.

Dividends

Holders of our common stock are entitled to receive dividends ratably, if any, as may be declared by our board of directors out of legally available funds, subject to any preferential dividend rights of any convertible preferred stock then outstanding.

Voting

Under the provisions of our certificate of incorporation, holders of our common stock are entitled to one vote for each share of common stock held by such holder on any matter submitted to a vote at a meeting of stockholders. Our certificate of incorporation does not provide cumulative voting rights to holders of our common stock.

Our by-laws provide that, except as required by law or our Charter Documents, all matters will be decided by the vote of the majority of the votes properly cast for such matter.

Other Rights

In the event of our liquidation, dissolution or winding up, the holders of common stock are entitled to share ratably in our net assets legally available after the payment of all our debts and other liabilities, subject to the preferential rights of any preferred stock then outstanding. Holders of common stock have no preemptive, conversion or subscription rights. There are no redemption or sinking fund provisions applicable to the common stock.

Preferred Stock

Our board of directors has the authority, without further action by our stockholders, to designate and issue up to 5,000,000 shares of preferred stock in one or more series. Our board of directors may also designate

the rights, preferences and privileges of the holders of each such series of preferred stock, any or all of which may be greater than or senior to those granted to the holders of common stock. While, the issuance of preferred stock provides flexibility in connection with possible future financings and acquisitions and other corporate purposes, the rights, preferences and privileges of holders of common stock are subject to, and may be adversely affected by, the rights of the holders of shares of any series of preferred stock that we may designate and issue in the future. Though the actual effect of any such issuance on the rights of the holders of common stock will not be known until such time as our board of directors determines the specific rights of the holders of preferred stock, the issuance of preferred stock could have the effect of restricting dividends on our common stock, diluting the voting power of our common stock, impairing the liquidation rights of our common stock, or delaying, deferring or preventing a change in control of our company, which might harm the market price of our common stock.

No shares of preferred stock are outstanding as of the date of our Annual Report on Form 10-K with which this Exhibit 4.3 is filed as an exhibit.

Anti-Takeover Effects of Delaware Law and Provisions of our Charter Documents

Certain provisions of the DGCL and our Charter Documents contain provisions that could have the effect of delaying, deferring or discouraging another party from acquiring control of us. These provisions, which are summarized below, are expected to discourage certain types of coercive takeover practices and inadequate takeover bids. These provisions are also designed in part to encourage anyone seeking to acquire control of us to first negotiate with our board of directors. We believe that the advantages gained by protecting our ability to negotiate with any unsolicited and potentially unfriendly acquirer outweigh the disadvantages of discouraging such proposals, including those priced above the then-current market value of our common stock, because, among other reasons, the negotiation of such proposals could improve their terms.

Charter Documents

Our Charter Documents include a number of provisions that may have the effect of encouraging persons considering unsolicited tender offers or other unilateral takeover proposals to negotiate with our board of directors rather than pursue non-negotiated takeover attempts. These provisions include the items described below.

Board Composition and Filling Vacancies. In accordance with our certificate of incorporation, our board is divided into three classes serving three-year terms, with one class being elected each year. Our certificate of incorporation also provides that directors may be removed only for cause and then only by the affirmative vote of the holders of 75% or more of the shares then entitled to vote at an election of directors. Furthermore, any vacancy on our board of directors, however occurring, including a vacancy resulting from an increase in the size of our board, may only be filled by the affirmative vote of a majority of our directors then in office, even if less than a quorum.

No Written Consent of Stockholders. Our certificate of incorporation provides that all stockholder actions are required to be taken by a vote of the stockholders at an annual or special meeting, and that stockholders may not take any action by written consent in lieu of a meeting.

Meetings of Stockholders. Our by-laws provide that only a majority of the members of our board of directors then in office may call special meetings of stockholders and only those matters set forth in the notice of the special meeting may be considered or acted upon at a special meeting of stockholders. Our

by-laws limit the business that may be conducted at an annual meeting of stockholders to those matters properly brought before the meeting.

Advance Notice Requirements. Our by-laws establish advance notice procedures with regard to stockholder proposals relating to the nomination of candidates for election as directors or new business to be brought before meetings of our stockholders. These procedures provide that notice of stockholder proposals must be timely given in writing to our corporate secretary prior to the meeting at which the action is to be taken. Generally, to be timely, notice must be received at our principal executive offices not less than 90 days or more than 120 days prior to the first anniversary date of the annual meeting for the preceding year. The notice must contain certain information specified in the by-laws. These provisions may have the effect of precluding the conduct of certain business at a meeting if the proper procedures are not followed. These provisions may also discourage or deter a potential acquirer from conducting a solicitation of proxies to elect the acquirer's own slate of directors or otherwise attempting to obtain control of our company.

Amendment to By-laws and Certificate of Incorporation. As required by the Delaware General Corporation Law, any amendment of our certificate of incorporation must first be approved by a majority of our board of directors and, if required by law or our certificate of incorporation, thereafter be approved by a majority of the outstanding shares entitled to vote on the amendment, and a majority of the outstanding shares of each class entitled to vote thereon as a class, except that the amendment of the provisions relating to stockholder action, directors, limitation of liability, exclusive jurisdiction of Delaware Courts and the amendment of our by-laws and certificate of incorporation must be approved by not less than 75% of the outstanding shares entitled to vote on the amendment, and not less than 75% of the outstanding shares of each class entitled to vote thereon as a class. Our by-laws may be amended by the affirmative vote of a majority of the directors then in office, subject to any limitations set forth in the by-laws; and may also be amended by the affirmative vote of at least 75% of the outstanding shares entitled to vote on the amendment, or, if the board of directors recommends that the stockholders approve the amendment, by the affirmative vote of the majority of the outstanding shares entitled to vote on the amendment, in each case voting together as a single class.

Blank Check Preferred Stock. Our certificate of incorporation provides for 5,000,000 authorized shares of preferred stock. The existence of authorized but unissued shares of preferred stock may enable our board of directors to render more difficult or to discourage an attempt to obtain control of us by means of a merger, tender offer, proxy contest or otherwise. For example, if in the due exercise of its fiduciary obligations, our board of directors were to determine that a takeover proposal is not in the best interests of us or our stockholders, our board of directors could cause shares of preferred stock to be issued without stockholder approval in one or more private offerings or other transactions that might dilute the voting or other rights of the proposed acquirer or insurgent stockholder or stockholder group. In this regard, our certificate of incorporation grants our board of directors broad power to establish the rights and preferences of authorized and unissued shares of preferred stock. The issuance of shares of preferred stock could decrease the amount of earnings and assets available for distribution to holders of shares of common stock. The issuance may also adversely affect the rights and powers, including voting rights, of these holders and may have the effect of delaying, deterring or preventing a change in control of us.

Delaware Anti-Takeover Statute

We are subject to the provisions of Section 203 of the DGCL regulating corporate takeovers. In general, Section 203 prohibits a publicly held Delaware corporation from engaging, under certain circumstances, in

a business combination with an interested stockholder for a period of three years following the date the person became an interested stockholder unless:

- prior to the date of the transaction, the board of directors of the corporation approved either the business combination or the transaction which resulted in the stockholder becoming an interested stockholder;
- upon completion of the transaction that resulted in the stockholder becoming an interested stockholder, the interested stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction commenced, excluding for purposes of determining the voting stock outstanding, but not for determining the outstanding voting stock owned by the interested stockholder, (1) shares owned by persons who are directors and also officers and (2) shares owned by employee stock plans in which employee participants do not have the right to determine confidentially whether shares held subject to the plan will be tendered in a tender or exchange offer; or
- at or subsequent to the date of the transaction, the business combination is approved by the board of directors of the corporation and authorized at an annual or special meeting of stockholders, and not by written consent, by the affirmative vote of at least 66 2/3% of the outstanding voting stock which is not owned by the interested stockholder.

Generally, a business combination includes a merger, asset or stock sale, or other transaction resulting in a financial benefit to the interested stockholder. An interested stockholder is a person who, together with affiliates and associates, owns or, within three years prior to the determination of interested stockholder status, did own 15% or more of a corporation's outstanding voting stock. We expect the existence of this provision to have an anti-takeover effect with respect to transactions our board of directors does not approve in advance. We also anticipate that Section 203 of the DGCL may discourage business combinations or other attempts that might result in a premium over the market price for the shares of common stock held by our stockholders.

The provisions of Delaware law and our Charter Documents could have the effect of discouraging others from attempting hostile takeovers and, as a consequence, may also inhibit temporary fluctuations in the market price of our common stock that often result from actual or rumored hostile takeover attempts. These provisions may also have the effect of preventing changes in our management. It is possible that these provisions could make it more difficult to accomplish transactions that stockholders may otherwise deem to be in their best interests.

Our certificate of incorporation requires, to the fullest extent permitted by law, that derivative actions brought in our name, actions against our directors, officers and employees for breach of fiduciary duty and other similar actions may be brought only in the Court of Chancery in the State of Delaware. Although we believe this provision benefits us by providing increased consistency in the application of Delaware law in the types of lawsuits to which it applies, the provision may have the effect of discouraging lawsuits against our directors and officers.

BLUEPRINT MEDICINES CORPORATION

2015 STOCK OPTION AND INCENTIVE PLAN

SECTION 1. GENERAL PURPOSE OF THE PLAN; DEFINITIONS

The name of the plan is the Blueprint Medicines Corporation 2015 Stock Option and Incentive Plan (the "Plan"). The purpose of the Plan is to encourage and enable the officers, employees, Non-Employee Directors and other key persons (including Consultants) of Blueprint Medicines Corporation (the "Company") and its Subsidiaries upon whose judgment, initiative and efforts the Company largely depends for the successful conduct of its business to acquire a proprietary interest in the Company. It is anticipated that providing such persons with a direct stake in the Company's welfare will assure a closer identification of their interests with those of the Company and its stockholders, thereby stimulating their efforts on the Company's behalf and strengthening their desire to remain with the Company.

The following terms shall be defined as set forth below:

"Act" means the Securities Act of 1933, as amended, and the rules and regulations thereunder.

"Administrator" means either the Board or the compensation committee of the Board or a similar committee performing the functions of the compensation committee and which is comprised of not less than two Non-Employee Directors who are independent.

"Award" or "Awards," except where referring to a particular category of grant under the Plan, shall include Incentive Stock Options, Non-Qualified Stock Options, Stock Appreciation Rights, Restricted Stock Units, Restricted Stock Awards, Unrestricted Stock Awards, Cash-Based Awards, Performance Share Awards and Dividend Equivalent Rights.

"Award Certificate" means a written or electronic document setting forth the terms and provisions applicable to an Award granted under the Plan. Each Award Certificate is subject to the terms and conditions of the Plan.

"Board" means the Board of Directors of the Company.

"Cash-Based Award" means an Award entitling the recipient to receive a cash-denominated payment.

"Code" means the Internal Revenue Code of 1986, as amended, and any successor Code, and related rules, regulations and interpretations.

"Consultant" means any natural person that provides bona fide services to the Company, and such services are not in connection with the offer or sale of securities in a capital-raising transaction and do not directly or indirectly promote or maintain a market for the Company's securities.

"Covered Employee" means an employee who is a "Covered Employee" within the meaning of Section 162(m) of the Code.

"Dividend Equivalent Right" means an Award entitling the grantee to receive credits based on cash dividends that would have been paid on the shares of Stock specified in the Dividend Equivalent Right (or other award to which it relates) if such shares had been issued to and held by the grantee.

"Effective Date" means the date set forth in Section 21.

"Exchange Act" means the Securities Exchange Act of 1934, as amended, and the rules and regulations thereunder.

"Fair Market Value" of the Stock on any given date means the fair market value of the Stock determined in good faith by the Administrator; provided, however, that if the Stock is admitted to quotation on the NASDAQ Capital Market, the NASDAQ Global Market, the NASDAQ Global Select Market, the New York Stock Exchange or another national

securities exchange, the determination shall be made by reference to the closing price of the Stock. If there is no closing price for such date, the determination shall be made by reference to the last date preceding such date for which there is a closing price; provided further, however, that if the date for which Fair Market Value is determined is the first day when trading prices for the Stock are reported on a national securities exchange, the Fair Market Value shall be the "Price to the Public" (or equivalent) set forth on the cover page for the final prospectus relating to the Company's Initial Public Offering.

"*Incentive Stock Option*" means any Stock Option designated and qualified as an "incentive stock option" as defined in Section 422 of the Code.

"*Initial Public Offering*" means the consummation of the first underwritten, firm commitment public offering pursuant to an effective registration statement under the Act covering the offer and sale by the Company of its equity securities, or such other event as a result of or following which the Stock shall be publicly held.

"*Non-Employee Director*" means a member of the Board who is not also an employee of the Company or any Subsidiary.

"*Non-Qualified Stock Option*" means any Stock Option that is not an Incentive Stock Option.

"*Option*" or "*Stock Option*" means any option to purchase shares of Stock granted pursuant to Section 5.

"*Performance-Based Award*" means any Restricted Stock Award, Restricted Stock Units, Performance Share Award or Cash-Based Award granted to a Covered Employee that is intended to qualify as "performance-based compensation" under Section 162(m) of the Code and the regulations promulgated thereunder.

"*Performance Criteria*" means the criteria that the Administrator selects for purposes of establishing the Performance Goal or Performance Goals for an individual for a Performance Cycle. The Performance Criteria (which shall be applicable to the organizational level specified by the Administrator, including, but not limited to, the Company or a unit, division, group, or Subsidiary of the Company) that will be used to establish Performance Goals are limited to the following: achievement of specified research and development, publication, clinical and/or regulatory milestones, total shareholder return, earnings before interest, taxes, depreciation and amortization, net income (loss) (either before or after interest, taxes, depreciation and/or amortization), changes in the market price of the Stock, economic value-added, funds from operations or similar measure, sales or revenue, acquisitions or strategic transactions, operating income (loss), cash flow (including, but not limited to, operating cash flow and free cash flow), return on capital, assets, equity, or investment, return on sales, gross or net profit levels, productivity, expense, margins, operating efficiency, customer satisfaction, working capital, earnings (loss) per share of Stock, sales or market shares and number of customers, any of which may be measured either in absolute terms or as compared to any incremental increase or as compared to results of a peer group.

"*Performance Cycle*" means one or more periods of time, which may be of varying and overlapping durations, as the Administrator may select, over which the attainment of one or more Performance Criteria will be measured for the purpose of determining a grantee's right to and the payment of a Restricted Stock Award, Restricted Stock Units, Performance Share Award or Cash-Based Award, the vesting and/or payment of which is subject to the attainment of one or more Performance Goals. Each such period shall not be less than 12 months.

"*Performance Goals*" means, for a Performance Cycle, the specific goals established in writing by the Administrator for a Performance Cycle based upon the Performance Criteria.

"*Performance Share Award*" means an Award entitling the recipient to acquire shares of Stock upon the attainment of specified Performance Goals.

"*Restricted Stock Award*" means an Award of shares of Stock subject to such restrictions and conditions as the Administrator may determine at the time of grant.

"*Restricted Stock Units*" means an Award of phantom stock units to a grantee.

"*Sale Event*" shall mean (i) the sale of all or substantially all of the assets of the Company on a consolidated basis to an unrelated person or entity, (ii) a merger, reorganization or consolidation pursuant to which the holders of the

Company's outstanding voting power and outstanding stock immediately prior to such transaction do not own a majority of the outstanding voting power and outstanding stock or other equity interests of the resulting or successor entity (or its ultimate parent, if applicable) immediately upon completion of such transaction, (iii) the sale of all of the Stock of the Company to an unrelated person, entity or group thereof acting in concert, or (iv) any other transaction in which the owners of the Company's outstanding voting power immediately prior to such transaction do not own at least a majority of the outstanding voting power of the Company or any successor entity immediately upon completion of the transaction other than as a result of the acquisition of securities directly from the Company.

"*Sale Price*" means the value as determined by the Administrator of the consideration payable, or otherwise to be received by stockholders, per share of Stock pursuant to a Sale Event.

"*Section 409A*" means Section 409A of the Code and the regulations and other guidance promulgated thereunder.

"*Stock*" means the Common Stock, par value \$0.001 per share, of the Company, subject to adjustments pursuant to Section 3.

"*Stock Appreciation Right*" means an Award entitling the recipient to receive shares of Stock having a value equal to the excess of the Fair Market Value of the Stock on the date of exercise over the exercise price of the Stock Appreciation Right multiplied by the number of shares of Stock with respect to which the Stock Appreciation Right shall have been exercised.

"*Subsidiary*" means any corporation or other entity (other than the Company) in which the Company has at least a 50 percent interest, either directly or indirectly.

"*Ten Percent Owner*" means an employee who owns or is deemed to own (by reason of the attribution rules of Section 424(d) of the Code) more than 10 percent of the combined voting power of all classes of stock of the Company or any parent or subsidiary corporation.

"*Unrestricted Stock Award*" means an Award of shares of Stock free of any restrictions.

SECTION 2. ADMINISTRATION OF PLAN; ADMINISTRATOR AUTHORITY TO SELECT GRANTEES AND DETERMINE AWARDS

(a) Administration of Plan. The Plan shall be administered by the Administrator.

