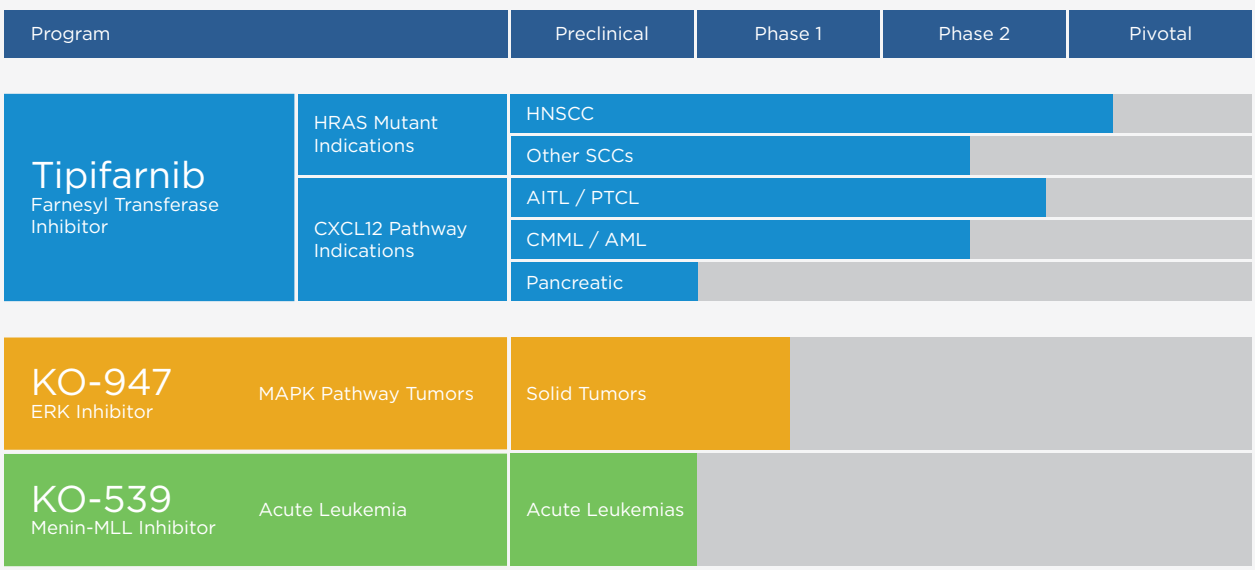
KURA ONCOLOGY

Developing Precision Medicines
for the Treatment of Cancer

ADVANCING OUR PIPELINE

2018 Annual Report

We are advancing a pipeline of precision medicines for the treatment of cancer. Our pipeline consists of small molecule drug candidates that target cancer signaling pathways where there is a strong scientific and clinical rationale to improve outcomes by identifying those patients most likely to benefit from treatment. Our most advanced drug candidate is tipifarnib, a farnesyl transferase inhibitor currently in a registration-directed clinical trial in patients with HRAS mutant head and neck squamous cell carcinoma.



Tipifarnib Investigator-Sponsored Trials : HRAS Mutant Urothelial Carcinomas, Samsung Medical Center ; HRAS Mutant Lung Squamous Cell Carcinomas (LSCC), Spanish Lung Cancer Group

To Our Shareholders

At Kura, we're committed to realizing the promise of precision medicines for the treatment of cancer. Approximately one year ago, we took another step toward achieving that goal with a successful end-of-Phase 2 meeting with the U.S. Food & Drug Administration (FDA). Now, a year later, I am very pleased to report that the first registration-directed trial of our lead drug candidate, tipifarnib, in patients with HRAS mutant head and neck squamous cell carcinoma (HNSCC) is underway.

Our registration-directed trial is designed to enroll at least 59 patients, with a primary endpoint of objective response rate. The trial, which initiated in November 2018, is expected to take approximately two years to fully enroll. However, according to the statistical assumptions, the trial could be positive as soon as 15 confirmed responses are observed. Based on feedback from the FDA, we believe that the trial, if positive, may be adequate to support a new drug application (NDA) seeking accelerated approval.

Meanwhile, we continue to enroll patients in our ongoing Phase 2 trial in HRAS mutant solid tumors, including HNSCC patients at clinical sites that have yet to open in our registration-directed trial, as well as patients with other squamous cell carcinomas. We look forward to providing additional data from this trial in the second half of 2019.

Expanding the Opportunity for Tipifarnib

In addition to our efforts in HRAS mutant solid tumors, we also made considerable strides over the past year to broaden the potential for tipifarnib, including the validation of CXCL12 as a therapeutic target of tipifarnib in peripheral T-cell lymphoma (PTCL) and clinical proof-of-concept in angioimmunoblastic T-cell lymphoma (AITL), an aggressive form of PTCL often characterized by high levels of CXCL12 expression.

We continue to be encouraged by our emerging clinical data in AITL and CXCL12 high PTCL, and we believe this represents another potential registrational opportunity for tipifarnib. We anticipate providing an update from our ongoing Phase 2 trial in mid-2019.

We are also working to validate the utility of CXCL12 pathway biomarkers as a strategy for patient enrichment in chronic myelomonocytic leukemia (CMML). If successful, we believe this approach may allow us to extend the potential use of tipifarnib to other myeloid indications, including previously untreated, poor-risk and elderly patients with acute myeloid leukemia (AML) as well as other lymphoid indications such as DLBCL and CTCL. In April 2019, we

Troy E. Wilson, Ph.D., J.D.
President & Chief Executive Officer

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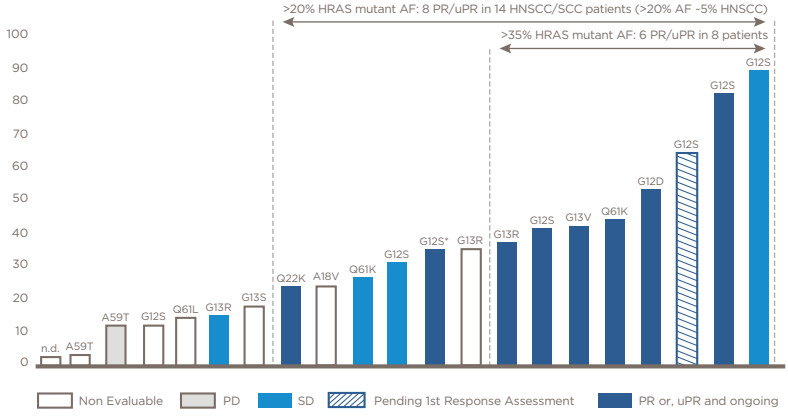
Multiple *Proof-of-Concept* Studies Reinforce Our Precision Medicine Approach

We have now demonstrated clinical proof-of-concept in multiple indications using biomarker strategies to select for patients most likely to benefit from treatment. In addition to our efforts in relapsed/refractory (R/R) HRAS mutant HNSCC and CXCL12+ AITL/PTCL, we are working to validate the utility of CXCL12 pathway biomarkers as a strategy for patient enrichment in R/R myeloid tumor indications, such as AML and CMML, other lymphoid malignancies, such as DLBCL and CTCL, and solid tumor indications, such as pancreatic cancer.

HRAS Mutant
HNSCC

HRAS Mutant Allele Frequency

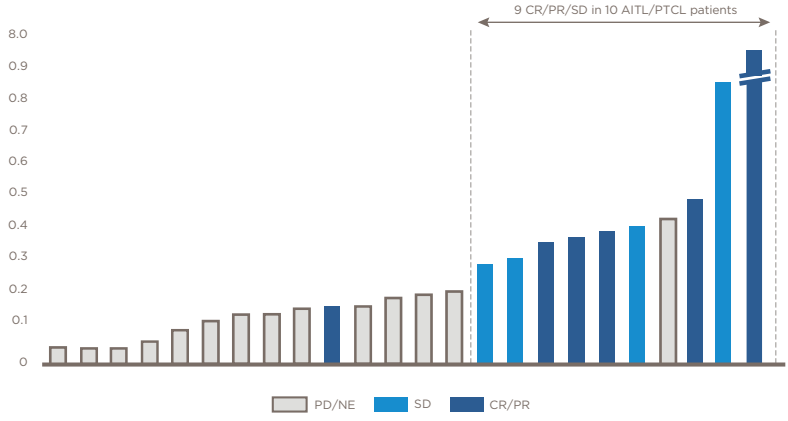
Clinical benefit observed in **high frequency HRAS mutant** population



CXCL12+
AITL/PTCL

High CXCL12 Levels

Clinical benefit observed in **high CXCL12 AITL/PTCL** population



presented preliminary data indicating an association between CXCL12 expression levels and clinical benefit in patients with multiple hematologic malignancies, and we anticipate presenting additional prospective data from our CMML trial at a medical meeting later this year.

The progress we have made toward validating the CXCL12 pathway as a therapeutic target of tipifarnib in hematologic malignancies has also motivated us to investigate the role of CXCL12 in certain solid tumors, including pancreatic cancer. In January 2019, we presented new findings identifying a potential association between CXCL12 expression and clinical benefit in patients with pancreatic cancer treated with tipifarnib. We believe these findings support further development of tipifarnib in pancreatic cancer, and we are currently working with key opinion leaders on the design of a proof-of-concept study in this indication.

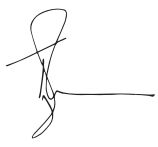
Together, these efforts are helping us to expand the potential opportunity for tipifarnib well beyond HRAS mutant solid tumors and into additional indications of high unmet need.

A Number of Potential Catalysts Ahead

As we look ahead, I believe Kura is well positioned in 2019, with additional data from three ongoing Phase 2 trials of tipifarnib expected throughout the year, an emerging pipeline that includes KO-947, an ERK inhibitor with Phase 1 data expected later this year, and KO-539, a menin-MLL inhibitor that is anticipated to enter the clinic shortly, and a cash runway into 2021.

On behalf of Kura's board of directors and leadership, I would like to take this opportunity to thank our team for their hard work and dedication, the patients in our clinical studies for placing their trust in us and you, our shareholders, for your continued support. We remain committed to realizing the promise of precision medicines for the treatment of cancer, and I look forward to updating you on our progress in the year ahead.

Sincerely,



Troy E. Wilson, Ph.D., J.D.
President & Chief Executive Officer

I believe Kura is well positioned in 2019, with additional data from three ongoing Phase 2 trials of tipifarnib expected throughout the year, an emerging pipeline and a cash runway into 2021.

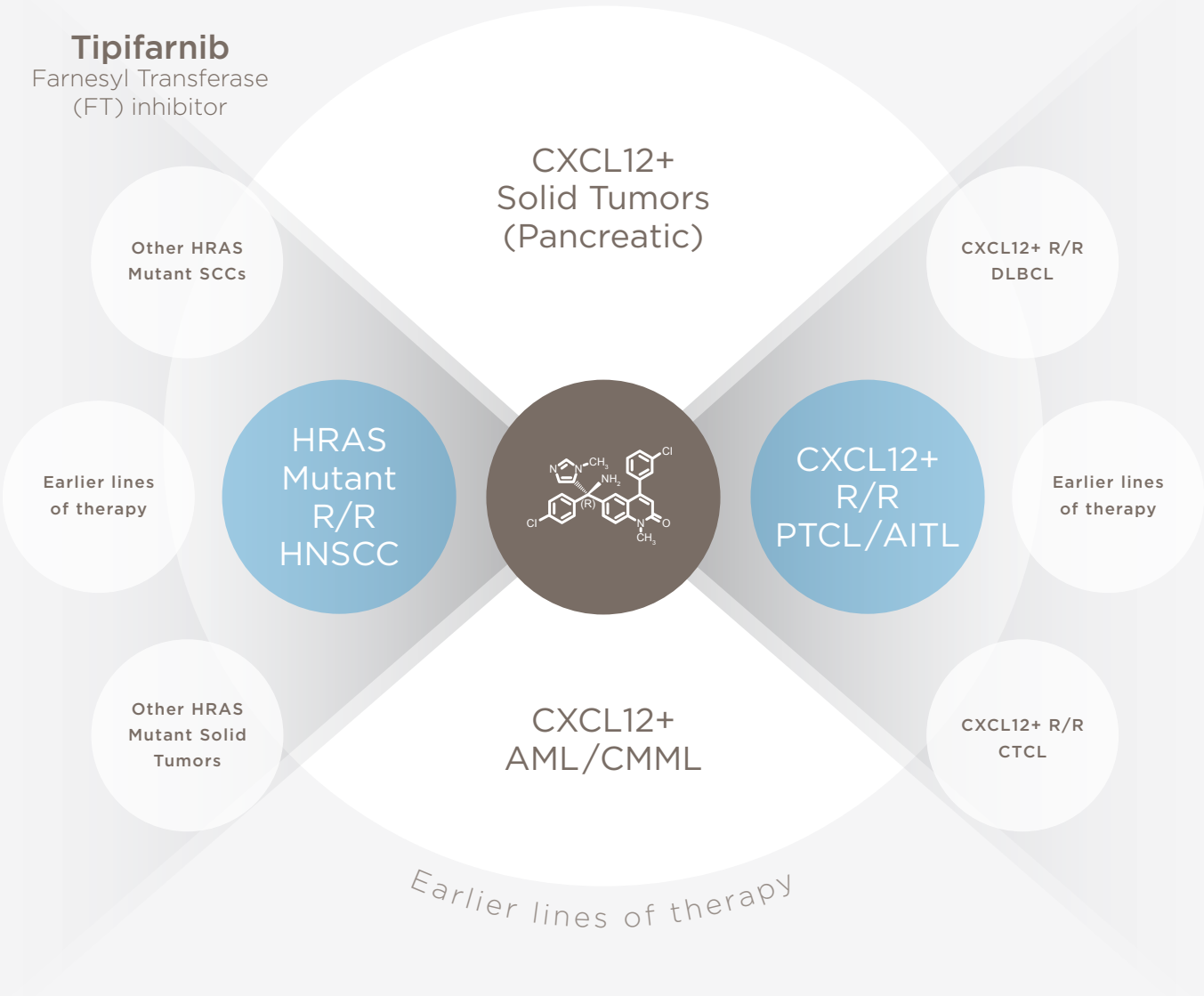
Cornerstone *Proof-of-Concepts* Support Expansion to Additional Indications

Tipifarnib in HRAS Mutant Solid Tumors

We are working to execute our pivotal trial and, if positive, to generate a data package to support an application for marketing approval in relapsed/refractory (R/R) HRAS mutant HNSCC. We also seek to broaden tipifarnib's potential use in other HRAS mutant solid tumors, including HRAS mutant SCCs other than HNSCC. Long-term, our development strategy for tipifarnib is to advance toward earlier lines of therapy and, ultimately, to treat patients with HRAS mutant SCCs in the continuum of systemic treatment settings.

Tipifarnib Using CXCL12 Biomarkers

Our objective is to validate CXCL12 as a therapeutic target of tipifarnib in multiple hematologic and solid tumor indications while optimizing dose and schedule for each disease. We plan to evaluate a number of criteria in determining whether to advance to registration-enabling studies, including: evidence of durable clinical benefit, potential for rapid clinical development, potential to move into earlier lines of therapy, potential for patent and regulatory exclusivity and commercial potential.



UNITED STATES
SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 10-K

(Mark One)

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

For the fiscal year ended December 31, 2018

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 001-37620

KURA ONCOLOGY, INC.

(Exact name of Registrant as specified in its Charter)

Delaware	**61-1547851**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. Employer Identification No.)**
3033 Science Park Road, Suite 220, San Diego, CA	**92121**
(Address of principal executive offices)	**(Zip Code)**

Registrant's telephone number, including area code: (858) 500-8800

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

Title of each class	**Name of each exchange on which registered**
Common Stock, par value $0.0001 per share	The Nasdaq Global Select Market

Securities registered pursuant to 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 15(d) of the Act. YES ☐ NO ☒

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

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

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§229.405 of this chapter) is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. ☐

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

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

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

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

The aggregate market value of the voting and non-voting of common equity held by non-affiliates of the registrant was approximately $525.4 million as of June 29, 2018 (the last trading day before June 30, 2018) based on the closing price of $18.20 as reported on the Nasdaq Global Select Market on such date. Shares of the registrant's common stock held by executive officers, directors, and their affiliates have been excluded from this calculation. This determination of affiliate status is not necessarily a conclusive determination for other purposes.

The number of outstanding shares of the registrant's common stock as of March 1, 2019 was 38,169,041.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's definitive proxy statement to be filed with the Securities and Exchange Commission, or SEC, subsequent to the date hereof pursuant to Regulation 14A in connection with the registrant's 2019 Annual Meeting of Stockholders, are incorporated by reference into Part III of this Annual Report on Form 10-K. Such proxy statement will be filed with the SEC not later than 120 days after the conclusion of the registrant's fiscal year ended December 31, 2018.

KURA ONCOLOGY, INC.
TABLE OF CONTENTS

		Page
PART I		
Item 1.	Business	2
Item 1A.	Risk Factors	27
Item 1B.	Unresolved Staff Comments	60
Item 2.	Properties	60
Item 3.	Legal Proceedings	60
Item 4.	Mine Safety Disclosures	60
PART II		
Item 5.	Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities	61
Item 6.	Selected Financial Data	61
Item 7.	Management's Discussion and Analysis of Financial Condition and Results of Operations	62
Item 7A.	Quantitative and Qualitative Disclosures About Market Risk	68
Item 8.	Financial Statements and Supplementary Data	68
Item 9.	Changes in and Disagreements With Accountants on Accounting and Financial Disclosure	68
Item 9A.	Controls and Procedures	68
Item 9B.	Other Information	69
PART III		
Item 10.	Directors, Executive Officers and Corporate Governance	70
Item 11.	Executive Compensation	70
Item 12.	Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters	70
Item 13.	Certain Relationships and Related Transactions, and Director Independence	70
Item 14.	Principal Accounting Fees and Services	70
PART IV		
Item 15.	Exhibits, Financial Statement Schedules	71
Item 16.	Form 10-K Summary	74
SIGNATURES		75

PART I

Forward-Looking Statements

This Annual Report on Form 10-K, or Annual Report, may include forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, or the Securities Act, that relate to future events or our future financial performance and involve known and unknown risks, uncertainties and other factors that may cause our actual results, levels of activity, performance or achievements to differ materially from any future results, levels of activity, performance or achievements expressed or implied by these forward-looking statements. Words such as, but not limited to, "believe," "expect," "anticipate," "estimate," "intend," "may," "plan," "potential," "predict," "project," "targets," "likely," "will," "would," "could," "should," "continue," and similar expressions or phrases, or the negative of those expressions or phrases, are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words. These statements reflect our beliefs and opinions on the relevant subject and are based upon information available to us as of the date of this Annual Report. Although we believe that we have a reasonable basis for each forward-looking statement contained in this Annual Report, we caution you that these statements are based on information that may be limited or incomplete, our projections of the future that are subject to known and unknown risks and uncertainties and other factors that may cause our actual results, level of activity, performance or achievements expressed or implied by these forward-looking statements, to differ. These statements are inherently uncertain and you are cautioned not to unduly rely upon these statements. The sections in this Annual Report entitled "Business," "Risk Factors," and "Management's Discussion and Analysis of Financial Condition and Results of Operations" as well as other sections in this Annual Report, discuss some of the factors that could contribute to these differences. These forward-looking statements include, among other things, statements about:

- the initiation, cost, timing, progress and results of our research and development activities, clinical trials and preclinical studies;
- the early stage of products under development;
- the timing of and our ability to obtain and maintain regulatory approval of our existing product candidates, any product candidates that we may develop, and any related restrictions, limitations, and/or warnings in the label of any approved product candidates;
- our plans to research, develop and commercialize our future product candidates;
- our ability to attract collaborators with development, regulatory and commercialization expertise;
- our ability to obtain and maintain intellectual property protection for our product candidates;
- our ability to successfully commercialize our product candidates;
- the size and growth of the markets for our product candidates and our ability to serve those markets;
- the rate and degree of market acceptance of any future products;
- the success of competing drugs that are or become available;
- government regulation;
- regulatory developments in the United States and other countries;
- the performance of our third-party suppliers and manufacturers and our ability to obtain alternative sources of raw materials;
- our ability to obtain additional financing;
- our use of cash, cash equivalents, investments and other resources;
- our expectations regarding the period during which we qualify as an emerging growth company under the Jumpstart Our Business Startups Act, or JOBS Act;
- the accuracy of our estimates regarding expenses, future revenues, capital requirements and the need for additional financing; and
- our ability to attract and retain key management, scientific or clinical personnel.

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

You should read this Annual Report and the documents that we reference in this Annual Report, completely and with the understanding that our actual future results may be materially different from what we expect. The forward-looking statements contained in this Annual Report are made as of the date of this Annual Report, and we do not assume, and specifically disclaim, any obligation to update any forward-looking statements, whether as a result of new information, future events or otherwise.

Item 1. Business.

Overview

We are a clinical-stage biopharmaceutical company committed to realizing the promise of precision medicines for the treatment of cancer. Our pipeline consists of small molecule product candidates that target cancer signaling pathways where there is a strong scientific and clinical rationale to improve outcomes, and we intend to pair them with molecular or cellular diagnostics to identify those patients most likely to respond to treatment. We plan to advance our product candidates through a combination of internal development and strategic partnerships and maintain significant development and commercial rights.

Our lead product candidate, tipifarnib, is a potent, selective and orally bioavailable inhibitor of farnesyl transferase. Tipifarnib was previously studied in more than 5,000 cancer patients and demonstrated compelling and durable anti-cancer activity in certain patients with a manageable side effect profile. We are currently evaluating tipifarnib in multiple solid tumor and hematologic indications.

Our most advanced solid tumor indication is in patients with head and neck squamous cell carcinoma, or HNSCC, that carry mutations in the HRAS gene. In September 2017, we reported that our ongoing proof-of-concept Phase 2 clinical trial of tipifarnib in patients with HRAS mutant HNSCC achieved its primary efficacy endpoint. Following feedback from the U.S. Food and Drug Administration, or the FDA, and other regulatory authorities, we initiated a registration-directed clinical trial of tipifarnib in HRAS mutant HNSCC in November 2018. The global, multicenter, open label, two-cohort, non-comparative trial is designed to enroll at least 59 patients with HRAS mutant HNSCC who have received prior platinum-based therapy and is expected to take approximately two years to fully enroll. Following achievement of the primary efficacy endpoint in our proof-of-concept clinical trial of tipifarnib in patients with HRAS mutant HNSCC, we added a cohort to enroll patients having HRAS mutant squamous cell carcinomas, or SCCs, other than HNSCC. We anticipate having additional data from this Phase 2 clinical trial in the second half of 2019.

In addition to our tipifarnib development program in HRAS mutant solid tumors, we are evaluating the potential utility of tipifarnib using CXCL12 pathway biomarkers in a number of hematologic and solid tumor indications. In December 2018, we reported preliminary data from our Phase 2 clinical trial of tipifarnib in patients with relapsed or refractory peripheral T-cell lymphomas, or PTCL. The data showed a significant association between CXCL12 expression and clinical benefit, as well as clinical proof-of-concept in patients with angioimmunoblastic T-cell lymphoma, or AITL, an aggressive form of PTCL often characterized by high levels of CXCL12 expression. We anticipate having additional data from this study in mid-2019.

We are also exploring the utility of CXCL12 pathway biomarkers as a strategy for patient enrichment in patients with relapsed or refractory acute myeloid leukemia, or AML, and chronic myelomonocytic leukemia, or CMML, in an ongoing Phase 2 clinical trial. We anticipate having additional data from the CMML clinical trial in 2019. Additionally, in January 2019, we reported the identification of a potential association between CXCL12 expression and clinical benefit from tipifarnib in patients with pancreatic cancer. We believe these findings support the potential use of tipifarnib in a broader set of hematologic and solid tumor indications, including pancreatic cancer, in which the CXCL12 pathway plays a role in tumor initiation and progression, and we are exploring opportunities for further clinical development.

Our second product candidate is KO-947, a potent and selective small molecule inhibitor of extracellular signal related kinase, or ERK, which we are advancing as a potential treatment for patients with tumors that have dysregulated activity due to mutations or other mechanisms in the mitogen-activated protein kinase, or MAPK, pathway. Our preclinical data suggest that KO-947 has anti-tumor activity in KRAS- or BRAF-mutant adenocarcinomas as well as certain subsets of squamous cell carcinomas. Our Phase 1 trial of KO-947 in patients with solid tumors is ongoing, and we anticipate having data from the dose-escalation portion of the trial in 2019.

Our third product candidate is KO-539, a potent and selective small molecule inhibitor of the menin-mixed lineage leukemia, or menin-MLL, protein-protein interaction. We have generated preclinical data that support the potential anti-tumor activity of KO-539 in genetically defined subsets of acute leukemia, including those with rearrangements or partial tandem duplications in the MLL gene as well as those with oncogenic driver mutations in genes such as NPM1. Our investigational new drug, or IND, application for KO-539 has been cleared by the FDA and we anticipate initiating our Phase 1 clinical trial in relapsed or refractory AML in the second quarter of 2019.

Unless the context requires otherwise, references in this Annual Report to "we," "us" and "our" refer to Kura Oncology, Inc., a private Delaware corporation incorporated in the State of Delaware in August 2014, for the periods prior to our reverse merger transaction which took place on March 6, 2015, or the Merger, and Kura Oncology, Inc., a Delaware corporation incorporated in November 2007 and formerly known as Zeta Acquisition Corp. III, for the periods following the Merger.

Our Strategy

Our strategy is to discover, acquire, develop and commercialize innovative anti-cancer agents in oncology indications with significant unmet medical need and attractive commercial potential. The key components of our strategy include the following:

- Focus on developing novel, small molecule product candidates for the treatment for cancer;
- Identify molecular, genetic or other tumor-related characteristics to identify patients more likely to benefit from our product candidates;
- Leverage clinical and pathology trends towards comprehensive tumor profiling and the use of companion diagnostics;
- Prioritize development of tipifarnib in clinical indications of high unmet need where improved outcomes are associated with specific biomarkers;
- Advance our programs through a combination of internal development and strategic partnerships;
- Maintain significant development and commercial rights to our product candidates; and
- Build a sustainable product pipeline.

Precision Medicines in Cancer Treatment

Advancements in cancer genetics and new molecular diagnostic tools are helping define why some patients respond to a specific therapy while other patients receive little to no clinical benefit. This new era in cancer drug discovery and development offers the potential for innovative treatments that are safer and more effective for patients with specific cancers. We aim to improve patient outcomes and contribute to the reduction in healthcare costs by matching targeted therapeutics to the patients who will derive the most benefit. We are developing a pipeline of small molecule product candidates designed to inhibit mutated or abnormally functioning cellular pathways that drive cancer growth and intend to pair them with molecular diagnostics to identify those patients with tumors most likely to respond to treatment. This approach to treatment is known as precision medicine.

A pioneering example of a precision medicine in cancer was the development of small molecule inhibitors against epidermal growth factor receptor, or EGFR, in patients with advanced lung cancer. Patients with EGFR mutations treated with EGFR inhibitors have a response rate in the 65% range, as opposed to a response rate of approximately 10% in unselected lung patients. Erlotinib (Tarceva®) was approved in the United States as a first-line treatment for patients with non-small cell lung cancer, or NSCLC, characterized by EGFR mutations. Other examples of approved agents developed using precision medicine approaches include ALK, BCR-ABL, BRAF and TRK inhibitors.