(b) Powers of Administrator. The Administrator shall have the power and authority to grant Awards consistent with the terms of the Plan, including the power and authority:

(i) to select the individuals to whom Awards may from time to time be granted;

(ii) to determine the time or times of grant, and the extent, if any, of Incentive Stock Options, Non-Qualified Stock Options, Stock Appreciation Rights, Restricted Stock Awards, Restricted Stock Units, Unrestricted Stock Awards, Cash-Based Awards, Performance Share Awards and Dividend Equivalent Rights, or any combination of the foregoing, granted to any one or more grantees;

(iii) to determine the number of shares of Stock to be covered by any Award;

(iv) to determine and modify from time to time the terms and conditions, including restrictions, not inconsistent with the terms of the Plan, of any Award, which terms and conditions may differ among individual Awards and grantees, and to approve the forms of Award Certificates;

(v) to accelerate at any time the exercisability or vesting of all or any portion of any Award provided that the Administrator generally shall not exercise such discretion to accelerate Awards subject to Sections 7 and 8 except in the event of the grantee's death, disability or retirement, or a change in control of the Company (including a Sale Event);

(vi) subject to the provisions of Section 5(b), to extend at any time the period in which Stock Options

may be exercised; and

(vii) at any time to adopt, alter and repeal such rules, guidelines and practices for administration of the Plan and for its own acts and proceedings as it shall deem advisable; to interpret the terms and provisions of the Plan and any Award (including related written instruments); to make all determinations it deems advisable for the administration of the Plan; to decide all disputes arising in connection with the Plan; and to otherwise supervise the administration of the Plan.

All decisions and interpretations of the Administrator shall be binding on all persons, including the Company and Plan grantees.

(c) Delegation of Authority to Grant Awards. Subject to applicable law, the Administrator, in its discretion, may delegate to the Chief Executive Officer of the Company all or part of the Administrator's authority and duties with respect to the granting of Awards to individuals who are (i) not subject to the reporting and other provisions of Section 16 of the Exchange Act and (ii) not Covered Employees. Any such delegation by the Administrator shall include a limitation as to the amount of Awards that may be granted during the period of the delegation and shall contain guidelines as to the determination of the exercise price and the vesting criteria. The Administrator may revoke or amend the terms of a delegation at any time but such action shall not invalidate any prior actions of the Administrator's delegate or delegates that were consistent with the terms of the Plan.

(d) Award Certificate. Awards under the Plan shall be evidenced by Award Certificates that set forth the terms, conditions and limitations for each Award which may include, without limitation, the term of an Award and the provisions applicable in the event employment or service terminates.

(e) Indemnification. Neither the Board nor the Administrator, nor any member of either or any delegate thereof, shall be liable for any act, omission, interpretation, construction or determination made in good faith in connection with the Plan, and the members of the Board and the Administrator (and any delegate thereof) shall be entitled in all cases to indemnification and reimbursement by the Company in respect of any claim, loss, damage or expense (including, without limitation, reasonable attorneys' fees) arising or resulting therefrom to the fullest extent permitted by law and/or under the Company's articles of incorporation or bylaws or any directors' and officers' liability insurance coverage which may be in effect from time to time and/or any indemnification agreement between such individual and the Company.

(f) Foreign Award Recipients. Notwithstanding any provision of the Plan to the contrary, in order to comply with the laws in other countries in which the Company and its Subsidiaries operate or have employees or other individuals eligible for Awards, the Administrator, in its sole discretion, shall have the power and authority to: (i) determine which Subsidiaries shall be covered by the Plan; (ii) determine which individuals outside the United States are eligible to participate in the Plan; (iii) modify the terms and conditions of any Award granted to individuals outside the United States to comply with applicable foreign laws; (iv) establish subplans and modify exercise procedures and other terms and procedures, to the extent the Administrator determines such actions to be necessary or advisable (and such subplans and/or modifications shall be attached to this Plan as appendices); provided, however, that no such subplans and/or modifications shall increase the share limitations contained in Section 3(a) hereof; and (v) take any action, before or after an Award is made, that the Administrator determines to be necessary or advisable to obtain approval or comply with any local governmental regulatory exemptions or approvals. Notwithstanding the foregoing, the Administrator may not take any actions hereunder, and no Awards shall be granted, that would violate the Exchange Act or any other applicable United States securities law, the Code, or any other applicable United States governing statute or law.

SECTION 3. STOCK ISSUABLE UNDER THE PLAN; MERGERS; SUBSTITUTION

(a) Stock Issuable. The maximum number of shares of Stock reserved and available for issuance under the Plan shall be 1,460,084 shares (the "Initial Limit"), subject to adjustment as provided in Section 3(c), plus on January 1, 2016 and each January 1 thereafter, the number of shares of Stock reserved and available for issuance under the Plan shall be cumulatively increased by 4% percent of the number of shares of Stock issued and outstanding on the immediately preceding December 31 or such lesser number of shares of Stock as determined by the Administrator (the "Annual Increase"). Subject to such overall limitation, the maximum aggregate number of shares of Stock that may be issued in the form of Incentive Stock Options shall not exceed the Initial Limit cumulatively increased on January 1, 2016 and on each January 1 thereafter by the lesser of the Annual Increase for such year or 1,460,084 shares of Stock, subject in all cases to

adjustment as provided in Section 3(c). The shares of Stock underlying any Awards under the Plan and under the Company's Amended and Restated 2011 Stock Option and Grant Plan, as amended, that are forfeited, canceled, held back upon exercise of an Option or settlement of an Award to cover the exercise price or tax withholding, reacquired by the Company prior to vesting, satisfied without the issuance of Stock or otherwise terminated (other than by exercise) shall be added back to the shares of Stock available for issuance under the Plan. In the event the Company repurchases shares of Stock on the open market, such shares shall not be added to the shares of Stock available for issuance under the Plan. Subject to such overall limitations, shares of Stock may be issued up to such maximum number pursuant to any type or types of Award; provided, however, that Stock Options or Stock Appreciation Rights with respect to no more than 1,460,084 shares of Stock may be granted to any one individual grantee during any one calendar year period. The shares available for issuance under the Plan may be authorized but unissued shares of Stock or shares of Stock reacquired by the Company.

(b) [Reserved]

(c) Changes in Stock. Subject to Section 3(d) hereof, if, as a result of any reorganization, recapitalization, reclassification, stock dividend, stock split, reverse stock split or other similar change in the Company's capital stock, the outstanding shares of Stock are increased or decreased or are exchanged for a different number or kind of shares or other securities of the Company, or additional shares or new or different shares or other securities of the Company or other non-cash assets are distributed with respect to such shares of Stock or other securities, or, if, as a result of any merger or consolidation, sale of all or substantially all of the assets of the Company, the outstanding shares of Stock are converted into or exchanged for securities of the Company or any successor entity (or a parent or subsidiary thereof), the Administrator shall make an appropriate or proportionate adjustment in (i) the maximum number of shares reserved for issuance under the Plan, including the maximum number of shares that may be issued in the form of Incentive Stock Options, (ii) the number of Stock Options or Stock Appreciation Rights that can be granted to any one individual grantee and the maximum number of shares that may be granted under a Performance-Based Award, (iii) the number and kind of shares or other securities subject to any then outstanding Awards under the Plan, (iv) the repurchase price, if any, per share subject to each outstanding Restricted Stock Award, and (v) the exercise price for each share subject to any then outstanding Stock Options and Stock Appreciation Rights under the Plan, without changing the aggregate exercise price (i.e., the exercise price multiplied by the number of Stock Options and Stock Appreciation Rights) as to which such Stock Options and Stock Appreciation Rights remain exercisable. The Administrator shall also make equitable or proportionate adjustments in the number of shares subject to outstanding Awards and the exercise price and the terms of outstanding Awards to take into consideration cash dividends paid other than in the ordinary course or any other extraordinary corporate event. The adjustment by the Administrator shall be final, binding and conclusive. No fractional shares of Stock shall be issued under the Plan resulting from any such adjustment, but the Administrator in its discretion may make a cash payment in lieu of fractional shares.

(d) Mergers and Other Transactions. Except as the Administrator may otherwise specify with respect to particular Awards in the relevant Award Certificate, in the case of and subject to the consummation of a Sale Event, the parties thereto may cause the assumption or continuation of Awards theretofore granted by the successor entity, or the substitution of such Awards with new Awards of the successor entity or parent thereof, with appropriate adjustment as to the number and kind of shares and, if appropriate, the per share exercise prices, as such parties shall agree. To the extent the parties to such Sale Event do not provide for the assumption, continuation or substitution of Awards, the Plan and all outstanding Awards hereunder will terminate at the effective time of such Sale Event. Notwithstanding the foregoing, the Administrator may in its discretion, or to the extent specified in the relevant Award Certificate, cause certain Awards to become vested and/or exercisable immediately prior to such Sale Event. In the event of such termination, (i) the Company shall have the right, but not the obligation, to make or provide for a cash payment to the grantees holding Options and Stock Appreciation Rights, in exchange for the cancellation thereof, in an amount equal to the difference between (A) the Sale Price multiplied by the number of shares of Stock subject to outstanding Options and Stock Appreciation Rights (to the extent then exercisable after taking into account any acceleration thereunder at prices not in excess of the Sale Price) and (B) the aggregate exercise price of all such outstanding Options and Stock Appreciation Rights or (ii) each grantee shall be permitted, within a specified period of time prior to the consummation of the Sale Event as determined by the Administrator, to exercise all outstanding Options and Stock Appreciation Rights (to the extent then exercisable) held by such grantee, including those that will become exercisable upon the consummation of the Sale Event (provided that such exercise shall be subject to the consummation of the Sale Event). The Company shall also have the right, but not the obligation, to make or provide a cash payment to the grantees holding other Awards, in exchange for cancellation thereof an amount equal to the Sale Price multiplied by the number of shares subject to such Awards, to be paid at the time of the Sale Event or upon the later vesting of such Awards.

SECTION 4.

ELIGIBILITY

Grantees under the Plan will be such full or part-time officers and other employees, Non-Employee Directors and key persons (including Consultants) of the Company and its Subsidiaries as are selected from time to time by the Administrator in its sole discretion.

SECTION 5.

STOCK OPTIONS

Any Stock Option granted under the Plan shall be in such form as the Administrator may from time to time approve.

Stock Options granted under the Plan may be either Incentive Stock Options or Non-Qualified Stock Options. Incentive Stock Options may be granted only to employees of the Company or any Subsidiary that is a "subsidiary corporation" within the meaning of Section 424(f) of the Code. To the extent that any Option does not qualify as an Incentive Stock Option, it shall be deemed a Non-Qualified Stock Option.

Stock Options granted pursuant to this Section 5 shall be subject to the following terms and conditions and shall contain such additional terms and conditions, not inconsistent with the terms of the Plan, as the Administrator shall deem desirable. If the Administrator so determines, Stock Options may be granted in lieu of cash compensation at the optionee's election, subject to such terms and conditions as the Administrator may establish.

(a) Exercise Price. The exercise price per share for the Stock covered by a Stock Option granted pursuant to this Section 5 shall be determined by the Administrator at the time of grant but shall not be less than one hundred percent (100%) of the Fair Market Value on the date of grant. In the case of an Incentive Stock Option that is granted to a Ten Percent Owner, the option price of such Incentive Stock Option shall be not less than one hundred ten percent (110%) of the Fair Market Value on the grant date.

(b) Option Term. The term of each Stock Option shall be fixed by the Administrator, but no Stock Option shall be exercisable more than ten years after the date the Stock Option is granted. In the case of an Incentive Stock Option that is granted to a Ten Percent Owner, the term of such Stock Option shall be no more than five years from the date of grant.

(c) Exercisability; Rights of a Stockholder. Stock Options shall become exercisable at such time or times, whether or not in installments, as shall be determined by the Administrator at or after the grant date. The Administrator may at any time accelerate the exercisability of all or any portion of any Stock Option. An optionee shall have the rights of a stockholder only as to shares acquired upon the exercise of a Stock Option and not as to unexercised Stock Options.

(d) Method of Exercise. Stock Options may be exercised in whole or in part, by giving written or electronic notice of exercise to the Company, specifying the number of shares to be purchased. Payment of the purchase price may be made by one or more of the following methods to the extent provided in the Option Award Certificate:

- (i) In cash, by certified or bank check or other instrument acceptable to the Administrator;
 - (ii) Through the delivery (or attestation to the ownership) of shares of Stock that are not then subject to restrictions under any Company plan. Such surrendered shares shall be valued at Fair Market Value on the exercise date;
 - (iii) By the optionee delivering to the Company a properly executed exercise notice together with irrevocable instructions to a broker to promptly deliver to the Company cash or a check payable and acceptable to the Company for the purchase price; provided that in the event the optionee chooses to pay the purchase price as so provided, the optionee and the broker shall comply with such procedures and enter into such agreements of indemnity and other agreements as the Administrator shall prescribe as a condition of such payment procedure; or
 - (iv) With respect to Stock Options that are not Incentive Stock Options, by a "net exercise" arrangement pursuant to which the Company will reduce the number of shares of Stock issuable upon exercise by the largest whole number of shares with a Fair Market Value that does not exceed the aggregate exercise price.
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Payment instruments will be received subject to collection. The transfer to the optionee on the records of the Company or of the transfer agent of the shares of Stock to be purchased pursuant to the exercise of a Stock Option will be contingent upon receipt from the optionee (or a purchaser acting in his stead in accordance with the provisions of the Stock Option) by the Company of the full purchase price for such shares and the fulfillment of any other requirements contained in the Option Award Certificate or applicable provisions of laws (including the satisfaction of any withholding taxes that the Company is obligated to withhold with respect to the optionee). In the event an optionee chooses to pay the purchase price by previously-owned shares of Stock through the attestation method, the number of shares of Stock transferred to the optionee upon the exercise of the Stock Option shall be net of the number of attested shares. In the event that the Company establishes, for itself or using the services of a third party, an automated system for the exercise of Stock Options, such as a system using an internet website or interactive voice response, then the paperless exercise of Stock Options may be permitted through the use of such an automated system.

(e) Annual Limit on Incentive Stock Options. To the extent required for “incentive stock option” treatment under Section 422 of the Code, the aggregate Fair Market Value (determined as of the time of grant) of the shares of Stock with respect to which Incentive Stock Options granted under this Plan and any other plan of the Company or its parent and subsidiary corporations become exercisable for the first time by an optionee during any calendar year shall not exceed \$100,000. To the extent that any Stock Option exceeds this limit, it shall constitute a Non-Qualified Stock Option.

SECTION 6. STOCK APPRECIATION RIGHTS

(a) Exercise Price of Stock Appreciation Rights. The exercise price of a Stock Appreciation Right shall not be less than one hundred percent (100%) of the Fair Market Value of the Stock on the date of grant.

(b) Grant and Exercise of Stock Appreciation Rights. Stock Appreciation Rights may be granted by the Administrator independently of any Stock Option granted pursuant to Section 5 of the Plan.

(c) Terms and Conditions of Stock Appreciation Rights. Stock Appreciation Rights shall be subject to such terms and conditions as shall be determined from time to time by the Administrator. The term of a Stock Appreciation Right may not exceed ten years.

SECTION 7. RESTRICTED STOCK AWARDS

(a) Nature of Restricted Stock Awards. The Administrator may grant Restricted Stock Awards under the Plan. A Restricted Stock Award is any Award of Stock (the “Restricted Shares”) subject to such restrictions and conditions as the Administrator may determine at the time of grant. Conditions may be based on continuing employment (or other service relationship) and/or achievement of pre-established performance goals and objectives. The terms and conditions of each such Award Certificate shall be determined by the Administrator, and such terms and conditions may differ among individual Awards and grantees.

(b) Rights as a Stockholder. Upon the grant of the Restricted Stock Award and payment of any applicable purchase price, a grantee shall have the rights of a stockholder with respect to the voting of the Restricted Shares and receipt of dividends; provided that if the lapse of restrictions with respect to the Restricted Stock Award is tied to the attainment of performance goals, any dividends paid by the Company during the performance period shall accrue and shall not be paid to the grantee until and to the extent the performance goals are met with respect to the Restricted Stock Award. Unless the Administrator shall otherwise determine, (i) uncertificated Restricted Shares shall be accompanied by a notation on the records of the Company or the transfer agent to the effect that they are subject to forfeiture until such Restricted Shares are vested as provided in Section 7(d) below, and (ii) certificated Restricted Shares shall remain in the possession of the Company until such Restricted Shares are vested as provided in Section 7(d) below, and the grantee shall be required, as a condition of the grant, to deliver to the Company such instruments of transfer as the Administrator may prescribe.

(c) Restrictions. Restricted Shares may not be sold, assigned, transferred, pledged or otherwise encumbered or disposed of except as specifically provided herein or in the Restricted Stock Award Certificate. Except as may otherwise be provided by the Administrator either in the Award Certificate or, subject to Section 18 below, in writing after the Award is issued, if a grantee’s employment (or other service relationship) with the Company and its Subsidiaries terminates for any reason, any Restricted Shares that have not vested at the time of termination shall automatically and

without any requirement of notice to such grantee from or other action by or on behalf of, the Company be deemed to have been reacquired by the Company at its original purchase price (if any) from such grantee or such grantee's legal representative simultaneously with such termination of employment (or other service relationship), and thereafter shall cease to represent any ownership of the Company by the grantee or rights of the grantee as a stockholder. Following such deemed reacquisition of Restricted Shares that are represented by physical certificates, a grantee shall surrender such certificates to the Company upon request without consideration.

(d) Vesting of Restricted Shares. The Administrator at the time of grant shall specify the date or dates and/or the attainment of pre-established performance goals, objectives and other conditions on which the non-transferability of the Restricted Shares and the Company's right of repurchase or forfeiture shall lapse. Subsequent to such date or dates and/or the attainment of such pre-established performance goals, objectives and other conditions, the shares on which all restrictions have lapsed shall no longer be Restricted Shares and shall be deemed "vested."