Precision medicine has several advantages over traditional drug development. We believe evidence-based selection of patients who are more likely to respond to a targeted therapy based on tumor biology provides the potential for: higher translatability from preclinical to clinical studies; increased overall response rates, requiring fewer patients for clinical development; and expedited clinical development in areas of high unmet need. We believe the precision medicine approach has the potential for more efficient drug development with reduced risks, costs and timelines. However, achieving success through a precision medicine approach is predicated on a thorough understanding of tumor biology and the mechanism of action of the product candidate. To develop this understanding, we have conducted extensive translational research on each of our programs.

Our Approach to Development of Precision Medicines in Oncology

Translational research is the practice of synthesizing our knowledge of basic research, preclinical and clinical data to develop a "bench-to-bedside" understanding of the potential of our product candidates, and it is the principal methodology we utilize to guide our precision medicine approach. We evaluate our product candidates through both *in vitro* and *in vivo* experiments to evaluate their potential as therapeutics using a number of tools, including patient-derived xenograft, or PDX, models. PDX models mostly retain the principal histologic and genetic characteristics of their donor tumor and have been shown in many instances to be predictive of clinical outcomes and are increasingly being used for preclinical drug evaluation, biomarker identification, biologic studies and personalized medicine strategies. We evaluate our product candidates in preclinical PDX studies seeking to corroborate clinical data and to identify and prioritize potential clinical indications.

Because we often target molecular and/or genetic alterations that are detectable, companion diagnostic tests can be developed to identify these alterations. Once we have identified a target, we will initially use existing diagnostic tools, such as next-generation sequencing, or NGS, or RNA expression profiling, to identify patient subsets that we believe will derive increased benefit from our product candidates. As we advance our product candidates clinically and determine the most important screening criteria, we intend to develop companion diagnostics as appropriate, with the help of technology partners, to seek to identify patients, and if our clinical development programs are successful, to support the potential registration and marketing of our product candidates.

Our clinical development strategy employs a disciplined approach designed to identify response signals early in development and reduce development risks. Based upon the data from our preclinical studies as well as clinical data, we seek to evaluate our product candidates in well-defined patient populations and believe this gives us a higher likelihood of demonstrating a clinical benefit. This approach is intended to allow for early insight into the therapeutic potential of a product candidate and the possibility for rapid clinical development and expedited regulatory strategies.

We are employing some or all of the steps above across our various programs as we advance our pipeline of targeted therapies. We believe the advantages of such an approach are the potential for higher translatability from preclinical to clinical studies, the ability to leverage clinical and pathology trends towards comprehensive tumor profiling and the potential for expedited clinical development.

Clinical Programs and Pipeline

Tipifarnib – An Oral Farnesyl Transferase Inhibitor

Overview

Tipifarnib is a member of a class of product candidates called farnesyl transferase inhibitors, or FTIs. We in-licensed tipifarnib from Janssen Pharmaceutica NV, or Janssen, an affiliate of Johnson & Johnson, in December 2014. Previously, tipifarnib was studied in more than 5,000 oncology patients in more than 70 clinical trials and was observed to be generally well tolerated with a manageable side effect profile as a single agent. Although tipifarnib has a well-established safety profile and has demonstrated compelling and durable anti-cancer activity in certain patients, its activity has not been sufficient in any prior clinical trial to support marketing approval by the FDA. However, clinical and preclinical data suggest that, in certain selected patient populations, tipifarnib has the potential to provide significant benefit to cancer patients with limited treatment options. We have worldwide rights to tipifarnib in all indications other than virology.

Protein Farnesylation and Tipifarnib

Tipifarnib is a potent and selective inhibitor of protein farnesylation. Certain cellular proteins must associate with the intracellular membrane to function. One of the mechanisms by which proteins are associated with the inner cell membrane is farnesylation, which modifies the protein by attaching a farnesyl group. Another, related mechanism of attachment of proteins to the membrane is protein geranylgeranylation, which is attachment of a geranylgeranyl group to the protein. Protein farnesylation and protein geranylgeranylation, collectively called protein prenylation, cause intracellular proteins to become anchored to the inside of the cell membrane due to the hydrophobic nature of the farnesyl and geranylgeranyl groups.

The enzyme that catalyzes the attachment of the farnesyl groups to proteins is called farnesyl transferase. Small molecule inhibitors of the farnesyl transferase enzyme have been discovered, and several inhibitors including tipifarnib have been evaluated in human clinical trials. The small molecule inhibitors are commonly referred to as FTIs. Many proteins involved in cellular signaling undergo prenylation because they must be associated with other proteins at the inner cellular membrane of the tumor cell to function properly. Treatment of tumors with FTIs results in the reversal of several hallmarks of cancer, including mitotic arrest, induction of apoptosis, growth inhibition, tissue invasion, sustained angiogenesis and tumor growth, as well as induction of tumor regression in animal models.

Among the hundreds of proteins estimated to be prenylated, some are either exclusively farnesylated or exclusively geranylgeranylated; some are both farnesylated and geranylgeranylated, and others are naturally farnesylated but become geranylgeranylated, when the farnesyl transferase enzyme is inhibited. HRAS is an example of a protein that is exclusively farnesylated while KRAS and NRAS are two proteins that are naturally farnesylated but may become geranylgeranylated upon treatment with FTIs.

Solid Tumors with HRAS Mutations

Retrovirus-associated DNA sequences, or RAS, are a family of membrane-associated proteins that are involved in regulating cell division in response to growth factor stimulation. HRAS is a member of the RAS family, which includes the other proto-oncogenes: KRAS and NRAS. Collectively, the three RAS genes constitute one of the most frequently mutated families of oncogenes in human cancers. Although HRAS mutations are less common overall relative to KRAS and NRAS mutations in human cancers, they have a higher prevalence in cancers of the upper digestive tract, skin, thyroid and urinary bladder.

The HRAS protein is involved in regulating cell division in response to growth factor stimulation. Growth factors act by binding cell surface receptors that span the cell's plasma membrane. Once activated, receptors stimulate signal transduction events in the cytoplasm, a process by which proteins and second messengers relay signals from outside the cell to the cell nucleus and instruct the cell to grow or divide. HRAS is localized in the plasma membrane, and it is an early player in many signal transduction pathways. HRAS acts as a molecular on/off switch – once HRAS is turned "on" it recruits and activates proteins necessary for the propagation of the receptor's signal. In certain tumors, mutations in HRAS or its upstream regulators cause HRAS to be permanently "on," resulting in persistent activation of downstream growth and proliferation signals that drive tumor cell growth. FTIs work to prevent the aberrant growth and proliferation of cells that are dependent on these signaling pathways by inhibiting protein farnesylation and subsequent membrane localization of HRAS, thereby switching HRAS "off." HRAS membrane localization is solely dependent on protein farnesylation, and therefore we believe that tipifarnib has the potential for the treatment of HRAS mutant solid tumors.

HNSCC is one of a number of different types of cancer that arises from squamous cells. Squamous cells are found in the outer layer of skin and in the mucous membranes, which are the moist tissues that line body cavities such as the airways and intestines. HNSCC develops in the mucous membranes of the mouth, nose, and throat and is classified by its location. HNSCC is caused by a variety of factors that can alter the DNA in cells. The strongest risk factors for developing this form of cancer are tobacco use, including smoking or using chewing tobacco, and heavy alcohol consumption. In addition, infection with certain strains of human papillomavirus, or HPV, is linked to the development of HNSCC.

HNSCC is a disease of high unmet need. Response rates for the three approved second-line agents, cetuximab (Erbitux®), nivolumab (Opdivo®) and pembrolizumab (Keytruda®) are in the range of 13-16% in unselected populations, with a median progression-free survival of approximately two months and a median overall survival of fewer than eight months. Data in the literature suggest response rates in patients with HRAS mutations may be even lower.

Other types of cancer that can result from squamous cells include vulvar squamous cell carcinoma, penile squamous cell carcinoma, cutaneous squamous cell carcinoma and lung squamous cell carcinoma. Our preclinical and clinical data

suggest that, among solid tumors with HRAS mutations, squamous cell tumors are sensitive tumors to treatment with tipifarnib, and treatment with tipifarnib can, in some patients, produce durable responses.

Clinical Development of Tipifarnib in HRAS Mutant Solid Tumors

Proof-of-Concept Trial in HNSCC and other SCCs. We initiated a proof-of-concept Phase 2 clinical trial in May 2015 to test the hypothesis whether tipifarnib could be used as a treatment for advanced tumors with HRAS mutations. The initiation of this clinical study was based on our preclinical data, which demonstrated that tipifarnib inhibits HRAS mutant cell proliferation and HRAS tumor growth in mouse models. The clinical study was originally designed to enroll two cohorts of 18 patients each, with a primary endpoint of objective response rate and tumor response assessments conducted according to Response Evaluation Criteria in Solid Tumors version 1.1, or RECIST 1.1, criteria with confirmation of response required.

Cohort 1 enrolled patients with malignant thyroid tumors with HRAS mutations, independently of thyroid histology. Ten evaluable patients have been enrolled in Stage 1 of Cohort 1. Although evidence of prolonged disease stabilization was observed in several patients, we saw no objective responses within the first stage of the thyroid cohort and the cohort was closed to further enrollment. Cohort 2 was initially designed to enroll any patient with a non-hematological HRAS mutant tumor other than thyroid cancer who meets the eligibility criteria. In March 2017, we presented preliminary data from this trial at the 15th International Congress on Targeted Anticancer Therapies, including data from a cohort of three patients with HRAS mutant HNSCC treated with tipifarnib, two of whom achieved confirmed partial responses, or PRs. Based upon these data, we amended the clinical study protocol to focus enrollment in Cohort 2 entirely on patients with HRAS mutant HNSCC.

In September 2017, we reported that our proof-of-concept clinical trial of tipifarnib in patients with HRAS mutant HNSCC achieved its primary efficacy endpoint with four confirmed, partial responses among the first six evaluable HNSCC patients enrolled in the trial. Following achievement of the primary efficacy endpoint in patients with HRAS mutant HNSCC, we further amended the clinical study protocol to add a third cohort with patients having HRAS mutant SCCs other than HNSCC.

In October 2018, we reported updated data from our proof-of-concept clinical trial of tipifarnib in patients with HRAS mutant HNSCC and preliminary data in our cohort of other HRAS mutant SCCs at the European Society for Medical Oncology 2018 Congress. As of the September 7, 2018 clinical data cutoff date, 17 patients with HRAS mutant HNSCC were enrolled in the trial. Tumor size reductions were observed in nine of 11 evaluable patients, with five confirmed partial responses, including three patients with durable responses lasting more than 17 months. A sixth patient achieved a confirmed PR after the data cutoff. Four patients had stable disease, including two patients who experienced prolonged disease stabilization lasting more than six months. Only one patient experienced progressive disease as best response. An additional patient with HRAS mutant HNSCC dosed off-protocol was reported as an unconfirmed partial response with a 40% tumor size reduction at first assessment.

Patients in our proof-of-concept clinical trial of tipifarnib in HRAS mutant HNSCC had a median of two prior lines of therapy (range 1-5), with confirmed responses observed in patients who had progressed on cetuximab regimens, immunotherapy or both. Patients received oral doses ranging from 600 mg to 900 mg twice daily on days 1-7 and 14-21 of 28-day cycles. Dose-limiting, treatment-emergent adverse events included hematological events and gastrointestinal disturbances, which were managed by dose interruption and/or dose reduction.

In addition, six patients were enrolled in our cohort of other HRAS mutant SCCs as of the September 7, 2018 clinical data cutoff date. One of the two evaluable patients in this cohort achieved a confirmed partial response and the other achieved prolonged disease stabilization lasting more than eight months. Four patients were not evaluable as of the data cutoff date, including two patients who were pending initial efficacy assessments.

An analysis of available tumor biopsy samples from patients with HRAS mutant HNSCC or other SCCs enrolled in our proof-of-concept clinical trial showed a significant association between tumor HRAS mutant allele frequency, or the measurement of mutated HRAS encoding DNA in a patient's tumor compared to wild type HRAS DNA, and clinical benefit in patients treated with tipifarnib. Of the 14 HNSCC or other SCC patients with a tumor HRAS mutant allele frequency greater than 20%, seven achieved PRs, one achieved an unconfirmed PR and two experienced disease stabilization greater than six months. No meaningful clinical benefit was observed in the seven patients with an allele frequency less than 20%. Data from The Cancer Genome Atlas indicate that approximately 5% of HNSCC patients have an HRAS mutant allele frequency greater than 20%.

Following the data update in October 2018, we modified our ongoing proof-of-concept clinical trial of tipifarnib in patients with other HRAS mutant SCCs to introduce a minimum tumor HRAS mutant allele frequency as an entry criterion and use 600 mg orally twice daily as the starting dose. We anticipate having additional data from this trial in the second half of 2019.

Registration-Directed Trial in HRAS Mutant HNSCC. Based on the positive results observed in our proof-of-concept clinical trial, and following feedback from the FDA and other regulatory authorities, we initiated a global, multi-center, open-label, registration-directed clinical trial in recurrent or metastatic patients with HRAS mutant HNSCC in November 2018. The trial has two cohorts: A non-interventional screening and outcomes cohort, which we call SEQ-HN, and a treatment cohort, which we call AIM-HN.

SEQ-HN is designed as a case-control study to determine the treatment outcomes of patients with recurrent or metastatic HNSCC with HRAS mutations. The primary objective of SEQ-HN is to determine the objective response rate of first-line therapy in patients with HNSCC that carry HRAS mutations compared to those without a known HRAS mutation. In addition, this screening and outcomes cohort is expected to enable the identification of patients with HRAS mutations for potential enrollment into AIM-HN.

AIM-HN is designed to enroll at least 59 patients with HRAS mutant HNSCC who have received prior platinum-based therapy, and the trial is expected to take approximately two years to fully enroll. Based on observations from our proof-of-concept clinical trial, patients in AIM-HN must have a tumor HRAS mutant allele frequency greater than or equal to 35%, or greater than or equal to 20% if the patient's serum albumin level is greater than or equal to 3.5 g/dL. Patients enrolled in the trial will receive a starting dose of 600 mg of oral tipifarnib, twice daily, on days 1-7 and 15-21 of 28-day treatment cycles. The trial's primary endpoint is objective response rate, as determined using RECIST 1.1 criteria and confirmed by independent radiological review. AIM-HN has approximately 80% power to detect a difference between a null hypothesis of 15%, which is the point estimate of the objective response rate of second-line therapy for recurrent and metastatic disease, and 30%, an objective response rate considered of interest. Based on feedback from the FDA, we believe that AIM-HN, if positive, may be adequate to support a new drug application, or NDA, seeking accelerated approval.

Investigator-Sponsored Trials in HRAS Mutant Solid Tumors. In addition to our company-sponsored clinical trials in HRAS mutant solid tumors, an investigator-sponsored clinical trial of tipifarnib for the treatment HRAS mutant lung squamous cell carcinoma is ongoing. This proof-of-concept clinical trial is being conducted by Grupo Español de Cáncer de Pulmón, or GECP, a Spanish lung cancer consortium, and is designed to enroll at least 18 patients. The primary endpoint of this clinical trial will be objective response rate, and secondary endpoints include progression-free survival, duration of response and safety.

An investigator-sponsored clinical trial of tipifarnib is also being conducted for the treatment of advanced, previously treated urothelial carcinomas that carry HRAS mutations. This proof-of-concept clinical trial is sponsored by the Samsung Medical Center in Korea and is designed to enroll at least 18 patients. The primary endpoint of this clinical trial is objective response rate, and secondary endpoints include progression-free survival, duration of response and safety.

Companion Diagnostics for Tipifarnib in HRAS Mutant Solid Tumors. Patients are currently being enrolled in the ongoing Phase 2 proof-of-concept HRAS mutant tumor clinical trial and our AIM-HN clinical trial based either upon information on the patients' tumor HRAS mutation status obtained by the clinical sites from NGS panels used by the site, or upon information obtained from third-party laboratories who conduct genetic screening on patient samples for the clinical sites. Working with our collaborators, we have obtained an investigational device exemption, or IDE, for use of a qualitative polymerase chain reaction, or qPCR, -based assay as a companion diagnostic test for our AIM-HN clinical trial. We expect that regulatory approval of tipifarnib as a treatment for patients with HRAS mutant tumors will require FDA approval of an HRAS assay in the form of a companion diagnostic test that has been validated for accuracy, precision and reproducibility.

Registration Strategy for Tipifarnib in HRAS Mutant Solid Tumors. Our immediate strategy for tipifarnib in HRAS mutant solid tumors is to generate a data package to support an application for marketing approval in HRAS mutant HNSCC. We will also seek to broaden tipifarnib's potential use in other HRAS mutant solid tumors, including HRAS mutant SCCs other than HNSCC, as we believe this may represent a near-term opportunity to expand the use of tipifarnib into a broader set of HRAS mutant cancers. Longer term, our development strategy for tipifarnib is to advance toward earlier lines of therapy and, ultimately, to treat patients with HRAS mutant SCCs in the continuum of systemic treatment settings.

Clinical Development of Tipifarnib Using CXCL12 Pathway Biomarkers

We are evaluating the potential utility of tipifarnib using CXCL12 pathway biomarkers in both hematologic and solid tumor indications. Our interest in these indications stems, in part, from prior clinical data obtained by Janssen and independent investigators, which demonstrated that tipifarnib can drive meaningful clinical benefit, including examples of objective responses, and in some cases complete responses. However, although tipifarnib demonstrated evidence of clinical activity in both hematologic and solid tumor settings such as PTCL, AML and pancreatic cancer, no molecular mechanism of action was identified at that time that could explain its activity in those patient populations and that could allow for a strategy to identify those patients most likely to benefit from treatment with tipifarnib.

In June 2017, we presented preliminary results from our ongoing Phase 2 clinical trial of tipifarnib in PTCL, identifying the CXCL12 pathway as a potential therapeutic target of tipifarnib. CXCL12 is a chemokine that is expressed primarily by immune cells, endothelial cells and stromal fibroblasts that constitute the tumor microenvironment. CXCL12 and its receptors, CXCR4 and CXCR7, are key factors linking cancer cells with the tumor microenvironment. Among its multiple functions, CXCL12 has been shown to be essential for homing of myeloid cells to the bone marrow and lymphoid cells to lymph nodes and other organs. Based on our initial observations of the role of CXCL12 as a potential biomarker of clinical activity in PTCL, we began to investigate the role of the CXCL12 pathway in other indications.

In December 2017, at the American Society of Hematology Annual Meeting and Exposition, or ASH, we also presented new findings that identified activation of the CXCL12 pathway and bone marrow homing of myeloid cells as potential biomarkers of tipifarnib activity. The results were obtained by analyzing data from previous clinical trials of tipifarnib in AML and myelodysplastic syndromes, or MDS, as well as data from our ongoing Phase 2 clinical trial of tipifarnib in CMML. We believe that these data all implicate the CXCL12 pathway in the activity of tipifarnib. Moreover, when we retrospectively stratify the patients on the basis of activation markers of the CXCL12 pathway, we observe clinical benefit that is consistent across different endpoints, treatment settings and indications. We are now working to further validate CXCL12 as a therapeutic target of tipifarnib in a number of indications.

*Peripheral T-Cell Lymphoma/*A*ngioimmunoblastic T-Cell Lymphoma.* Lymphoma is the most common blood cancer. The two main forms of lymphoma are Hodgkin's lymphoma, or HL, and Non-Hodgkin's lymphoma, or NHL. PTCL consists of a group of rare and usually aggressive, fast-growing NHLs that develop from mature T-cells. PTCLs are sub-classified into various subtypes, each of which are typically considered to be separate diseases based on their distinct clinical differences. Most of these subtypes are rare; two of the most common are AITL and PTCL not otherwise specified, or PTCL-NOS.

Despite several approvals over the past decade, the treatment of relapsed and/or refractory PTCL remains a significant unmet medical need. Three of the more recent launches, pralatrexate (Folotyn®), romidepsin (Istodax®) and belinostat (Beleodaq®), were approved based on single-arm clinical trials of fewer than 130 patients, each with response rates in the range of 25-27% and only two to three months of median progression-free survival in unselected populations.

We initiated a Phase 2 clinical trial in September 2015 to evaluate the hypothesis that tipifarnib can be used as a treatment for relapsed or refractory PTCL. The Phase 2 clinical trial was initially designed to investigate the anti-tumor activity of tipifarnib in 18 patients with advanced PTCL. The primary endpoint is objective response rate, and tumor response assessments are conducted according to the International Workshop Criteria for the assessment of responses in lymphoma.

In December 2017, we reported updated, preliminary data from our Phase 2 clinical trial of tipifarnib in an unselected population of patients with PTCL at ASH. The results of the study, which was conducted in patients having a median of four prior lines of therapy, showed that patients having elevated levels of CXCL12 gene expression and/or the absence of a single nucleotide variation in the 3'-untranslated region, or 3'-UTR, of the CXCL12 gene, or CXCL12+, had a higher rate of clinical benefit in terms of objective response rate and progression-free survival in this advanced patient population. Of the three partial responses in the study, two occurred in the three patients on study with AITL. These findings are consistent with published data that show patients with AITL express high levels of CXCL12. Based upon these observations, we started enrolling two expansion cohorts in PTCL patients, the first in patients with AITL histology, and the second in patients with CXCL12 high PTCL, other than AITL.

In December 2018, we reported preliminary data from the two expansion cohorts in our Phase 2 clinical trial of tipifarnib in patients with relapsed or refractory PTCL at ASH. The data showed a significant association between CXCL12 expression and clinical benefit, as well as proof-of-concept in AITL. As of the November 21, 2018 data cutoff date, a total of 39 patients were enrolled in the ongoing Phase 2 clinical trial, including 19 patients with AITL (16 patients in the AITL extension cohort and 3 patients in the previous portion of the study). Six of the 16 AITL patients were not evaluable as of the data cutoff date, including two who were pending initial efficacy assessments. Of the 13 evaluable AITL patients, two

achieved a complete response and four achieved a partial response, for an objective response rate of 46% (six of 13). According to the study protocol, the AITL cohort is considered positive when four or more responses are observed.

The study also identified a particularly responsive subset within AITL and non-AITL patients. Specifically, patients with a high ratio of expression of CXCL12 to its receptor CXCR4 experienced an objective response rate of 50% (five of 10) and a clinical benefit rate of 90% (nine of 10 with either complete response, partial response or stable disease) with tipifarnib. Patients in this Phase 2 clinical trial had a median of three prior lines of therapy (range 1-7). High expression of CXCL12 was observed in approximately 40% of the PTCL patients. The high CXCL12/CXCR4 expression ratio had 90% sensitivity and 93% specificity to identify PTCL patients likely to benefit from tipifarnib. We anticipate additional data from this Phase 2 clinical trial of tipifarnib in mid-2019 including duration of response data from the AITL cohort and additional data from the CXCL12 high PTCL cohort.

In addition to the Phase 2 clinical data, the results from two ancillary, non-clinical studies were also reported at ASH. In the first, the expression of CXCL12 and CXCR4 was investigated using tumor bank samples of PTCL patients treated with standard-of-care agents. Worse prognosis was observed in PTCL patients with high CXCL12/CXCR4 expression ratio, suggesting that CXCL12 is a negative prognostic factor for standard PTCL therapy. In the second study, the effect of the incubation of stroma cells with tipifarnib on CXCL12 secretion was investigated in a mouse model of bone marrow culture. Tipifarnib reduced secretion of the CXCL12 chemokine from the stromal cells, providing a potential mechanism of action for the observed clinical activity.

Other Hematologic Malignancies. We are also evaluating tipifarnib in other hematological malignancies, including CMML and AML. CMML is a disorder of bone marrow stem cells in which an increase in white blood cells, or monocytosis, is a defining feature. The clinical presentation of CMML varies from predominantly myelodysplastic, an ineffective production of blood cells, to predominantly myeloproliferative, an overproduction of blood cells. AML is a type of cancer in which the bone marrow makes abnormal myeloblasts, a type of white blood cell, red blood cells or platelets. In prior clinical studies conducted by Janssen and independent investigators, tipifarnib has demonstrated clinical responses in adults with refractory and relapsed AML, in older adults with newly diagnosed poor-risk AML and in patients with poor-risk MDS. However, the activity of tipifarnib in those studies was not sufficient to support registration of tipifarnib.

In December 2017, we reported preliminary results from our Phase 2 clinical trial of tipifarnib in CMML at ASH. The primary objective of the study was met with three objective responses in nine evaluable patients with KRAS or NRAS wild-type CMML, for an overall response rate of 33%. Although the signal observed in RAS wild-type patients is encouraging, our discovery of potential CXCL12 pathway biomarkers has shifted our focus in CMML to the evaluation of other potential biomarkers of activity for tipifarnib in CMML, including activation of the CXCL12 pathway.

Our analyses of data from our ongoing clinical trial in CMML, as well as data from prior clinical trials sponsored by Janssen and others in AML and MDS, has identified activation of the CXCL12 pathway, as measured by the ratio of CXCR4/CXCR2 gene expression and bone marrow homing of myeloid cells, as a potential biomarker of tipifarnib activity in patients with AML in addition to CMML. As such, we amended our Phase 2 clinical trial in patients with CMML to include prospectively cohorts of relapsed and/or refractory MDS/myeloproliferative neoplasia, or MPN, including CMML and AML patients with elevated levels of CXCL12 pathway biomarkers. Our initial focus in this trial is on the CMML cohort. Additionally, our analysis of gene expression from bone marrow samples in 27 previously untreated poor-risk and elderly AML patients who were treated with tipifarnib in a prior Cancer Therapy Evaluation Program, or CTEP 20, Phase 2 clinical trial indicated a potential association between high CXCL12 expression and clinical activity in these patients. Our goals are to validate the utility of CXCL12 pathway biomarkers as a strategy for patient enrichment in relapsed/refractory myeloid tumor indications starting in CMML and other MDS/MPN overlap syndromes, and then to extend the potential use of tipifarnib to other myeloid indications and settings.

We have also been evaluating CXCL12 pathway markers in our ongoing Phase 2 clinical trial of tipifarnib in MDS to determine whether they could be of utility for patient selection. Given our current focus in HRAS mutant solid tumors and other CXCL12 pathway indications, our Phase 2 clinical trial of tipifarnib in MDS has been deprioritized and is not currently enrolling new patients. Additional opportunities for future development of tipifarnib in other potential CXCL12-expressing indications may include diffuse large B-cell lymphoma, Hodgkin's lymphoma and mycosis fungoides, a form of cutaneous T-cell lymphoma. Responses were observed in each of these indications in a National Cancer Institute-sponsored Phase 2 clinical trial of tipifarnib in unselected patients with other relapsed or refractory hematologic malignancies.

Solid Tumors. Elevated CXCL12 expression is known to be a poor prognosis factor in patients with certain solid tumors, including pancreatic, lung and esophageal-gastric cancers. In the specific context of pancreatic cancer, high CXCL12

expressing tumors may evade early diagnosis by decreasing abdominal pain through the attraction of pain-suppressing Schwann cells. To investigate the potential for association between CXCL12 expression and clinical benefit in pancreatic cancer patients, we conducted a retrospective analysis of study INT-11, a randomized, placebo-controlled Phase 3 clinical trial of gemcitabine plus tipifarnib compared with gemcitabine plus placebo in patients with advanced pancreatic cancer conducted by Janssen. In January 2019, we presented new findings at the 2019 Gastrointestinal Cancers Symposium identifying a potential association between CXCL12 expression and clinical benefit in patients with pancreatic cancer treated with tipifarnib.