SECTION 8. RESTRICTED STOCK UNITS

(a) Nature of Restricted Stock Units. The Administrator may grant Restricted Stock Units under the Plan. A Restricted Stock Unit is an Award of stock units that may be settled in shares of Stock upon the satisfaction of such restrictions and conditions at the time of grant. Conditions may be based on continuing employment (or other service relationship) and/or achievement of pre-established performance goals and objectives. The terms and conditions of each such Award Certificate shall be determined by the Administrator, and such terms and conditions may differ among individual Awards and grantees. Except in the case of Restricted Stock Units with a deferred settlement date that complies with Section 409A, at the end of the vesting period, the Restricted Stock Units, to the extent vested, shall be settled in the form of shares of Stock. Restricted Stock Units with deferred settlement dates are subject to Section 409A and shall contain such additional terms and conditions as the Administrator shall determine in its sole discretion in order to comply with the requirements of Section 409A.

(b) Election to Receive Restricted Stock Units in Lieu of Compensation. The Administrator may, in its sole discretion, permit a grantee to elect to receive a portion of future cash compensation otherwise due to such grantee in the form of an award of Restricted Stock Units. Any such election shall be made in writing and shall be delivered to the Company no later than the date specified by the Administrator and in accordance with Section 409A and such other rules and procedures established by the Administrator. Any such future cash compensation that the grantee elects to defer shall be converted to a fixed number of Restricted Stock Units based on the Fair Market Value of Stock on the date the compensation would otherwise have been paid to the grantee if such payment had not been deferred as provided herein. The Administrator shall have the sole right to determine whether and under what circumstances to permit such elections and to impose such limitations and other terms and conditions thereon as the Administrator deems appropriate. Any Restricted Stock Units that are elected to be received in lieu of cash compensation shall be fully vested, unless otherwise provided in the Award Certificate.

(c) Rights as a Stockholder. A grantee shall have the rights as a stockholder only as to shares of Stock acquired by the grantee upon settlement of Restricted Stock Units; provided, however, that the grantee may be credited with Dividend Equivalent Rights with respect to the stock units underlying his Restricted Stock Units, subject to the provisions of Section 13 and such terms and conditions as the Administrator may determine.

(d) Termination. Except as may otherwise be provided by the Administrator either in the Award Certificate or, subject to Section 18 below, in writing after the Award is issued, a grantee's right in all Restricted Stock Units that have not vested shall automatically terminate upon the grantee's termination of employment (or cessation of service relationship) with the Company and its Subsidiaries for any reason.

SECTION 9. UNRESTRICTED STOCK AWARDS

Grant or Sale of Unrestricted Stock. The Administrator may, in its sole discretion, grant (or sell at par value or such higher purchase price determined by the Administrator) an Unrestricted Stock Award under the Plan. Unrestricted Stock Awards may be granted in respect of past services or other valid consideration, or in lieu of cash compensation due to such grantee.

SECTION 10.

CASH-BASED AWARDS

Grant of Cash-Based Awards. The Administrator may, in its sole discretion, grant Cash-Based Awards to any grantee in such number or amount and upon such terms, and subject to such conditions, as the Administrator shall determine at the time of grant. The Administrator shall determine the maximum duration of the Cash-Based Award, the amount of cash to which the Cash-Based Award pertains, the conditions upon which the Cash-Based Award shall become vested or payable, and such other provisions as the Administrator shall determine. Each Cash-Based Award shall specify a cash-denominated payment amount, formula or payment ranges as determined by the Administrator. Payment, if any, with respect to a Cash-Based Award shall be made in accordance with the terms of the Award and may be made in cash or in shares of Stock, as the Administrator determines.

SECTION 11.

PERFORMANCE SHARE AWARDS

(a) Nature of Performance Share Awards. The Administrator may, in its sole discretion, grant Performance Share Awards independent of, or in connection with, the granting of any other Award under the Plan. The Administrator shall determine whether and to whom Performance Share Awards shall be granted, the Performance Goals, the periods during which performance is to be measured, which may not be less than one year except in the case of a Sale Event, and such other limitations and conditions as the Administrator shall determine.

(b) Rights as a Stockholder. A grantee receiving a Performance Share Award shall have the rights of a stockholder only as to shares actually received by the grantee under the Plan and not with respect to shares subject to the Award but not actually received by the grantee. A grantee shall be entitled to receive shares of Stock under a Performance Share Award only upon satisfaction of all conditions specified in the Performance Share Award Certificate (or in a performance plan adopted by the Administrator).

(c) Termination. Except as may otherwise be provided by the Administrator either in the Award agreement or, subject to Section 18 below, in writing after the Award is issued, a grantee's rights in all Performance Share Awards shall automatically terminate upon the grantee's termination of employment (or cessation of service relationship) with the Company and its Subsidiaries for any reason.

SECTION 12.

PERFORMANCE-BASED AWARDS TO COVERED EMPLOYEES

(a) Performance-Based Awards. Any employee or other key person providing services to the Company and who is selected by the Administrator may be granted one or more Performance-Based Awards in the form of a Restricted Stock Award, Restricted Stock Units, Performance Share Awards or Cash-Based Award payable upon the attainment of Performance Goals that are established by the Administrator and relate to one or more of the Performance Criteria, in each case on a specified date or dates or over any period or periods determined by the Administrator. The Administrator shall define in an objective fashion the manner of calculating the Performance Criteria it selects to use for any Performance Cycle. Depending on the Performance Criteria used to establish such Performance Goals, the Performance Goals may be expressed in terms of overall Company performance or the performance of a division, business unit, or an individual. The Administrator, in its discretion, may adjust or modify the calculation of Performance Goals for such Performance Cycle in order to prevent the dilution or enlargement of the rights of an individual (i) in the event of, or in anticipation of, any unusual or extraordinary corporate item, transaction, event or development, (ii) in recognition of, or in anticipation of, any other unusual or nonrecurring events affecting the Company, or the financial statements of the Company, or (iii) in response to, or in anticipation of, changes in applicable laws, regulations, accounting principles, or business conditions; provided, however, that the Administrator may not exercise such discretion in a manner that would increase the Performance-Based Award granted to a Covered Employee. Each Performance-Based Award shall comply with the provisions set forth below.

(b) Grant of Performance-Based Awards. With respect to each Performance-Based Award granted to a Covered Employee (or any other eligible individual that the Administrator determines is reasonably likely to become a Covered Employee), the Administrator shall select, within the first 90 days of a Performance Cycle (or, if shorter, within the maximum period allowed under Section 162(m) of the Code) the Performance Criteria for such grant, and the Performance Goals with respect to each Performance Criterion (including a threshold level of performance below which no amount will become payable with respect to such Award). Each Performance-Based Award will specify the amount payable, or the formula for determining the amount payable, upon achievement of the various applicable performance targets. The Performance Criteria established by the Administrator may be (but need not be) different for each

Performance Cycle and different Performance Goals may be applicable to Performance-Based Awards to different Covered Employees.

(c) Payment of Performance-Based Awards. Following the completion of a Performance Cycle, the Administrator shall meet to review and certify in writing whether, and to what extent, the Performance Goals for the Performance Cycle have been achieved and, if so, to also calculate and certify in writing the amount of the Performance-Based Awards earned for the Performance Cycle. The Administrator shall then determine the actual size of each Covered Employee's Performance-Based Award, and, in doing so, may reduce or eliminate the amount of the Performance-Based Award for a Covered Employee if, in its sole judgment, such reduction or elimination is appropriate.

(d) Maximum Award Payable. The maximum Performance-Based Award payable to any one Covered Employee under the Plan for a Performance Cycle is 1,460,084 shares of Stock (subject to adjustment as provided in Section 3(c) hereof) or \$2,000,000 in the case of a Performance-Based Award that is a Cash-Based Award.

SECTION 13. DIVIDEND EQUIVALENT RIGHTS

(a) Dividend Equivalent Rights. A Dividend Equivalent Right may be granted hereunder to any grantee as a component of an award of Restricted Stock Units, Restricted Stock Award or Performance Share Award or as a freestanding award. The terms and conditions of Dividend Equivalent Rights shall be specified in the Award Certificate. Dividend equivalents credited to the holder of a Dividend Equivalent Right may be paid currently or may be deemed to be reinvested in additional shares of Stock, which may thereafter accrue additional equivalents. Any such reinvestment shall be at Fair Market Value on the date of reinvestment or such other price as may then apply under a dividend reinvestment plan sponsored by the Company, if any. Dividend Equivalent Rights may be settled in cash or shares of Stock or a combination thereof, in a single installment or installments. A Dividend Equivalent Right granted as a component of an award of Restricted Stock Units or Restricted Stock Award with performance vesting or Performance Share Award shall provide that such Dividend Equivalent Right shall be settled only upon settlement or payment of, or lapse of restrictions on, such other Award, and that such Dividend Equivalent Right shall expire or be forfeited or annulled under the same conditions as such other Award.

(b) Termination. Except as may otherwise be provided by the Administrator either in the Award Certificate or, subject to Section 18 below, in writing after the Award is issued, a grantee's rights in all Dividend Equivalent Rights or interest equivalents granted as a component of an award of Restricted Stock Units, Restricted Stock Award or Performance Share Award that has not vested shall automatically terminate upon the grantee's termination of employment (or cessation of service relationship) with the Company and its Subsidiaries for any reason.

SECTION 14. Transferability of Awards

(a) Transferability. Except as provided in Section 14(b) below, during a grantee's lifetime, his or her Awards shall be exercisable only by the grantee, or by the grantee's legal representative or guardian in the event of the grantee's incapacity. No Awards shall be sold, assigned, transferred or otherwise encumbered or disposed of by a grantee other than by will or by the laws of descent and distribution or pursuant to a domestic relations order. No Awards shall be subject, in whole or in part, to attachment, execution, or levy of any kind, and any purported transfer in violation hereof shall be null and void.

(b) Administrator Action. Notwithstanding Section 14(a), the Administrator, in its discretion, may provide either in the Award Certificate regarding a given Award or by subsequent written approval that the grantee (who is an employee or director) may transfer his or her Non-Qualified Options to his or her immediate family members, to trusts for the benefit of such family members, or to partnerships in which such family members are the only partners, provided that the transferee agrees in writing with the Company to be bound by all of the terms and conditions of this Plan and the applicable Award. In no event may an Award be transferred by a grantee for value.

(c) Family Member. For purposes of Section 14(b), "family member" shall mean a grantee's child, stepchild, grandchild, parent, stepparent, grandparent, spouse, former spouse, sibling, niece, nephew, mother-in-law, father-in-law, son-in-law, daughter-in-law, brother-in-law, or sister-in-law, including adoptive relationships, any person sharing the grantee's household (other than a tenant of the grantee), a trust in which these persons (or the grantee) have more than fifty percent (50%) of the beneficial interest, a foundation in which these persons (or the grantee) control the management of assets, and any other entity in which these persons (or the grantee) own more than fifty percent (50%) of the voting

interests.

(d) Designation of Beneficiary. Each grantee to whom an Award has been made under the Plan may designate a beneficiary or beneficiaries to exercise any Award or receive any payment under any Award payable on or after the grantee's death. Any such designation shall be on a form provided for that purpose by the Administrator and shall not be effective until received by the Administrator. If no beneficiary has been designated by a deceased grantee, or if the designated beneficiaries have predeceased the grantee, the beneficiary shall be the grantee's estate.

SECTION 15. TAX WITHHOLDING

(a) Payment by Grantee. Each grantee shall, no later than the date as of which the value of an Award or of any Stock or other amounts received thereunder first becomes includable in the gross income of the grantee for Federal income tax purposes, pay to the Company, or make arrangements satisfactory to the Administrator regarding payment of, any Federal, state, or local taxes of any kind required by law to be withheld by the Company with respect to such income. The Company and its Subsidiaries shall, to the extent permitted by law, have the right to deduct any such taxes from any payment of any kind otherwise due to the grantee. The Company's obligation to deliver evidence of book entry (or stock certificates) to any grantee is subject to and conditioned on tax withholding obligations being satisfied by the grantee.

(b) Payment in Stock. Subject to approval by the Administrator, the Company's minimum required tax withholding obligation may be satisfied, in whole or in part, by the Company withholding from shares of Stock to be issued pursuant to any Award a number of shares with an aggregate Fair Market Value (as of the date the withholding is effected) that would satisfy the withholding amount due.

SECTION 16. Section 409A awards

To the extent that any Award is determined to constitute "nonqualified deferred compensation" within the meaning of Section 409A (a "409A Award"), the Award shall be subject to such additional rules and requirements as specified by the Administrator from time to time in order to comply with Section 409A. In this regard, if any amount under a 409A Award is payable upon a "separation from service" (within the meaning of Section 409A) to a grantee who is then considered a "specified employee" (within the meaning of Section 409A), then no such payment shall be made prior to the date that is the earlier of (i) six months and one day after the grantee's separation from service, or (ii) the grantee's death, but only to the extent such delay is necessary to prevent such payment from being subject to interest, penalties and/or additional tax imposed pursuant to Section 409A. Further, the settlement of any such Award may not be accelerated except to the extent permitted by Section 409A.

SECTION 17. TRANSFER, LEAVE OF ABSENCE, ETC.

For purposes of the Plan, the following events shall not be deemed a termination of employment:

(a) a transfer to the employment of the Company from a Subsidiary or from the Company to a Subsidiary, or from one Subsidiary to another; or

(b) an approved leave of absence for military service or sickness, or for any other purpose approved by the Company, if the employee's right to re-employment is guaranteed either by a statute or by contract or under the policy pursuant to which the leave of absence was granted or if the Administrator otherwise so provides in writing.

SECTION 18. AMENDMENTS AND TERMINATION

The Board may, at any time, amend or discontinue the Plan and the Administrator may, at any time, amend or cancel any outstanding Award for the purpose of satisfying changes in law or for any other lawful purpose, but no such action shall adversely affect rights under any outstanding Award without the holder's consent. Except as provided in Section 3(c) or 3(d), without prior stockholder approval, in no event may the Administrator exercise its discretion to reduce the exercise price of outstanding Stock Options or Stock Appreciation Rights or effect repricing through cancellation and re-grants or cancellation of Stock Options or Stock Appreciation Rights in exchange for cash. To the extent required under the rules of any securities exchange or market system on which the Stock is listed, to the extent determined by the Administrator to be required by the Code to ensure that Incentive Stock Options granted under the Plan are qualified under Section 422 of the Code, or to ensure that compensation earned under Awards qualifies as

performance-based compensation under Section 162(m) of the Code, Plan amendments shall be subject to approval by the Company stockholders entitled to vote at a meeting of stockholders. Nothing in this Section 18 shall limit the Administrator's authority to take any action permitted pursuant to Section 3(c) or 3(d).

SECTION 19. STATUS OF PLAN

With respect to the portion of any Award that has not been exercised and any payments in cash, Stock or other consideration not received by a grantee, a grantee shall have no rights greater than those of a general creditor of the Company unless the Administrator shall otherwise expressly determine in connection with any Award or Awards. In its sole discretion, the Administrator may authorize the creation of trusts or other arrangements to meet the Company's obligations to deliver Stock or make payments with respect to Awards hereunder, provided that the existence of such trusts or other arrangements is consistent with the foregoing sentence.

SECTION 20. GENERAL PROVISIONS

(a) No Distribution. The Administrator may require each person acquiring Stock pursuant to an Award to represent to and agree with the Company in writing that such person is acquiring the shares without a view to distribution thereof.

(b) Delivery of Stock Certificates. Stock certificates to grantees under this Plan shall be deemed delivered for all purposes when the Company or a stock transfer agent of the Company shall have mailed such certificates in the United States mail, addressed to the grantee, at the grantee's last known address on file with the Company. Uncertificated Stock shall be deemed delivered for all purposes when the Company or a Stock transfer agent of the Company shall have given to the grantee by electronic mail (with proof of receipt) or by United States mail, addressed to the grantee, at the grantee's last known address on file with the Company, notice of issuance and recorded the issuance in its records (which may include electronic "book entry" records). Notwithstanding anything herein to the contrary, the Company shall not be required to issue or deliver any certificates evidencing shares of Stock pursuant to the exercise of any Award, unless and until the Administrator has determined, with advice of counsel (to the extent the Administrator deems such advice necessary or advisable), that the issuance and delivery of such certificates is in compliance with all applicable laws, regulations of governmental authorities and, if applicable, the requirements of any exchange on which the shares of Stock are listed, quoted or traded. All Stock certificates delivered pursuant to the Plan shall be subject to any stop-transfer orders and other restrictions as the Administrator deems necessary or advisable to comply with federal, state or foreign jurisdiction, securities or other laws, rules and quotation system on which the Stock is listed, quoted or traded. The Administrator may place legends on any Stock certificate to reference restrictions applicable to the Stock. In addition to the terms and conditions provided herein, the Administrator may require that an individual make such reasonable covenants, agreements, and representations as the Administrator, in its discretion, deems necessary or advisable in order to comply with any such laws, regulations, or requirements. The Administrator shall have the right to require any individual to comply with any timing or other restrictions with respect to the settlement or exercise of any Award, including a window-period limitation, as may be imposed in the discretion of the Administrator.

(c) Stockholder Rights. Until Stock is deemed delivered in accordance with Section 20(b), no right to vote or receive dividends or any other rights of a stockholder will exist with respect to shares of Stock to be issued in connection with an Award, notwithstanding the exercise of a Stock Option or any other action by the grantee with respect to an Award.

(d) Other Compensation Arrangements; No Employment Rights. Nothing contained in this Plan shall prevent the Board from adopting other or additional compensation arrangements, including trusts, and such arrangements may be either generally applicable or applicable only in specific cases. The adoption of this Plan and the grant of Awards do not confer upon any employee any right to continued employment with the Company or any Subsidiary.

(e) Trading Policy Restrictions. Option exercises and other Awards under the Plan shall be subject to the Company's insider trading policies and procedures, as in effect from time to time.

(f) Clawback Policy. Awards under the Plan shall be subject to the Company's clawback policy, as in effect from time to time.

SECTION 21.

EFFECTIVE DATE OF PLAN

This Plan shall become effective immediately prior to the Company's Initial Public Offering, following stockholder approval of the Plan in accordance with applicable state law, the Company's bylaws and articles of incorporation, and applicable stock exchange rules or pursuant to written consent. No grants of Stock Options and other Awards may be made hereunder after the tenth anniversary of the Effective Date and no grants of Incentive Stock Options may be made hereunder after the tenth anniversary of the date the Plan is approved by the Board.

SECTION 22.

GOVERNING LAW

This Plan and all Awards and actions taken thereunder shall be governed by, and construed in accordance with, the laws of the State of Delaware, applied without regard to conflict of law principles.

DATE APPROVED BY BOARD OF DIRECTORS: March 12, 2015

DATE APPROVED BY STOCKHOLDERS: April 6, 2015

**NON-QUALIFIED STOCK OPTION AGREEMENT
FOR COMPANY EMPLOYEES
UNDER BLUEPRINT MEDICINES CORPORATION
2015 STOCK OPTION AND INCENTIVE PLAN**

Name of Optionee: FIRST_NAME LAST_NAME
No. of Option Shares: TOTAL_SHARES_GRANTED
Option Exercise Price per Share: OPTION_PRICE
Vesting Start Date: VEST_BASE_DATE
Grant Date: OPTION_DATE
Expiration Date: EXPIRE_DATE_PERIOD1

Pursuant to the Blueprint Medicines Corporation 2015 Stock Option and Incentive Plan as amended through the date hereof (the "Plan"), Blueprint Medicines Corporation (the "Company") hereby grants to the Optionee named above an option (the "Stock Option") to purchase on or prior to the Expiration Date specified above all or part of the number of shares of Common Stock, par value \$0.001 per share (the "Stock") of the Company specified above at the Option Exercise Price per Share specified above subject to the terms and conditions set forth herein and in the Plan. This Stock Option is not intended to be an "incentive stock option" under Section 422 of the Internal Revenue Code of 1986, as amended.

1. Exercisability Schedule. No portion of this Stock Option may be exercised until such portion shall have become exercisable. Except as set forth below, and subject to the discretion of the Administrator (as defined in Section 2 of the Plan) to accelerate the exercisability schedule hereunder, this Stock Option shall be exercisable as follows:

For so long as Optionee remains an employee of the Company or a Subsidiary on the relevant date, [] ([]%) of the Option Shares shall vest on the one-year anniversary of the Vesting Start Date, and the remaining [] ([]%) of the Option Shares shall vest in [] ([]) equal monthly installments following the one-year anniversary of the Vesting Start Date; provided that one hundred percent (100%) of the Option Shares shall become fully vested immediately upon the Optionee's death or disability, subject to the Optionee's continued employment with the Company or a Subsidiary until the date of such death or disability.

Once exercisable, this Stock Option shall continue to be exercisable at any time or times prior to the close of business on the Expiration Date, subject to the provisions hereof and of the Plan.

2. Manner of Exercise.

(a) The Optionee may exercise this Stock Option only in the following manner: from time to time on or prior to the Expiration Date of this Stock Option, the Optionee may give written notice to the Administrator of his or her election to purchase some or all of the Option Shares purchasable at the time of such notice. This notice shall specify the number of Option Shares to be purchased.

Payment of the purchase price for the Option Shares may be made by one or more of the following methods: (i) in cash, by certified or bank check or other instrument acceptable to the Administrator; (ii) through the delivery (or attestation to the ownership) of shares of Stock that have been purchased by the Optionee on the open market or that are beneficially owned by the Optionee and are not then subject to any restrictions under any Company plan and that otherwise satisfy any holding periods as may be required by the Administrator; (iii) by the Optionee delivering to the Company a properly executed exercise notice together with irrevocable instructions to a broker to promptly deliver to the Company cash or a check payable and acceptable to the Company to pay the option purchase price, provided that in the event the Optionee chooses to pay the option purchase price as so provided, the Optionee and the broker shall comply with such procedures and enter into such agreements of indemnity and other agreements as the Administrator shall prescribe as a condition of such payment procedure; (iv) by a "net exercise" arrangement pursuant to which the Company will reduce the number of shares of Stock issuable upon exercise by the largest whole number of shares with a Fair

Market Value that does not exceed the aggregate exercise price; or (v) a combination of (i), (ii), (iii) and (iv) above. Payment instruments will be received subject to collection.

The transfer to the Optionee on the records of the Company or of the transfer agent of the Option Shares will be contingent upon (i) the Company's receipt from the Optionee of the full purchase price for the Option Shares, as set forth above, (ii) the fulfillment of any other requirements contained herein or in the Plan or in any other agreement or provision of laws, and (iii) the receipt by the Company of any agreement, statement or other evidence that the Company may require to satisfy itself that the issuance of Stock to be purchased pursuant to the exercise of Stock Options under the Plan and any subsequent resale of the shares of Stock will be in compliance with applicable laws and regulations. In the event the Optionee chooses to pay the purchase price by previously-owned shares of Stock through the attestation method, the number of shares of Stock transferred to the Optionee upon the exercise of the Stock Option shall be net of the Shares attested to.

(b) The shares of Stock purchased upon exercise of this Stock Option shall be transferred to the Optionee on the records of the Company or of the transfer agent upon compliance to the satisfaction of the Administrator with all requirements under applicable laws or regulations in connection with such transfer and with the requirements hereof and of the Plan. The determination of the Administrator as to such compliance shall be final and binding on the Optionee. The Optionee shall not be deemed to be the holder of, or to have any of the rights of a holder with respect to, any shares of Stock subject to this Stock Option unless and until this Stock Option shall have been exercised pursuant to the terms hereof, the Company or the transfer agent shall have transferred the shares to the Optionee, and the Optionee's name shall have been entered as the stockholder of record on the books of the Company. Thereupon, the Optionee shall have full voting, dividend and other ownership rights with respect to such shares of Stock.

(c) [Reserved].

(d) Notwithstanding any other provision hereof or of the Plan, no portion of this Stock Option shall be exercisable after the Expiration Date hereof.

3. Termination of Employment. If the Optionee's employment by the Company or a Subsidiary (as defined in the Plan) is terminated, the period within which to exercise the Stock Option may be subject to earlier termination as set forth below.

(a) Termination Due to Death. If the Optionee's employment terminates by reason of the Optionee's death, any portion of this Stock Option outstanding on such date, to the extent exercisable on the date of death, may thereafter be exercised by the Optionee's legal representative or legatee for a period of 12 months from the date of death or until the Expiration Date, if earlier. Any portion of this Stock Option that is not exercisable on the date of death shall terminate immediately and be of no further force or effect.

(b) Termination Due to Disability. If the Optionee's employment terminates by reason of the Optionee's disability (as determined by the Administrator), any portion of this Stock Option outstanding on such date, to the extent exercisable on the date of such disability, may thereafter be exercised by the Optionee for a period of 12 months from the date of disability or until the Expiration Date, if earlier. Any portion of this Stock Option that is not exercisable on the date of disability shall terminate immediately and be of no further force or effect.

(c) Termination for Cause. If the Optionee's employment terminates for Cause, any portion of this Stock Option outstanding on such date shall terminate immediately and be of no further force and effect. For purposes hereof, "Cause" shall mean, unless otherwise provided in an employment agreement between the Company and the Optionee, a determination by the Administrator that the Optionee shall be dismissed as a result of (i) the Optionee's dishonest statements or acts with respect to the Company or any affiliate of the Company, or any of the Company's current or prospective customers, suppliers vendors or other third parties with which such entity does business; (ii) the Optionee's commission of (A) a felony or (B) any misdemeanor involving moral turpitude, deceit, dishonesty or fraud; (iii) the Optionee's failure to perform his assigned duties and responsibilities to the reasonable satisfaction of the Company which failure continues, in the reasonable judgment of the Company, after written notice given to the grantee by the Company; (iv) the Optionee's gross negligence, willful misconduct or insubordination with respect to the Company or any affiliate of the Company; or (v) the Optionee's material violation of any provision of any agreement(s) between the Optionee and the Company relating to noncompetition, nondisclosure and/or assignment of inventions.

(d) Other Termination. If the Optionee's employment terminates for any reason other than the Optionee's death, the Optionee's disability or Cause, and unless otherwise determined by the Administrator, any portion of this Stock Option outstanding on such date may be exercised, to the extent exercisable on the date of termination, for a period of three months from the date of termination or until the Expiration Date, if earlier. Any portion of this Stock Option that is not exercisable on the date of termination shall terminate immediately and be of no further force or effect.

The Administrator's determination of the reason for termination of the Optionee's employment shall be conclusive and binding on the Optionee and his or her representatives or legatees.

4. Incorporation of Plan. Notwithstanding anything herein to the contrary, this Stock Option shall be subject to and governed by all the terms and conditions of the Plan, including the powers of the Administrator set forth in Section 2(b) of the Plan. Capitalized terms in this Agreement shall have the meaning specified in the Plan, unless a different meaning is specified herein.

5. Transferability. This Agreement is personal to the Optionee, is non-assignable and is not transferable in any manner, by operation of law or otherwise, other than by will or the laws of descent and distribution. This Stock Option is exercisable, during the Optionee's lifetime, only by the Optionee, and thereafter, only by the Optionee's legal representative or legatee.

6. Tax Withholding. The Optionee shall, not later than the date as of which the exercise of this Stock Option becomes a taxable event for Federal income tax purposes, pay to the Company or make arrangements satisfactory to the Administrator for payment of any Federal, state, and local taxes required by law to be withheld on account of such taxable event. The Company shall have the authority to cause the minimum required tax withholding obligation to be satisfied, in whole or in part, by withholding from shares of Stock to be issued to the Optionee a number of shares of Stock with an aggregate Fair Market Value that would satisfy the minimum withholding amount due.

7. No Obligation to Continue Employment. Neither the Company nor any Subsidiary is obligated by or as a result of the Plan or this Agreement to continue the Optionee in employment and neither the Plan nor this Agreement shall interfere in any way with the right of the Company or any Subsidiary to terminate the employment of the Optionee at any time.

8. Integration. This Agreement constitutes the entire agreement between the parties with respect to this Stock Option and supersedes all prior agreements and discussions between the parties concerning such subject matter.

9. Data Privacy Consent. In order to administer the Plan and this Agreement and to implement or structure future equity grants, the Company, its subsidiaries and affiliates and certain agents thereof (together, the "Relevant Companies") may process any and all personal or professional data, including but not limited to Social Security or other identification number, home address and telephone number, date of birth and other information that is necessary or desirable for the administration of the Plan and/or this Agreement (the "Relevant Information"). By entering into this Agreement, the Optionee (i) authorizes the Company to collect, process, register and transfer to the Relevant Companies all Relevant Information; (ii) waives any privacy rights the Optionee may have with respect to the Relevant Information; (iii) authorizes the Relevant Companies to store and transmit such information in electronic form; and (iv) authorizes the transfer of the Relevant Information to any jurisdiction in which the Relevant Companies consider appropriate. The Optionee shall have access to, and the right to change, the Relevant Information. Relevant Information will only be used in accordance with applicable law.

10. Notices. Notices hereunder shall be mailed or delivered to the Company at its principal place of business and shall be mailed or delivered to the Optionee at the address on file with the Company or, in either case, at such other address as one party may subsequently furnish to the other party in writing.

BLUEPRINT MEDICINES CORPORATION

By: _____
Name:
Title:

The foregoing Agreement is hereby accepted and the terms and conditions thereof hereby agreed to by the undersigned. Electronic acceptance of this Agreement pursuant to the Company's instructions to the Optionee (including through an online acceptance process) is acceptable.

Dated: _____

Optionee's Signature

Optionee's name and address:

FIRST_NAME LAST_NAME

ADDRESS_LINE_1

ADDRESS_LINE_2

CITY STATE

COUNTRY

ZIPCODE

**NON-QUALIFIED STOCK OPTION AGREEMENT
FOR CONSULTANTS
UNDER BLUEPRINT MEDICINES CORPORATION
2015 STOCK OPTION AND INCENTIVE PLAN**

Name of Optionee: FIRST_NAME LAST_NAME

No. of Option Shares: TOTAL_SHARES_GRANTED

Option Exercise Price per Share: OPTION_PRICE

Vesting Start Date: VEST_BASE_DATE

Grant Date: OPTION_DATE

Expiration Date: EXPIRE_DATE_PERIOD1

Pursuant to the Blueprint Medicines Corporation 2015 Stock Option and Incentive Plan as amended through the date hereof (the "Plan"), Blueprint Medicines Corporation (the "Company") hereby grants to the Optionee named above an option (the "Stock Option") to purchase on or prior to the Expiration Date specified above all or part of the number of shares of Common Stock, par value \$0.001 per share (the "Stock") of the Company specified above at the Option Exercise Price per Share specified above subject to the terms and conditions set forth herein and in the Plan. This Stock Option is not intended to be an "incentive stock option" under Section 422 of the Internal Revenue Code of 1986, as amended.

1. Exercisability Schedule. No portion of this Stock Option may be exercised until such portion shall have become exercisable. Except as set forth below, and subject to the discretion of the Administrator (as defined in Section 2 of the Plan) to accelerate the exercisability schedule hereunder, this Stock Option shall be exercisable as follows:

For so long as Optionee remains a service provider of the Company or a Subsidiary on the relevant date, twenty-five percent (25%) of the Option Shares shall vest on the one-year anniversary of the Vesting Start Date, and the remaining seventy-five percent (75%) of the Option Shares shall vest in thirty-six (36) equal monthly installments following the one-year anniversary of the Vesting Start Date.

Once exercisable, this Stock Option shall continue to be exercisable at any time or times prior to the close of business on the Expiration Date, subject to the provisions hereof and of the Plan.

2. Manner of Exercise.

(a) The Optionee may exercise this Stock Option only in the following manner: from time to time on or prior to the Expiration Date of this Stock Option, the Optionee may give written notice to the Administrator of his or her election to purchase some or all of the Option Shares purchasable at the time of such notice. This notice shall specify the number of Option Shares to be purchased.

Payment of the purchase price for the Option Shares may be made by one or more of the following methods: (i) in cash, by certified or bank check or other instrument acceptable to the Administrator; (ii) through the delivery (or attestation to the ownership) of shares of Stock that have been purchased by the Optionee on the open market or that are beneficially owned by the Optionee and are not then subject to any restrictions under any Company plan and that otherwise satisfy any holding periods as may be required by the Administrator; (iii) by the Optionee delivering to the Company a properly executed exercise notice together with irrevocable instructions to a broker to promptly deliver to the Company cash or a check payable and acceptable to the Company to pay the option purchase price, provided that in the event the Optionee chooses to pay the option purchase price as so provided, the Optionee and the broker shall comply with such procedures and enter into such agreements of indemnity and other agreements as the Administrator shall prescribe as a condition of such payment procedure; (iv) by a "net exercise" arrangement pursuant to which the Company will reduce the number of shares of Stock issuable upon exercise by the largest whole number of shares with a Fair Market Value that does not exceed the aggregate exercise price; or (v) a combination of (i), (ii), (iii) and (iv) above. Payment instruments will be received subject to collection.

The transfer to the Optionee on the records of the Company or of the transfer agent of the Option Shares will be

contingent upon (i) the Company's receipt from the Optionee of the full purchase price for the Option Shares, as set forth above, (ii) the fulfillment of any other requirements contained herein or in the Plan or in any other agreement or provision of laws, and (iii) the receipt by the Company of any agreement, statement or other evidence that the Company may require to satisfy itself that the issuance of Stock to be purchased pursuant to the exercise of Stock Options under the Plan and any subsequent resale of the shares of Stock will be in compliance with applicable laws and regulations. In the event the Optionee chooses to pay the purchase price by previously-owned shares of Stock through the attestation method, the number of shares of Stock transferred to the Optionee upon the exercise of the Stock Option shall be net of the Shares attested to.

(b) The shares of Stock purchased upon exercise of this Stock Option shall be transferred to the Optionee on the records of the Company or of the transfer agent upon compliance to the satisfaction of the Administrator with all requirements under applicable laws or regulations in connection with such transfer and with the requirements hereof and of the Plan. The determination of the Administrator as to such compliance shall be final and binding on the Optionee. The Optionee shall not be deemed to be the holder of, or to have any of the rights of a holder with respect to, any shares of Stock subject to this Stock Option unless and until this Stock Option shall have been exercised pursuant to the terms hereof, the Company or the transfer agent shall have transferred the shares to the Optionee, and the Optionee's name shall have been entered as the stockholder of record on the books of the Company. Thereupon, the Optionee shall have full voting, dividend and other ownership rights with respect to such shares of Stock.

(c) [Reserved].

(d) Notwithstanding any other provision hereof or of the Plan, no portion of this Stock Option shall be exercisable after the Expiration Date hereof.

3. Termination of Service Relationship. If the Optionee ceases to be a service provider to the Company or a Subsidiary (as defined in the Plan), the period within which to exercise the Stock Option may be subject to earlier termination as set forth below.