A total of 688 pancreatic cancer patients were enrolled in study INT-11, of whom 155 reported no abdominal pain at study entry. Although no differences in survival were observed in the overall study, the absence of patient-reported abdominal pain at study entry was associated with higher median survival in the tipifarnib plus gemcitabine arm (10.2 months vs. 5.9 months, hazard ratio, or HR=0.52, $p<0.0001$), whereas no significant effect was observed in the placebo plus gemcitabine arm (6.0 months vs. 6.1 months), suggesting that the absence of abdominal pain may serve as a surrogate of CXCL12 expression and related clinical benefit from tipifarnib in pancreatic cancer.

In addition, patients with nodal disease or distant metastases limited to the liver also appeared more likely to receive clinical benefit from tipifarnib. Significant clinical benefit was observed in 67 patients with nodal metastases (12.8 months vs. 8.2 months, HR=0.46, $p=0.01$) and in 233 patients with liver only metastases (6.8 months vs. 5.0 months, HR=0.7, $p=0.02$), respectively. Nodal and liver metastases of pancreatic cancer were, in separate analyses, found to express high levels of CXCL12.

Analyzing data from The Cancer Genome Atlas, or TCGA, we also found an association between high CXCL12 expression and pancreatic tumors with low KRAS mutant allele frequency ($\leq$ 5%, representing approximately 30% of pancreatic cancer patients). This observation may lead to the use of KRAS mutant allele frequency as a tool which may help identify patients with tumors overexpressing CXCL12 and more likely to respond to tipifarnib therapy. We believe these findings support the development of tipifarnib in pancreatic cancer and we are exploring opportunities for conducting a proof-of-concept study in this indication.

Companion Diagnostics for Tipifarnib Using CXCL12 Biomarkers. If the results of any of our ongoing Phase 2 clinical trials in CXCL12-driven indications are positive, and any of our potential CXCL12 pathway biomarkers, such as the absence of a single nucleotide variation in the 3'-UTR of the CXCL12 gene in PTCL patients or the ratio of expression of the CXCR4/CXCR2 genes in CMML study, are shown to be predictive of response to tipifarnib, we would expect to partner development and validation of a companion diagnostic test to aid in the selection of patients in subsequent clinical trials of tipifarnib in the respective patient populations. Genetic assays detecting the absence of a single nucleotide variation in the 3'-UTR of the CXCL12 gene are already available.

Registration Strategy for Tipifarnib Using CXCL12 Biomarkers. The objective of our ongoing Phase 2 clinical trials of tipifarnib in CXCL12-driven indications is to confirm the clinical activity of tipifarnib, validate biomarker hypotheses and optimize dose and schedule for each disease to inform whether to proceed to registration-enabling studies. For each disease indication, we plan to evaluate a number of criteria in determining whether to advance tipifarnib. These criteria include: biomarker validation, evidence of durable, clinical benefit, potential for rapid clinical development, potential to move into earlier lines of therapy, the potential for patent and regulatory exclusivity and the commercial potential.

KO-947 – A Potent Inhibitor of ERK1/2

We are advancing KO-947, a small molecule inhibitor of ERK, as a potential treatment for patients with tumors that have dysregulated activity due to mutations or other mechanisms in the MAPK pathway, including lung cancers, colorectal cancers and pancreatic cancers. We dosed the first patient in our Phase 1 clinical trial of KO-947 in April 2017. We acquired KO-947 from Araxes Pharma LLC, or Araxes, a private biopharmaceutical company.

KO-947, demonstrates potent inhibition of the ERK kinase and high selectivity relative to a panel of approximately 400 kinases. KO-947 also demonstrates prolonged inhibition of the MAPK pathway *in vivo*. Following a single dose *in vivo*, KO-947 demonstrated a near complete inhibition of MAPK pathway signaling for more than 72 hours. The prolonged inhibition of the pathway supports the potential for intermittent dosing schedules.

KO-947 has been evaluated in a panel of more than 200 different PDX models comprising 20 different clinical indications, utilizing intermittent dosing, to identify and prioritize potential lead clinical indications. Preclinical data presented at the American Association for Cancer Research Annual Meeting, or AACR, in April 2017 showed that KO-947

demonstrated robust and durable activity, including tumor regressions, in lung, colorectal and pancreatic tumors harboring KRAS and BRAF mutations and in squamous cell carcinomas of the head and neck and esophagus and lacking mutations in the MAPK pathway. In each of these subsets of tumors characterized by mutation or dysregulation of the MAPK pathway, KO-947 demonstrated response rates of greater than 50%. Through our preclinical studies, we have identified potential development opportunities including KRAS and BRAF mutant cancers and squamous cell carcinomas. In addition, we have identified potential biomarkers to enable patient selection strategies for clinical development.

In April 2018, we presented preclinical data at AACR, including the identification of 11q13 amplification as a potential biomarker of activity for KO-947 in squamous cell carcinomas. Amplification of chromosomal region 11q13 is a common genetic alteration in squamous cell carcinomas, comprising approximately 20% of HNSCC and approximately 50% of esophageal squamous cell carcinoma.

We initiated our Phase 1 clinical trial of KO-947 in April 2017. The trial is designed to determine the maximum tolerated dose, or MTD, of KO-947 in patients with locally advanced unresectable or metastatic, relapsed and/or refractory, non-hematological malignancies. If an MTD cannot be identified, a recommended Phase 2 dose will be determined. In addition, extension cohorts may be conducted to further characterize the safety and tolerability of KO-947 and seek to provide preliminary evidence of anti-tumor activity. Currently, two tumor-specific cohorts, NSCLC adenocarcinomas with mutations in KRAS or BRAF and squamous cell carcinomas, have been identified as potential extension cohorts. We are evaluating a number of doses and schedules and anticipate having data from the dose-escalation portion of our Phase 1 clinical trial in 2019.

KO-539 – A Selective Inhibitor of the Menin-MLL Interaction

We are developing orally bioavailable small molecule inhibitors of the menin-MLL interaction for the treatment of genetically defined subsets of acute leukemias, including AML and acute lymphoblastic leukemia, or ALL. The menin-MLL program was licensed from the Regents of The University of Michigan, or the University of Michigan. Our IND application for KO-539 has been cleared by the FDA and we anticipate initiating our Phase 1 clinical trial in relapsed or refractory AML in the second quarter of 2019.

MLL-rearranged, or MLL-r, leukemias, are characterized by chromosomal translocations of the MLL gene that are primarily found in patients with AML and ALL and affect both children and adults. These translocations form oncogenes encoding MLL fusion proteins, which play a causative role in the onset, development and progression of MLL-r leukemias. MLL fusion proteins drive the up-regulation of expression of small set of target genes involved in the malignant transformation of blood cells, however, the fusion protein is critically dependent on binding the oncogenic co-factor menin to function. This implies that the menin-MLL interaction represents a valuable target for molecular therapy and supports the development of inhibitors of the menin-MLL protein-protein interaction.

The target genes of the MLL fusion proteins are also found to be overexpressed in a broader subset of AMLs characterized by mutations in NPM1, DNMT3A, IDH1, IDH2 and a different mutation in the MLL gene, known as a MLL-partial tandem duplication, or MLL-PTD. These mutations also appear to be dependent on the interaction between menin and MLL, suggesting that the menin-MLL complex is a central node in epigenetic dysregulation driven by distinct oncogenic driver mutations known to be important in AML and other hematologic malignancies.

In preclinical studies, KO-539 has demonstrated potent and selective inhibition of the proliferation of MLL-r leukemia cell lines. In November 2017, we reported preclinical data at the AACR-NCI-EORTC International Conference on Molecular Targets and Cancer Therapeutics showing robust and durable efficacy in multiple *in vivo* models of AML characterized by MLL-rearrangements or mutations in NPM1, DNMT3A, IDH1 and IDH2. We have further demonstrated that the inhibition of the menin-MLL interaction results in the down-regulation of MLL fusion target genes and an up-regulation of markers of differentiation.

License and Asset Purchase Agreements

Janssen Pharmaceutica NV

In December 2014, we entered into a license agreement with Janssen, which was amended in June 2016, which grants us exclusive global rights to develop and commercialize tipifarnib in all indications other than virology and includes the right to grant sublicenses. We are obligated under the license agreement to use commercially reasonable efforts to develop and commercialize tipifarnib and, with the exception of the transfer to us without cost of Janssen's existing inventory of tipifarnib material, we are responsible for all future development and commercialization costs for tipifarnib. Under the license agreement, Janssen had a first right to negotiate for an exclusive license back from us to develop and commercialize tipifarnib on terms to be negotiated in good faith, which Janssen could exercise during the 60-day period following completion of a Phase 2 clinical trial of tipifarnib in HRAS mutant patients in oncology and delivery by us to Janssen of a complete data package from such clinical trial. In June 2018, Janssen declined to exercise this first right to negotiate.

Under the terms of the license agreement, in January 2015 we issued a convertible promissory note in the principal amount of $1.0 million to Johnson & Johnson Innovation—JJDC, Inc., which automatically converted into shares of common stock in our March 2015 private placement. When and if commercial sales of tipifarnib begin, we are obligated to pay Janssen tiered royalties of low double digit percentages of our net sales, depending on the amount of our net sales, with standard provisions for royalty offsets in the event of generic competition or compulsory licenses, on a product-by-product and country-by-country basis until the later of the expiration of the last to expire valid claim of the licensed patents covering the licensed product in the field in such country the expiration of any regulatory exclusivity with respect to such product in such country, and ten years from our first commercial sale. We are also required to make regulatory milestone payments to Janssen of up to $25.0 million in the aggregate, if specified regulatory approvals are achieved for the first indication and additional payments for each subsequent indication if specified regulatory approvals are achieved. In addition, we are required to make sales milestone payments of up to $50.0 million in the aggregate if specified sales thresholds are surpassed. If we grant sublicenses under the license from Janssen, we are required to pay to Janssen a percentage of any upfront, lump-sum or milestone payments received from our sublicensee, subject to certain exclusions for regulatory milestone payments due under the license agreement.

The license agreement with Janssen will remain in effect until the expiration of all of our royalty and sublicense revenue obligations to Janssen, determined on a product-by-product and country-by-country basis, unless we elect to terminate the license agreement earlier. If we fail to meet our obligations under the license agreement and are unable to cure such failure within specified time periods, Janssen can terminate the license agreement, resulting in a loss of our licensed rights to tipifarnib.

Araxes Pharma LLC

In December 2014, we entered into an asset purchase agreement with Araxes, which was amended and restated in February 2015, under which we purchased all of Araxes' patent rights in its ERK inhibitor program, including KO-947 and additional backup compounds, and related intellectual property. When and if commercial sales of a product candidate covered by the purchased patent rights begin, we are obligated to pay Araxes tiered royalties of low single digit percentages of our net sales, depending on the amount of our net sales with standard provisions for royalty offsets. We are also required to make development and regulatory milestone payments to Araxes of up to $9.7 million in the aggregate if specified development events and regulatory approvals are achieved. Under the terms of the asset purchase agreement, in December 2014 we issued a convertible promissory note in the principal amount of $0.5 million to Araxes, which automatically converted into shares of common stock in our March 2015 private placement.

The University of Michigan

In December 2014, we entered into a license agreement with the University of Michigan, which was amended in March 2015, July 2015, September 2016, February 2017, May 2017 and August 2017, which grants us exclusive worldwide rights under certain patent rights to compounds in our menin-MLL program. Under this license agreement, we paid the University of Michigan an upfront nonrefundable license fee and are obligated to pay the University of Michigan annual license maintenance fees. We are also required to make development and regulatory milestone payments to the University of Michigan of up to $3.4 million in the aggregate if specified development and regulatory events are achieved for the first indication and additional payments for each subsequent indication. If we grant sublicenses under the license from the University of Michigan, we are required to pay the University of Michigan a percentage of certain amounts received from the sublicenses. When and if commercial sales of products covered by the licensed patent rights begin, we are obligated to pay the University of Michigan tiered royalties of low single digit percentages of our net sales depending on the amount of our

net sales with standard provision for royalty offsets and sales-based milestones. All future development, regulatory and commercial work on the licensed compounds will be completed fully by us and at our sole expense. The University of Michigan retains the right to use the licensed compounds for non-commercial research, internal and/or educational purposes, with the right to grant the same limited rights to other non-profit research institutions. Under the agreement, as a result of our March 2015 private placement, we issued to the University of Michigan 79,113 shares of our common stock at a fair value of $0.5 million. The license agreement with the University of Michigan will terminate upon the last-to-expire patent rights, or may be terminated by us at any time with 90 days written notice of termination or terminated by the University of Michigan upon a bankruptcy by us, payment failure by us that is not cured within 30 days or a material breach of the agreement by us that is not cured within 60 days.

Competition

The development and commercialization of new products to treat cancer is intensely competitive and subject to rapid and significant technological change. Although we believe that our knowledge, experience and scientific resources provide us with competitive advantages, we face substantial competition from major pharmaceutical companies, specialty pharmaceutical companies, and biotechnology companies worldwide. Many of our competitors have significantly greater financial, technical and human resources. Smaller and early-stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large and established companies. As a result, our competitors may discover, develop, license or commercialize products before or more successfully than we do.

We face competition with respect to our current product candidates, and we will face competition with respect to future product candidates, from segments of the pharmaceutical, biotechnology and other related markets that pursue approaches to targeting molecular alterations and signaling pathways associated with cancer. Our competitors may obtain regulatory approval of their products more rapidly than we do or may obtain patent protection or other intellectual property rights that limit our ability to develop or commercialize our product candidates. Our competitors may also develop drugs that are more effective, more convenient, less costly or possessing better safety profiles than our products, and these competitors may be more successful than us in manufacturing and marketing their products.

In addition, we will need to develop our product candidates in collaboration with diagnostic companies and will face competition from other companies in establishing these collaborations. Our competitors will also compete with us in recruiting and retaining qualified scientific, management and commercial personnel, establishing clinical trial sites and patient registration for clinical trials, as well as in acquiring technologies complementary to, or necessary for, our programs.

Furthermore, we also face competition more broadly across the market for cost-effective and reimbursable cancer treatments. The most common methods of treating patients with cancer are surgery, radiation and drug therapy, including chemotherapy, hormone therapy and targeted drug therapy or a combination of such methods. There are a variety of available drug therapies marketed for cancer. In many cases, these drugs are administered in combination to enhance efficacy. While our product candidates, if any are approved, may compete with these existing drug and other therapies, to the extent they are ultimately used in combination with or as an adjunct to these therapies, our product candidates may not be competitive with them. Some of these drugs are branded and subject to patent protection, and others are available on a generic basis. Insurers and other third-party payors may also encourage the use of generic products or specific branded products. We expect that if our product candidates are approved, they will be priced at a premium over competitive generic, including branded generic, products. As a result, obtaining market acceptance of, and gaining significant share of the market for, any of our product candidates that we successfully introduce to the market will pose challenges. In addition, many companies are developing new therapeutics, and we cannot predict what the standard of care will be as our product candidates progress through clinical development.

Tipifarnib Competition

Although there are currently no approved drugs targeting farnesyl transferase, we are aware of several compounds that are now or have previously been in clinical development, including Merck's lonafarnib, Bristol-Myers Squibb's BMS-214662, Astellas Pharma's, formerly OSI Pharmaceuticals, CP-609,754, and AstraZeneca's AZD3409. To our knowledge, there are no ongoing clinical trials evaluating any of these agents for the treatment of cancer. However, the initiation of clinical development of another of these agents in an oncology setting could become competitively significant, and if tipifarnib or our other product candidates do not offer sustainable advantages over competing products, we may not be able to successfully compete against current and future competitors.

Even if we are successful in developing our product candidates, the resulting products would compete with a variety of established drugs in each targeted therapeutic indication. Although there are currently no drugs approved specifically for the treatment of HRAS-mutant solid tumors, there are several targeted therapies approved for the treatment of HNSCC, including Eli Lilly's/Merck KGaA's cetuximab (Erbitux®), Bristol Myers Squibb's nivolumab (Opdivo®) and Merck's pembrolizumab (Keytruda®), and Sq-NSCLC, including Keytruda, Opdivo, Roche's atezolizumab (Tencentriq®)and Eli Lilly's ramucirumab (Cyramza®). While there are no approved drugs targeting CXCL12, we are aware of Noxxon's olaptesed pegol, currently in clinical development. Competitive drugs currently approved for PTCL include belinostat (Beleodaq®) and pralatrexate (Folotyn®), marketed by Spectrum Pharmaceuticals, romidepsin (Istodax®), marketed by Celgene, and brentuximab vedotin (Adcetris®) for anaplastic large cell lymphoma, marketed by Seattle Genetics. There are no targeted therapies approved for the treatment of CMML.

ERK Inhibitor Competition

While there are currently no approved drugs targeting ERK, we are aware of several compounds that are in clinical development, including BioMed Valley Discoveries' ulixertinib (BVD-523), Eli Lilly's LY-3214996, Merck's MK-8353, Novartis' LTT-462, Asana's ASN-007 and Astex's ASTX-029. Furthermore, it is possible that other companies are also engaged in discovery or preclinical development of compounds targeting ERK. These competitors, if successful in clinical development, may achieve clinical activity, regulatory approval and market adoption in advance of our compounds, constraining the ability of our compounds to gain significant market share. Although we believe that KO-947 presents several potential advantages relative to these aforementioned candidates, including potency, prolonged pathway inhibition and the ability to be administered as an intravenous infusion, these results may not translate to superior therapeutic benefit in clinical trials.

Menin-MLL Inhibitor Competition

Although there are currently no approved drugs targeting the menin-MLL interaction, we are aware of other companies engaged in discovery or preclinical development of menin-MLL inhibitors including Syndax and Aurigene/Orion. However, to our knowledge, there are no drugs approved or in clinical trials targeting the menin-MLL protein-protein interaction. Although there are no targeted therapies approved specifically for the treatment of MLL-r leukemias, there are several products in clinical development, including Epizyme's EPZ-5676 and Novartis's midostaurin. In addition, Pfizer's palbociclib (IBRANCE®) is also in development and has received accelerated approval in combination with letrozole for the treatment of certain genetically identified postmenopausal women.

Commercialization

We have not yet established a sales, marketing or product distribution infrastructure because our lead candidates are still in preclinical or clinical development. We anticipate that we will aim to retain commercial rights in North America for any of our product candidates for which we may in the future receive marketing approvals. We may also seek to retain commercial rights in Europe for any of our product candidates for which we may in the future receive marketing approvals. We currently anticipate that, if and when appropriate, we will seek to access the North American or European oncology markets through a focused, specialized, internal sales force.

Subject to receiving marketing approvals, we expect to commence commercialization activities by building a focused internal sales and marketing team in North America to sell our products. We may also build a focused internal sales and marketing team in Europe to sell our products. We believe that such an approach will enable us to address the community of oncologists who are the key specialists in treating the patient populations for which our current product candidates are being developed. Outside of regions where we maintain commercial rights, we may enter into distribution and other marketing arrangements with third parties for any of our product candidates that obtain marketing approval in foreign jurisdictions.

We also aim to build a marketing and sales management force to create and implement marketing strategies for any products that we may in the future market through our own sales teams and to oversee and support our sales force. We anticipate that our goals for any such marketing force include developing educational initiatives with respect to any approved products and establishing relationships with thought leaders in relevant fields of medicine.

We currently expect that any third parties with which we may collaborate in the future on the development of any commercial companion diagnostics for use with our therapeutic products will most likely hold the commercial rights to those diagnostic products. We expect that we would coordinate closely with any future diagnostic collaborators in connection with the marketing and sale of such diagnostic products and our related therapeutic products.

Manufacturing

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 product candidates for preclinical and clinical testing as well as for commercial manufacture of any products that we may commercialize. All of our product candidates are small molecules and are manufactured in synthetic processes from available starting materials. The chemistry does not currently require unusual equipment in the manufacturing process. We expect to continue to develop product candidates that can be produced cost-effectively at contract manufacturing facilities.

For all our product candidates, we aim to identify and qualify manufacturers to provide the active pharmaceutical ingredient, or API, and drug product services prior to submission of an NDA to the FDA.

We generally expect to rely on third parties for the manufacture of any companion diagnostics we or our collaborators may develop.

Intellectual Property

Our commercial success depends in part on our ability to obtain and maintain proprietary or intellectual property protection for our product candidates and our core technologies, including novel biomarker and diagnostic discoveries 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. We expect that we will seek to protect our proprietary and intellectual property position by, among other methods, licensing or filing our own 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, which we generally seek to protect through contractual obligations with third parties.

We currently, and expect that we will continue to, file or license patent applications directed to our key product candidates in an effort to establish intellectual property positions regarding composition-of-matter of these product candidates, as well as biomarkers that may be useful in selecting the right patient population for use of any of our product candidates, formulations, processes and methods of using these product candidates in the treatment of various cancers. We own or in-license a patent portfolio including issued U.S. patents and their respective counterparts in a number of foreign jurisdictions, pending U.S. patent applications, pending applications under the Patent Cooperation Treaty and corresponding pending patent applications in a number of foreign jurisdictions. We have exclusively licensed from Janssen a portfolio of approximately 20 patent families. The in-licensed Janssen composition-of-matter and method-of-use patents expired in the United States and Europe in 2016. In July 2017 and July 2018, the U.S. Patent and Trademark Office, or U.S. PTO, issued us patents directed to the method of treatment of HRAS mutant HNSCC with tipifarnib and corresponding patents have been issued in a number of foreign jurisdictions. In May 2018 the U.S. PTO issued us a patent directed to the method of treatment of CXCL12-expressing PTCL or AML, with tipifarnib, and in November 2018 the U.S. PTO issued us a patent directed to the method of treatment of AITL with tipifarnib. We are pursuing additional U.S. and foreign method of treatment patents for tipifarnib. We have also exclusively licensed from Memorial Sloan Kettering Cancer Center a patent family pertaining to a method of use of tipifarnib. In addition, the U.S. PTO and the European Patent Office have issued us patents covering the composition of matter of KO-947 and certain structurally related compounds, and methods of using the compounds for the treatment of cancers, and we are pursuing additional U.S. and foreign patents for KO-947. We have exclusively licensed from the University of Michigan or co-own multiple families of patent applications pertaining to our menin-MLL program. The U.S. PTO has issued the University of Michigan and us patents covering the composition of matter of KO-539 and certain structurally related compounds, and methods of using the compounds for the treatment of cancers, and we are pursuing

additional U.S. and foreign patents for KO-539. We currently, and expect that we will continue to, file for patents in the United States with counterparts in major market countries in Europe and other key markets in the rest of the world.

In addition to the patent applications that we have filed to date, we plan to continue to expand our intellectual property portfolio by filing patent applications directed to dosage forms, methods of treatment and additional inhibitor compounds of oncology molecular targets and their derivatives. Specifically, we anticipate that we will seek patent protection in the United States and internationally for novel compositions of matter covering the compounds, the chemistries and processes for manufacturing these compounds, their intermediates and/or metabolites, the use of these compounds in a variety of therapies and the use of biomarkers for patient selection for these compounds. However, these or other patent applications that we may file or license from third parties may not result in the issuance of patents, and any issued patents may cover limited claims that reduce their value and/or may be challenged, invalidated or circumvented. See "Risk Factors—Risks Related to Our Intellectual Property."

In addition to patents, we also 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, using confidentiality agreements with our collaborators, scientific advisors, employees and consultants, and invention assignment agreements with our employees and selected consultants, scientific advisors and collaborators. The confidentiality agreements are designed to protect our proprietary information and, in the case of agreements or clauses requiring invention assignment, to grant us ownership of technologies that are developed through a relationship with a third-party.

Orange Book Listing

In seeking approval for a drug through an NDA, applicants are required to list with the FDA certain patents whose claims cover the applicant's product. Upon approval, each of the patents listed in the application for the drug is then published in the FDA's Approved Drug Products with Therapeutic Equivalence Evaluations, commonly known as the Orange Book. Any applicant who files an abbreviated new drug application, or ANDA, seeking approval of a generic equivalent version of a drug listed in the Orange Book or a Section 505(b)(2) NDA referencing a drug listed in the Orange Book must certify to the FDA that (1) no patent information on the drug product that is the subject of the application has been submitted to the FDA; (2) such patent has expired; (3) the date on which such patent expires; or (4) such patent is invalid or will not be infringed upon by the manufacture, use or sale of the drug product for which the application is submitted. This last certification is known as a paragraph IV certification. A notice of the paragraph IV certification must be provided to each owner of the patent that is the subject of the certification and to the holder of the approved NDA to which the ANDA or Section 505(b)(2) application refers. The applicant may also elect to submit a "section viii" statement certifying that its proposed label does not contain, or carves out, any language regarding the patented method-of-use rather than certify to a listed method-of-use patent.

If the NDA holder for the reference drug and/or patent owners assert a patent challenge directed to one of the Orange Book listed patents within 45 days of the receipt of the paragraph IV certification notice, the FDA is prohibited from approving the application until the earlier of 30 months from the receipt of the paragraph IV certification, expiration of the patent, settlement of the lawsuit or a decision in the infringement case that is favorable to the applicant. The ANDA or Section 505(b)(2) application also will not be approved until any applicable non-patent exclusivity listed in the Orange Book for the reference drug has expired as described in further detail below.

Non-Patent Exclusivity

In addition to patent exclusivity, the holder of an NDA for a listed drug may be entitled to a period of non-patent exclusivity, during which the FDA cannot approve an ANDA or Section 505(b)(2) application that relies on the listed drug. For example, a pharmaceutical manufacturer may obtain five years of non-patent exclusivity upon FDA approval of an NCE, which is a drug that contains an active moiety that has not been approved by the FDA in any other NDA. An "active moiety" is defined as the molecule or ion responsible for the drug substance's physiological or pharmacologic action. During the five-year exclusivity period, the FDA cannot accept for filing any ANDA seeking approval of a generic version of that drug or any Section 505(b)(2) NDA for the same active moiety and that relies on the FDA's findings regarding that drug, except that the FDA may accept an application for filing after four years if the follow-on applicant makes a paragraph IV certification. Five-year NCE exclusivity does not block the submission, review or approval of a 505(b)(1) NDA.

Patent Term Extension

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

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

Government Regulation

FDA Approval Process

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

Pharmaceutical product development for a new product or certain changes to an approved product in the United States typically involves preclinical laboratory and animal tests, the submission to the FDA of an IND which must become effective before clinical testing may commence, and adequate and well-controlled clinical trials to establish the safety and effectiveness of the drug for each indication for which FDA approval is sought.

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

A 30-day waiting period after the submission of each IND is required prior to the commencement of clinical testing in humans. If the FDA has not placed the IND on hold within this 30-day period, the clinical trial proposed in the IND may begin.