(a) Termination Due to Death. If the Optionee ceases to be a service provider to the Company or a Subsidiary by reason of the Optionee's death, any portion of this Stock Option outstanding on such date, to the extent exercisable on the date of death, may thereafter be exercised by the Optionee's legal representative or legatee for a period of 12 months from the date of death or until the Expiration Date, if earlier. Any portion of this Stock Option that is not exercisable on the date of death shall terminate immediately and be of no further force or effect.

(b) Termination Due to Disability. If the Optionee ceases to be a service provider to the Company or a Subsidiary by reason of the Optionee's disability (as determined by the Administrator), any portion of this Stock Option outstanding on such date, to the extent exercisable on the date of such disability, may thereafter be exercised by the Optionee for a period of 12 months from the date of disability or until the Expiration Date, if earlier. Any portion of this Stock Option that is not exercisable on the date of disability shall terminate immediately and be of no further force or effect.

(c) Termination for Cause. If the Optionee ceases to be a service provider to the Company or a Subsidiary due to a termination by the Company or a Subsidiary for Cause, any portion of this Stock Option outstanding on such date shall terminate immediately and be of no further force and effect. For purposes hereof, "Cause" shall mean, unless otherwise provided in an employment, consulting or other service agreement between the Company and the Optionee, a determination by the Administrator that the Optionee shall be dismissed as a result of (i) the Optionee's dishonest statements or acts with respect to the Company or any affiliate of the Company, or any of the Company's current or prospective customers, suppliers vendors or other third parties with which such entity does business; (ii) the Optionee's commission of (A) a felony or (B) any misdemeanor involving moral turpitude, deceit, dishonesty or fraud; (iii) the Optionee's failure to perform his assigned duties and responsibilities to the reasonable satisfaction of the Company which failure continues, in the reasonable judgment of the Company, after written notice given to the grantee by the Company; (iv) the Optionee's gross negligence, willful misconduct or insubordination with respect to the Company or any affiliate of the Company; or (v) the Optionee's material violation of any provision of any agreement(s) between the Optionee and the Company relating to noncompetition, nondisclosure and/or assignment of inventions.

(d) Other Termination. If the Optionee ceases to be a service provider to the Company or a Subsidiary due to a termination for any reason other than the Optionee's death, the Optionee's disability or Cause, and unless

otherwise determined by the Administrator, any portion of this Stock Option outstanding on such date may be exercised, to the extent exercisable on the date of termination, for a period of three months from the date of termination or until the Expiration Date, if earlier. Any portion of this Stock Option that is not exercisable on the date of termination shall terminate immediately and be of no further force or effect.

The Administrator's determination of the reason for termination of the Optionee's service relationship with the Company or a Subsidiary shall be conclusive and binding on the Optionee and his or her representatives or legatees.

4. Incorporation of Plan. Notwithstanding anything herein to the contrary, this Stock Option shall be subject to and governed by all the terms and conditions of the Plan, including the powers of the Administrator set forth in Section 2(b) of the Plan. Capitalized terms in this Agreement shall have the meaning specified in the Plan, unless a different meaning is specified herein.

5. Transferability. This Agreement is personal to the Optionee, is non-assignable and is not transferable in any manner, by operation of law or otherwise, other than by will or the laws of descent and distribution. This Stock Option is exercisable, during the Optionee's lifetime, only by the Optionee, and thereafter, only by the Optionee's legal representative or legatee.

6. No Obligation to Continue Service. Neither the Company nor any Subsidiary is obligated by or as a result of the Plan or this Agreement to continue the Optionee in a service relationship with the Company or any Subsidiary and neither the Plan nor this Agreement shall interfere in any way with the right of the Company or any Subsidiary to terminate the service relationship of the Optionee with the Company or any Subsidiary at any time.

7. Integration. This Agreement constitutes the entire agreement between the parties with respect to this Stock Option and supersedes all prior agreements and discussions between the parties concerning such subject matter.

8. Data Privacy Consent. In order to administer the Plan and this Agreement and to implement or structure future equity grants, the Company, its subsidiaries and affiliates and certain agents thereof (together, the "Relevant Companies") may process any and all personal or professional data, including but not limited to Social Security or other identification number, home address and telephone number, date of birth and other information that is necessary or desirable for the administration of the Plan and/or this Agreement (the "Relevant Information"). By entering into this Agreement, the Optionee (i) authorizes the Company to collect, process, register and transfer to the Relevant Companies all Relevant Information; (ii) waives any privacy rights the Optionee may have with respect to the Relevant Information; (iii) authorizes the Relevant Companies to store and transmit such information in electronic form; and (iv) authorizes the transfer of the Relevant Information to any jurisdiction in which the Relevant Companies consider appropriate. The Optionee shall have access to, and the right to change, the Relevant Information. Relevant Information will only be used in accordance with applicable law.

9. Notices. Notices hereunder shall be mailed or delivered to the Company at its principal place of business and shall be mailed or delivered to the Optionee at the address on file with the Company or, in either case, at such other address as one party may subsequently furnish to the other party in writing.

BLUEPRINT MEDICINES CORPORATION

By: _____
Name:
Title:

The foregoing Agreement is hereby accepted and the terms and conditions thereof hereby agreed to by the undersigned. Electronic acceptance of this Agreement pursuant to the Company's instructions to the Optionee (including through an online acceptance process) is acceptable.

Dated: _____

Optionee's Signature

Optionee's name and address:

FIRST_NAME LAST_NAME

ADDRESS_LINE_1

ADDRESS_LINE_2

CITY STATE

COUNTRY

ZIPCODE

**RESTRICTED STOCK UNIT AWARD AGREEMENT
FOR COMPANY EMPLOYEES
UNDER BLUEPRINT MEDICINES CORPORATION
2015 STOCK OPTION AND INCENTIVE PLAN**

Name of Grantee: FIRST_NAME LAST_NAME

No. of Restricted Stock Units: TOTAL_SHARES_GRANTED

Grant Date: GRANT_DATE

Pursuant to the Blueprint Medicines Corporation 2015 Stock Option and Incentive Plan as amended through the date hereof (the "Plan"), Blueprint Medicines Corporation (the "Company") hereby grants an award of the number of Restricted Stock Units listed above (an "Award") to the Grantee named above. Each Restricted Stock Unit shall relate to one share of Common Stock, par value \$0.001 per share (the "Stock") of the Company.

1. Restrictions on Transfer of Award. This Award may not be sold, transferred, pledged, assigned or otherwise encumbered or disposed of by the Grantee, and any shares of Stock issuable with respect to the Award may not be sold, transferred, pledged, assigned or otherwise encumbered or disposed of until (i) the Restricted Stock Units have vested as provided in Paragraph 2 of this Agreement and (ii) shares of Stock have been issued to the Grantee in accordance with the terms of the Plan and this Agreement.

2. Vesting of Restricted Stock Units. The restrictions and conditions of Paragraph 1 of this Agreement shall lapse on the Vesting Date or Dates specified in the following schedule so long as the Grantee remains an employee of the Company or a Subsidiary on such Dates; provided that the vesting of the Award shall accelerate and the Award shall become fully vested immediately upon the Grantee's death or disability, subject to the Grantee's continued employment with the Company or a Subsidiary until the date of such death or disability, as applicable. If a series of Vesting Dates is specified, then the restrictions and conditions in Paragraph 1 shall lapse only with respect to the number of Restricted Stock Units specified as vested on such date.

<u>Incremental Number of Restricted Stock Units Vested</u>	<u>Vesting Date</u>
(%)	
(%)	
(%)	
(%)	
(%)	

The Administrator may at any time accelerate the vesting schedule specified in this Paragraph 2.

3. Termination of Employment. If the Grantee's employment with the Company and its Subsidiaries terminates for any reason prior to the satisfaction of the vesting conditions set forth in Paragraph 2 above, any Restricted Stock Units that have not vested as of such date shall automatically and without notice terminate and be forfeited, and neither the Grantee nor any of his or her successors, heirs, assigns, or personal representatives will thereafter have any further rights or interests in such unvested Restricted Stock Units.

4. Issuance of Shares of Stock. As soon as practicable following each Vesting Date (but in no event later than two and one-half months after the end of the year in which the Vesting Date occurs), the Company shall issue to the Grantee the number of shares of Stock equal to the aggregate number of Restricted Stock Units that have vested pursuant to Paragraph 2 of this Agreement on such date and the Grantee shall thereafter have all the rights of a stockholder of the Company with respect to such shares.

5. Incorporation of Plan. Notwithstanding anything herein to the contrary, this Agreement shall be subject to and governed by all the terms and conditions of the Plan, including the powers of the Administrator set forth in Section 2(b) of the Plan. Capitalized terms in this Agreement shall have the meaning specified in the Plan, unless a different meaning is specified herein.

6. Tax Withholding. The Grantee shall, not later than the date as of which the receipt of this Award becomes a taxable event for Federal income tax purposes, pay to the Company or make arrangements satisfactory to the Administrator for payment of any Federal, state, and local taxes required by law to be withheld on account of such taxable event. Accordingly, in the event the Company is required to withhold taxes from the Grantee for taxable compensation relating to the issuance of shares of Stock in connection with this Award, the Company shall cause its transfer agent and any manager of the Company's stock plan benefits to sell from the number of shares of Stock to be issued to the Grantee, the minimum number of shares of Stock necessary to satisfy the Federal, state and local taxes required by law to be withheld from the Grantee on account of such transfer along with any applicable third-party commission. The Company shall use the proceeds from such sale to satisfy the Grantee's tax withholding obligation hereunder.

7. Section 409A of the Code. This Agreement shall be interpreted in such a manner that all provisions relating to the settlement of the Award are exempt from the requirements of Section 409A of the Code as "short-term deferrals" as described in Section 409A of the Code.

8. No Obligation to Continue Employment. Neither the Company nor any Subsidiary is obligated by or as a result of the Plan or this Agreement to continue the Grantee in employment and neither the Plan nor this Agreement shall interfere in any way with the right of the Company or any Subsidiary to terminate the employment of the Grantee at any time.

9. Integration. This Agreement constitutes the entire agreement between the parties with respect to this Award and supersedes all prior agreements and discussions between the parties concerning such subject matter.

10. Data Privacy Consent. In order to administer the Plan and this Agreement and to implement or structure future equity grants, the Company, its subsidiaries and affiliates and certain agents thereof (together, the "Relevant Companies") may process any and all personal or professional data, including but not limited to Social Security or other identification number, home address and telephone number, date of birth and other information that is necessary or desirable for the administration of the Plan and/or this Agreement (the "Relevant Information"). By entering into this Agreement, the Grantee (i) authorizes the Company to collect, process, register and transfer to the Relevant Companies all Relevant Information; (ii) waives any privacy rights the Grantee may have with respect to the Relevant Information; (iii) authorizes the Relevant Companies to store and transmit such information in electronic form; and (iv) authorizes the transfer of the Relevant Information to any jurisdiction in which the Relevant Companies consider appropriate. The Grantee shall have access to, and the right to change, the Relevant Information. Relevant Information will only be used in accordance with applicable law.

11. Notices. Notices hereunder shall be mailed or delivered to the Company at its principal place of business and shall be mailed or delivered to the Grantee at the address on file with the Company or, in either case, at such other address as one party may subsequently furnish to the other party in writing.

BLUEPRINT MEDICINES CORPORATION

By: _____
Name: _____
Title: _____

The foregoing Agreement is hereby accepted and the terms and conditions thereof hereby agreed to by the undersigned. Electronic acceptance of this Agreement pursuant to the Company's instructions to the Grantee (including through an online acceptance process) is acceptable.

Dated: _____

Grantee's Signature

Grantee's name and address:
FIRST NAME LAST NAME _____
ADDRESS LINE 1 _____
ADDRESS LINE 2 _____
CITY STATE _____
COUNTRY _____
ZIPCODE _____

**RESTRICTED STOCK UNIT AWARD AGREEMENT
FOR NON-EMPLOYEE DIRECTORS
UNDER BLUEPRINT MEDICINES CORPORATION
2015 STOCK OPTION AND INCENTIVE PLAN**

Name of Grantee: FIRST_NAME LAST_NAME

No. of Restricted Stock Units: TOTAL_SHARES_GRANTED

Grant Date: GRANT_DATE

Pursuant to the Blueprint Medicines Corporation 2015 Stock Option and Incentive Plan as amended through the date hereof (the "Plan"), Blueprint Medicines Corporation (the "Company") hereby grants an award of the number of Restricted Stock Units listed above (an "Award") to the Grantee named above. Each Restricted Stock Unit shall relate to one share of Common Stock, par value \$0.001 per share (the "Stock") of the Company.

1. **Restrictions on Transfer of Award.** This Award may not be sold, transferred, pledged, assigned or otherwise encumbered or disposed of by the Grantee, and any shares of Stock issuable with respect to the Award may not be sold, transferred, pledged, assigned or otherwise encumbered or disposed of until (i) the Restricted Stock Units have vested as provided in Paragraph 2 of this Agreement and (ii) shares of Stock have been issued to the Grantee in accordance with the terms of the Plan and this Agreement.

2. **Vesting of Restricted Stock Units.** The restrictions and conditions of Paragraph 1 of this Agreement shall lapse on the Vesting Date or Dates specified in the following schedule so long as the Grantee remains in service as a member of the Board on such Dates; provided that the vesting of the Award shall accelerate and the Award shall become fully vested immediately upon the Grantee's death or disability or upon the consummation of a Sale Event, subject to the Grantee's continued service as a member of the Board until the date of such death, disability or Sale Event, as applicable. If a series of Vesting Dates is specified, then the restrictions and conditions in Paragraph 1 shall lapse only with respect to the number of Restricted Stock Units specified as vested on such date.

Incremental Number of Restricted Stock Units Vested	Vesting Date
(%)	
(%)	
(%)	
(%)	
(%)	

The Administrator may at any time accelerate the vesting schedule specified in this Paragraph 2.

3. **Termination of Service.** If the Grantee's service with the Company and its Subsidiaries terminates for any reason prior to the satisfaction of the vesting conditions set forth in Paragraph 2 above, any Restricted Stock Units that have not vested as of such date shall automatically and without notice terminate and be forfeited, and neither the Grantee nor any of his or her successors, heirs, assigns, or personal representatives will thereafter have any further rights or interests in such unvested Restricted Stock Units.

4. **Issuance of Shares of Stock.** As soon as practicable following each Vesting Date (but in no event later than two and one-half months after the end of the year in which the Vesting Date occurs), the Company shall issue to the Grantee the number of shares of Stock equal to the aggregate number of Restricted Stock Units that have vested pursuant to Paragraph 2 of this Agreement on such date and the Grantee shall thereafter have all the



rights of a stockholder of the Company with respect to such shares.

5. Incorporation of Plan. Notwithstanding anything herein to the contrary, this Agreement shall be subject to and governed by all the terms and conditions of the Plan, including the powers of the Administrator set forth in Section 2(b) of the Plan. Capitalized terms in this Agreement shall have the meaning specified in the Plan, unless a different meaning is specified herein.

6. Section 409A of the Code. This Agreement shall be interpreted in such a manner that all provisions relating to the settlement of the Award are exempt from the requirements of Section 409A of the Code as “short-term deferrals” as described in Section 409A of the Code.

7. No Obligation to Continue as a Director. Neither the Plan nor this Award confers upon the Grantee any rights with respect to continuance as a Director.

8. Integration. This Agreement constitutes the entire agreement between the parties with respect to this Award and supersedes all prior agreements and discussions between the parties concerning such subject matter.

9. Data Privacy Consent. In order to administer the Plan and this Agreement and to implement or structure future equity grants, the Company, its subsidiaries and affiliates and certain agents thereof (together, the “Relevant Companies”) may process any and all personal or professional data, including but not limited to Social Security or other identification number, home address and telephone number, date of birth and other information that is necessary or desirable for the administration of the Plan and/or this Agreement (the “Relevant Information”). By entering into this Agreement, the Grantee (i) authorizes the Company to collect, process, register and transfer to the Relevant Companies all Relevant Information; (ii) waives any privacy rights the Grantee may have with respect to the Relevant Information; (iii) authorizes the Relevant Companies to store and transmit such information in electronic form; and (iv) authorizes the transfer of the Relevant Information to any jurisdiction in which the Relevant Companies consider appropriate. The Grantee shall have access to, and the right to change, the Relevant Information. Relevant Information will only be used in accordance with applicable law.

10. Notices. Notices hereunder shall be mailed or delivered to the Company at its principal place of business and shall be mailed or delivered to the Grantee at the address on file with the Company or, in either case, at such other address as one party may subsequently furnish to the other party in writing.

BLUEPRINT MEDICINES CORPORATION

By: _____
Name:
Title:

The foregoing Agreement is hereby accepted and the terms and conditions thereof hereby agreed to by the undersigned. Electronic acceptance of this Agreement pursuant to the Company's instructions to the Grantee (including through an online acceptance process) is acceptable.

Dated: _____

Grantee's Signature

Grantee's name and address:
FIRST NAME LAST NAME

ADDRESS LINE 1

ADDRESS LINE 2

CITY STATE

COUNTRY

ZIPCODE

**RESTRICTED STOCK UNIT AWARD AGREEMENT
FOR CONSULTANTS
UNDER BLUEPRINT MEDICINES CORPORATION
2015 STOCK OPTION AND INCENTIVE PLAN**

Name of Grantee: FIRST_NAME LAST_NAME

No. of Restricted Stock Units: TOTAL_SHARES_GRANTED

Grant Date: GRANT_DATE

Pursuant to the Blueprint Medicines Corporation 2015 Stock Option and Incentive Plan as amended through the date hereof (the "Plan"), Blueprint Medicines Corporation (the "Company") hereby grants an award of the number of Restricted Stock Units listed above (an "Award") to the Grantee named above. Each Restricted Stock Unit shall relate to one share of Common Stock, par value \$0.001 per share (the "Stock") of the Company.

1. Restrictions on Transfer of Award. This Award may not be sold, transferred, pledged, assigned or otherwise encumbered or disposed of by the Grantee, and any shares of Stock issuable with respect to the Award may not be sold, transferred, pledged, assigned or otherwise encumbered or disposed of until (i) the Restricted Stock Units have vested as provided in Paragraph 2 of this Agreement and (ii) shares of Stock have been issued to the Grantee in accordance with the terms of the Plan and this Agreement.

2. Vesting of Restricted Stock Units. The restrictions and conditions of Paragraph 1 of this Agreement shall lapse on the Vesting Date or Dates specified in the following schedule so long as the Grantee remains a service provider of the Company or a Subsidiary on such Dates. If a series of Vesting Dates is specified, then the restrictions and conditions in Paragraph 1 shall lapse only with respect to the number of Restricted Stock Units specified as vested on such date.

<u>Incremental Number of Restricted Stock Units Vested</u>	<u>Vesting Date</u>
(%)	
(%)	
(%)	
(%)	
(%)	

The Administrator may at any time accelerate the vesting schedule specified in this Paragraph 2.

3. Termination of Service Relationship. If the Grantee's service relationship with the Company and its Subsidiaries terminates for any reason (including death or disability) prior to the satisfaction of the vesting conditions set forth in Paragraph 2 above, any Restricted Stock Units that have not vested as of such date shall automatically and without notice terminate and be forfeited, and neither the Grantee nor any of his or her successors, heirs, assigns, or personal representatives will thereafter have any further rights or interests in such unvested Restricted Stock Units.

4. Issuance of Shares of Stock. As soon as practicable following each Vesting Date (but in no event later than two and one-half months after the end of the year in which the Vesting Date occurs), the Company shall issue to the Grantee the number of shares of Stock equal to the aggregate number of Restricted Stock Units that have vested pursuant to Paragraph 2 of this Agreement on such date and the Grantee shall thereafter have all the rights of a stockholder of the Company with respect to such shares.

5. Incorporation of Plan. Notwithstanding anything herein to the contrary, this Agreement shall be subject to and governed by all the terms and conditions of the Plan, including the powers of the Administrator set forth in Section 2(b) of the Plan. Capitalized terms in this Agreement shall have the meaning specified in the Plan, unless a different meaning is specified herein.

6. Section 409A of the Code. This Agreement shall be interpreted in such a manner that all provisions relating to the settlement of the Award are exempt from the requirements of Section 409A of the Code as “short-term deferrals” as described in Section 409A of the Code.

7. No Obligation to Continue Service. Neither the Company nor any Subsidiary is obligated by or as a result of the Plan or this Agreement to continue the Grantee in a service relationship with the Company or any Subsidiary and neither the Plan nor this Agreement shall interfere in any way with the right of the Company or any Subsidiary to terminate the service relationship of the Grantee with the Company or any Subsidiary at any time.

9. Integration. This Agreement constitutes the entire agreement between the parties with respect to this Award and supersedes all prior agreements and discussions between the parties concerning such subject matter.

10. Data Privacy Consent. In order to administer the Plan and this Agreement and to implement or structure future equity grants, the Company, its subsidiaries and affiliates and certain agents thereof (together, the “Relevant Companies”) may process any and all personal or professional data, including but not limited to Social Security or other identification number, home address and telephone number, date of birth and other information that is necessary or desirable for the administration of the Plan and/or this Agreement (the “Relevant Information”). By entering into this Agreement, the Grantee (i) authorizes the Company to collect, process, register and transfer to the Relevant Companies all Relevant Information; (ii) waives any privacy rights the Grantee may have with respect to the Relevant Information; (iii) authorizes the Relevant Companies to store and transmit such information in electronic form; and (iv) authorizes the transfer of the Relevant Information to any jurisdiction in which the Relevant Companies consider appropriate. The Grantee shall have access to, and the right to change, the Relevant Information. Relevant Information will only be used in accordance with applicable law.

11. Notices. Notices hereunder shall be mailed or delivered to the Company at its principal place of business and shall be mailed or delivered to the Grantee at the address on file with the Company or, in either case, at such other address as one party may subsequently furnish to the other party in writing.

BLUEPRINT MEDICINES CORPORATION

By: _____
Name:
Title:

The foregoing Agreement is hereby accepted and the terms and conditions thereof hereby agreed to by the undersigned. Electronic acceptance of this Agreement pursuant to the Company's instructions to the Grantee (including through an online acceptance process) is acceptable.

Dated: _____

Grantee's Signature

Grantee's name and address:
FIRST_NAME LAST_NAME
ADDRESS_LINE_1
ADDRESS_LINE_2
CITY STATE
COUNTRY
ZIPCODE



**BLUEPRINT MEDICINES CORPORATION
2015 EMPLOYEE STOCK PURCHASE PLAN**

The purpose of the Blueprint Medicines Corporation 2015 Employee Stock Purchase Plan (as amended and restated, the “Plan”) is to provide eligible employees of Blueprint Medicines Corporation (the “Company”) and each Designated Subsidiary (as defined in Section 11) with opportunities to purchase shares of the Company’s common stock, par value \$0.001 per share (the “Common Stock”). 243,347 shares of Common Stock in the aggregate have been approved and reserved for this purpose, plus on January 1, 2016 and each January 1 thereafter through January 1, 2030, the number of shares of Common Stock reserved and available for issuance under the Plan shall be cumulatively increased by 1% percent of the number of shares of Common Stock issued and outstanding on the immediately preceding December 31 or such lesser number of shares of Common Stock as determined by the Administrator (the “Annual Increase”). The Plan is intended to constitute an “employee stock purchase plan” within the meaning of Section 423(b) of the Internal Revenue Code of 1986, as amended (the “Code”), and shall be interpreted in accordance with that intent.

1. Administration. The Plan will be administered by the person or persons (the “Administrator”) appointed by the Company’s Board of Directors (the “Board”) for such purpose. The Administrator has authority at any time to: (i) adopt, alter and repeal such rules, guidelines and practices for the administration of the Plan and for its own acts and proceedings as it shall deem advisable; (ii) interpret the terms and provisions of the Plan; (iii) make all determinations it deems advisable for the administration of the Plan; (iv) decide all disputes arising in connection with the Plan; and (v) otherwise supervise the administration of the Plan. All interpretations and decisions of the Administrator shall be binding on all persons, including the Company and the Participants. No member of the Board or individual exercising administrative authority with respect to the Plan shall be liable for any action or determination made in good faith with respect to the Plan or any option granted hereunder.

2. Offerings. The Company will make one or more offerings to eligible employees to purchase Common Stock under the Plan (“Offerings”). Unless otherwise determined by the Administrator, an Offering will begin on the first business day occurring on or after each January 1st and July 1st and will end on the last business day occurring on or before the following June 30th and December 31st, respectively. The Administrator may, in its discretion, designate a different period for any Offering, provided that no Offering shall exceed 12 months in duration or overlap any other Offering.

3. Eligibility. All individuals classified as employees on the payroll records of the Company and each Designated Subsidiary are eligible to participate in any one or more of the Offerings under the Plan, provided that as of the first day of the applicable Offering (the “Offering Date”) they are customarily employed by the Company or a Designated Subsidiary for more than 20 hours a week and have completed at least six months of employment. Notwithstanding any other provision herein, individuals who are not contemporaneously classified as employees of the Company or a Designated Subsidiary for purposes of the Company’s or applicable Designated Subsidiary’s payroll system are not considered to be eligible employees of the Company or any Designated Subsidiary and shall not be eligible to participate in the Plan. In the event any such individuals are reclassified as employees of the Company or a Designated Subsidiary for any purpose, including, without limitation, common law or statutory employees, by any action of any third party, including, without limitation, any government agency, or as a result of any private lawsuit, action or administrative proceeding, such individuals shall, notwithstanding such reclassification, remain ineligible for participation. Notwithstanding the foregoing, the exclusive means for individuals who are not contemporaneously classified as employees of the Company or a Designated

Subsidiary on the Company's or Designated Subsidiary's payroll system to become eligible to participate in this Plan is through an amendment to this Plan, duly executed by the Company, which specifically renders such individuals eligible to participate herein.

4. Participation.

(a) Participants in Offering. An eligible employee who is not a Participant on any Offering Date may participate in such Offering by submitting an enrollment form to his or her appropriate payroll location at least 15 business days before the Offering Date (or by such other deadline as shall be established by the Administrator for the Offering).

(b) Enrollment. The enrollment form will (a) state a whole percentage to be deducted from an eligible employee's Compensation (as defined in Section 11) per pay period, (b) authorize the purchase of Common Stock in each Offering in accordance with the terms of the Plan and (c) specify the exact name or names in which shares of Common Stock purchased for such individual are to be issued pursuant to Section 10. An employee who does not enroll in accordance with these procedures will be deemed to have waived the right to participate. Unless a Participant files a new enrollment form or withdraws from the Plan, such Participant's deductions and purchases will continue at the same percentage of Compensation for future Offerings, provided he or she remains eligible.

(c) Notwithstanding the foregoing, participation in the Plan will neither be permitted nor be denied contrary to the requirements of the Code.

5. Employee Contributions. Each eligible employee may authorize payroll deductions at a minimum of one percent (1%) up to a maximum of ten percent (10%) of such employee's Compensation for each pay period. The Company will maintain book accounts showing the amount of payroll deductions made by each Participant for each Offering. No interest will accrue or be paid on payroll deductions.

6. Deduction Changes. Except as may be determined by the Administrator in advance of an Offering, a Participant may not increase or decrease his or her payroll deduction during any Offering, but may increase or decrease his or her payroll deduction with respect to the next Offering (subject to the limitations of Section 5) by filing a new enrollment form at least 15 business days before the next Offering Date (or by such other deadline as shall be established by the Administrator for the Offering). The Administrator may, in advance of any Offering, establish rules permitting a Participant to increase, decrease or terminate his or her payroll deduction during an Offering.

7. Withdrawal. A Participant may withdraw from participation in the Plan by delivering a written notice of withdrawal to his or her appropriate payroll location. The Participant's withdrawal will be effective as of the next business day. Following a Participant's withdrawal, the Company will promptly refund such individual's entire account balance under the Plan to him or her (after payment for any Common Stock purchased before the effective date of withdrawal). Partial withdrawals are not permitted. Such an employee may not begin participation again during the remainder of the Offering, but may enroll in a subsequent Offering in accordance with Section 4.

8. Grant of Options. On each Offering Date, the Company will grant to each eligible employee who is then a Participant in the Plan an option ("Option") to purchase on the last day of such Offering (the "Exercise Date"), at the Option Price (as defined herein) for, the lowest of (a) a number of shares of Common Stock determined by dividing such Participant's accumulated payroll deductions on such Exercise Date by the Option Price (as defined herein), (b) 2,500 shares; or (c) such other lesser maximum

number of shares as shall have been established by the Administrator in advance of the Offering; provided, however, that such Option shall be subject to the limitations set forth below. Each Participant's Option shall be exercisable only to the extent of such Participant's accumulated payroll deductions on the Exercise Date. The purchase price for each share purchased under each Option (the "Option Price") will be eighty-five percent (85%) of the Fair Market Value of the Common Stock on the Offering Date or the Exercise Date, whichever is less.

Notwithstanding the foregoing, no Participant may be granted an Option hereunder if such Participant, immediately after the Option was granted, would be treated as owning stock possessing five percent (5%) or more of the total combined voting power or value of all classes of stock of the Company or any Parent or Subsidiary (as defined in Section 11). For purposes of the preceding sentence, the attribution rules of Section 424(d) of the Code shall apply in determining the stock ownership of a Participant, and all stock which the Participant has a contractual right to purchase shall be treated as stock owned by the Participant. In addition, no Participant may be granted an Option which permits his or her rights to purchase stock under the Plan, and any other employee stock purchase plan of the Company and its Parents and Subsidiaries, to accrue at a rate which exceeds \$25,000 of the fair market value of such stock (determined on the Option grant date or dates) for each calendar year in which the Option is outstanding at any time. The purpose of the limitation in the preceding sentence is to comply with Section 423(b)(8) of the Code and shall be applied taking Options into account in the order in which they were granted.

9. Exercise of Option and Purchase of Shares. Each employee who continues to be a Participant in the Plan on the Exercise Date shall be deemed to have exercised his or her Option on such date and shall acquire from the Company such number of whole shares of Common Stock reserved for the purpose of the Plan as his or her accumulated payroll deductions on such date will purchase at the Option Price, subject to any other limitations contained in the Plan. Any amount remaining in a Participant's account at the end of an Offering solely by reason of the inability to purchase a fractional share will be carried forward to the next Offering; any other balance remaining in a Participant's account at the end of an Offering will be refunded to the Participant promptly.

10. Issuance of Certificates. Certificates representing shares of Common Stock purchased under the Plan may be issued only in the name of the employee, in the name of the employee and another person of legal age as joint tenants with rights of survivorship, or in the name of a broker authorized by the employee to be his, her or their, nominee for such purpose.

11. Definitions.

The term "Compensation" means the amount of base pay, prior to salary reduction pursuant to Sections 125, 132(f) or 401(k) of the Code, but excluding overtime, commissions, incentive or bonus awards, allowances and reimbursements for expenses such as relocation allowances or travel expenses, income or gains on the exercise of Company stock options, and similar items.

The term "Designated Subsidiary" means any present or future Subsidiary (as defined below) that has been designated by the Board to participate in the Plan. The Board may so designate any Subsidiary, or revoke any such designation, at any time and from time to time, either before or after the Plan is approved by the stockholders.

The term "Fair Market Value of the Common Stock" on any given date means the fair market value of the Common Stock determined in good faith by the Administrator; provided, however, that if the Common Stock is admitted to quotation on the NASDAQ Capital Market, the NASDAQ Global Market,

the NASDAQ Global Select Market or another national securities exchange, the determination shall be made by reference to the closing price on such date. If there is no closing price for such date, the determination shall be made by reference to the last date preceding such date for which there is a closing price.

The term “Initial Public Offering” means the consummation of the first underwritten firm commitment public offering pursuant to an effective registration statement under the Securities Act of 1933, as amended, covering the offer and sale by the Company of its Common Stock.

The term “Parent” means a “parent corporation” with respect to the Company, as defined in Section 424(e) of the Code.

The term “Participant” means an individual who is eligible as determined in Section 3 and who has complied with the provisions of Section 4.

The term “Subsidiary” means a “subsidiary corporation” with respect to the Company, as defined in Section 424(f) of the Code.

12. Rights on Termination of Employment. If a Participant’s employment terminates for any reason before the Exercise Date for any Offering, no payroll deduction will be taken from any pay due and owing to the Participant and the balance in the Participant’s account will be paid to such Participant or, in the case of such Participant’s death, to his or her designated beneficiary as if such Participant had withdrawn from the Plan under Section 7. An employee will be deemed to have terminated employment, for this purpose, if the corporation that employs him or her, having been a Designated Subsidiary, ceases to be a Subsidiary, or if the employee is transferred to any corporation other than the Company or a Designated Subsidiary. An employee will not be deemed to have terminated employment for this purpose, if the employee is on an approved leave of absence for military service or sickness or for any other purpose approved by the Company, if the employee’s right to reemployment is guaranteed either by a statute or by contract or under the policy pursuant to which the leave of absence was granted or if the Administrator otherwise provides in writing.

13. Special Rules. Notwithstanding anything herein to the contrary, the Administrator may adopt special rules applicable to the employees of a particular Designated Subsidiary, whenever the Administrator determines that such rules are necessary or appropriate for the implementation of the Plan in a jurisdiction where such Designated Subsidiary has employees; provided that such rules are consistent with the requirements of Section 423(b) of the Code. Any special rules established pursuant to this Section 13 shall, to the extent possible, result in the employees subject to such rules having substantially the same rights as other Participants in the Plan.

14. Optionees Not Stockholders. Neither the granting of an Option to a Participant nor the deductions from his or her pay shall constitute such Participant a holder of the shares of Common Stock covered by an Option under the Plan until such shares have been purchased by and issued to him or her.

15. Rights Not Transferable. Rights under the Plan are not transferable by a Participant other than by will or the laws of descent and distribution, and are exercisable during the Participant’s lifetime only by the Participant.

16. Application of Funds. All funds received or held by the Company under the Plan may be combined with other corporate funds and may be used for any corporate purpose.

17. Adjustment in Case of Changes Affecting Common Stock. In the event of a subdivision of outstanding shares of Common Stock, the payment of a dividend in Common Stock or any other change affecting the Common Stock, the number of shares approved for the Plan and the share limitation set forth in Section 8 shall be equitably or proportionately adjusted to give proper effect to such event.

18. Amendment of the Plan. The Board may at any time and from time to time amend the Plan in any respect, except that without the approval within 12 months of such Board action by the stockholders, no amendment shall be made increasing the number of shares approved for the Plan or making any other change that would require stockholder approval in order for the Plan, as amended, to qualify as an “employee stock purchase plan” under Section 423(b) of the Code.