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

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

Clinical trials to support NDAs for marketing approval are typically conducted in three sequential phases, but the phases may overlap. In Phase 1, the initial introduction of the drug into healthy human patients, the drug is tested to assess metabolism, pharmacokinetics, pharmacological actions, side effects associated with increasing doses and, if possible, early

evidence of effectiveness. Phase 2 usually involves clinical trials in a limited patient population to determine the effectiveness of the drug for a specific indication, dosage tolerance and optimum dosage and to identify common adverse effects and safety risks. If a compound demonstrates evidence of effectiveness and an acceptable safety profile in Phase 2 evaluations, Phase 3 clinical trials are undertaken to obtain the additional information about clinical efficacy and safety in a larger number of patients, typically at geographically dispersed clinical trial sites, to permit the FDA to evaluate the overall benefit-risk relationship of the drug and to provide adequate information for the labeling of the drug. In most cases, the FDA requires two adequate and well-controlled Phase 3 clinical trials to demonstrate the efficacy of the drug. A single Phase 3 clinical trial with other confirmatory evidence may be sufficient in rare instances where the study is a large multicenter clinical trial demonstrating internal consistency and a statistically very persuasive finding of a clinically meaningful effect on mortality, irreversible morbidity or prevention of a disease with a potentially serious outcome and confirmation of the result in a second clinical trial would be practically or ethically impossible.

After completion of the required clinical testing, an NDA is prepared and submitted to the FDA. FDA approval of the NDA is required before marketing of the product may begin in the United States. The NDA must include the results of all preclinical, clinical and other testing and a compilation of data relating to the product's pharmacology, chemistry, manufacture and controls. The cost of preparing and submitting an NDA is substantial, and the application user fees are typically increased annually.

The FDA has 60 days from its receipt of an NDA to determine whether the application will be accepted for filing based on the agency's threshold determination that it is sufficiently complete to permit substantive review. Once the submission is accepted for filing, the FDA begins an in-depth review. The FDA has agreed to certain performance goals in the review of NDAs to encourage timeliness. Most applications for standard review drug products are reviewed within 12 months from submission; most applications for priority review drugs are reviewed within eight months from submission. Priority review can be applied to drugs that the FDA determines offer major advances in treatment or provide a treatment where no adequate therapy exists. The review process for both standard and priority review may be extended by the FDA for three additional months to consider certain late-submitted information, or information intended to clarify information already provided in the submission.

The FDA may also refer applications for novel drug products, or drug products that present difficult questions of safety or efficacy, to an outside advisory committee—typically a panel that includes clinicians and other experts—for review, evaluation and a recommendation as to whether the application should be approved. The FDA is not bound by the recommendation of an advisory committee, but it generally follows such recommendations.

Before approving an NDA, the FDA will typically inspect one or more clinical sites to assure compliance with GCP. Additionally, the FDA will inspect the facility or the facilities at which the drug is manufactured. The FDA will not approve the product unless compliance with current good manufacturing practice, or cGMP—a quality system regulating manufacturing—is satisfactory and the NDA contains data that provide substantial evidence that the drug is safe and effective in the indication studied.

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

An approval letter authorizes commercial marketing of the drug with specific prescribing information for specific indications. As a condition of NDA approval, the FDA may require a risk evaluation and mitigation strategy, or REMS, to help ensure that the benefits of the drug outweigh the potential risks. REMS can include medication guides, communication plans for healthcare professionals, and elements to assure safe use, or ETASU. ETASU can include, but is not limited to, special training or certification for prescribing or dispensing, dispensing only under certain circumstances, special monitoring and the use of patient registries. The requirement for a REMS can materially affect the potential market and profitability of the drug. Moreover, product approval may require substantial post-approval testing and surveillance to monitor the drug's safety or efficacy. Once granted, product approvals may be withdrawn if compliance with regulatory standards is not maintained or problems are identified following initial marketing.

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

original application, and the FDA uses the same procedures and actions in reviewing NDA supplements as it does in reviewing NDAs.

Fast Track Designation and Accelerated Approval

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

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

In clinical trials, a surrogate endpoint is a measurement of laboratory or clinical signs of a disease or condition that substitutes for a direct measurement of how a patient feels, functions or survives. Surrogate endpoints can often be measured more easily or more rapidly than clinical endpoints. A product candidate approved on this basis is subject to rigorous post-approval compliance requirements, including the completion of Phase 4, or post-approval clinical trials, to confirm the effect on the clinical endpoint. Failure to conduct required post-approval studies, or confirm a clinical benefit during post-approval studies, will allow the FDA to withdraw the drug from the market on an expedited basis. All promotional materials for product candidates approved under accelerated regulations are subject to priority review by the FDA.

If a submission is granted Fast Track Designation, the sponsor may engage in more frequent interactions with the FDA, and the FDA may review sections of the NDA before the application is complete. This rolling review is available if the applicant provides, and the FDA approves, a schedule for the submission of the remaining information and the applicant pays applicable user fees. However, the FDA's time period goal for reviewing an application does not begin until the last section of the NDA is submitted. Additionally, Fast Track Designation may be withdrawn by the FDA if the FDA believes that the designation is no longer supported by data emerging in the clinical trial process.

Breakthrough Therapy Designation

The FDA is also required to expedite the development and review of the application for approval of drugs that are intended to treat a serious or life-threatening disease or condition where preliminary clinical evidence indicates that the drug may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints. Under the Breakthrough Therapy program, the sponsor of a new product candidate may request that the FDA designate the product candidate for a specific indication as a breakthrough therapy concurrent with, or after, the filing of the IND for the product candidate. The FDA must determine if the product candidate qualifies for Breakthrough Therapy designation within 60 days of receipt of the sponsor's request.

Orphan Drug Designation and Exclusivity

The Orphan Drug Act provides incentives for the development of products intended to treat rare diseases or conditions. Under the Orphan Drug Act, the FDA may grant orphan designation to a drug intended to treat a rare disease or condition, which is generally a disease or condition that affects fewer than 200,000 individuals in the United States, or more than 200,000 individuals in the United States and for which there is no reasonable expectation that the cost of developing and making a drug available in the United States for this type of disease or condition will be recovered from sales of the product. If a sponsor demonstrates that a drug is intended to treat a rare disease or condition, the FDA will grant orphan designation for that product for the orphan disease indication, assuming the same drug has not already been approved for the indication for which the sponsor is seeking orphan designation. If the same drug has already been approved for the indication for which the sponsor is seeking orphan designation, the sponsor must present a plausible hypothesis of clinical superiority to obtain orphan designation. Orphan designation must be requested before submitting an NDA. After the FDA grants orphan designation, the FDA discloses the identity of the therapeutic agent and its potential orphan use.

Orphan designation may provide manufacturers with benefits such as research grants, tax credits, Prescription Drug User Fee Act application fee waivers, and eligibility for orphan drug exclusivity. If a product that has orphan designation subsequently receives the first FDA approval of the active moiety for that disease or condition for which it has such designation, the product is entitled to orphan drug exclusivity, which for seven years prohibits the FDA from approving another product with the same active ingredient for the same indication, except in limited circumstances. Orphan drug exclusivity will not bar approval of another product under certain circumstances, including if a subsequent product with the same active ingredient for the same indication is shown to be clinically superior to the approved product on the basis of greater efficacy or safety or is shown to provide a major contribution to patient care or if the company with orphan drug exclusivity is not able to meet market demand. Further, the FDA may approve more than one product for the same orphan indication or disease as long as the products contain different active ingredients. Moreover, competitors may receive approval of different products for the indication for which the orphan drug has exclusivity or obtain approval for the same product but for a different indication for which the orphan drug has exclusivity.

In the European Union, orphan designation also entitles a party to financial incentives such as reduction of fees or fee waivers and a grant of ten years of market exclusivity following drug or biological product approval. This period may be reduced to six years if the orphan 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 designation must be requested prior to submission of an application for marketing approval. Orphan designation does not convey any advantage in, or shorten the duration of, the regulatory review and approval process.

Post-Approval Requirements

Once an NDA is approved, a product will be subject to certain post-approval requirements. For instance, the FDA closely regulates the post-approval marketing and promotion of drugs, including standards and regulations for direct-to-consumer advertising, off-label promotion, industry-sponsored scientific and educational activities and promotional activities involving the internet. Drugs may be marketed only for the approved indications and in accordance with the provisions of the approved labeling. However, companies may share truthful and not misleading information that is otherwise consistent with the drug's FDA approved labeling.

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

Pediatric Information

Under the Pediatric Research Equity Act, or PREA, NDAs or supplements to NDAs must contain data to assess the safety and effectiveness of the drug for the claimed indications in all relevant pediatric subpopulations and to support dosing and administration for each pediatric subpopulation for which the drug is safe and effective. The FDA may grant full or partial waivers, or deferrals, for submission of data. Unless otherwise required by regulation, PREA does not apply to any drug for an indication for which orphan designation has been granted.

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

FDA Regulation of Companion Diagnostics

Our drug products may rely upon *in vitro* companion diagnostics for use in selecting the patients that we believe will respond to our cancer therapeutics. If safe and effective use of a therapeutic product depends on an *in vitro* diagnostic, or IVD, the FDA generally will require approval or clearance of the diagnostic at the same time that the FDA approves the therapeutic product. This policy is described in an August 2014 FDA guidance document.

The FDA has required *in vitro* companion diagnostics intended to select the patients who will respond to cancer treatment to obtain a premarket approval, or PMA, for that diagnostic simultaneously with approval of the drug. We believe that the FDA will require PMA approval of one or more *in vitro* companion diagnostics to identify patient populations suitable for our cancer therapies. The review of these *in vitro* companion diagnostics in conjunction with the review of our cancer treatments involves coordination of review by the FDA's Center for Drug Evaluation and Research and by the FDA's Center for Devices and Radiological Health.

The PMA process, including the gathering of clinical and nonclinical data and the submission to and review by the FDA, can take several years or longer. It involves a rigorous premarket review during which the applicant must prepare and provide the FDA with reasonable assurance of the device's safety and effectiveness and information about the device and its components regarding, among other things, device design, manufacturing and labeling. PMA applications are subject to an application fee. In addition, PMAs for certain devices must generally include the results from extensive preclinical and adequate and well-controlled clinical trials to establish the safety and effectiveness of the device for each indication for which FDA approval is sought. In particular, for a diagnostic, the applicant must demonstrate that the diagnostic produces reproducible results when the same sample is tested multiple times by multiple users at multiple laboratories. As part of the PMA review, the FDA will typically inspect the manufacturer's facilities for compliance with the Quality System Regulation, or QSR, which imposes elaborate testing, control, documentation and other quality assurance requirements.

PMA approval is not guaranteed, and the FDA may ultimately respond to a PMA submission with a not approvable determination based on deficiencies in the application and require additional clinical trial or other data that may be expensive and time-consuming to generate and that can substantially delay approval. If the FDA's evaluation of the PMA application is favorable, the FDA typically issues an approvable letter requiring the applicant's agreement to specific conditions, such as changes in labeling, or specific additional information, such as submission of final labeling, in order to secure final approval of the PMA. If the FDA concludes that the applicable criteria have been met, the FDA will issue a PMA for the approved indications, which can be more limited than those originally sought by the applicant. The PMA can include post-approval conditions that the FDA believes necessary to ensure the safety and effectiveness of the device, including, among other things, restrictions on labeling, promotion, sale and distribution.

After a device is placed on the market, it remains subject to significant regulatory requirements. Medical devices may be marketed only for the uses and indications for which they are cleared or approved. Device manufacturers must also establish registration and device listings with the FDA. A medical device manufacturer's manufacturing processes and those of its suppliers are required to comply with the applicable portions of the QSR, which cover the methods and documentation of the design, testing, production, processes, controls, quality assurance, labeling, packaging and shipping of medical devices. Domestic facility records and manufacturing processes are subject to periodic unscheduled inspections by the FDA. The FDA also may inspect foreign facilities that export products to the United States.

Failure to comply with applicable regulatory requirements can result in enforcement action by the FDA, which may include any of the following sanctions: warning letters, fines, injunctions, civil or criminal penalties, recall or seizure of current or future products, operating restrictions, partial suspension or total shutdown of production, denial of submissions for new products or withdrawal of PMA approvals.

Clinical Trials and IDEs

A clinical trial is almost always required to support a PMA application. In some cases, one or more smaller IDE studies may precede a pivotal clinical trial intended to demonstrate the safety and efficacy of the investigational device.

All clinical studies of investigational devices must be conducted in compliance with the FDA's requirements. If an investigational device could pose a significant risk to patients pursuant to FDA regulations, the FDA must approve an IDE application prior to initiation of investigational use. IVD trials usually do not require an IDE, as the FDA does not judge them to be a significant risk because the results do not affect the patients in the study. However, for a clinical trial where the IVD

result directs the therapeutic care of patients with cancer, we believe that the FDA may consider the investigation to present significant risk and require an IDE application.

An IDE application must be supported by appropriate data, such as laboratory test results, showing that it is safe to test the device in humans and that the testing protocol is scientifically sound. The FDA typically grants IDE approval for a specified number of patients. A non-significant risk device does not require FDA approval of an IDE. Both significant risk and non-significant risk investigational devices require approval from IRBs at the study centers where the device will be used.

During the clinical trial, the sponsor must comply with the FDA's IDE requirements for investigator selection, clinical trial monitoring, reporting and record keeping. The investigators must obtain patient informed consent, rigorously follow the investigational plan and study protocol, control the disposition of investigational devices and comply with all reporting and record keeping requirements. Prior to granting PMA approval, the FDA typically inspects the records relating to the conduct of the study and the clinical data supporting the PMA application for compliance with applicable requirements.

Although the QSR does not fully apply to investigational devices, the QSR requirement for controls on design and development does apply. The sponsor also must manufacture the investigational device in conformity with the quality controls described in the IDE application and any conditions of IDE approval that the FDA may impose with respect to manufacturing.

Foreign Regulation

In addition to regulations in the United States, we will be subject to a variety of foreign regulations governing clinical trials and commercial sales and distribution of our product candidates to the extent we choose to sell any products outside of the United States. Whether or not we obtain FDA approval for a product, we must obtain approval of a product by regulatory authorities of foreign countries before we can commence clinical trials or marketing of the product in those countries. The approval process varies from country to country and the time may be longer or shorter than that required for FDA approval. The requirements governing the conduct of clinical trials, product licensing, pricing and reimbursement vary greatly from country to country. As in the United States, post-approval regulatory requirements, such as those regarding product manufacture, marketing, or distribution would apply to any product that is approved outside the United States.

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

There are also foreign regulations governing the privacy and security of health information and the use of personal information to sell or market products, including the General Data Protection Regulation (EU) 2016/679, or GDPR, which went into effect on May 25, 2018, and which imposes privacy and security obligations on any entity that collects and/or processes health data from individuals located in the European Union and/or sells or markets products in the European Union. Under the GDPR, fines of up to 20 million euros or up to 4% of the annual global turnover of the infringer, whichever is greater, could be imposed for significant non-compliance.

Additional Regulations and Environmental Matters

In addition to FDA restrictions on marketing of pharmaceutical products, we are subject to additional healthcare regulation and enforcement by the federal government and by authorities in the states and foreign jurisdictions in which we conduct our business. These laws include transparency laws, anti-kickback statutes, false claims statutes and regulation regarding providing drug samples, among others.

The federal Anti-Kickback Statute prohibits, among other things, individuals and entities from knowingly and willfully offering, paying, soliciting or receiving remuneration to induce or in return for either the referral of an individual or the purchasing, leasing, ordering or arranging for the purchase, lease or order of any healthcare item or service reimbursable under Medicare, Medicaid or other federally financed healthcare programs. Violations of the federal Anti-Kickback Statute are punishable by imprisonment, criminal fines, civil monetary penalties and exclusion from participation in federal healthcare programs.

Federal false claims laws, including the False Claims Act, prohibit, among other things, any person or entity from knowingly presenting, or causing to be presented, a false claim for payment to the federal government, or knowingly making, or causing to be made, a false statement to have a false claim paid. Recently, several pharmaceutical companies have been prosecuted under these laws for allegedly inflating drug prices they report to pricing services, which in turn were used by the government to set Medicare and Medicaid reimbursement rates, and for allegedly providing free product to customers with the expectation that the customers would bill federal programs for the product. In addition, certain marketing practices, including off-label promotion, may also violate false claims laws.

The federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, imposes criminal and civil liability for, among other things, executing a scheme to defraud any healthcare benefit program or making false statements relating to healthcare matters.

HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act, or the HITECH Act, and their implementing regulations, also imposes obligations, including mandatory contractual terms, with respect to safeguarding the privacy, security and transmission of protected health information used and disclosed by covered entities and their business associates that create, receive, maintain, or transmit protected health information in connection with providing a service for or on behalf of a covered entity. Many states and foreign jurisdictions also have laws and regulations that govern the privacy and security of individually identifiable health information, and such laws often vary from one another and from HIPAA.

The federal Physician Payments Sunshine Act requires certain manufacturers of drugs, devices, biologics and medical supplies for which payment is available under Medicare, Medicaid or the Children's Health Insurance Program, with specific exceptions, to report annually to the Centers for Medicare & Medicaid Services, or CMS, information related to payments or other transfers of value made to physicians and teaching hospitals. It also requires certain manufacturers and group purchasing organizations to report annually ownership and investment interests held by physicians and their immediate family members.

The majority of states also have statutes or regulations similar to the federal Anti-Kickback Statute and false claims laws, which apply to items and services reimbursed under Medicaid and other state programs, or, in several states, apply regardless of the payor. 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 and may require drug manufacturers to track and report information related to payments and other transfers of value to physicians and other healthcare providers, marketing expenditures or drug pricing. Certain state and local laws also require the registration of pharmaceutical sales representatives. Our activities may also subject to be certain state laws regarding the privacy and security of health information that may not be preempted by HIPAA.

Because of the breadth of these laws, it is possible that some of our business activities could be subject to challenge under one or more of such laws. If our operations are found to be in violation of any of the federal and state laws described above or any other governmental regulations that apply to us, we may be subject to penalties, including potentially significant administrative, criminal and civil penalties, damages, fines, imprisonment, exclusion from participation in government healthcare programs, additional reporting requirements and oversight if we become subject to a corporate integrity agreement or similar agreement to resolve allegations of non-compliance with these laws, injunctions, recall or seizure of products, total or partial suspension of production, denial or withdrawal of pre-marketing product approvals, private "qui tam" actions brought by individual whistleblowers in the name of the government or refusal to allow us to enter into supply contracts, including government contracts, and the curtailment or restructuring of our operations, any of which could adversely affect our ability to operate our business and our results of operations

In addition to regulatory schemes that apply, or may in the future apply, to our business, we are or may become subject to various environmental, health and safety laws and regulations governing, among other things, laboratory procedures and any use and disposal by us of hazardous or potentially hazardous substances used in connection with our research and development activities. We do not presently expect such environmental, health and safety laws or regulations to materially impact our present or planned future activities.

Coverage and Reimbursement

Sales of any of our product candidates that may be approved, including any drug or companion diagnostics we may develop, will depend, in part, on the extent to which the cost of the product will be covered by third-party payors. Third-party payors may limit coverage to an approved list of products, or formulary, which might not include all drug products approved

by the FDA for an indication. A payor's decision to provide coverage for a drug product does not imply that an adequate reimbursement rate will be approved. Further, one payor's determination to provide coverage for a drug product does not assure that other payors will also provide coverage for the drug product. Adequate third-party payor reimbursement may not be available to enable us to maintain price levels sufficient to realize an appropriate return on our investment in product development.

Any product candidates for which we obtain marketing approval may not be considered medically necessary or cost-effective by third-party payors, and we may need to conduct expensive pharmacoeconomic studies in the future to demonstrate the medical necessity and/or cost effectiveness of any such product. Nonetheless, our product candidates may not be considered medically necessary or cost effective. The U.S. government, state legislatures and foreign governments have shown increased interest in implementing cost containment programs to limit government-paid health care costs, including price controls, restrictions on reimbursement and requirements for substitution of generic products. Continued interest in and adoption of such controls and measures, and tightening of restrictive policies in jurisdictions with existing controls and measures, could limit payments for pharmaceuticals such as the product candidates we are developing.

Health Reform

The United States and some foreign jurisdictions are considering or have enacted a number of legislative and regulatory proposals to change the healthcare system in ways that could affect our ability to sell our products profitably. Among policy makers and payors in the United States and elsewhere, there is significant interest in promoting changes in healthcare systems with the stated goals of containing healthcare costs, improving quality and expanding access. In the United States, the pharmaceutical industry has been a specific focus of these efforts and has been significantly affected by major legislative initiatives. By way of example, in March 2010, the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act, or collectively the ACA, was signed into law, which intended to broaden access to health insurance, reduce or constrain the growth of healthcare spending, enhance remedies against fraud and abuse, add transparency requirements for the healthcare and health insurance industries, impose taxes and fees on the health industry and impose additional health policy reforms. With regard to pharmaceutical products, among other things, the ACA expanded and increased industry rebates for drugs covered under Medicaid programs and made changes to the coverage requirements under the Medicare prescription drug benefit. Some of the provisions of the ACA have yet to be implemented, and there have been judicial and Congressional challenges to certain aspects of the ACA. Since January 2017, President Trump has signed two Executive Orders and other directives designed to delay the implementation of certain provisions of the ACA or otherwise circumvent some of the requirements for health insurance mandated by the ACA. Concurrently, Congress has considered legislation that would repeal or repeal and replace all or part of the ACA. While Congress has not passed comprehensive repeal legislation, two bills affecting the implementation of certain taxes under the ACA have been signed into law. Legislation enacted in 2017, informally titled the Tax Cuts and Jobs Act, included a provision which repealed, effective January 1, 2019, the tax-based shared responsibility payment imposed by the ACA 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 January 22, 2018, President Trump signed a continuing resolution on appropriations for fiscal year 2018 that delayed the implementation of certain ACA-mandated fees, including the so-called "Cadillac" tax on certain high cost employer-sponsored insurance plans, the annual fee imposed on certain health insurance providers based on market share, and the medical device excise tax on non-exempt medical devices. The Bipartisan Budget Act of 2018, or the BBA, among other things, amended the ACA, effective January 1, 2019, to increase from 50% to 70% the point-of-sale discount that is owed by pharmaceutical manufacturers who participate in Medicare Part D and to close the coverage gap in most Medicare drug plans, commonly referred to as the "donut hole". On December 14, 2018, a Texas U.S. District Court Judge ruled that the ACA is unconstitutional in its entirety because the "individual mandate" was repealed by Congress as part of the Tax Cuts and Jobs Act. While the Texas U.S. District Court Judge, as well as the Trump administration and CMS, have stated that the ruling will have no immediate effect pending appeal of the decision, it is unclear how this decision, subsequent appeals, and other efforts to repeal and replace the ACA will impact the ACA.

In addition, other legislative changes have been proposed and adopted since the ACA was enacted. These changes included aggregate reductions to Medicare payments to providers of up to 2% per fiscal year effective April 1, 2013 and, due to subsequent legislative amendments to the statute, including the BBA, will stay in effect through 2027 unless additional Congressional action is taken. In January 2013, President Obama signed into law the American Taxpayer Relief Act of 2012, which, among other things, reduced Medicare payments to several providers, and increased the statute of limitations period for the government to recover overpayments to providers from three to five years. These new laws may result in additional reductions in Medicare and other healthcare funding, which could have a material adverse effect on customers for our drugs, if approved, and, accordingly, our financial operations.

Recently there has been heightened governmental scrutiny over the manner by which manufacturers set prices for their marketed products. For example, there have been several recent U.S. Congressional inquiries and proposed and enacted federal and state legislation designed to, among other things, bring more transparency to drug pricing, review the relationship between pricing and manufacturer patient programs, reduce the cost of drugs under Medicare, and reform government program reimbursement methodologies for drug products. At the federal level, the Trump administration's budget proposal for fiscal year 2019 contains further drug price control measures that could be enacted during the 2019 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. Further, the Trump administration released a "Blueprint", or plan, 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. The Department of Health and Human Services, or HHS, has already started the process of soliciting feedback on some of these measures and, at the same, is immediately implementing others under its existing authority. For example, in September 2018, CMS announced that it will allow Medicare Advantage plans the option to use step therapy for Part B drugs beginning January 1, 2019. On January 31, 2019, the HHS Office of Inspector General, proposed modifications to the federal Anti-Kickback Statute discount safe harbor for the purpose of reducing the cost of drug products to consumers which, among other things, if finalized, will affect discounts paid by manufacturers to Medicare Part D plans, Medicaid managed care organizations and pharmacy benefit managers working with these organizations. While some of these and other proposed measures may require authorization through additional legislation 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. At the state level, legislatures have increasingly passed legislation and implemented regulations designed to control pharmaceutical and biological product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing.

Additionally, on May 30, 2018, the Trickett Wendler, Frank Mongiello, Jordan McLinn, and Matthew Bellina Right to Try Act of 2017, or the Right to Try Act, was signed into law. The law, among other things, provides a federal framework for certain patients to access certain investigational new drug products that have completed a Phase I 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.

In the coming years, additional legislative and regulatory changes could be made to governmental health programs that could significantly impact pharmaceutical companies and the success of our product candidates.

Employees

As of December 31, 2018, we had 43 full-time employees and three part-time employees. None of our employees is represented by a labor union or covered by a collective bargaining agreement. We consider our relationship with our employees to be good.

Corporate Information

Our corporate headquarters are located at 3033 Science Park Road, Suite 220, San Diego, California 92121, and our telephone number is (858) 500-8800. We also occupy offices in Cambridge, Massachusetts. We maintain a website at www.kuraoncology.com. Our website and the information contained on, or that can be accessed through, the website will not be deemed to be incorporated by reference in, and are not considered part of, this Annual Report. Our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and amendments to such reports filed or furnished pursuant to Section 13(a) and 15(d) of the Securities Exchange Act of 1934, as amended, or the Exchange Act, are available free of charge on the Investors and Media portion of our website as soon as reasonably practical after we electronically file such material with, or furnish it to, the SEC.

All brand names or trademarks appearing in this Annual Report are the property of their respective holders. Use or display by us of other parties' trademarks, trade dress, or products in this Annual Report is not intended to, and does not, imply a relationship with, or endorsements or sponsorship of, us by the trademark or trade dress owners.

We are an "emerging growth company," as defined in the JOBS Act. We will remain an emerging growth company until the earlier of (1) December 31, 2020, (2) the last day of the fiscal year in which we have total annual gross revenue of at least $1.07 billion, (3) the day we are deemed to be a large accelerated filer, which means the market value of our common stock that is held by non-affiliates exceeded $700.0 million as measured as of the prior June 30th, and (4) the date on which we have issued more than $1.0 billion in non-convertible debt during the prior three-year period. References herein to "emerging growth company" shall have the meaning associated with it in the JOBS Act.

Item 1A. Risk Factors.

RISK FACTORS

Except for the historical information contained herein or incorporated by reference, this Annual Report and the information incorporated by reference contains forward-looking statements that involve risks and uncertainties. These statements include projections about our accounting and finances, plans and objectives for the future, future operating and economic performance and other statements regarding future performance. These statements are not guarantees of future performance or events. Our actual results may differ materially from those discussed here. Factors that could cause or contribute to differences in our actual results include those discussed in the following section, as well as those discussed in Part II, Item 7 entitled "Management's Discussion and Analysis of Financial Condition and Results of Operations" and elsewhere throughout this Annual Report and in any other documents incorporated by reference into this Annual Report. You should consider carefully the following risk factors, together with all of the other information included or incorporated in this Annual Report. Each of these risk factors, either alone or taken together, could adversely affect our business, operating results and financial condition, as well as adversely affect the value of an investment in our common stock. There may be additional risks that we do not presently know of or that we currently believe are immaterial which could also impair our business and financial position.