19. Insufficient Shares. If the total number of shares of Common Stock that would otherwise be purchased on any Exercise Date plus the number of shares purchased under previous Offerings under the Plan exceeds the maximum number of shares issuable under the Plan, the shares then available shall be apportioned among Participants in proportion to the amount of payroll deductions accumulated on behalf of each Participant that would otherwise be used to purchase Common Stock on such Exercise Date.

20. Termination of the Plan. The Plan may be terminated at any time by the Board. Upon termination of the Plan, all amounts in the accounts of Participants shall be promptly refunded.

21. Governmental Regulations. The Company’s obligation to sell and deliver Common Stock under the Plan is subject to obtaining all governmental approvals required in connection with the authorization, issuance, or sale of such stock.

22. Governing Law. This Plan and all Options and actions taken thereunder shall be governed by, and construed in accordance with, the laws of the State of Delaware, applied without regard to conflict of law principles.

23. Issuance of Shares. Shares may be issued upon exercise of an Option from authorized but unissued Common Stock, from shares held in the treasury of the Company, or from any other proper source.

24. Tax Withholding. Participation in the Plan is subject to any minimum required tax withholding on income of the Participant in connection with the Plan. Each Participant agrees, by entering the Plan, that the Company and its Subsidiaries shall have the right to deduct any such taxes from any payment of any kind otherwise due to the Participant, including shares issuable under the Plan.

25. Notification Upon Sale of Shares. Each Participant agrees, by entering the Plan, to give the Company prompt notice of any disposition of shares purchased under the Plan where such disposition occurs within two years after the date of grant of the Option pursuant to which such shares were purchased.

26. Effective Date and Approval of Shareholders. The Plan shall take effect on the date of the Company's Initial Public Offering, subject to approval by the holders of a majority of the votes cast at a meeting of stockholders at which a quorum is present or by written consent of the stockholders.

DATE APPROVED BY BOARD OF DIRECTORS: March 12, 2015

DATE APPROVED BY STOCKHOLDERS: April 6, 2015

AMENDMENT APPROVED BY BOARD OF DIRECTORS: February 10, 2020

EMPLOYMENT AGREEMENT

This Employment Agreement (“Agreement”) is dated as of November 22, 2017 (the “Effective Date”), between Blueprint Medicines Corporation, a Delaware corporation (the “Company”), and Debra Durso-Bumpus (the “Executive”).

WHEREAS, the Company and the Executive previously entered into an offer letter agreement, dated March 31, 2015 (the “Prior Agreement”), which the Company and the Executive intend to replace in its entirety with this Agreement; and

WHEREAS, the Company desires to continue to employ the Executive and the Executive desires to continue to be employed by the Company on the terms and conditions contained herein.

NOW, THEREFORE, in consideration of the mutual covenants and agreements herein contained and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the parties agree as follows:

1. Employment.

(a) Term. The term of this Agreement shall commence on the Effective Date and continue until terminated in accordance with the provisions of Section 3 (the “Term”).

(b) Position and Duties. During the Term, the Executive shall serve as the Senior Vice President, Human Resources of the Company, and shall have such duties as are consistent with such position. The Executive shall report to the Chief Executive Officer of the Company (the “CEO”). The Executive shall devote her full working time and efforts to the business and affairs of the Company. Notwithstanding the foregoing, the Executive may serve on other boards of directors, with the approval of the Board of Directors of the Company (the “Board”), or engage in religious, charitable or other activities as long as such services and activities are approved by the Board and do not materially interfere with the Executive’s performance of her duties to the Company as provided in this Agreement.

2. Compensation and Related Matters.

(a) Base Salary. During the Term, the Executive’s annual base salary shall be \$289,174. The Executive’s base salary shall be re-determined annually by the Board or the Compensation Committee of the Board (the “Compensation Committee”) and shall be subject to increase but not decrease while the Executive is serving in the Senior Vice President, Human Resources role. The annual base salary in effect at any given time is referred to herein as “Base Salary.” The Base Salary shall be payable in a manner that is consistent with the Company’s usual payroll practices for senior executives.

(b) Incentive Compensation. During the Term, the Executive shall be eligible to receive cash incentive compensation as determined by the Board or the Compensation Committee from time to time. The Executive’s initial target annual incentive compensation shall be 30% of her Base Salary (the “Target Incentive Compensation”) and shall be re-determined

periodically by the Board or the Compensation Committee. To earn incentive compensation, the Executive must be employed by the Company on the day such incentive compensation is paid.

(c) Expenses. The Executive shall be entitled to receive prompt reimbursement for all reasonable expenses incurred by the Executive during the Term in performing services hereunder, in accordance with the policies and procedures then in effect and established by the Company for its senior executive officers.

(d) Other Benefits. During the Term, the Executive shall be eligible to participate in or receive benefits under the Company's employee benefit plans in effect from time to time, subject to the terms of such plans.

(e) Vacations. During the Term, the Executive shall be entitled to accrue paid vacation in accordance with the Company's applicable policy.

3. Termination. During the Term, the Executive's employment hereunder may be terminated without any breach of this Agreement under the following circumstances:

(a) Death. The Executive's employment hereunder shall terminate upon her death.

(b) Disability. The Company may terminate the Executive's employment if she is disabled and unable to perform the essential functions of the Executive's then existing position or positions under this Agreement with or without reasonable accommodation for a period of 180 days (which need not be consecutive) in any 12-month period. If any question shall arise as to whether during any period the Executive is disabled so as to be unable to perform the essential functions of the Executive's then-existing position or positions with or without reasonable accommodation, the Executive may, and at the request of the Company shall, submit to the Company a certification in reasonable detail by a physician selected by the Company to whom the Executive or the Executive's guardian has no reasonable objection as to whether the Executive is so disabled or how long such disability is expected to continue, and such certification shall for the purposes of this Agreement be conclusive of the issue. The Executive shall cooperate with any reasonable request of the physician in connection with such certification. If such question shall arise and the Executive shall fail to submit such certification, the Company's determination of such issue shall be binding on the Executive. Nothing in this Section 3(b) shall be construed to waive the Executive's rights, if any, under existing law including, without limitation, the Family and Medical Leave Act of 1993, 29 U.S.C. §2601 *et seq.* and the Americans with Disabilities Act, 42 U.S.C. §12101 *et seq.*

(c) Termination by Company for Cause. The Company may terminate the Executive's employment hereunder for Cause. For purposes of this Agreement, "Cause" shall mean: (i) conduct by the Executive constituting a material act of misconduct in connection with the performance of her duties, including, without limitation, misappropriation of funds or property of the Company or any of its subsidiaries or affiliates other than the occasional, customary and de minimis use of Company property for personal purposes; (ii) the commission by the Executive of any felony or a misdemeanor involving moral turpitude, deceit, dishonesty or

fraud, or any conduct by the Executive that would reasonably be expected to result in material injury or reputational harm to the Company or any of its subsidiaries and affiliates if she were retained in her position; (iii) continued non-performance by the Executive of her duties hereunder (other than by reason of the Executive's physical or mental illness, incapacity or disability) which has continued for more than 30 days following written notice of such non-performance from the CEO; (iv) a material breach by the Executive of any of the provisions contained in Section 7 of this Agreement; (v) a material violation by the Executive of the Company's written employment policies; or (vi) failure to cooperate with a bona fide internal investigation or an investigation by regulatory or law enforcement authorities, after being instructed by the Company to cooperate, or the willful destruction or failure to preserve documents or other materials known to be relevant to such investigation or the inducement of others to fail to cooperate or to produce documents or other materials in connection with such investigation.

(d) Termination by the Company Without Cause. The Company may terminate the Executive's employment at any time without Cause. Any termination by the Company of the Executive's employment under this Agreement which does not constitute a termination for Cause under Section 3(c) and does not result from the death or disability of the Executive under Section 3(a) or (b) shall be deemed a termination by the Company without Cause.

(e) Termination by the Executive. The Executive may terminate her employment hereunder at any time for any reason, including but not limited to Good Reason. For purposes of this Agreement, "Good Reason" shall mean that the Executive has complied with the "Good Reason Process" (hereinafter defined) following the occurrence of any of the following events without the Executive's express written consent: (i) a material diminution in the Executive's responsibilities, authority or duties without the Executive's consent; (ii) a material diminution in the Executive's Base Salary and/or Target Incentive Compensation without the Executive's consent (unless such diminution is in connection with a proportional reduction in compensation to all or substantially all of the Company's employees); (iii) a material change of more than 50 miles in the geographic location at which the Executive provides services to the Company; or (iv) the material breach of this Agreement by the Company. "Good Reason Process" shall mean that (i) the Executive reasonably determines in good faith that a "Good Reason" condition has occurred; (ii) the Executive notifies the Company in writing of the first occurrence of the Good Reason condition within 60 days of the first occurrence of such condition; (iii) the Executive cooperates in good faith with the Company's efforts, for a period not less than 30 days following such notice (the "Cure Period") to remedy the condition; (iv) notwithstanding such efforts, the Good Reason condition continues to exist; and (v) the Executive terminates her employment within 60 days after the end of the Cure Period. If the Company cures the Good Reason condition during the Cure Period, Good Reason shall be deemed not to have occurred.

(f) Notice of Termination. Except for termination as specified in Section 3(a), any termination of the Executive's employment by the Company or any such termination by the Executive shall be communicated by written Notice of Termination to the other party hereto. For

purposes of this Agreement, a “Notice of Termination” shall mean a notice which shall indicate the specific termination provision in this Agreement relied upon.

(g) Date of Termination. “Date of Termination” shall mean: (i) if the Executive’s employment is terminated by her death, the date of her death; (ii) if the Executive’s employment is terminated on account of disability under Section 3(b) or by the Company for Cause under Section 3(c), the date on which Notice of Termination is given; (iii) if the Executive’s employment is terminated by the Company under Section 3(d), the date on which a Notice of Termination is given; (iv) if the Executive’s employment is terminated by the Executive under Section 3(e) without Good Reason, 30 days after the date on which a Notice of Termination is given, and (v) if the Executive’s employment is terminated by the Executive under Section 3(e) with Good Reason, the date on which a Notice of Termination is given after the end of the Cure Period. Notwithstanding the foregoing, in the event that the Executive gives a Notice of Termination to the Company, the Company may unilaterally accelerate the Date of Termination and such acceleration shall not result in a termination by the Company for purposes of this Agreement.

4. Compensation Upon Termination.

(a) Termination Generally. If the Executive’s employment with the Company is terminated for any reason, the Company shall pay or provide to the Executive (or to her authorized representative or estate) (i) any Base Salary earned through the Date of Termination, unpaid expense reimbursements (subject to, and in accordance with, Section 2(c) of this Agreement) and unused vacation that accrued through the Date of Termination on or before the time required by law but in no event more than 30 days after the Executive’s Date of Termination; and (ii) any vested benefits the Executive may have under any employee benefit plan of the Company through the Date of Termination, which vested benefits shall be paid and/or provided in accordance with the terms of such employee benefit plans (collectively, the “Accrued Benefit”).

(b) Termination by the Company Without Cause or by the Executive with Good Reason. During the Term, if the Executive’s employment is terminated by the Company without Cause as provided in Section 3(d), or the Executive terminates her employment for Good Reason as provided in Section 3(e), then the Company shall pay the Executive her Accrued Benefit. In addition, subject to the Executive signing a separation agreement containing, among other provisions, a general release of claims in favor of the Company and related persons and entities, confidentiality, return of property and non-disparagement, in a form and manner satisfactory to the Company (the “Separation Agreement and Release”) and the Separation Agreement and Release becoming irrevocable, all within 60 days after the Date of Termination:

(i) the Company shall pay the Executive an amount equal to one (1) times the Executive’s Base Salary (the “Severance Amount”); and

(ii) if the Executive was participating in the Company’s group health plan immediately prior to the Date of Termination and elects COBRA health continuation, then the Company shall pay to the Executive a monthly cash payment for

twelve (12) months or the Executive's COBRA health continuation period, whichever ends earlier, in an amount equal to the monthly employer contribution that the Company would have made to provide health insurance to the Executive if the Executive had remained employed by the Company.

The amounts payable under this Section 4(b) shall be paid out in substantially equal installments in accordance with the Company's payroll practice over twelve (12) months commencing within 60 days after the Date of Termination; provided, however, that if the 60-day period begins in one calendar year and ends in a second calendar year, the Severance Amount shall begin to be paid in the second calendar year by the last day of such 60-day period; provided, further, that the initial payment shall include a catch-up payment to cover amounts retroactive to the day immediately following the Date of Termination. Each payment pursuant to this Agreement is intended to constitute a separate payment for purposes of Treasury Regulation Section 1.409A-2(b)(2).

The receipt of any severance payments or benefits pursuant to Section 4 will be subject to Executive not violating the Restrictive Covenant Agreement (as defined below), the terms of which are hereby incorporated by reference. In the event Executive breaches the Restrictive Covenant Agreement, in addition to all other legal and equitable remedies, the Company shall have the right to terminate or suspend all continuing payments and benefits to which Executive may otherwise be entitled pursuant to Section 4 without affecting the Executive's release or Executive's obligations under the Separation Agreement and Release

5. Sale Event Payment. These provisions are intended to assure and encourage in advance the Executive's continued attention and dedication to her assigned duties and her objectivity during the pendency and after the occurrence of any Sale Event (as defined below). These provisions shall apply in lieu of, and expressly supersede, the provisions of Section 4(b) regarding severance pay and benefits upon a termination of employment, if the Date of Termination occurs within twelve (12) months after the occurrence of the first event constituting a Sale Event. These provisions shall terminate and be of no further force or effect beginning twelve (12) months after the occurrence of a Sale Event.

(a) Sale Event. During the Term, if within twelve (12) months after a Sale Event, the Executive's employment is terminated by the Company without Cause as provided in Section 3(d) or the Executive terminates her employment for Good Reason as provided in Section 3(e), then, subject to the signing of the Separation Agreement and Release by the Executive and the Separation Agreement and Release becoming irrevocable, all within 60 days after the Date of Termination,

(i) the Company shall pay the Executive a lump sum in cash in an amount equal to the sum of (A) one (1) times the Executive's current Base Salary (or the Executive's Base Salary in effect immediately prior to the Sale Event, if higher) plus (B) one (1) times the Executive's Target Incentive Compensation; and

(ii) if the Executive was participating in the Company's group health plan immediately prior to the Date of Termination and elects COBRA health continuation, then the Company shall pay to the Executive a monthly cash payment for

twelve (12) months or the Executive's COBRA health continuation period, whichever ends earlier, in an amount equal to the monthly employer contribution that the Company would have made to provide health insurance to the Executive if the Executive had remained employed by the Company; and

(iii) all time-based stock options and other time-based stock-based awards held by the Executive shall accelerate and become fully exercisable or non-forfeitable as of the Date of Termination; provided that, if any stock options or other stock-based awards held by the Executive prior to the Effective Date have accelerated vesting terms that are more favorable to the Executive than those set forth in this Section 5(a)(iii), the vesting terms of those stock options or other stock-based awards shall apply as opposed to the accelerated vesting terms set forth in this Section 5(a)(iii) solely with respect to such awards.

The amounts payable under Section 5(a)(i) and (ii) shall be paid or commence to be paid within 60 days after the Date of Termination; provided however, that if the 60-day period begins in one calendar year and ends in a second calendar year, such payment shall be paid or commence to be paid in the second calendar year by the last day of such 60-day period.

(b) Additional Limitation.

(i) Anything in this Agreement to the contrary notwithstanding, in the event that the amount of any compensation, payment or distribution by the Company to or for the benefit of the Executive, whether paid or payable or distributed or distributable pursuant to the terms of this Agreement or otherwise, calculated in a manner consistent with Section 280G of the Internal Revenue Code of 1986, as amended (the "Code") and the applicable regulations thereunder (the "Aggregate Payments"), would be subject to the excise tax imposed by Section 4999 of the Code, then the Aggregate Payments shall be reduced (but not below zero) so that the sum of all of the Aggregate Payments shall be \$1.00 less than the amount at which the Executive becomes subject to the excise tax imposed by Section 4999 of the Code; provided that such reduction shall only occur if it would result in the Executive receiving a higher After Tax Amount (as defined below) than the Executive would receive if the Aggregate Payments were not subject to such reduction. In such event, the Aggregate Payments shall be reduced in the following order, in each case, in reverse chronological order beginning with the Aggregate Payments that are to be paid the furthest in time from consummation of the transaction that is subject to Section 280G of the Code: (1) cash payments not subject to Section 409A of the Code; (2) cash payments subject to Section 409A of the Code; (3) equitybased payments and acceleration; and (4) non-cash forms of benefits; provided that in the case of all the foregoing Aggregate Payments all amounts or payments that are not subject to calculation under Treas. Reg. §1.280G-1, Q&A-24(b) or (c) shall be reduced before any amounts that are subject to calculation under Treas. Reg. §1.280G-1, Q&A-24(b) or (c).

(ii) For purposes of this Section 5(b), the "After Tax Amount" means the amount of the Aggregate Payments less all federal, state, and local income, excise and employment taxes imposed on the Executive as a result of the Executive's receipt of the

Aggregate Payments. For purposes of determining the After Tax Amount, the Executive shall be deemed to pay federal income taxes at the highest marginal rate of federal income taxation applicable to individuals for the calendar year in which the determination is to be made, and state and local income taxes at the highest marginal rates of individual taxation in each applicable state and locality, net of the maximum reduction in federal income taxes which could be obtained from deduction of such state and local taxes.