Risks Related to Our Financial Position and Need For Additional Capital

We expect to incur losses over the next several years and may never achieve or maintain profitability.

We expect that it will be many years, if ever, before we have a product candidate ready for commercialization. To date, we have financed our operations primarily through equity and debt financings. We expect to continue to incur significant expenses and increasing operating losses for the foreseeable future. The net losses we incur may fluctuate significantly from quarter-to-quarter and year-to-year. We anticipate that our expenses will increase substantially if and as we:

- continue research and development of our product candidates;
- initiate new clinical trials for our product candidates;
- seek marketing approvals for our product candidates;
- enter into collaboration arrangements for companion diagnostics for our product candidates;
- establish a sales, marketing and distribution infrastructure to commercialize any products for which we may obtain marketing approval;
- maintain, expand and protect our intellectual property portfolio;
- hire additional personnel;
- add operational, financial and management information systems and personnel, including personnel to support our product development and planned future commercialization efforts; and
- incur increased costs as a result of continued operations as a public company.

To become and remain profitable, we must develop and eventually commercialize a product or products with significant market potential. This will require us to be successful in a range of challenging activities, including completing clinical trials of our product candidates, successfully developing companion diagnostics, obtaining marketing approval from the FDA and from comparable foreign authorities for these product candidates and manufacturing, marketing and selling those products for which we may obtain marketing approval. We may never succeed in these activities and, even if we do, may never generate revenues that are significant or even sufficient to achieve profitability. If we do achieve profitability, we may not be able to sustain or increase profitability on a quarterly or annual basis. Our failure to become and remain profitable could decrease the value of the company and could impair our ability to raise capital, maintain our research and development efforts, expand our business or continue our operations. A decline in the value of our company could also cause you to lose all or part of your investment.

We are a clinical-stage company with no approved products and no historical product revenue. Consequently, we expect that our financial and operating results will vary significantly from period to period.

We are a clinical-stage company that has incurred losses since our inception and expect to continue to incur substantial losses in the foreseeable future. Biopharmaceutical product development is a highly speculative undertaking and involves a substantial degree of uncertainty. We expect our actual financial condition and operating results to fluctuate significantly from quarter-to-quarter or year-to-year due to a variety of factors, many of which are beyond our control. Factors relating to our business that may contribute to these fluctuations include:

- the success of our clinical trials through all phases of clinical development;
- delays in the commencement, enrollment and timing of clinical trials;
- our ability to secure and maintain collaborations, licensing or other arrangements for the future development and/or commercialization of our product candidates, as well as the terms of those arrangements;
- our and our collaborators' ability to develop and validate companion diagnostics for our product candidates;
- our ability to obtain, as well as the timeliness of obtaining, additional funding to develop our product candidates;
- the results of clinical trials or marketing applications for product candidates that may compete with our product candidates;
- competition from existing products or new products that may receive marketing approval;
- potential side effects of our product candidates that could delay or prevent approval or cause an approved drug to be taken off the market;
- any delays in regulatory review and approval of our product candidates;
- our ability to identify and develop additional product candidates;
- the ability of patients or healthcare providers to obtain sufficient coverage and adequate reimbursement for our products;
- our ability, and the ability of third parties such as contract research organizations, or CROs, to adhere to clinical study and other regulatory requirements;
- the ability of third-party manufacturers to manufacture our product candidates and key ingredients needed to conduct clinical trials and, if approved, successfully commercialize our products;
- the costs to us, and our ability as well as the ability of any third-party collaborators, to obtain, maintain and protect our intellectual property rights;
- costs related to and outcomes of any future intellectual property litigation;
- our ability to adequately support future growth;
- our ability to attract and retain key personnel to manage our business effectively; and
- our ability to build our finance infrastructure and, to the extent required, improve our accounting systems and controls.

Accordingly, the likelihood of our success must be evaluated in light of many potential challenges and variables associated with a clinical-stage company, many of which are outside of our control, and past operating or financial results should not be relied on as an indication of future results. Fluctuations in our operating and financial results could cause our share price to decline. It is possible that in some future periods, our operating results will be above or below the expectations of securities analysts or investors, which could also cause our share price to decline.

Our limited operating history may make it difficult for you to evaluate the success of our business to date and to assess our future viability.

We are a clinical development company with a limited operating history. Our operations to date have been limited to organizing and staffing our company, business planning, raising capital, identifying and acquiring potential product candidates, undertaking preclinical studies for our product candidates and undertaking clinical studies of tipifarnib and KO-947. We have not yet demonstrated our ability to successfully complete any clinical trials, including those clinical trials in support of FDA approval, develop companion diagnostics, obtain marketing approvals, manufacture a commercial scale

product, or arrange for a third-party to do so on our behalf, or conduct sales and marketing activities necessary for successful product commercialization. Medicines, on average, take 10 to 15 years to be developed from the time they are discovered to the time they are available for treating patients. Consequently, any predictions you make about our future success or viability based on our short operating history to date may not be as accurate as they could be if we had a longer operating history.

In addition, we may encounter unforeseen expenses, difficulties, complications, delays and other known and unknown factors. We may in the future need to transition from a company with a research and development focus to a company capable of supporting commercial activities. We may not be successful in such a transition.

We will need to obtain substantial additional capital in connection with our continuing operations. Raising additional capital may cause dilution to our stockholders, restrict our operations or require us to relinquish rights to our technologies or product candidates.

Until such time, if ever, as we can generate substantial product revenues, we will need to raise additional capital in connection with our continuing operations. We expect to finance our cash needs through a combination of equity offerings and debt financings. In November 2018, we entered into a loan and security agreement, or loan agreement, with Silicon Valley Bank, or the Lender, providing for up to $20.0 million in term loans. Under the terms of the loan agreement, the Lender has initially provided us with a term loan of $7.5 million, or Term A Loan, with an additional $12.5 million available at any time until May 1, 2020, or Term B Loan, and together with Term A Loan, the Term Loans. Other than our term loan facility, we do not have any committed external source of funds.

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

While any amounts are outstanding under our term loan facility, we are subject to affirmative and restrictive covenants, including covenants regarding delivery of financial statements, maintenance of inventory, payment of taxes, maintenance of insurance, dispositions of property, business combinations or acquisitions, incurrence of additional indebtedness and transactions with affiliates, among other customary covenants. If we default under our term loan facility, the Lender may accelerate our repayment obligations and take control of our pledged assets, potentially requiring us to renegotiate our agreement on terms less favorable to us or to immediately cease operations. Further, if we are liquidated, the Lender's right to repayment would be senior to the rights of the holders of our common stock to receive any proceeds from the liquidation. The Lender could declare a default under our term loan facility upon the occurrence of an event of default, which includes our failure to satisfy our payment obligations under the loan agreement, the breach of certain of our other covenants under the loan agreement or the occurrence of a material adverse change, thereby requiring us to repay the loan immediately or to attempt to reverse the declaration of default through negotiation or litigation. Any declaration by the Lender of an event of default could significantly harm our business and prospects and could cause the price of our common stock to decline.

We cannot be certain that additional funding will be available on acceptable terms, or at all. Subject to limited exceptions, our term loan facility also prohibits us from incurring indebtedness without the prior written consent of the Lender. If we are unable to raise additional funds when needed, we may be required to delay, limit, reduce or terminate our product development or future commercialization efforts.

Risks Related to the Discovery and Development of Our Product Candidates

We are highly dependent on the success of our lead product candidate, tipifarnib, which is still in clinical development, and we cannot give any assurance that tipifarnib or any other product candidates, will receive regulatory approval, which is necessary before they can be commercialized.

Our future success is highly dependent on our ability to obtain regulatory approval for, and then successfully commercialize our lead product candidate, tipifarnib. Our other product candidates are in earlier stages of development. Our business depends entirely on the successful development and commercialization of our product candidates. We have not completed the development of any product candidates; we currently generate no revenues from sales of any product, and we may never be able to develop a marketable product.

Tipifarnib will require additional clinical development, evaluation of clinical, preclinical and manufacturing activities, regulatory approval in one or more jurisdictions, substantial investment, access to sufficient commercial manufacturing capacity and significant marketing efforts before we can generate any revenues from product sales. The FDA has also informed us that an approved companion diagnostic is required in order to obtain approval of tipifarnib in HRAS mutant HNSCC. Companion diagnostics are subject to regulation as medical devices and must be separately approved for marketing by the FDA. We are not permitted to market or promote tipifarnib, or any other product candidates before we receive regulatory approval from the FDA or comparable foreign regulatory authorities, and we may never receive such regulatory approvals. Although the scope of regulatory approval is similar in other countries, in some countries there are additional regulatory risks and we cannot predict success in these jurisdictions.

We initiated our registration-directed clinical trial in patients with HRAS mutant HNSCC in November 2018. There is no guarantee that this trial will be completed on time or at all. Prior to receiving approval to commercialize tipifarnib or future product candidates, if any, in the United States or internationally, we must demonstrate to the satisfaction of the FDA and other regulatory authorities, that such product candidates are safe and effective for their intended uses. The results from preclinical studies and clinical trials can be interpreted in different ways, and the favorable results from previous trials of a product candidate may not be replicated in subsequent clinical trials. There is no guarantee that the level of clinical activity observed in our ongoing Phase 2 RUN-HN clinical trial will be replicated in our registration-directed clinical trial. We are using a starting dose of 600mg administered twice daily in AIM-HN, which is lower than the starting dose used in our RUN-HN clinical trial. Although we have observed preliminary evidence of clinical activity in the RUN-HN clinical trial at the 600mg dose, there is no guarantee that we will see comparable activity in AIM-HN. Even if we believe the preclinical or clinical data are promising, such data may not be sufficient to support approval by the FDA and other regulatory authorities. We maintain frequent, ongoing dialog with the FDA and other regulatory bodies regarding our clinical trial design, including the patient selection criteria, dosing plan and statistical analysis plan. There is a risk that the FDA or other regulatory agencies could at any time raise objections. Any such objections could delay the initiation or completion of our registration-directed clinical trial. Although we believe from our discussions with the FDA and the minutes from our recent End of Phase 2 meeting with the FDA, that if AIM-HN is positive, there is the potential for accelerated approval of tipifarnib for the treatment of patients with relapsed or refractory HNSCC who harbor the HRAS mutation, the FDA has substantial discretion in the approval process and may not grant approval based on data from AIM-HN and RUN-HN. Even if the trial results are positive, we cannot guarantee that the FDA or foreign regulatory authorities will interpret the results as we do. There is also no guarantee that data from SEQ-HN will support any potential marketing application for tipifarnib in HRAS mutant HNSCC. If the results of the trial are not satisfactory to the FDA or foreign regulatory authorities for support of a marketing application, we may be required to expend significant additional resources to conduct additional trials in support of potential approval of tipifarnib.

We have not previously submitted an NDA to the FDA, or similar product approval filings to comparable foreign authorities, or received marketing approval for any product candidate, and we cannot be certain that tipifarnib will be successful in clinical trials or receive regulatory approval for any indication. We cannot anticipate whether or when we will seek regulatory review of tipifarnib for any other indications. If we do not receive regulatory approvals for and successfully commercialize tipifarnib on a timely basis or at all, we may not be able to continue our operations. Even if we successfully obtain regulatory approvals to market tipifarnib, our revenues will be dependent, in part, on our collaborator's ability to commercialize the companion diagnostic as well as the size of the markets in the territories for which we gain regulatory approval and have commercial rights. If the markets for the treatment of HNSCC are not as significant as we estimate, our business and prospects will be harmed.

Our discovery, preclinical and clinical development is focused on the development of targeted therapeutics for patients with genetically defined cancers, which is a rapidly evolving area of science, and the approach we are taking to discover and develop drugs may never lead to marketable products.

The discovery and development of targeted therapeutics for patients with genetically defined cancers, and the scientific discoveries that form the basis for our efforts to discover and develop product candidates, are relatively new. The scientific evidence to support the feasibility of developing product candidates based on these discoveries is both preliminary and limited. The patient populations for our product candidates are not completely defined but are substantially smaller than the general treated cancer population, and patients will need to be screened and identified in order to be eligible for our therapies. Successful identification of patients is dependent on several factors, including screening enough patients to identify if they harbor a particular genetic alteration or expression level, achieving certainty as to how specific genetic alterations or expression levels respond to our product candidates and developing companion diagnostics to identify such genetic alterations or expression levels. Furthermore, even if we are successful in identifying patients, we cannot be certain that the resulting patient populations will be large enough to allow us to successfully commercialize any products for which we are able to obtain marketing approval and achieve profitability. Therefore, we do not know if our approach of treating patients with genetically defined cancers will be successful. If our approach is unsuccessful, our business will suffer.

In order to execute on our strategy of advancing the clinical development of tipifarnib, we have designed our clinical trials of tipifarnib, and expect to design future clinical trials of tipifarnib and our other product candidates, to include patients who harbor a particular genetic alteration or expression level that we believe contribute to or are associated with particular cancer subsets. Our goal in doing this is to enroll patients who have the highest probability of responding to our product candidate and in our proof of concept Phase 2 clinical trials, to show early and statistically significant evidence of clinical efficacy. Potential molecular biomarkers we have identified in retrospective analyses of data from clinical trials of tipifarnib in certain cancer indications may not be prospectively validated as biomarkers of tipifarnib activity in our ongoing Phase 2 clinical trials or future clinical trials we may conduct in these indications. If we are unable to identify molecular or genetic alterations, or biomarkers, that are predictive of response to our product candidates, or we are unable to include patients who harbor the applicable genetic alterations or expression levels in our clinical trials, or if our product candidates fail to work as we expect, our ability to assess the therapeutic effect, seek participation in FDA expedited review and approval programs, including Breakthrough Therapy, Fast Track Designation, Priority Review and Accelerated Approval, or otherwise to seek to accelerate clinical development and regulatory timelines, could be compromised, resulting in longer development times, larger clinical trials and a reduced likelihood of obtaining regulatory approval.

We may find it difficult to enroll patients in our clinical trials for tipifarnib. Difficulty in enrolling patients could delay or prevent clinical trials of our product candidates.

Identifying and qualifying patients to participate in clinical studies of our product candidates is critical to our success. The timing of our clinical studies depends in part on the speed at which we can recruit patients to participate in testing our product candidates, and we may experience delays in our clinical trials if we encounter difficulties in enrollment.

In addition to the potentially small populations for our clinical trials of tipifarnib, the eligibility criteria of our clinical trials will further limit the pool of available study participants as we will require that patients have specific characteristics that we can measure or to assure their disease is either severe enough or not too advanced to include them in a study. Additionally, the process of finding and diagnosing patients may prove costly. For example, many physicians who treat HNSCC patients do not routinely screen their patients for genetic mutations, such as HRASs. To seek to address this, we have contracted with third-party laboratories to facilitate the genetic screening of patients for our clinical sites. However, there is no guarantee that these efforts will be effective.

We also may not be able to identify, recruit and enroll a sufficient number of patients to complete our clinical studies because of the perceived risks and benefits of the product candidate under study including the number and frequency of study required procedures and tests, the availability and efficacy of competing therapies and clinical trials, the proximity and availability of clinical study sites for prospective patients, and the patient referral practices of physicians. For example, with the approvals of immune therapy agents nivolumab and pembrolizumab, many HNSCC patients are now being treated with one of these agents after failure of first line treatments such as chemotherapy and/or cetuximab. If patients, or physicians treating them, are unwilling to participate in our studies for any reason, the timeline for recruiting patients, conducting studies, and obtaining regulatory approval of potential products may be delayed.

Additionally, in estimating the frequency of biomarkers, such as the frequency of HRAS mutations in patients with HNSCC, we rely on data published in the scientific literature as well as our experience and that of our collaborators. Initial studies on the frequency of HRAS mutation in HNSCC were conducted in a mostly HPV negative population that does not

reflect the increase in HPV-related HNSCC in the United States. The technologies used to identify mutations in published datasets may be different from the technologies we are using currently, which may make it more difficult to compare results across clinical trials. Moreover, sample quality in academic studies of molecular biomarkers may not reflect standard clinical practice that is focused on pathological diagnosis. We are using a minimum tumor HRAS mutant allele frequency of 20% in our AIM-HN clinical trial. Data from TCGA HNSCC, provisional, indicate that patients with an HRAS mutant allele frequency greater than 20% represent approximately 5% of the overall HNSCC population. If the incidence of tumor HRAS mutant allele frequency equal to or greater than the clinical cutoff as detected in our AIM-HN clinical trial is significantly different from either the TCGA database or our Phase 2 clinical trial experience, it may take us longer to screen patients to identify those patients with HRAS mutations who may be candidates for our clinical trial. Even if patients carrying HRAS mutations are identified, interest to participate in clinical trials is low in HNSCC and potential study subjects may be located far away from potential clinical trial sites. Any delay or failure by us or third-party collaborators to screen patients or identify patients with HRAS mutations for enrollment in our AIM-HN clinical trial and other ongoing trials could delay or prevent us from completing our clinical trials which could prevent us from obtaining regulatory approval or commercializing tipifarnib on a timely or profitable basis, or at all.

If we experience delays in the completion of, or termination of, any clinical trial of our product candidates, the commercial prospects of our product candidates may be harmed, and our ability to generate product revenue from any of these product candidates could be delayed or prevented. In addition, any delays in completing our clinical trials will increase our costs, slow down our product candidate development and approval process, and jeopardize our ability to commence product sales and generate revenue. Any of these occurrences may harm our business, financial condition, and prospects significantly. In addition, many of the factors that cause, or lead to, a delay in the commencement or completion of clinical trials may also ultimately lead to the denial of regulatory approval of our product candidates, including:

- unforeseen safety issues or adverse side effects;
- failure of our companion diagnostics in identifying patients;
- modifications to protocols of our clinical trials resulting from the FDA or comparable foreign regulatory authorities or IRB decisions; and
- ambiguous or negative interim results of our clinical trials or results that are inconsistent with earlier results.

Clinical drug development involves a lengthy and expensive process with an uncertain outcome. The results of preclinical studies and early clinical trials of our product candidates may not be predictive of the results of subsequent clinical trials, and preliminary or interim results of a clinical trial do not necessarily predict final results. We may incur additional costs or experience delays in completing, or ultimately be unable to complete, the development and commercialization of our product candidates.

The risk of failure for our product candidates is high. Before obtaining marketing approval from regulatory authorities for the sale of any product candidate, we must complete preclinical development and then conduct extensive clinical trials to demonstrate the safety and efficacy of our product candidates in humans. Clinical testing is expensive, difficult to design and implement and can take many years to complete, and its outcome is inherently uncertain. Failure can occur at any time during the clinical trial process. Further, the results of preclinical studies and early clinical trials of our product candidates may not be predictive of the results of subsequent clinical trials, and preliminary or interim results of a clinical trial do not necessarily predict final results. For example, the preliminary data we have presented from our positive Phase 2 clinical trial of tipifarnib in HRAS mutant HNSCC, may not predict the results of AIM-HN or any other later-stage clinical trials we may conduct. The primary endpoint of AIM-HN is objective response rate as determined using RECIST 1.1 criteria and as determined by independent radiological review. Independent radiological review refers to a formal process whereby third-party radiologists who are not affiliated with the drug development program are engaged to provide an independent assessment of the primary radiological images. All of our patient responses disclosed to date in our ongoing Phase 2 proof-of-concept clinical trial in HRAS mutant HNSCC have been assessed by the trial investigators. In contrast to independent radiology review, investigator assessed response is performed by investigators or their affiliated radiology colleagues who may be aware of the study treatment, patient history or other information that could impact their choices in applying the rules and conventions of RECIST 1.1. Conversely, independent radiology reviewers have limited access to non-radiographic clinical information or other ancillary information, which could have informed their application of RECIST 1.1 response rules. The published literature demonstrates a consistent decrease in response rate when investigator assessed response rates are verified by independent radiology review. Furthermore, HNSCC lesions are difficult to assess due to the complexity of the anatomic locations. For AIM-HN we will be identifying trial subjects with measurable disease that meets criteria for RECIST 1.1 target lesions by local radiology review. This may further reduce the number of subjects eligible to join AIM-HN within the small pool of HRAS mutant HNSCC patients.

Results from clinical trials conducted at a single clinical site or a small number of clinical sites, may not be predictive of results from additional clinical sites or from subsequent clinical trials. Moreover, preclinical and clinical data are often susceptible to varying interpretations and analyses, and many companies that have believed their product candidates performed satisfactorily in preclinical studies and clinical trials have nonetheless failed to obtain marketing approval of their products. For instance, the FDA previously issued a non-approval letter to Janssen for tipifarnib as a treatment for elderly, untreated AML in June 2005. It is impossible to predict when or if any of our product candidates will prove effective or safe in humans or will receive regulatory approval.

We may experience delays in our clinical trials and we do not know whether ongoing or planned clinical trials will begin or enroll patients on time, need to be redesigned or be completed on schedule, if at all. If the FDA or comparable foreign regulatory authorities, or IRBs have comments on our study plans for our clinical trials of tipifarnib or any of our other product candidates, that we are required to address, such studies may be delayed, or may not start at all. Clinical trials may be delayed, suspended or prematurely terminated at any time by us or by the FDA or other similar regulatory agency if it is determined at any time that patients may be or are being exposed to unacceptable health risks, including risk of death, or if compounds are not manufactured in compliance with cGMP regulations or with acceptable quality. There can be no assurance that the FDA or other similar regulatory agency will not put any of our product candidates on clinical hold in the future. We may experience numerous unforeseen events during, or as a result of, clinical trials that could delay or prevent our ability to receive marketing approval or commercialize our product candidates. Clinical trials may be delayed, suspended or prematurely terminated because costs are greater than we anticipate or for a variety of reasons, such as:

- failure to generate sufficient preclinical, toxicology or other *in vivo* or *in vitro* data to support the initiation or continuation of clinical trials;
- delay or failure in reaching agreement with the FDA or a comparable foreign regulatory authority on a clinical trial design that we are able to execute;
- delay or failure in obtaining authorization to commence a clinical trial or inability to comply with conditions imposed by a regulatory authority regarding the scope or design of a clinical trial;
- delays in reaching, or failure to reach, agreement on acceptable clinical trial contracts or clinical trial protocols with prospective clinical trial sites;
- inability, delay or failure in identifying and maintaining a sufficient number of clinical trial sites, many of which may already be engaged in other clinical programs;
- delay or failure in recruiting and enrolling suitable subjects to participate in a clinical trial;
- delay or failure in having subjects complete a clinical trial or return for post-treatment follow-up;
- delay or failure in determining an acceptable dose and schedule for a product candidate in a clinical trial;
- clinical sites and investigators deviating from clinical trial protocol, failing to conduct the clinical trial in accordance with regulatory requirements or dropping out of a clinical trial;
- lack of adequate funding to continue the clinical trial, including the incurrence of unforeseen costs due to enrollment delays, requirements to conduct additional clinical studies and increased expenses associated with the services of our CROs and other third parties;
- clinical trials of our product candidates may produce negative or inconclusive results, and we may decide, or regulators may require us, to redesign or modify our clinical trial protocols, conduct additional clinical trials or abandon product development programs;
- the number of patients required for clinical trials of our product candidates may be larger than we anticipate, enrollment in these clinical trials may be slower than we anticipate or participants may drop out of these clinical trials at a higher rate than we anticipate;
- we may experience delays or difficulties in the enrollment of patients whose tumors harbor the specific genetic alterations that our product candidates are designed to target;
- our third-party contractors may fail to comply with regulatory requirements or meet their contractual obligations to us in a timely manner, or at all;
- we may have difficulty partnering with experienced CROs that can screen for patients whose tumors harbor the applicable genetic alterations and run our clinical trials effectively;

- regulators or IRBs 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 supply or quality of our product candidates or other materials necessary to conduct clinical trials of our product candidates may be insufficient or inadequate; or
- there may be changes in governmental regulations or administrative actions.

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

- be delayed in obtaining marketing approval for our product candidates;
- not obtain marketing approval at all;
- obtain approval for indications or patient populations that are not as broad as intended or desired;
- obtain approval with labeling that includes significant use or distribution restrictions or safety warnings that could reduce the potential market for our products or inhibit our ability to successfully commercialize our products;
- be subject to additional post-approval restrictions and/or testing requirements; or
- have the product removed from the market after obtaining marketing approval.

Our product development costs will also increase if we experience delays in testing or marketing approvals. We do not know whether any of our preclinical studies or clinical trials will need to be restructured or will be completed on schedule, or at all. Significant preclinical or clinical trial delays also could shorten any periods during which we may have the exclusive right to commercialize our product candidates or allow our competitors to bring products to market before we do and impair our ability to successfully commercialize our product candidates and may harm our business and results of operations.

Preclinical and clinical testing of tipifarnib that has been conducted to date may not have been performed in compliance with applicable regulatory standards, which could lead to increased costs or material delays for their further development.

We licensed the rights to develop our lead product candidate, tipifarnib, from Janssen in December 2014, and the development of tipifarnib prior to our license was conducted wholly by Janssen or any third parties with which it had contracted. As a result, we were not involved with nor did we have any control over any of those development activities. Because we had no input on Janssen's development activities relating to tipifarnib, we may discover that all or certain elements of the clinical trials and studies or tipifarnib manufacturing activities it performed have not been in compliance with applicable regulatory standards or have otherwise been deficient, particularly relative to current requirements as development of tipifarnib began in the 1990s. Any such deficiency in the prior development of tipifarnib may adversely affect our ability to obtain regulatory approval for tipifarnib.

Our product candidates may cause serious adverse events or have unacceptable side effects that could delay, limit or prevent their development.

If our product candidates are associated with unacceptable side effects in preclinical or clinical trials or have characteristics that are unexpected, we may need to interrupt, delay or 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.

Tipifarnib has been studied in more than 5,000 oncology patients and was generally well tolerated and exhibited a manageable side effect profile. The most common hematologic adverse events of any grade were neutropenia, or low white blood cell count, anemia and thrombocytopenia, or low platelet count. The most common non-hematologic adverse events of any grade were gastrointestinal system disorders such as nausea, anorexia, diarrhea and vomiting, fatigue and rash. Treatment discontinuation across the prior tipifarnib clinical studies has been in the range of approximately 20-25%. We are exploring a range of doses and dosing schedules in our ongoing Phase 2 clinical trials. The side effects observed so far in our ongoing Phase 2 clinical trials of tipifarnib have been generally consistent with the prior observations; however, there is no guarantee that additional or more severe side effects will not be identified through further clinical studies, including our AIM-HN clinical trial. Rights to develop tipifarnib in virology indications have been granted by Janssen to EB Pharma LLC, or EB

Pharma, a subsidiary of Eiger BioPharmaceuticals. Undesirable side effects may be identified in clinical trials that EB Pharma may conduct in virology indications, which may negatively impact the development, commercialization or potential value of tipifarnib.