(iii) The determination as to whether a reduction in the Aggregate Payments shall be made pursuant to Section 5(b)(i) shall be made by a nationally recognized accounting firm selected by the Company (the "Accounting Firm"), which shall provide detailed supporting calculations both to the Company and the Executive within 15 business days of the Date of Termination, if applicable, or at such earlier time as is reasonably requested by the Company or the Executive. Any determination by the Accounting Firm shall be binding upon the Company and the Executive.

(c) Sale Event Definition. For purposes of this Section 5, "Sale Event" shall mean (i) the sale of all or substantially all of the assets of the Company on a consolidated basis to an unrelated person or entity, (ii) a merger, reorganization or consolidation pursuant to which the holders of the Company's outstanding voting power and outstanding stock immediately prior to such transaction do not own a majority of the outstanding voting power and outstanding stock or other equity interests of the resulting or successor entity (or its ultimate parent, if applicable) immediately upon completion of such transaction, (iii) the sale of all of the Stock of the Company to an unrelated person, entity or group thereof acting in concert, or (iv) any other transaction in which the owners of the Company's outstanding voting power immediately prior to such transaction do not own at least a majority of the outstanding voting power of the Company or any successor entity immediately upon completion of the transaction other than as a result of the acquisition of securities directly from the Company. Notwithstanding the foregoing, if the definition of Sale Event in an option agreement or stock-based award agreement between the Executive and the Company dated prior to the Effective Date (each, a "Preexisting Equity Agreement") is broader than this definition of Sale Event, the definition of Sale Event in such Preexisting Equity Agreement shall apply solely with respect to the equity award covered by such Preexisting Equity Agreement.

Notwithstanding the foregoing, a "Sale Event" shall not be deemed to have occurred for purposes of the foregoing clauses (ii) and (iv) solely as the result of an acquisition of securities by the Company which, by reducing the number of shares of voting securities outstanding, increases the proportionate number of voting securities beneficially owned by any person to 50 percent or more of the combined voting power of all of the then outstanding voting securities; provided, however, that if any person referred to in this sentence shall thereafter become the beneficial owner of any additional shares of voting securities (other than pursuant to a stock split, stock dividend, or similar transaction or as a result of an acquisition of securities directly from the Company) and immediately thereafter beneficially owns 50 percent or more of the combined voting power of all of the then outstanding voting securities, then a "Sale Event" shall be deemed to have occurred for purposes of the foregoing clauses (ii) and (iv).

6. Section 409A.

(a) Anything in this Agreement to the contrary notwithstanding, if at the time of the Executive's separation from service within the meaning of Section 409A of the Code, the Company determines that the Executive is a "specified employee" within the meaning of Section 409A(a)(2)(B)(i) of the Code, then to the extent any payment or benefit that the Executive becomes entitled to under this Agreement on account of the Executive's separation from service would be considered deferred compensation otherwise subject to the 20 percent additional tax imposed pursuant to Section 409A(a) of the Code as a result of the application of Section 409A(a)(2)(B)(i) of the Code, such payment shall not be payable and such benefit shall not be provided until the date that is the earlier of (A) six months and one day after the Executive's separation from service, or (B) the Executive's death. If any such delayed cash payment is otherwise payable on an installment basis, the first payment shall include a catch-up payment covering amounts that would otherwise have been paid during the six-month period but for the application of this provision, and the balance of the installments shall be payable in accordance with their original schedule.

(b) All in-kind benefits provided and expenses eligible for reimbursement under this Agreement shall be provided by the Company or incurred by the Executive during the time periods set forth in this Agreement. All reimbursements shall be paid as soon as administratively practicable, but in no event shall any reimbursement be paid after the last day of the taxable year following the taxable year in which the expense was incurred. The amount of in-kind benefits provided or reimbursable expenses incurred in one taxable year shall not affect the in-kind benefits to be provided or the expenses eligible for reimbursement in any other taxable year (except for any lifetime or other aggregate limitation applicable to medical expenses). Such right to reimbursement or in-kind benefits is not subject to liquidation or exchange for another benefit.

(c) To the extent that any payment or benefit described in this Agreement constitutes "non-qualified deferred compensation" under Section 409A of the Code, and to the extent that such payment or benefit is payable upon the Executive's termination of employment, then such payments or benefits shall be payable only upon the Executive's "separation from service." The determination of whether and when a separation from service has occurred shall be made in accordance with the presumptions set forth in Treasury Regulation Section 1.409A-1(h).

(d) The parties intend that this Agreement will be administered in accordance with Section 409A of the Code. To the extent that any provision of this Agreement is ambiguous as to its compliance with Section 409A of the Code, the provision shall be read in such a manner so that all payments hereunder comply with Section 409A of the Code. Each payment pursuant to this Agreement is intended to constitute a separate payment for purposes of Treasury Regulation Section 1.409A-2(b)(2). The parties agree that this Agreement may be amended, as reasonably requested by either party, and as may be necessary to fully comply with Section 409A of the Code and all related rules and regulations in order to preserve the payments and benefits provided hereunder without additional cost to either party.

(e) The Company makes no representation or warranty and shall have no liability to the Executive or any other person if any provisions of this Agreement are determined to constitute deferred compensation subject to Section 409A of the Code but do not satisfy an exemption from, or the conditions of, such Section.

7. Restrictive Covenants. The Executive agrees to the terms of the Non-Solicitation, Non-Competition, Confidentiality and Assignment Agreement, dated as of April 15, 2015, by and between the Company and the Executive (the "Restrictive Covenant Agreement"), the terms of which are hereby incorporated by reference as material terms of this Agreement.

8. Arbitration of Disputes. Any controversy or claim arising out of or relating to this Agreement or the breach thereof or otherwise arising out of the Executive's employment or the termination of that employment (including, without limitation, any claims of unlawful employment discrimination whether based on age or otherwise) shall, to the fullest extent permitted by law, be settled by arbitration in any forum and form agreed upon by the parties or, in the absence of such an agreement, under the auspices of the American Arbitration Association ("AAA") in Boston, Massachusetts in accordance with the Employment Dispute Resolution Rules of the AAA, including, but not limited to, the rules and procedures applicable to the selection of arbitrators. In the event that any person or entity other than the Executive or the Company may be a party with regard to any such controversy or claim, such controversy or claim shall be submitted to arbitration subject to such other person or entity's agreement. Judgment upon the award rendered by the arbitrator may be entered in any court having jurisdiction thereof. This Section 8 shall be specifically enforceable. Notwithstanding the foregoing, this Section 8 shall not preclude either party from pursuing a court action for the sole purpose of obtaining a temporary restraining order or a preliminary injunction in circumstances in which such relief is appropriate; provided that any other relief shall be pursued through an arbitration proceeding pursuant to this Section 8.

9. Consent to Jurisdiction. To the extent that any court action is permitted consistent with or to enforce Section 8 of this Agreement, the parties hereby consent to the jurisdiction of the Superior Court of the Commonwealth of Massachusetts and the United States District Court for the District of Massachusetts. Accordingly, with respect to any such court action, the Executive (a) submits to the personal jurisdiction of such courts; (b) consents to service of process; and (c) waives any other requirement (whether imposed by statute, rule of court, or otherwise) with respect to personal jurisdiction or service of process.

10. Integration. This Agreement constitutes the entire agreement between the parties with respect to the subject matter hereof and supersedes the Prior Agreement as well as all other prior agreements between the parties concerning such subject matter; provided that the Restrictive Covenant Agreement is expressly preserved and incorporated by reference herein.

11. Withholding. All payments made by the Company to the Executive under this Agreement shall be net of any tax or other amounts required to be withheld by the Company under applicable law.

12. Successor to the Executive. This Agreement shall inure to the benefit of and be enforceable by the Executive's personal representatives, executors, administrators, heirs, distributees, devisees and legatees. In the event of the Executive's death after her termination of employment but prior to the completion by the Company of all payments due to the Executive under this Agreement, the Company shall continue such payments to the Executive's beneficiary designated in writing to the Company prior to her death (or to her estate, if the Executive fails to make such designation).

13. Enforceability. If any portion or provision of this Agreement (including, without limitation, any portion or provision of any section of this Agreement) shall to any extent be declared illegal or unenforceable by a court of competent jurisdiction, then the remainder of this Agreement, or the application of such portion or provision in circumstances other than those as to which it is so declared illegal or unenforceable, shall not be affected thereby, and each portion and provision of this Agreement shall be valid and enforceable to the fullest extent permitted by law.

14. Survival. The provisions of this Agreement shall survive the termination of this Agreement and/or the termination of the Executive's employment to the extent necessary to effectuate the terms contained herein.

15. Waiver. No waiver of any provision hereof shall be effective unless made in writing and signed by the waiving party. The failure of any party to require the performance of any term or obligation of this Agreement, or the waiver by any party of any breach of this Agreement, shall not prevent any subsequent enforcement of such term or obligation or be deemed a waiver of any subsequent breach.

16. Notices. Any notices, requests, demands and other communications provided for by this Agreement shall be sufficient if in writing and delivered in person or sent by a nationally recognized overnight courier service or by registered or certified mail, postage prepaid, return receipt requested, to the Executive at the last address the Executive has filed in writing with the Company or, in the case of the Company, at its main offices, attention of the Board.

17. Amendment. This Agreement may be amended or modified only by a written instrument signed by the Executive and by a duly authorized representative of the Company.

18. Governing Law. This is a Massachusetts contract and shall be construed under and be governed in all respects by the laws of the Commonwealth of Massachusetts, without giving effect to the conflict of laws principles of such Commonwealth. With respect to any disputes concerning federal law, such disputes shall be determined in accordance with the law as it would be interpreted and applied by the United States Court of Appeals for the First Circuit.

19. Counterparts. This Agreement may be executed in any number of counterparts, each of which when so executed and delivered shall be taken to be an original; but such counterparts shall together constitute one and the same document.

20. Successor to Company. The Company shall require any successor (whether direct or indirect, by purchase, merger, consolidation or otherwise) to all or substantially all of the business or assets of the Company expressly to assume and agree to perform this Agreement to the same extent that the Company would be required to perform it if no succession had taken place. Failure of the Company to obtain an assumption of this Agreement at or prior to the effectiveness of any succession shall be a material breach of this Agreement.

[Signature page follows.]

IN WITNESS WHEREOF, the parties have executed this Agreement effective on the date and year first above written.

BLUEPRINT MEDICINES CORPORATION

By: /s/ Jeffrey Albers
Name: Jeffrey Albers
Title: President and Chief Executive Officer

EXECUTIVE

/s/ Debra Durso-Bumpus
Name: Debra Durso-Bumpus

FIRST AMENDMENT TO EMPLOYMENT AGREEMENT

This First Amendment to Employment Agreement (this “**Amendment**”) is dated as of February 10, 2020, between Blueprint Medicines Corporation, a Delaware corporation (the “**Company**”), and Debra-Durso-Bumpus (the “**Executive**”). Capitalized terms used and not defined herein shall have the meanings ascribed to such terms in the Employment Agreement (as defined below). This Amendment is effective as of February 10, 2020 (the “**Amendment Effective Date**”).

WHEREAS, the Company and the Executive are parties to the Employment Agreement dated as of November 22, 2017 (the “**Employment Agreement**”); and

WHEREAS, the Company and the Executive desire to amend certain provisions of the Employment Agreement;

NOW, THEREFORE, for good and valuable consideration, the receipt of which is hereby confirmed, the Company and the Executive agree that the Employment Agreement is amended as follows:

1. Section 1(b) of the Employment Agreement shall be amended and restated as follows:

“Position and Duties. The Executive shall serve as the Chief People Officer of the Company and shall have such powers and duties as may from time to time be prescribed by the Company’s Chief Executive Officer (“**CEO**”). The Executive shall devote her full working time and efforts to the business and affairs of the Company. Notwithstanding the foregoing, the Executive may serve on other boards of directors, with the approval of the Board of Directors of the Company (the “**Board**”), or engage in religious, charitable or other activities as long as such services and activities are approved by the Board and do not materially interfere with the Executive’s performance of her duties to the Company as provided in this Agreement.”

2. Section 2(a) of the Employment Agreement shall be amended and restated as follows:

“Base Salary. Effective January 1, 2020, the Executive’s annual base salary shall be \$351,067. The Executive’s base salary shall be re-determined annually by the Board or the Compensation Committee of the Board (the “**Compensation Committee**”) and shall be subject to increase but not decrease while the Executive is serving in the Chief People Officer role. The annual base salary in effect at any given time is referred to herein as the “**Base Salary**.” The Base Salary shall be payable in a manner that is consistent with the Company’s usual payroll practices for senior executives.”

3. Section 2(b) of the Employment Agreement shall be amended and restated as follows:

“Incentive Compensation. The Executive shall be eligible to receive cash

incentive compensation as determined by the Board or the Compensation Committee from time to time. The Executive's target annual incentive compensation shall be 45% of her Base Salary (the "**Target Incentive Compensation**") and shall be re-determined periodically by the Board or the Compensation Committee. To earn incentive compensation, the Executive must be employed by the Company on the day such incentive compensation is paid."

4. The Executive hereby gives her express written consent in this Amendment for the changes described herein. Accordingly, the Executive acknowledges and agrees that the changes described herein shall not be the basis of a "Good Reason" trigger as defined in the Employment Agreement, and therefore the Executive shall not be eligible to resign for Good Reason as a result of any such changes or in connection with the negotiation, execution and delivery of this Amendment.

5. To the extent that there is any inconsistency between the terms and conditions of this Amendment and the terms and conditions of the Employment Agreement, the terms and conditions of this Amendment shall prevail.

6. The Executive hereby acknowledges that the terms of the Non-Solicitation, Non-Competition, Confidentiality and Assignment Agreement, dated as of April 15, 2015, by and between the Company and the Executive (the "**Restrictive Covenant Agreement**") remain in full force and effect.

7. This Amendment may be executed in any number of counterparts, each of which when so executed and delivered shall be taken to be an original, but such counterparts shall together constitute one and the same document. Counterparts may be delivered via facsimile, electronic mail (including pdf or any electronic signature complying with the U.S. Federal ESIGN Act of 2000) or other transmission method, and any counterpart so delivered shall be deemed to have been duly and validly delivered and be valid and effective for all purposes.

8. Except as amended hereby, the Employment Agreement remains in full force and effect and the Employment Agreement, as amended, represents the entire agreement between the Executive and the Company, and there are no other agreements, written or oral, relating to the subject matter hereof, except the Restrictive Covenant Agreement, which remains in full force and effect. All references in the Employment Agreement to "this Agreement" (including "hereof", "herein" and similar words or phrases) shall mean the Employment Agreement, as amended by this Amendment.

[Signature page follows.]

IN WITNESS WHEREOF, the undersigned have executed this Amendment as of the Amendment Effective Date.

BLUEPRINT MEDICINES CORPORATION

By: /s/ Jeffrey Albers
Name: Jeffrey Albers
Title: President and Chief Executive Officer

EXECUTIVE

/s/ Debra-Durso-Bumpus
Debra-Durso-Bumpus

Subsidiaries of the Registrant

<u>Entity</u>	<u>State/Jurisdiction of Incorporation or Organization</u>
Blueprint Medicines Security Corporation	Massachusetts
Blueprint Medicines (Switzerland) GmbH	Switzerland
Blueprint Medicines (Netherlands) B.V.	Netherlands
Blueprint Medicines (UK) Ltd.	United Kingdom
Blueprint Medicines (Germany) GmbH	Germany
Blueprint Medicines Spain, S.L.	Spain
Blueprint Medicines (France) SAS	France
Blueprint Medicines (Italy) S.r.L.	Italy

Consent of Independent Registered Public Accounting Firm

We consent to the incorporation by reference in the following Registration Statements:

- (1) Registration Statement (Form S-3 No. 333-216573) of Blueprint Medicines Corporation,
- (2) Registration Statement (Form S-8 No. 333-203749) pertaining to the 2011 Stock Option and Grant Plan, 2015 Stock Option and Incentive Plan, and 2015 Employee Stock Purchase Plan of Blueprint Medicines Corporation, and
- (3) Registration Statements (Form S-8 Nos. 333-210125, 333-216575, 333-223131 and 333-229885) pertaining to the 2015 Stock Option and Incentive Plan and 2015 Employee Stock Purchase Plan of Blueprint Medicines Corporation;

of our reports dated February 13, 2020, with respect to the consolidated financial statements of Blueprint Medicines Corporation and the effectiveness of internal control over financial reporting of Blueprint Medicines Corporation included in this Annual Report (Form 10-K) of Blueprint Medicines Corporation for the year ended December 31, 2019.

/s/ Ernst & Young LLP

Boston, Massachusetts
February 13, 2020

CERTIFICATIONS

I, Jeffrey W. Albers, certify that:

1. I have reviewed this Annual Report on Form 10-K of Blueprint Medicines Corporation;
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(s) 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: February 13, 2020

By: /s/ Jeffrey W. Albers
Jeffrey W. Albers
President and Chief Executive Officer
(Principal Executive Officer)

CERTIFICATIONS

I, Michael Landsittel, certify that:

1. I have reviewed this Annual Report on Form 10-K of Blueprint Medicines Corporation;
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(s) 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: February 13, 2020

By: /s/ Michael Landsittel
Michael Landsittel
Chief Financial Officer
(Principal Financial Officer)

**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 Blueprint Medicines Corporation (the "Company") for the year ended December 31, 2019 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), each of the undersigned officers 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: February 13, 2020

By: /s/ Jeffrey W. Albers
Jeffrey W. Albers
President and Chief Executive Officer
(Principal Executive Officer)

Date: February 13, 2020

By: /s/ Michael Landsittel
Michael Landsittel
Chief Financial Officer
(Principal Financial Officer)