We are currently evaluating KO-947 in a Phase 1 clinical trial in patients with non-hematological malignancies. Any observed, drug-related side effects could affect the ability of patients to tolerate potentially therapeutically effective doses of the drug, which in turn could affect patient recruitment or the ability of enrolled patients to complete the clinical trial or result in potential product liability claims. Additionally, if results of our clinical trials for tipifarnib, KO-947 or other product candidates reveal an unacceptable frequency and severity of serious adverse events or side effects, our trials could be suspended or terminated and the FDA or comparable foreign regulatory agencies could require us to cease further development of, or deny approval of, our product candidates for any or all targeted indications. Many compounds developed in the biopharmaceutical industry that initially showed promise in early-stage testing for treating cancer have later been found to cause side effects that prevented further development of those compounds. Any of these occurrences may significantly harm our business, financial condition and prospects.

We may expend our limited resources to pursue a specific product candidate or indication and fail to capitalize on product 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 must focus on a limited number of research programs and product candidates and on specific indications. As a result, we may forego or delay pursuit of opportunities with other product 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 products or profitable market opportunities. Our spending on current and future discovery and preclinical development programs and product candidates for specific indications may not yield any commercially viable products.

Failure to successfully validate, develop and obtain regulatory approval for companion diagnostics for our product candidates could harm our drug development strategy and operational results.

As one of the central elements of our business strategy and clinical development approach, we seek to screen and identify subsets of patients with molecular or genetic alterations who may derive meaningful benefit from our product candidates. To achieve this, certain of our programs will require the development and commercialization of a companion diagnostic. We rely on third-party collaborators for development of companion diagnostics for use in clinical trials and, if successful, will rely on third-party collaborators for development of companion diagnostics for commercialization of our product candidates. Companion diagnostics are developed in conjunction with clinical programs for the associated product and are subject to regulation as medical devices. For example, for tipifarnib for the treatment of HRAS mutant HNSCC, we and our third-party collaborators have obtained an IDE for use of a qPCR-based assay to identify patients with HRAS mutant tumors as the companion diagnostic in AIM-HN in this indication. Patients can also be enrolled based on information on the patients' tumor HRAS mutation status obtained by the clinical sites from NGS panels used by the site or third parties to characterize patients' tumors. Additionally, we have introduced a minimum tumor HRAS mutant allele frequency as an entry criteria for enrollment in AIM-HN. The results of NGS panels used by our clinical sites may not be accurate or consistent across sites and may not be consistent with results obtained from our companion diagnostic, and our development of tipifarnib or a companion diagnostic may be delayed or complicated as a result.

If the results of our other Phase 2 clinical trials of tipifarnib or our Phase 1 clinical trial of KO-947 are positive and we validate our biomarker hypotheses in those clinical trials, we plan to partner development and validation of companion diagnostic tests to aid in the selection of patients in any subsequent clinical trials we decide to pursue for those product candidates and to prepare and submit an IDE for use of the companion diagnostic in the clinical trials, when necessary. Any delay or failure by us or our third-party collaborators to develop or obtain IDE approval for use of companion diagnostics in our clinical trials could delay or prevent us from commencing or completing our clinical trials. Companion diagnostics are subject to regulation by the FDA and comparable foreign regulatory authorities as medical devices and require separate clearance or approval prior to their commercialization. To date, the FDA has required PMA of all companion diagnostics for cancer therapies. The FDA has informed us that an approved companion diagnostic is required in order to obtain approval of tipifarnib in HRAS mutant HNSCC. We and our third-party collaborators may encounter difficulties in developing and obtaining approval for these companion diagnostics. Any delay or failure by us or third-party collaborators to develop or obtain regulatory approval of a companion diagnostic could delay or prevent approval of our product candidates. The approval of a companion diagnostic as part of the product label will limit the use of the product candidate to only those patients who express the specific genetic alteration it was developed to detect. We may also experience delays in developing a sustainable, reproducible and scalable manufacturing process or transferring that process to commercial partners or

negotiating insurance reimbursement plans, all of which may prevent us from completing our clinical trials or commercializing our products on a timely or profitable basis, if at all.

Failure by us or our third-party collaborators to successfully commercialize companion diagnostics developed for use with our product candidates could harm our ability to commercialize these product candidates.

Even if we or our companion diagnostic collaborators successfully obtain regulatory approval for the companion diagnostics for our product candidates, our collaborators:

- may not perform their obligations as expected;
- may not pursue commercialization of companion diagnostics for our therapeutic product candidates that achieve regulatory approval;
- may elect not to continue or renew commercialization programs based on changes in the collaborators' 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 such product or products; and
- may terminate their relationship with us.

Additionally, we or our collaborators may encounter production difficulties that could constrain the supply of the companion diagnostics, affect the ease of use, affect the price or have difficulties gaining acceptance of the use of the companion diagnostics in the clinical community.

If companion diagnostics for use with our product candidates fail to gain market acceptance, our ability to derive revenues from sales of our product candidates could be harmed. If insurance reimbursement to the laboratories who perform the companion diagnostic tests is inadequate, utilization may be low, and patient tumors may not be comprehensively screened for the presence of the genetic markers that predict response to our product candidates. If we or our collaborators fail to commercialize these companion diagnostics, 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 our product candidates or do so on commercially reasonable terms, which could adversely affect and delay the development or commercialization of our product candidates.

Risks Related to Our Dependence on Third Parties

We rely on third-party contractors and organizations to conduct our clinical trials, and those third parties may not perform satisfactorily, including failing to meet deadlines for the completion of such clinical trials.

We rely, and expect to continue to rely, on third-party contractors, clinical data management organizations, independent contractors, medical institutions and clinical investigators to support our preclinical development activities and conduct our clinical trials, including our registration-directed clinical trial of tipifarnib in HRAS mutant HNSCC, our other ongoing Phase 2 clinical trials of tipifarnib, our Phase 1 clinical trial of KO-947, and any other subsequent clinical trials of tipifarnib and our other product candidates. These agreements may terminate for a variety of reasons, including a failure to perform by the third parties. If we are required to enter into alternative arrangements, our product development activities could be delayed.

We compete with many other companies, some of which may be our business competitors, for the resources of these third parties. Large pharmaceutical companies often have significantly more extensive agreements and relationships with such third-party providers, and such third-party providers may prioritize the requirements of such large pharmaceutical companies over ours. The third parties on whom we rely may terminate their engagements with us at any time, which may cause delay in the development and commercialization of our product candidates. If any such third-party terminates its engagement with us or fails to perform as agreed, we may be required to enter into alternative arrangements, which could result in significant cost and delay to our product development program. Moreover, our agreements with such third parties generally do not provide assurances regarding employee turnover and availability, which may cause interruptions in the research on our product candidates by such third parties.

Our reliance on these third parties to conduct our clinical trials reduces our control over these activities but does not relieve us of our responsibilities. For example, we will remain responsible for ensuring that each of our clinical trials is conducted in accordance with the general investigational plan and protocols for the clinical trial. Moreover, the FDA and

other regulatory authorities require us to comply with GCPs for conducting, recording and reporting the results of clinical trials to assure that data and reported results are credible and accurate and that the rights, integrity and confidentiality of clinical trial participants are protected. We are also required to register ongoing clinical trials and post the results of completed clinical trials on a government-sponsored database, ClinicalTrials.gov, within specified timeframes. Failure to do so can result in fines, adverse publicity and civil and criminal sanctions.

Additionally, we rely substantially on third-party data managers for our clinical trial data. There is no assurance that these third parties will not make errors in the design, management or retention of our data or data systems. There is no assurance that these third parties will pass FDA or other regulatory audits, which could delay or prevent regulatory approval.

If these third parties do not successfully carry out their contractual duties, meet expected deadlines or conduct our clinical trials in accordance with regulatory requirements or our stated protocols, we will not be able to obtain, or may be delayed in obtaining, marketing approvals for our product candidates and will not be able to, or may be delayed in our efforts to, successfully commercialize our product candidates.

We depend on third parties for the manufacture of our product candidates for preclinical and clinical testing and expect to continue to do so for commercialization. This reliance on third parties increases the risk that we will not have sufficient quantities of our product candidates or products at an acceptable cost and quality, which could delay, prevent or impair our development or commercialization efforts.

We do not own or operate facilities for the manufacture of our product candidates, and we do not have any manufacturing personnel. We currently have no plans to build our own clinical or commercial scale manufacturing capabilities. We rely, and expect to continue to rely, on third parties for the manufacture of clinical supplies of tipifarnib and our other product candidates for preclinical and clinical testing. We will rely on third parties as well for commercial manufacture if any of our product candidates receive marketing approval. This reliance on third parties increases the risk that we will not have sufficient quantities of our product candidates or products or such quantities at an acceptable cost or quality, which could delay, prevent or impair our development or commercialization efforts. We also expect to rely on other third parties to package and label the drug product as well as to store and distribute drug supplies for our clinical trials.

The manufacture of pharmaceutical products is complex and requires significant expertise and capital investment, including the development of drug formulation and manufacturing techniques and process controls. Manufacturers of active pharmaceutical ingredient, or APIs, and pharmaceutical products often encounter difficulties in production, particularly in scaling up and validating initial production and absence of contamination. These problems include difficulties with production costs and yields, quality control, including stability of the product, quality assurance testing, operator error, shortages of qualified personnel, as well as compliance with strictly enforced federal, state and foreign regulations. Furthermore, if contaminants are discovered in our products or in the manufacturing facilities in which our products are made, such manufacturing facilities may need to be closed for an extended period of time to investigate and remedy the contamination. We have recently developed a modified drug product manufacturing process and a modified tablet formulation of tipifarnib which we plan to use in our AIM-HN clinical trial. Even though our Phase 1 relative bioavailability study indicated pharmacokinetic comparability between the original and the modified tablets, we cannot be certain that in our AIM-HN or other clinical trials we will not observe differences between the tablets which could impact clinical outcomes.

If we are unable to develop formulations of our product candidates with acceptable stability and sterility characteristics, or experience an unexpected delay or loss of supply of any of our product candidates for any reason, whether as a result of manufacturing, supply or storage issues or otherwise, our business may be harmed and we may experience delays, disruptions, suspensions or terminations of, or we may be required to restart or repeat, any pending or ongoing clinical trials. Although we generally do not begin a clinical trial unless we believe we have a sufficient supply of a product candidate to complete the clinical trial, we may be required to manufacture additional supplies of our product candidates to the extent our estimates of the amounts required prove inaccurate, we suffer unexpected losses of product candidate supplies, or to the extent that we are required to have fresh product candidate supplies manufactured to satisfy regulatory requirements or specifications. Any significant delay or discontinuation in the supply of a product candidate, or the raw material components thereof, due to the need to replace a supplier, contract manufacturer or other third-party manufacturer, could considerably harm our business and delay completion of our clinical trials, product testing and potential regulatory approval of our product candidates. Any performance failure on the part of our existing or future manufacturers, suppliers or distributors could delay clinical development or marketing approval of our product candidates or commercialization of our products, producing additional losses and depriving us of potential product revenue. We do not currently have arrangements in place for redundant supply or a second source for bulk drug substance and drug product. 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 product candidates, we may incur added costs and delays in identifying and qualifying any such replacement.

We may be unable to establish any agreements with third-party manufacturers or to do so on acceptable terms. Even if we are able to establish 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;
- catastrophic events at the third-party organization;
- 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.

The facilities used by our contract manufacturers to manufacture our product candidates must be approved by the applicable regulatory authorities, including the FDA, pursuant to inspections that will be conducted after an NDA is submitted to the FDA. We are completely dependent on our contract manufacturing partners for compliance with the FDA's requirements for manufacture of both the active drug substances and finished drug product for tipifarnib and our other product candidates. If our contract manufacturers cannot successfully manufacture material that conforms to our specifications and the FDA's regulatory requirements, they will not be able to secure or maintain FDA approval for the manufacturing facilities. In addition, we have limited control over the ability of our contract manufacturers to maintain adequate quality control, quality assurance and qualified personnel. If the FDA or any other applicable regulatory authorities does not approve these facilities for the manufacture of our product candidates or if it withdraws any such approval in the future, or if our suppliers or contract manufacturers decide they no longer want to supply or manufacture our products, we may need to find alternative manufacturing facilities, in which case we might not be able to identify manufacturers for clinical or commercial supply on acceptable terms, or at all, which would significantly impact our ability to develop, obtain regulatory approval for or market our product candidates. Third-party manufacturers may not be able to comply with cGMP regulations or similar regulatory requirements outside the United States. 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 product candidates or products, operating restrictions and criminal prosecutions, any of which could significantly and adversely affect supplies of our products.

Our product candidates and any products that we may develop may compete with other product candidates and products 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.

Risks Related to Regulatory Approval of Our Product Candidates and Other Legal Compliance Matters

If we are not able to obtain, or if there are delays in obtaining, required regulatory approvals, we will not be able to commercialize our product candidates, and our ability to generate revenue will be materially impaired.

Our product candidates must be approved by the FDA pursuant to an NDA in the United States and by the European Medicines Agency, or EMA, and similar regulatory authorities outside the United States prior to commercialization. The process of obtaining marketing approvals, both in the United States and abroad, is expensive and takes many years, if approval is obtained at all, and can vary substantially based upon a variety of factors, including the type, complexity and novelty of the product candidates involved. Failure to obtain marketing approval for a product candidate will prevent us from commercializing the product candidate. We have not received approval to market any of our product candidates from regulatory authorities in any jurisdiction. We have no experience in filing and supporting the applications necessary to gain marketing approvals and expect to rely on third-party CROs to assist us in this process. Securing marketing approval requires the submission of extensive preclinical and clinical data and supporting information to regulatory authorities for each therapeutic indication to establish the product candidate's safety and efficacy. Securing marketing approval also requires the submission of information about the product manufacturing process to, and inspection of manufacturing facilities by, the regulatory authorities, among other requirements. Our product candidates may not be effective, may be only moderately effective, may not have an acceptable durability of response, may not have an acceptable risk-benefit profile 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. Regulatory authorities 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 preclinical, clinical or other studies. In addition, varying interpretations of the data obtained from preclinical and clinical testing could delay, limit or prevent marketing approval of a product candidate. 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 product application, may also cause delays in or prevent the approval of an application.

If we experience delays in obtaining approval or if we fail to obtain approval of our product candidates, the commercial prospects for our product candidates may be harmed and our ability to generate revenues will be materially impaired.

We may not be able to benefit from available regulatory exclusivity periods if another company obtains regulatory approval for tipifarnib before we do.

As the composition of matter patents covering tipifarnib expired in the United States and in countries in Europe in 2016 and we have only a limited number of issued U.S. and foreign patents directed to our potential tipifarnib indications, our commercial strategy for tipifarnib relies on obtaining other patents related to tipifarnib and on non-patent regulatory exclusivity. In the United States, a pharmaceutical manufacturer may obtain five years of non-patent exclusivity upon FDA approval of an NDA for an NCE, which is a drug that contains an active moiety that has not been approved by the FDA in any other NDA. An "active moiety" is defined as the molecule or ion responsible for the drug substance's physiological or pharmacologic action. During the five-year exclusivity period, the FDA cannot accept for filing any ANDA seeking approval of a generic version of that drug or any Section 505(b)(2) NDA for the same active moiety and that relies on the FDA's findings regarding that drug, except that the FDA may accept an application for filing after four years if the follow-on applicant makes a paragraph IV certification. EB Pharma has licensed rights from Janssen to develop tipifarnib in virology indications. If EB Pharma obtains regulatory approval for tipifarnib in a virology indication before we obtain regulatory approval in one of our oncology or other non-virology indications, the five-year exclusivity period would commence on the date upon which EB Pharma obtains regulatory approval, and as a result, the period of regulatory exclusivity to which we may be entitled may be reduced or eliminated and the commercial prospects for tipifarnib could be harmed as a result.

Additionally, if EB Pharma obtains approval of tipifarnib for a virology indication, EB Pharma may sell tipifarnib at a lower price, which could adversely affect the price at which we could sell tipifarnib for oncology or other non-virology indications.

We may not be able to obtain orphan drug exclusivity for the product candidates for which we seek it, which could limit the potential profitability of such product candidates.

Regulatory authorities in some jurisdictions, including the United States and Europe, may designate drugs for relatively small patient populations as orphan drugs. Under the Orphan Drug Act, the FDA may designate a product as an orphan drug if it is a drug intended to treat a rare disease or condition, which is generally defined as a patient population of fewer than 200,000 individuals in the United States. Generally, if a product with an orphan designation subsequently receives the first marketing approval for the indication for which it receives the designation, then the product is entitled to a period of marketing exclusivity that precludes the applicable regulatory authority from approving another marketing application for the same drug for the same indication during the exclusivity period. The applicable period is seven years in the United States and ten years in Europe. The European exclusivity period can be reduced to six years if a drug no longer meets the criteria for orphan designation or if the drug is sufficiently profitable so that market exclusivity is no longer justified. Orphan drug exclusivity may be lost if the FDA or EMA 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.

We intend to pursue an orphan designation for at least some of our product candidates, including tipifarnib. However, obtaining an orphan designation can be difficult, and we may not be successful in doing so for tipifarnib or any of our product candidates. The EMA does not generally recognize for orphan designation, molecular defined subsets of non-orphan disease indications, and as an example, EMA recently rejected orphan designation for a drug product for ALK-positive NSCLC. As such, we do not expect to be able to obtain orphan drug designation in Europe for tipifarnib in the subset of HRAS mutant HNSCC at the current time. Even if we were to obtain orphan exclusivity for a product candidate, that exclusivity may not effectively protect the product from the competition of different drugs for the same orphan condition, which could be approved during the exclusivity period. Additionally, after an orphan drug is approved, the FDA could subsequently approve another application for the same drug for the same condition if the FDA concludes that the later drug is shown to be safer, more effective or makes a major contribution to patient care. The failure to obtain an orphan designation for any product candidates we may develop for the treatment of rare cancers, and/or the inability to maintain that designation

for the duration of the applicable exclusivity period, could reduce our ability to make sufficient sales of the applicable product candidate to balance our expenses incurred to develop it, which would have a negative impact on our operational results and financial condition.

If we obtain an orphan designation and FDA approval of tipifarnib for an oncology indication, we would be entitled to seven years of marketing exclusivity for that orphan indication. However, if a competitor obtained approval of a generic form of tipifarnib for another indication, physicians would not be prevented from prescribing the generic drug for the orphan indication during the period of marketing exclusivity. Such prescribing practices could adversely affect the sales of tipifarnib for the orphan indication.

A Fast Track Designation by the FDA, even if granted for any of our product candidates, may not lead to a faster development or regulatory review or approval process and does not increase the likelihood that our product candidates will receive marketing approval.

We do not currently have Fast Track Designation for any of our product candidates but intend to seek Fast Track Designation if our clinical data supports such a designation. 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 to the FDA for Fast Track Designation. The FDA has broad discretion whether to grant this designation. Even if we believe a specific product candidate is eligible for this designation, we cannot assure you that the FDA would decide to grant it. Even if we do receive Fast Track Designation, we may not experience a faster development process, review or approval compared to conventional FDA procedures. The FDA may withdraw Fast Track Designation if it believes that the designation is no longer supported by data from our clinical development program. Many drugs that have received Fast Track Designation have failed to obtain drug approval.

A Breakthrough Therapy Designation by the FDA, even if granted for any of our product candidates, may not lead to a faster development or regulatory review or approval process, and does not increase the likelihood that our product candidates will receive marketing approval.

We do not currently have Breakthrough Therapy Designation for any of our product candidates, but we intend to seek such designation if our clinical data supports such a designation. 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 can help to identify the most efficient path for development.

Designation as a Breakthrough Therapy is within the discretion of the FDA. Accordingly, even if we believe that one of our product candidates meets the criteria for designation as a Breakthrough Therapy, the FDA may disagree and instead determine not to make such designation. However, the reduced timelines may introduce significant chemistry, manufacturing and controls challenges for product development. In any event, the receipt of a Breakthrough Therapy Designation for a product candidate may not result in a faster development process, review or approval compared to drugs considered for approval under conventional FDA procedures and does not assure ultimate approval by the FDA. In addition, even if one or more of our product candidates qualify as Breakthrough Therapies, the FDA may later decide that such product candidates no longer meet the conditions for qualification and rescind such designations.

Failure to obtain marketing approval in international jurisdictions would prevent our product candidates from being marketed abroad.

In order to market and sell our products in the European Union and many other jurisdictions, we or our third-party collaborators must obtain separate marketing approvals and comply with numerous and varying regulatory requirements. The approval procedure varies among countries and can involve additional testing and different criteria for approval. The time required to obtain approval may differ substantially from that required to obtain FDA approval. The regulatory approval process outside the United States generally includes all of the risks associated with obtaining FDA approval. In addition, in many countries outside the United States, it is required that the product be approved for reimbursement before the product can be approved for sale in that country. We or our third-party collaborators may not obtain approvals from regulatory authorities outside the United States on a timely basis, if at all. Approval by the FDA does not ensure approval by regulatory authorities in other countries or jurisdictions, and approval by one regulatory authority outside the United States does not ensure approval by regulatory authorities in other countries or jurisdictions or by the FDA. However, failure to obtain

marketing approval in some countries or jurisdictions may compromise our ability to obtain approval elsewhere. We may not be able to file for marketing approvals and may not receive necessary approvals to commercialize our products in any market.

Any product candidate for which we obtain marketing approval will be subject to extensive post-approval regulatory requirements and could be subject to post-approval restrictions or withdrawal from the market, and we may be subject to penalties if we fail to comply with regulatory requirements or if we experience unanticipated problems with our products, when and if any of them are approved.

Our product candidates and the activities associated with their development and commercialization, including their testing, manufacture, recordkeeping, labeling, storage, approval, advertising, promotion, sale and distribution, are subject to comprehensive regulation by the FDA and other regulatory authorities. These requirements include, without limitation, submissions of safety and other post-approval information and reports, registration and listing requirements, cGMP requirements relating to manufacturing, quality control, quality assurance and corresponding maintenance of records and documents, including periodic inspections by the FDA and other regulatory authorities, restrictions or requirements regarding the distribution of samples to physicians, tracking and reporting of payments to physicians and other healthcare providers, and recordkeeping requirements.

The FDA may also impose requirements for costly post-approval studies or clinical trials and surveillance to monitor the safety or efficacy of the product. The FDA closely regulates the post-approval marketing and promotion of drugs to ensure drugs are marketed only for the approved indications and in accordance with the provisions of the approved labeling. The FDA imposes stringent restrictions on manufacturers' communications regarding use of their products and if we promote our products beyond their approved indications, we may be subject to enforcement action for off-label promotion. Violations of the Federal Food, Drug and Cosmetic Act relating to the promotion of prescription drugs may lead to investigations alleging violations of federal and state healthcare fraud and abuse laws, as well as state consumer protection laws.

In addition, later discovery of previously unknown adverse events or other problems with our products, manufacturers or manufacturing processes, or failure to comply with regulatory requirements, may yield various results, including:

- restrictions on such products, manufacturers or manufacturing processes;
- restrictions on the labeling or marketing of a product;
- restrictions on product distribution or use;
- requirements to conduct post-approval studies or clinical trials;
- warning or untitled letters;
- withdrawal of the products from the market;
- refusal to approve pending applications or supplements to approved applications that we submit;
- recall of products;
- fines, restitution or disgorgement of profits or revenues;
- suspension or withdrawal of marketing approvals;
- refusal to permit the import or export of our products;
- product seizure; or
- injunctions or the imposition of civil or criminal penalties.

Non-compliance with European Union requirements regarding safety monitoring or pharmacovigilance, and with requirements related to the development of products for the pediatric population, can also result in significant financial penalties. Similarly, failure to comply with the European Union's requirements regarding the protection of personal information can also lead to significant penalties and sanctions.

Our relationships with customers and third-party payors and our general business operations may be subject to applicable anti-kickback, fraud and abuse, privacy and other healthcare laws and regulations, which could expose us to criminal sanctions, civil penalties, contractual damages, reputational harm and diminished profits and future earnings, among other penalties.

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

- the federal Anti-Kickback Statute which prohibits, among other things, individuals and entities from knowingly and willfully soliciting, offering, receiving or providing remuneration, directly or indirectly, in cash or in kind, to induce or reward, or in return for, either the referral of an individual for, or the purchase, order or recommendation of, any good or service, for which payment may be made under a federal healthcare program such as Medicare and Medicaid;
- the federal civil and criminal false claims and civil monetary penalties laws, including the civil False Claims Act, which can be enforced by private citizens, on behalf of the government, through civil whistleblower or qui tam actions, which prohibits, among other things, individuals and entities from 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;
- HIPAA which imposes criminal and civil liability for, among other things, executing a scheme to defraud any healthcare benefit program or making false statements relating to healthcare matters;
- HIPAA, as amended by the HITECH Act, and their implementing regulations, which also imposes obligations, including mandatory contractual terms, with respect to safeguarding the privacy, security and transmission of protected health information on covered entities which include certain healthcare providers, health plans and healthcare clearinghouses, and their business associates that create, receive, maintain, or transmit protected health information in connection with providing a service for or on behalf of a covered entity;
- the federal Physician Payments Sunshine Act which requires applicable manufacturers of certain drugs, devices, biologics, and medical supplies for which payment is available under Medicare, Medicaid, or the Children's Health Insurance Program, with specific exceptions, to report annually to the CMS information related to payments and other transfers of value to physicians and teaching hospitals, as well as certain manufacturers and group purchasing organizations to report annually ownership and investment interests held by physicians or their immediate family;
- analogous state and foreign laws and regulations, such as state anti-kickback and false claims laws, which 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
- state and foreign laws that govern 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 or are in conflict with HIPAA, thus complicating compliance efforts, including the GDPR, which went into effect on May 25, 2018, and imposes privacy and security obligations on any entity that collects and/or processes health data from individuals located in the European Union. Under the GDPR, fines of up to 20 million euros or up to 4% of the annual global turnover of the infringer, whichever is greater, could be imposed for significant non-compliance. As well as complicating our compliance efforts, non-compliance with these laws could result in penalties or significant legal liability.

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 and may require drug manufacturers to report information related to payments and other transfers of value to physicians and other healthcare providers, marketing expenditures, or drug pricing. Some state and local laws also require the registration of pharmaceutical sales representatives.

Efforts to ensure that our business arrangements with third parties will comply with applicable healthcare laws and regulations will involve substantial costs. It is possible that governmental authorities will conclude that our business practices may not comply with current or future statutes, regulations or case law involving applicable fraud and abuse or other healthcare laws and regulations. If our operations are found to be in violation of any of these laws or any other governmental

regulations that may apply to us, we may be subject to significant civil, criminal and administrative penalties, damages, fines, imprisonment, additional reporting requirements and oversight if we become subject to a corporate integrity agreement or similar agreement to resolve allegations of non-compliance with these laws, exclusion from government funded healthcare programs, such as Medicare and Medicaid, disgorgement, contractual damages, reputational harm, diminished profits and future earnings, and the curtailment or restructuring of our operations. If any of the physicians or other healthcare 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 significant criminal, civil or administrative sanctions, including exclusions from government funded healthcare programs.

Recently enacted and future legislation may increase the difficulty and cost for us to obtain marketing approval of and commercialize our product candidates and affect the prices we may obtain.

In the United States and some foreign jurisdictions, there have been a number of legislative and regulatory changes and proposed changes regarding the healthcare system that could prevent or delay marketing approval of our product candidates, restrict or regulate post-approval activities and affect our ability to profitably sell any product candidates for which we obtain marketing approval.

For example, in March 2010, President Obama signed into law the ACA, a sweeping law intended to broaden access to health insurance, improve quality, reduce or constrain the growth of healthcare spending, enhance remedies against fraud and abuse, add new transparency requirements for the healthcare and health insurance industries, impose new taxes and fees on the health industry and impose additional health policy reforms.

Among the provisions of the ACA of importance to our potential product candidates and our business are the following:

- an annual, nondeductible fee on any entity that manufactures or imports specified branded prescription drugs and biologic agents;
- an increase in the statutory minimum rebates a manufacturer must pay under the Medicaid Drug Rebate Program;
- expansion of healthcare fraud and abuse laws, including the civil False Claims Act and the federal Anti-Kickback Statute, new government investigative powers, and enhanced penalties for noncompliance;
- a new Medicare Part D coverage gap discount program, in which manufacturers must now agree to offer 70% point-of-sale discounts off negotiated prices of applicable brand drugs to eligible beneficiaries during their coverage gap period, as a condition for a manufacturer's outpatient drugs to be covered under Medicare Part D;
- extension of manufacturers' Medicaid rebate liability;
- expansion of eligibility criteria for Medicaid programs;
- expansion of the entities eligible for discounts under the Public Health Service pharmaceutical pricing program;
- new requirements to report certain financial arrangements with physicians and teaching hospitals;
- a new requirement to annually report information regarding drug samples that manufacturers and distributors provide to physicians; and
- a new Patient-Centered Outcomes Research Institute to oversee, identify priorities in, and conduct comparative clinical effectiveness research, along with funding for such research.

Some of the provisions of the ACA have yet to be fully implemented, while certain provisions have been subject to judicial and Congressional challenges, as well as efforts by the Trump administration to repeal or replace certain aspects of the ACA. Certain changes to the ACA, such as the removal of the ACA's individual health insurance mandate by federal tax legislation, a delay in the implementation of certain ACA-mandated fees, and other changes to the ACA to close the coverage gap in most Medicare drug plans, commonly referred to as the "donut hole", were recently enacted or implemented, and the effect of these changes is unknown. On December 14, 2018, a Texas U.S. District Court Judge ruled that ACA is unconstitutional in its entirety because the "individual mandate" was repealed by Congress as part of the Tax Cuts and Jobs Act. While the Texas U.S. District Court Judge, as well as the Trump administration and CMS, have stated that the ruling will have no immediate effect pending appeal of the decision, it is unclear how this decision, subsequent appeals, and other efforts to repeal and replace ACA will impact ACA and our business. We cannot predict the ultimate content, timing or effect of healthcare reform legislation or regulation or the impact of potential legislation or regulation on us.

In addition, other legislative changes have been proposed and adopted since the ACA was enacted. These changes included aggregate reductions to Medicare payments to providers of up to 2% per fiscal year, starting in 2013, that due to subsequent legislative amendments, will stay in effect through 2027 unless additional Congressional action is taken. In January 2013, President Obama signed into law the American Taxpayer Relief Act of 2012, which, among other things, reduced Medicare payments to certain providers, and increased the statute of limitations period for the government to recover overpayments to providers from three to five years. These new laws and other potential legislation may result in additional reductions in Medicare and other healthcare funding, which could have a material adverse effect on customers for our drugs, if approved, and accordingly, our financial operations.

Further, recently there has been heightened governmental scrutiny over the manner in which manufacturers set prices for their marketed products. As a result, there have been several recent U.S. Congressional inquiries and proposed and enacted federal and state legislation designed to, among other things, bring more transparency to drug pricing, review the relationship between pricing and manufacturer patient programs, reduce the cost of drugs under Medicare, and reform government program reimbursement methodologies for drug products. At the federal level, 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, is immediately implementing others under its existing authority. For example, in September 2018, CMS announced that it will allow Medicare Advantage plans the option to use step therapy for Part B drugs beginning January 1, 2019. On January 31, 2019, the HHS Office of Inspector General, proposed modifications to the federal Anti-Kickback Statute discount safe harbor for the purpose of reducing the cost of drug products to consumers which, among other things, if finalized, will affect discounts paid by manufacturers to Medicare Part D plans, Medicaid managed care organizations and pharmacy benefit managers working with these organizations. Although a number of the proposed drug price control measures at the federal level, and other potential proposals, may require authorization through additional legislation 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. At the state level, legislatures have increasingly passed legislation and implemented regulations designed to control pharmaceutical and biological product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing. Future legislation could potentially change drug pricing dynamics. We cannot predict all of the ways in which future healthcare reform legislation or regulation could affect our business.

Additionally, on May 30, 2018, the Trickett Wendler, Frank Mongiello, Jordan McLinn, and Matthew Bellina Right to Try Act of 2017, or the Right to Try Act, was signed into law. The Right to Try Act, among other things, provides a federal framework for certain patients to access certain investigational new drug products that have completed a Phase I 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.

We expect that healthcare reform measures that have been adopted and may be adopted in the future, may result in more rigorous coverage criteria and in additional downward pressure on the price that we receive for any approved product. Any reduction in reimbursement from Medicare or other government programs may result in a similar reduction in payments from private payors. The implementation of cost containment measures or other healthcare reforms may prevent us from being able to generate revenue, attain profitability, or commercialize our products.

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

Additionally, California recently enacted legislation that has been dubbed the first "GDPR-like" law in the United States. Known as the California Consumer Privacy Act, or CCPA, it creates new individual privacy rights for consumers (as that word is broadly defined in the law) and places increased privacy and security obligations on entities handling personal

data of consumers or households. When it goes into effect on January 1, 2020, the CCPA will require covered companies to provide new disclosures to California consumers, provide such consumers new ways to opt-out of certain sales of personal information, and allow for a new cause of action for data breaches. Legislators have stated that amendments will be proposed to the CCPA before it goes into effect, but it remains unclear what, if any, modifications will be made to this legislation or how it will be interpreted. As currently written, the CCPA will likely impact (possibly significantly) our business activities and exemplifies the vulnerability of our business to not only cyber threats but also the evolving regulatory environment related to personal data and protected health information.

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

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

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 harm 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 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 for failure to comply with such laws and regulations.

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.

In addition, we may incur substantial costs in order to comply with current or future environmental, health and safety laws and regulations. These current or future laws and regulations may impair our discovery, preclinical development or production efforts. Our failure to comply with these laws and regulations also may result in substantial fines, penalties or other sanctions.

Risks Related to Our Intellectual Property

If we are unable to obtain and maintain intellectual property protection for our product candidates, or if the scope of the intellectual property protection obtained is not sufficiently broad, our competitors could develop and commercialize products similar or identical to ours, and our ability to successfully commercialize our product candidates may be impaired.

We intend to rely upon a combination of regulatory exclusivity periods, patents, trade secret protection, confidentiality agreements, and license agreements to protect the intellectual property related to our current product candidates and development programs. If the breadth or strength of protection provided by any patents, patent applications or future patents we may own, license, or pursue with respect to any of our current or future product candidates or products is threatened, it could threaten our ability to commercialize any of our current or future product candidates or products. Further, if we encounter delays in our development efforts, the period of time during which we could market any of our current or future product candidates or products under any patent protection we obtain would be reduced. Given the amount of time required for the development, testing and regulatory review of new product candidates or products, patents protecting such candidates might expire before or shortly after such product candidates or products are commercialized.

Our patent rights may not protect our patent protected products and product candidates if competitors devise ways of making products that compete with us without legally infringing our patent rights. For example, our patent rights in tipifarnib are limited in ways that affect our ability to exclude third parties from competing against us. In particular, the patent term for the composition of matter patents covering the API of tipifarnib expired in the United States and countries in Europe in 2016. Composition of matter patents on APIs are generally considered to be the strongest form of intellectual property protection because such patents provide protection without regard to any particular method of use or manufacture or formulation of the API used. In July 2017 and July 2018, the U.S. PTO issued us patents directed to the method of treatment of HRAS mutant HNSCC with tipifarnib and corresponding patents have been issued in a number of foreign jurisdictions. In 2018 the U.S. PTO issued us patents directed to the method of treatment of AITL with tipifarnib and the method of treatment of CXCL12-expressing PTCL or AML with tipifarnib. Although these patents are currently in force, there is no guarantee that a court would agree that any of the patents are valid or enforceable. Further, if a competitor were to develop tipifarnib for use in an indication other than that claimed by the patents, we would not be able to prevent them from marketing tipifarnib in the United States or other jurisdictions based on the patent. A limited number of patents directed to the use of tipifarnib in certain patients with HRAS mutant HNSCC have been granted in foreign jurisdictions. We are pursuing additional United States and foreign method of treatment patents for tipifarnib, however there is no guarantee that any such patents will be granted. We have issued patents in the United States and Europe covering the composition of matter of KO-947 and certain structurally related compounds, and methods of using the compounds for the treatment of cancers. We also have issued patents in the United States covering the composition of matter of KO-539 and certain structurally related compounds and methods of using the compounds for treating cancers. Although these patents are currently in force, there is no guarantee that a court would agree that any of the patents are valid or enforceable. We are pursuing additional U.S. and foreign patents for KO-947 and KO-539, however there is no guarantee that any such patents will be granted. Patent term extension may be available in the United States to account for regulatory delays in obtaining human marketing approval for a product candidate; however, only one patent may be extended per marketed compound. Under our license agreement with Janssen for tipifarnib, we and Janssen agree to cooperate in obtaining available patent term extensions. We and Janssen may not reach agreement and no patent term extension may be obtained. Additionally, the applicable authorities, including the U.S. PTO and the FDA, and any equivalent regulatory authority in other countries, may not agree with our assessment of whether such extensions are available, and may refuse to grant extensions to patents, or may grant more limited extensions than requested. If this occurs, our competitors who obtain the requisite regulatory approval can offer products with the same API as tipifarnib so long as the competitors do not infringe any method of use patents that we may hold. Competitors may take advantage of our investment in development and clinical trials by referencing our clinical and preclinical data and launch their product earlier than might otherwise be the case.

We expect that following expiration of patents and any regulatory exclusivity we are able to obtain, competitors may manufacture and sell generic versions of tipifarnib, at a lower price, which would reduce tipifarnib's revenues. In certain jurisdictions, legislation mandates generic substitution for brand name drugs.

We depend on our licensors to prosecute and maintain patents and patent applications that are material to our business. Any failure by our licensors to effectively protect these intellectual property rights could adversely impact our business and operations.

We have licensed patent rights from third parties for some of our development programs, including tipifarnib from Janssen and compounds in our menin-MLL program from the University of Michigan. As a licensee of third parties, we rely on these third parties to file and prosecute patent applications and maintain patents and otherwise protect the licensed intellectual property under some of our license agreements. We have not had and do not have primary control over these activities for certain of our patents or patent applications and other intellectual property rights. We cannot be certain that such activities by third parties have been or will be conducted in compliance with applicable laws and regulations or will result in valid and enforceable patents or other intellectual property rights. Pursuant to the terms of the license agreements with some of our licensors, the licensors may have the right to control enforcement of our licensed patents or defense of any claims asserting the invalidity of these patents and even if we are permitted to pursue such enforcement or defense, we will require the cooperation of our licensors. We cannot be certain that our licensors will allocate sufficient resources or prioritize their or our enforcement of such patents or defense of such claims to protect our interests in the licensed patents. Even if we are not a party to these legal actions, an adverse outcome could harm our business because it might prevent us from continuing to license intellectual property that we may need to operate our business.

With respect to the patent portfolio for tipifarnib, which is in-licensed from Janssen, Janssen maintains rights to prosecute and maintain patents and patent applications within the portfolio as well as to assert such patents against infringers within and outside the scope of our license, and to defend such patents against claims of invalidity and unenforceability. Although we have rights to consult with Janssen on actions taken as well as back-up rights of prosecution and enforcement,

rights to tipifarnib granted to another licensee, such as EB Pharma, could potentially influence Janssen's interests in the exercise of its prosecution, maintenance and enforcement rights in a manner that may favor the interests of such other licensee as compared with us.

If we breach any of the agreements under which we license from third parties the commercialization rights to our product candidates, we could lose license rights that are important to our business and our operations could be materially harmed.

We have in-licensed from Janssen the use, development and commercialization rights in all indications other than virology, for our lead product candidate, tipifarnib. We have also in-licensed rights to KO-539 and other compounds in our menin-MLL program from the University of Michigan. Additionally, we have an exclusive worldwide license from Memorial Sloan Kettering Cancer Center to a patent family pertaining to a method of use of tipifarnib. As a result, our current business plans are dependent upon our satisfaction of certain conditions to the maintenance of the Janssen agreement and the rights we license under it and our other in-license agreements. The Janssen license agreement and the University of Michigan license agreement each provide that we are subject to diligence obligations relating to the commercialization and development of the respective product candidates, milestone payments, royalty payments and other obligations. If we fail to comply with any of the conditions or obligations or otherwise breach the terms of our license agreement with Janssen, or any of our other license agreements or license agreements we may enter into on which our business or product candidates are dependent, Janssen or other licensors may have the right to terminate the applicable agreement in whole or in part and thereby extinguish our rights to the licensed technology and intellectual property and/or any rights we have acquired to develop and commercialize certain product candidates, including, with respect to our license agreement with Janssen, tipifarnib. The loss of the rights licensed to us under our license agreement with Janssen, or our other license agreements or any future license agreement that we may enter granting us rights on which our business or product candidates are dependent, would eliminate our ability to further develop the applicable product candidates and would materially harm our business, prospects, financial condition and results of operations.

The patent applications of pharmaceutical and biotechnology companies involve highly complex legal and factual questions, which, if determined adversely to us, could negatively impact our patent position.

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. In addition, the laws of foreign countries may not protect our rights to the same extent as the laws of the United States. For example, India and China do not allow patents for methods of treating the human body. Publications of discoveries in the scientific literature often lag behind the actual discoveries, and patent applications in the United States and other jurisdictions are typically not published until 18 months after filing, or in some cases not at all. Therefore, we cannot know with certainty whether we or our licensors were the first to make the inventions claimed in our owned or licensed patents or pending patent applications, or that we or our licensors 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 are highly uncertain. Our pending and future patent applications may not result in patents being issued which protect our technology or products, in whole or in part, or which effectively prevent others from commercializing competitive technologies and products. Changes in either the patent laws or interpretation of the patent laws in the United States and other countries may diminish the value of our patents or narrow the scope of our patent protection.

Patent reform legislation could increase the uncertainties and costs surrounding the prosecution of our patent applications and the enforcement or defense of our issued patents. On September 16, 2011, the Leahy-Smith America Invents Act, or the Leahy-Smith Act, was signed into law. 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 and may also affect patent litigation. The U.S. PTO developed new regulations and procedures to govern administration of the Leahy-Smith Act, and many of the substantive changes to patent law associated with the Leahy-Smith Act, and in particular, the first to file provisions, became effective on March 16, 2013. Accordingly, it is not 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 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 have a material adverse effect on our business and financial condition.

Moreover, we may be subject to a third-party preissuance submission of prior art to the U.S. PTO, or 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. An adverse determination in any such submission, proceeding or litigation could reduce the scope of, or invalidate, our patent rights, allow third parties to commercialize our technology or products and compete directly with us, without payment to us, or result in our inability to manufacture or commercialize products without infringing third-party patent rights. 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 product candidates.

Even if our owned and licensed patent applications issue as patents, they may not issue in a form that will provide us with any meaningful protection, prevent competitors from competing with us or otherwise provide us with any competitive advantage. Even if our owned and licensed patents might provide such protection or competitive advantage, we may not have the resources to effectively enforce our rights under such patents, which can be expensive and time-consuming. Further, our competitors may be able to circumvent our owned or licensed patents by developing similar or alternative technologies or products in a non-infringing manner.

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

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

Periodic maintenance fees, renewal fees, annuity fees and various other governmental fees on patents and/or applications will be due to be paid to the U.S. PTO and various governmental patent agencies outside of the United States in several stages over the lifetime of the patents and/or applications. We have systems in place to remind us to pay these fees, and we employ an outside firm and rely on our outside counsel to pay these fees due to non-U.S. patent agencies. The U.S. PTO and various non-U.S. governmental patent agencies require compliance with a number of procedural, documentary, fee payment and other similar provisions during the patent application process. We employ reputable law firms and other professionals to help us comply, and in many cases, an inadvertent lapse can be cured by payment of a late fee or by other means in accordance with the applicable rules. However, there are situations in which non-compliance can result in abandonment or lapse of the patent or patent application, resulting in partial or complete loss of patent rights in the relevant jurisdiction. In such an event, our competitors might be able to enter the market and this circumstance would have a material adverse effect on our business.

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

Because competition in our industry is intense, competitors may infringe or otherwise violate our issued patents, patents of our licensors or other intellectual property. To counter infringement or unauthorized use, we may be required to file infringement claims, which can be expensive and time consuming. Any claims we assert against perceived infringers could provoke these parties to assert counterclaims against us alleging that we infringe their patents. In addition, in a patent infringement proceeding, a court may decide that a patent of ours is invalid or unenforceable, in whole or in part, construe the patent's claims narrowly or refuse to stop the other party from using the technology at issue on the grounds that our patents do not cover the technology in question. An adverse result in any litigation proceeding could put one or more of our patents at risk of being invalidated or interpreted narrowly. We may also elect to enter into license agreements in order to settle patent infringement claims or to resolve disputes prior to litigation, and any such license agreements may require us to pay royalties and other fees that could be significant. 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.

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 product candidates and use our proprietary technologies without infringing the proprietary rights of third parties. There is considerable intellectual property litigation in the biotechnology and pharmaceutical industries. We may become party to, or threatened with, future adversarial proceedings or litigation regarding intellectual property rights with respect to

our products and technology, including interference or derivation proceedings before the U.S. PTO. Third parties may assert infringement claims against us based on existing patents or patents that may be granted in the future.

If we are found to infringe a third-party's intellectual property rights, we could be required to obtain a license from such third-party to continue developing and marketing our products and technology. However, we may not be able to obtain any required license on commercially reasonable terms or at all. Even if we were able to obtain a license, it could be non-exclusive, thereby giving our competitors access to the same technologies licensed to us. We could be forced, including by court order, to cease commercializing the infringing technology or product. In addition, we could be found liable for monetary damages, including treble damages and attorneys' fees if we are found to have willfully infringed a patent. A finding of infringement could prevent us from commercializing our product candidates or force us to cease some of our business operations, which could materially harm our business. Claims that we have misappropriated the confidential information or trade secrets of third parties could have a similar negative impact on our business.

We may not be successful in obtaining or maintaining necessary rights for our development pipeline through acquisitions and in-licenses.

Presently we have rights to intellectual property under an exclusive license from Janssen, to develop tipifarnib in all fields other than virology, and an exclusive worldwide license from Memorial Sloan Kettering Cancer Center to a patent family pertaining to a method of use of tipifarnib, as well as an exclusive worldwide license from the University of Michigan for all therapeutic indications for KO-539 and other compounds in our menin-MLL program. Because our programs may involve additional product candidates that may require the use of proprietary rights held by third parties, the growth of our business may depend in part on our ability to acquire, in-license or use these proprietary rights. Additionally, a companion diagnostic may require that we or a third-party collaborator developing the diagnostic acquire proprietary rights held by third parties, which may not be available. We may be unable to acquire or in-license any compositions, methods of use, or other third-party intellectual property rights from third parties that we identify. The licensing and acquisition of third-party intellectual property rights is a competitive area, and a number of more established companies are also pursuing strategies to license or acquire third-party intellectual property rights that we may consider attractive. These established companies may have a competitive advantage over us due to their size, cash resources and greater clinical development and commercialization capabilities.

For example, we may collaborate with U.S. and foreign academic institutions to accelerate our discovery and preclinical development work under written agreements with these institutions. Typically, these institutions provide us with an option to negotiate a license to any of the institution's rights in technology resulting from the collaboration. Regardless of such right of first negotiation for intellectual property, we may be unable to negotiate a license within the specified time frame or under terms that are acceptable to us. If we are unable to do so, the institution may offer the intellectual property rights to other parties, potentially blocking our ability to pursue our program.

In addition, companies that perceive us to be a competitor may be unwilling to assign or license rights to us. We also may be unable to license or acquire third-party intellectual property rights on terms that would allow us to make an appropriate return on our investment. If we are unable to successfully obtain rights to required third-party intellectual property rights, our business, financial condition and prospects for growth could suffer.

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

In addition to seeking patents for some of our technology and product candidates, we also rely on trade secrets, including unpatented know-how, technology and other proprietary information, to maintain our competitive position. We seek to protect these trade secrets, in part, by entering into non-disclosure and confidentiality agreements with parties who have access to them, such as our employees, corporate collaborators, outside scientific collaborators, contract manufacturers, consultants, advisors and other third parties. We seek to protect our confidential proprietary information, in part, by entering into confidentiality and invention or patent assignment agreements with our employees and consultants, however, we cannot be certain that such agreements have been entered into with all relevant parties. Moreover, to the extent we enter into such agreements, any of these parties may breach the agreements and disclose our proprietary information, including our trade secrets, and we may not be able to obtain adequate remedies for such breaches. Enforcing a claim that a party illegally disclosed or misappropriated a trade secret is difficult, expensive and time-consuming, and the outcome is unpredictable. In addition, some courts inside and outside the United States are less willing or unwilling to protect trade secrets. If any of our trade secrets were to be lawfully obtained or independently developed by a competitor, we would have no right to prevent them, or those to whom they communicate it, from using that technology or information to compete with us. If any of our trade secrets were to be disclosed to or independently developed by a competitor, our competitive position would be harmed.

Risks Related to the Commercialization of Our Product Candidates

Even if any of our product candidates receives marketing approval, it may fail to achieve the degree of market acceptance by physicians, patients, third-party payors and others in the medical community necessary for commercial success.

If any of our product candidates receives marketing approval, it may nonetheless fail to gain sufficient market acceptance by physicians, patients, third-party payors and others in the medical community. For example, current cancer treatments like chemotherapy and radiation therapy are well established in the medical community, and doctors may continue to rely on these treatments to the exclusion of our product candidates. In addition, physicians, patients and third-party payors may prefer other novel products to ours, such as the recently approved immune-oncology therapies, in which there is increasing awareness and interest. If our product candidates do not achieve an adequate level of acceptance, we may not generate significant product revenues and we may not become profitable. The degree of market acceptance of our product candidates, if approved for commercial sale, will depend on a number of factors, including:

- the efficacy and safety and potential advantages and disadvantages compared to alternative treatments;
- our ability to offer our products for sale at competitive prices;
- the convenience and ease of administration compared to alternative treatments;
- the willingness of the target patient population to try new therapies and of physicians to prescribe these therapies;
- the strength of our marketing and distribution support;
- the availability of third-party coverage and adequate reimbursement, including patient cost-sharing programs such as copays and deductibles;
- our ability to develop or partner with third-party collaborators to develop companion diagnostics;
- the prevalence and severity of any side effects; and
- any restrictions on the use of our products together with other medications.

We currently have no marketing and sales force. If we are unable to establish effective sales or marketing capabilities or enter into agreements with third parties to sell or market our product candidates if they obtain regulatory approval, we may not be able to effectively sell or market our product candidates, if approved, or generate product revenues.

We currently do not have a marketing or sales team for the marketing, sales and distribution of any of our product candidates that are able to obtain regulatory approval. In order to commercialize any product candidates, we must build on a territory-by-territory basis marketing, sales, distribution, managerial and other non-technical capabilities or make arrangements with third parties to perform these services, and we may not be successful in doing so. If our product candidates receive regulatory approval, we intend to establish an internal sales or marketing team with technical expertise and supporting distribution capabilities to commercialize our product candidates, which will be expensive and time consuming and will require significant attention of our executive officers to manage. Capable managers with commercial experience may need to be identified and successfully recruited to our company. Any failure or delay in the development of our internal sales, marketing and distribution capabilities would adversely impact the commercialization of any of our products that we obtain approval to market. With respect to the commercialization of all or certain of our product candidates, we may choose to collaborate, either globally or on a territory-by-territory basis, with third parties that have direct sales forces and established distribution systems, either to augment our own sales force and distribution systems or in lieu of our own sales force and distribution systems. If we are unable to enter into such arrangements when needed on acceptable terms or at all, we may not be able to successfully commercialize any of our product candidates that receive regulatory approval or any such commercialization may experience delays or limitations. If we are not successful in commercializing our product candidates, either on our own or through collaborations with one or more third parties, our future product revenue will suffer and we may incur significant additional losses.

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

The development and commercialization of new drug products is highly competitive. We face competition with respect to our current product candidates, and will face competition with respect to any product candidates that we may seek to develop or commercialize in the future, from major pharmaceutical companies, specialty pharmaceutical companies and biotechnology companies worldwide. There are a number of large pharmaceutical and biotechnology companies that currently market and sell products or are pursuing the development of products for the treatment of the disease indications for

which we are developing our product candidates. Some of these competitive products 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, which may directly compete with tipifarnib, KO-947, KO-539 and any other future product candidates.

Our commercial opportunity could be reduced or eliminated if our competitors develop and commercialize products that are safer, more effective, have fewer or less severe side effects, are more convenient or are less expensive than any products that we may develop. Our competitors also may obtain FDA or other regulatory approval for their products more rapidly than we may obtain approval for ours, which could result in our competitors establishing a strong market position before we are able to enter the market or slow our regulatory approval. In addition, our ability to compete may be affected in many cases by insurers or other third-party payors seeking to encourage the use of generic products. Generic products are currently on the market for the indications that we are pursuing, and additional products are expected to become available on a generic basis over the coming years. If our product candidates achieve marketing approval, we expect that they will be priced at a significant premium over competitive generic products.

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

The insurance coverage and reimbursement status of newly-approved products is uncertain. Failure to obtain or maintain coverage and adequate reimbursement for new or current products could limit our ability to market those products and decrease our ability to generate revenue.

The availability and extent of coverage and reimbursement by governmental and private payors is essential for most patients to be able to afford expensive treatments. Sales of our product candidates will depend substantially, both domestically and abroad, on the extent to which the costs of our product candidates 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 reimbursement is not available, or is available only to limited levels, we may not be able to successfully commercialize our product candidates. 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.

There is significant uncertainty related to the insurance coverage and reimbursement of newly approved products. In the United States, the principal decisions about reimbursement for new medicines are typically made by CMS, an agency within the HHS, as CMS decides whether and to what extent a new medicine will be covered and reimbursed under Medicare. Private payors often, but not always, follow CMS's decisions regarding coverage and reimbursement. It is difficult to predict what CMS will decide with respect to coverage and reimbursement for fundamentally novel products such as ours, as there is no body of established practices and precedents for these new products. One payor's determination to provide coverage for a drug product does not assure that other payors will also provide coverage for the drug product. Further, a payor's decision to provide coverage for a drug product does not imply that an adequate reimbursement rate will be approved. We or our collaborators may need to conduct expensive pharmacoeconomic studies in order to demonstrate the medical necessity and cost-effectiveness of our products, in addition to the costs required to obtain FDA approvals. Nonetheless, our product candidates may not be considered medically necessary or cost-effective.

Reimbursement agencies in countries other than the United States may be more conservative than CMS. For example, a number of cancer drugs have been approved for reimbursement in the United States and have not been approved for reimbursement in certain European countries. Outside the United States, international operations are generally subject to extensive governmental price controls and other market regulations, and we believe the increasing emphasis on cost-containment initiatives in Europe, Canada, and other countries has and will continue to put pressure on the pricing and usage of our product candidates. In many countries, the prices of medical products are subject to varying price control mechanisms as part of national health systems. In general, the prices of medicines under such systems are substantially lower than in the United States. Other countries allow companies to fix their own prices for medicines but monitor and control company profits. Additional foreign price controls or other changes in pricing regulation could restrict the amount that we are able to charge for our product candidates. Accordingly, in markets outside the United States, the reimbursement for our products may be reduced compared with the United States and may be insufficient to generate commercially reasonable revenues and profits.

Moreover, increasing efforts by governmental and third-party payors, in the United States and abroad, to cap or reduce healthcare costs may cause such organizations to limit both coverage and level of reimbursement for new products approved and, as a result, they may not cover or provide adequate payment for our product candidates. In addition, drug-pricing by pharmaceutical companies has come under increased scrutiny. Specifically, there have been several recent U.S. Congressional inquiries and proposed and enacted federal and state legislation designed to, among other things, bring more transparency to drug pricing by requiring drug companies to notify insurers and government regulators of price increases and provide an explanation of the reasons for the increase, reduce the out-of-pocket cost of prescription drugs, review the relationship between pricing and manufacturer patient programs and reform government program reimbursement methodologies for drugs. We expect to experience pricing pressures in connection with the sale of any of our product candidates, due to the trend toward managed healthcare, the increasing influence of health maintenance organizations and additional legislative changes. The downward pressure on healthcare costs in general, particularly prescription drugs and surgical procedures and other treatments, has become very intense. As a result, increasingly high barriers are being erected to the entry of new products into the healthcare market.

In addition to CMS and private payors, professional organizations such as the National Comprehensive Cancer Network and the American Society of Clinical Oncology can influence decisions about reimbursement for new medicines by determining standards for care. In addition, many private payors contract with commercial vendors who sell software that provide guidelines that attempt to limit utilization of, and therefore reimbursement for, certain products deemed to provide limited benefit to existing alternatives. Such organizations may set guidelines that limit reimbursement or utilization of our products.

Further, we or our collaborators will be required to obtain coverage and reimbursement for companion diagnostic tests separate and apart from the coverage and reimbursement we seek for our product candidates, once approved. There is significant uncertainty regarding our and our collaborators ability to obtain coverage and adequate reimbursement for any companion diagnostic test for the same reasons applicable to our product candidates If insurance coverage and reimbursement for companion diagnostic tests for our product candidates is inadequate, utilization may be low, and patient tumors may not be comprehensively screened for the presence of the genetic markers that predict response to our product candidates.

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

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

- decreased demand for any product candidates or products that we may develop;
- 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 clinical trial participants or patients;

- loss of revenue;
- reduced resources of our management to pursue our business strategy; and
- the inability to commercialize any products that we may develop.

Our current product liability insurance coverage may not be adequate to cover all liabilities that we may incur. We may need to increase our insurance coverage as we expand our clinical trials or if we commence commercialization of our product 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.

Risks Related to Employee Matters, Managing Growth and Macroeconomic Conditions

We currently have a limited number of employees, are highly dependent on our Chief Executive Officer and our future success depends on our ability to retain key executives and to attract, retain and motivate qualified personnel.

We are a clinical development company with a limited operating history, and, as of December 31, 2018, we had only 43 full-time employees and three part-time employees. We are highly dependent on the expertise of Troy E. Wilson, Ph.D., J.D., our President and Chief Executive Officer and Antonio Gualberto, M.D., Ph.D., our Head of Development and Chief Medical Officer, as well as the other principal members of our management, scientific and clinical teams. Although we have entered into employment letter agreements with our executive officers, each of them may terminate their employment with us at any time. We do not maintain "key person" insurance for any of our executives or other employees.

Recruiting and retaining qualified scientific, clinical, manufacturing and sales and marketing personnel will also be 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 executive officers and key employees 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 products. 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. In addition, we rely on consultants and advisors, including scientific and clinical advisors, to assist us in formulating our discovery and preclinical 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 expand our development and regulatory capabilities and potentially implement sales, marketing and distribution capabilities, and as a result, we may encounter difficulties in managing our growth, which could disrupt our operations.

We expect to experience significant growth in the number of our employees and the scope of our operations, particularly in the areas of regulatory affairs and commercial, if any of our product candidates receives marketing approval, sales, marketing and distribution. 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. Due to our limited financial resources and the limited experience of our management team in managing a company with such anticipated growth, we may not be able to effectively manage the expansion of our operations or recruit and train additional qualified personnel. The expansion of our operations may lead to significant costs and may divert our management and business development resources. Any inability to manage growth could delay the execution of our business plans or disrupt our operations.

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. The recent global financial crisis caused extreme volatility and disruptions in the capital and credit markets. A severe or prolonged economic downturn, such as the recent global financial crisis, could result in a variety of risks to our business, including our ability to raise additional capital when needed on acceptable terms, if at all. This is particularly true in Europe, which is undergoing a continued severe economic crisis. A weak or declining economy could also

strain our suppliers, possibly resulting in supply disruption. Any of the foregoing could harm our business and we cannot anticipate all of the ways in which the current economic climate and financial market conditions could adversely impact our business.

The United Kingdom's referendum to leave the European Union or "Brexit," has and may continue to cause disruptions to capital and currency markets worldwide. The full impact of the Brexit decision, however, remains uncertain. A process of negotiation will determine the future terms of the United Kingdom's relationship with the European Union. During this period of negotiation, our results of operations and access to capital may be negatively affected by interest rate, exchange rate and other market and economic volatility, as well as regulatory and political uncertainty. Brexit may also have a detrimental effect on our customers, distributors and suppliers, which would, in turn, adversely affect our financial condition.

Our business could be negatively impacted by cyber security threats.

In the ordinary course of our business, we use our data centers and our networks to store and access our proprietary business information. We face various cyber security threats, including cyber security attacks to our information technology infrastructure and attempts by others to gain access to our proprietary or sensitive information. The procedures and controls we use to monitor these threats and mitigate our exposure may not be sufficient to prevent cyber security incidents. The result of these incidents could include disrupted operations, lost opportunities, misstated financial data, liability for stolen assets or information, increased costs arising from the implementation of additional security protective measures, litigation and reputational damage. Any remedial costs or other liabilities related to cyber security incidents may not be fully insured or indemnified by other means.

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

Despite the implementation of security measures, our internal computer systems and those of our CROs, collaborators and third-parties on whom we rely are vulnerable to damage from computer viruses, unauthorized access, natural disasters, terrorism, war and telecommunication and electrical failures. While we have not experienced any such system failure, accident or security breach to date, if such an event were to occur and cause interruptions in our operations, it could result in a material disruption of our drug development programs. For example, the loss of clinical trial data from completed or ongoing or planned clinical trials could result in delays in our regulatory approval efforts and we may incur substantial costs to attempt to recover or reproduce the data. If any disruption or security breach resulted in a loss of or damage to our data or applications, or inappropriate disclosure of confidential or proprietary information, we could incur liability and/or the further development of our product candidates could be delayed.

Our operations are vulnerable to interruption by natural disasters, power loss, terrorist activity and other events beyond our control, the occurrence of which could materially harm our business.

Businesses located in California have, in the past, been subject to electrical blackouts as a result of a shortage of available electrical power, and any future blackouts could disrupt our operations. We are vulnerable to a major earthquake, wildfire and other natural disasters, and we have not undertaken a systematic analysis of the potential consequences to our business as a result of any such natural disaster and do not have an applicable recovery plan in place. We do not carry any business interruption insurance that would compensate us for actual losses from interruption of our business that may occur, and any losses or damages incurred by us could cause our business to materially suffer.

Risks Related to Ownership of our Common Stock

Our stock price may fluctuate significantly and you may have difficulty selling your shares based on current trading volumes of our stock.

Our common stock has been listed on the Nasdaq Global Select Market, or Nasdaq, under the symbol "KURA" since November 5, 2015. The high and low price per share of our common stock as reported by Nasdaq during the period from November 5, 2015 until December 31, 2018, were $24.03 and $2.50, respectively. We cannot predict the extent to which investor interest in our company will sustain an active trading market on Nasdaq or any other exchange in the future. We have several stockholders, including affiliated stockholders, who hold substantial blocks of our stock. Sales of large numbers of shares by any of our large stockholders could adversely affect our trading price, particularly given our small historic trading volumes. If stockholders holding shares of our common stock sell, indicate an intention to sell, or if it is perceived that they will sell, substantial amounts of their common stock in the public market, the trading price of our common stock

could decline. Moreover, if an active trading market is not sustained or if the volume of trading is limited, holders of our common stock may have difficulty selling their shares.

The price of our common stock may be volatile and may be influenced by numerous factors, some of which are beyond our control.

The market for our common stock could fluctuate substantially due to a variety of factors, some of which may be beyond our control. In addition to the factors discussed in this "Risk Factors" section and elsewhere in this report, these factors include:

- the product candidates we seek to pursue, and our ability to obtain rights to develop, commercialize and market those product candidates;
- our decision to initiate a clinical trial, not to initiate a clinical trial or to terminate an existing clinical trial;
- actual or anticipated adverse results or delays in our clinical trials;
- our failure to commercialize our product candidates, if approved;
- changes in the structure of healthcare payment systems;
- unanticipated serious safety concerns related to the use of any of our product candidates;
- adverse regulatory decisions;
- additions or departures of key scientific or management personnel;
- changes in laws or regulations applicable to our product candidates, including without limitation clinical trial requirements for approvals;
- disputes or other developments relating to patents and other proprietary rights and our ability to obtain patent protection for our product candidates;
- our dependence on third parties, including CROs as well as our potential partners that produce companion diagnostic products;
- failure to meet or exceed any financial guidance or expectations regarding development milestones that we may provide to the public;
- actual or anticipated variations in quarterly operating results, liquidity or other indicators of our financial condition;
- failure to meet or exceed the estimates and projections of the investment community;
- overall performance of the equity markets and other factors that may be unrelated to our operating performance or the operating performance of our competitors, including changes in market valuations of similar companies;
- market conditions or trends in the biotechnology and biopharmaceutical industries;
- introduction of new products offered by us or our competitors;
- announcements of significant acquisitions, strategic partnerships, joint ventures or capital commitments by us or our competitors;
- our ability to maintain an adequate rate of growth and manage such growth;
- issuances of debt or equity securities;
- sales of our common stock by us or our stockholders in the future, or the perception that such sales could occur;
- trading volume of our common stock;
- ineffectiveness of our internal control over financial reporting or disclosure controls and procedures;
- general political and economic conditions;
- effects of natural or man-made catastrophic events; and
- other events or factors, many of which are beyond our control.

In addition, the stock market in general, and the stocks of small-cap biotechnology companies in particular, have experienced extreme price and volume fluctuations that have often been unrelated or disproportionate to the operating performance of these companies. Broad market and industry factors may negatively affect the market price of our common stock, regardless of our actual operating performance. These events may also lead to securities litigation, which can be expensive and time-consuming to defend, regardless of the merit or outcome. The realization of any of the above risks or any of a broad range of other risks, including those described in these "Risk Factors," could have a dramatic and material adverse impact on the market price of our common stock.

We have broad discretion in the use of our cash and may not use our cash effectively, which could adversely affect our results of operations.

Our management has broad discretion in the application of our cash resources. Because of the number and variability of factors that will determine our use of our cash resources, our management might not apply our cash in ways that ultimately increase the value of our common stock. The failure by our management to apply our cash effectively could harm our business. Pending their use, we may invest our cash in short-term, investment-grade, interest-bearing securities. These investments may not yield a favorable return to our stockholders. If we do not invest or apply our cash in ways that enhance stockholder value, we may fail to achieve expected financial results, which could cause our stock price to decline.

FINRA sales practice requirements may limit a stockholder's ability to buy and sell our stock.

The Financial Industry Regulatory Authority, or FINRA, has adopted rules requiring that, in recommending an investment to a customer, a broker-dealer must have reasonable grounds for believing that the investment is suitable for that customer. Prior to recommending speculative or low-priced securities to their non-institutional customers, broker-dealers must make reasonable efforts to obtain information about the customer's financial status, tax status, investment objectives and other information. Under interpretations of these rules, FINRA has indicated its belief that there is a high probability that speculative or low-priced securities will not be suitable for at least some customers. If these FINRA requirements are applicable to us or our securities, they may make it more difficult for broker-dealers to recommend that at least some of their customers buy our common stock, which may limit the ability of our stockholders to buy and sell our common stock and could have an adverse effect on the market for and price of our common stock.

The resale of shares covered by our effective shelf registration statement could adversely affect the market price of our common stock in the public market, should one develop, which result would in turn negatively affect our ability to raise additional equity capital.

The sale, or availability for sale, of our common stock in the public market may adversely affect the prevailing market price of our common stock and may impair our ability to raise additional capital by selling equity or equity-linked securities. We filed a shelf registration statement with the SEC, which has been declared effective, to register the resale of 13,947,599 shares of our common stock, which represents a substantial portion of the shares of our common stock issued in connection with our reverse merger transaction. The shelf registration statement permits the resale of these shares at any time, subject to restrictions under applicable law. The resale of a substantial number of shares of our common stock in the public market could adversely affect the market price for our common stock and make it more difficult for you to sell shares of our common stock at times and prices that you feel are appropriate. Furthermore, we expect that, because there are a large number of shares registered pursuant to the shelf registration statement, the selling stockholders named in such registration statement will continue to offer shares covered by the shelf registration statement for a significant period of time, the precise duration of which cannot be predicted. Accordingly, the adverse market and price pressures resulting from an offering pursuant to the shelf registration statement may continue for an extended period of time and continued negative pressure on the market price of our common stock could have a material adverse effect on our ability to raise additional equity capital.

We will incur increased costs and demands upon management as a result of complying with the laws and regulations affecting public companies, which could harm our operating results.

As a public company, we have incurred and will incur significant legal, accounting and other expenses, including costs associated with public company reporting requirements. We also have incurred and will incur costs associated with current corporate governance requirements, including requirements under Section 404 and other provisions of the Sarbanes-Oxley Act of 2002, or Sarbanes-Oxley Act, as well as rules implemented by the SEC or Nasdaq or any other stock exchange or inter-dealer quotations system on which our common stock may be listed in the future. The expenses incurred by public companies for reporting and corporate governance purposes have increased dramatically in recent years.

If we fail to maintain proper and effective internal controls, our ability to produce accurate and timely financial statements could be impaired, which could harm our operating results, our ability to operate our business and investors' views of us.

We are required to comply with certain aspects of Section 404 of the Sarbanes-Oxley Act. Section 404 of the Sarbanes-Oxley Act requires public companies to, among other things, conduct an annual review and evaluation of their internal controls over financial reporting. Ensuring that we have adequate internal financial and accounting controls and procedures in place so that we can produce accurate financial statements on a timely basis is a costly and time-consuming effort that will require frequent evaluation. Our failure to maintain the effectiveness of our internal controls in accordance with the requirements of the Sarbanes-Oxley Act could have a material adverse effect on our business. We could lose investor confidence in the accuracy and completeness of our financial reports, which could have an adverse effect on the price of our common stock. In addition, if our efforts to comply with new or changed laws, regulations and standards differ from the activities intended by regulatory or governing bodies, regulatory authorities may initiate legal proceedings against us and our business may be harmed.

We are an emerging growth company, which will allow us to take advantage of certain reduced disclosure obligations as a public reporting company that may make our common stock less attractive to investors.

We are an "emerging growth company" under the Jumpstart Our Business Startups Act and a "smaller reporting company" as defined in applicable rules under the Exchange Act. As an emerging growth company and a smaller reporting company, we are eligible to take advantage of certain extended accounting standards and exemptions from various reporting requirements that are not available to public reporting companies that do not qualify for those classifications. For instance, we are exempt from any requirement that may be adopted by the Public Company Accounting Oversight Board regarding mandatory audit firm rotation or a supplement to the auditor's report providing additional information about the audit and financial statements, commonly known as an "auditor discussion and analysis"; we are not required to hold a nonbinding advisory stockholder vote on executive compensation or any golden parachute payments not previously approved by stockholders; we are not required to comply with the requirement of auditor attestation of management's assessment of internal control over financial reporting, which is required for some other public reporting companies by Section 404 of the Sarbanes-Oxley Act; we are eligible for reduced disclosure obligations regarding executive compensation in our periodic and annual reports; and we are eligible for reduced financial statement disclosure in any registration statements under the Securities Act or reports under the Exchange Act that we may file. For as long as we continue to be an emerging growth company and/or a smaller reporting company, which we anticipate will be for the foreseeable future, we expect that we will take advantage of the reduced disclosure obligations available to us as a result of those respective classifications. As a result, our publicly available disclosure may not be as robust or comprehensive as that of other public reporting companies that do not qualify for those classifications.

Further, as an emerging growth company, we can elect to delay the adoption of certain accounting standards until those standards would otherwise apply to private companies. We have irrevocably elected not to take advantage of this extended transition period and, therefore, will be subject to the same new or revised accounting standards as other public companies that are not emerging growth companies. As a result, changes in rules of U.S. generally accepted accounting principles or their interpretation, the adoption of new guidance or the application of existing guidance to changes in our business could significantly affect our financial position and results of operations.

Future sales and issuances of our common stock or rights to purchase common stock, including pursuant to our equity incentive plans, outstanding stock options, warrants, or otherwise, could result in dilution to the percentage ownership of our stockholders and could cause our stock price to fall.

We expect that significant additional capital will be needed in the future to continue our planned operations. To raise capital, we may sell common stock, convertible securities or other equity securities in one or more transactions at prices and in a manner we determine from time to time.

If we sell common stock, convertible securities or other equity securities in more than one transaction, investors in a prior transaction may be materially diluted by subsequent sales. Additionally, any such sales may result in material dilution to our existing stockholders, and new investors could gain rights, preferences and privileges senior to those of holders of our common stock. Further, any future sales of our common stock by us or resales of our common stock by our existing stockholders or the perception that such sales could occur could cause the market price of our common stock to decline. In January 2017, we entered into an at-the-market issuance sales agreement with Cowen and Company, LLC, or Cowen, which was amended in November 2017 and March 2018, under which we could offer and sell, from time to time, shares of our common stock having an aggregate offering price of up to $160.0 million, or the ATM facility. In January 2018, we sold an

aggregate of 3,136,722 shares of our common stock under the ATM facility at a weighted average price per share of $18.85 for net proceeds of approximately $57.4 million, after deducting commissions and offering expenses. In July 2018, we terminated the ATM facility. Also in July 2018, we completed a public offering in which we sold an aggregate of 4,600,000 shares of common stock at a price of $16.75 per share for net proceeds of $74.5 million, after deducting underwriting discounts, commissions and offering expenses.

Pursuant to our Amended and Restated 2014 Equity Incentive Plan, or 2014 Plan, we are authorized to grant equity awards consisting of shares of our common stock to our employees, directors and consultants. As of December 31, 2018, we had 586,559 shares of common stock reserved for future issuance under the 2014 Plan and options to purchase up to an aggregate of 3,185,836 shares of common stock outstanding. The number of shares available for future grant under the 2014 Plan will automatically increase on January 1 of each year through January 1, 2025 by 4% of the total number of shares of our common stock outstanding on December 31 of the preceding calendar year, subject to the ability of our board of directors to take action to reduce the size of the increase in any given year. On January 1, 2019, an automatic increase pursuant to the 2014 Plan occurred, resulting in 1,525,906 additional shares available for future grant under the 2014 Plan.

In addition, we may grant or provide for the grant of rights to purchase shares of our common stock pursuant to our 2015 Employee Stock Purchase Plan, or ESPP. As of December 31, 2018, we had 233,094 shares of common stock reserved for future issuance under the ESPP. The number of shares of our common stock reserved for issuance under the ESPP will automatically increase on January 1 of each calendar year through January 1, 2025 by the lesser of 1% of the total number of shares of our common stock outstanding on December 31 of the preceding calendar year and 2,000,000 shares, subject to the ability of our board of directors to take action to reduce the size of the increase in any given year. In November 2018, the board of directors elected not to automatically increase the number of shares of our common stock reserved for issuance under the ESPP in 2019. In addition, warrants to purchase up to 33,988 shares of our common stock at an exercise price of $3.31 per share are outstanding as of December 31, 2018.

Any future grants of options, warrants or other securities exercisable or convertible into our common stock, or the exercise or conversion of such shares, and any sales of such shares in the market, could have an adverse effect on the market price of our common stock.

Anti-takeover provisions under our charter documents and Delaware law could delay or prevent a change of control which could limit the market price of our common stock and may prevent or frustrate attempts by our stockholders to replace or remove our current management.

Our amended and restated certificate of incorporation, as amended, and amended and restated bylaws contain provisions that could delay or prevent a change of control of our company or changes in our board of directors that our stockholders might consider favorable. Some of these provisions include:

- a prohibition on stockholder action through written consent, which requires that all stockholder actions be taken at a meeting of our stockholders;
- a requirement that special meetings of stockholders be called only by the chairman of the board of directors, the chief executive officer, or by a majority of the total number of authorized directors;
- advance notice requirements for stockholder proposals and nominations for election to our board of directors;
- division of our board of directors into three classes;
- a requirement that no member of our board of directors may be removed from office by our stockholders except for cause and, in addition to any other vote required by law, upon the approval of not less than 66⅔% of all outstanding shares of our voting stock then entitled to vote in the election of directors;
- a requirement of approval of not less than 66⅔% of all outstanding shares of our voting stock to amend any bylaws by stockholder action or to amend specific provisions of our certificate of incorporation; and
- the authority of the board of directors to issue preferred stock on terms determined by the board of directors without stockholder approval and which preferred stock may include rights superior to the rights of the holders of common stock.

In addition, because we are incorporated in Delaware, we are governed by the provisions of Section 203 of the Delaware General Corporate Law, which may prohibit certain business combinations with stockholders owning 15% or more of our outstanding voting stock. These anti-takeover provisions and other provisions in our amended and restated certificate

of incorporation, as amended, and amended and restated bylaws could make it more difficult for stockholders or potential acquirers to obtain control of our board of directors or initiate actions that are opposed by the then-current board of directors and could also delay or impede a merger, tender offer or proxy contest involving our company. These provisions could also discourage proxy contests and make it more difficult for you and other stockholders to elect directors of your choosing or cause us to take other corporate actions you desire. Any delay or prevention of a change of control transaction or changes in our board of directors could cause the market price of our common stock to decline.

Comprehensive tax reform could adversely affect our business and financial condition.

On December 22, 2017, U.S. federal income tax legislation was signed into law (H.R. 1, "An Act to provide for reconciliation pursuant to titles II and V of the concurrent resolution on the budget for fiscal year 2018"), informally titled the Tax Cuts and Jobs Act, that significantly revises the Internal Revenue Code of 1986, as amended. The Tax Cuts and Jobs Act, among other things, contains significant changes to corporate taxation, including reduction of the corporate tax rate from a top marginal rate of 35% to a flat rate of 21%, limitation of the tax deduction for interest expense to 30% of adjusted earnings, except for certain small businesses, limitation of the deduction for net operating losses to 80% of current year taxable income and elimination of net operating loss carrybacks, one time taxation of offshore earnings at reduced rates regardless of whether they are repatriated, elimination of U.S. tax on foreign earnings, subject to certain important exceptions, immediate deductions for certain new investments instead of deductions for depreciation expense over time and modifying or repealing many business deductions and credits, including reducing the business tax credit for certain clinical testing expenses incurred in the testing of certain drugs for rare diseases or conditions. Notwithstanding the reduction in the corporate income tax rate, the overall impact of the Tax Cuts and Jobs Act is uncertain, and our business and financial condition could be adversely affected. In addition, it is unknown if and to what extent various states will conform to the Tax Cuts and Jobs Act. The impact of the Tax Cuts and Jobs Act on holders of our common stock is likewise uncertain and could be adverse. We urge our stockholders to consult with their legal and tax advisors with respect to the Tax Cuts and Jobs Act and the potential tax consequences of investing in or holding our common stock.

Our ability to use net operating losses to offset future taxable income may be subject to limitations.

As of December 31, 2018, we had federal and state net operating loss carryforwards of $128.3 million and $151.3 million, respectively. Federal net operating loss carryforwards of $52.9 million carry forward indefinitely (but are subject to a percentage limitation) and $75.4 million of our federal and all of our state net operating loss carryforwards will begin to expire, if not utilized, beginning in 2034 and 2030, respectively. The net operating loss carryforwards subject to expiration could expire unused and be unavailable to offset future income tax liabilities. In addition, under Sections 382 and 383 of the Internal Revenue Code of 1986, as amended, and corresponding provisions of state law, if a corporation undergoes an "ownership change," which is generally defined as a greater than 50% change in its equity ownership value over a three-year period, the corporation's ability to use its pre-change net operating loss carryforwards and other pre-change tax attributes to offset its post-change income or taxes may be limited. We have experienced an ownership change in the past and we may also experience additional ownership changes in the future as a result of subsequent shifts in our stock ownership, some of which may be outside of our control. If an ownership change occurs and our ability to use our net operating loss carryforwards is materially limited, it would harm our future operating results by effectively increasing our future tax obligations. In addition, at the state level, there may be periods during which the use of net operating loss carryforwards is suspended or otherwise limited, which could accelerate or permanently increase state taxes owed. As a result, if we earn net taxable income, we may be unable to use all or a material portion of our net operating loss carryforwards and other tax attributes, which could potentially result in increased future tax liability to us and adversely affect our future cash flows.

We do not intend to pay cash dividends on our capital stock in the foreseeable future.

We have never declared or paid any dividends on our common stock and do not anticipate paying any dividends in the foreseeable future. Any payment of cash dividends in the future would depend on our financial condition, contractual restrictions, including under our term loan facility, solvency tests imposed by applicable corporate laws, results of operations, anticipated cash requirements and other factors and will be at the discretion of our board of directors. Our stockholders should not expect that we will ever pay cash or other dividends on our outstanding capital stock.

Because we have an even number of members of our board of directors, deadlocks may occur in our board of directors' decision-making process, which may delay or prevent critical decisions from being made.

Since we have an even number of directors, deadlocks may occur when such directors disagree on a particular decision or course of action. Our amended and restated certificate of incorporation and amended and restated bylaws do not contain any

mechanisms for resolving potential deadlocks. While our directors are under a duty to act in the best interest of our company, any deadlocks may impede the further development of our business in that such deadlocks may delay or prevent critical decisions regarding our business.

Item 1B. Unresolved Staff Comments.

None.

Item 2. Properties.

We occupy approximately 5,216 rentable square feet of office space in San Diego, California under a sublease with Wellspring Biosciences, Inc., or Wellspring, that expires in April 2020. We also occupy approximately 3,766 square feet of office space in Cambridge, Massachusetts under a lease that expires in August 2020. We believe that our facilities are sufficient to meet our current needs and that suitable additional space will be available as and when needed.

Item 3. Legal Proceedings.

We are not currently a party to, nor is our property the subject of, 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.

Market Information

Since November 5, 2015, our common stock has been listed on Nasdaq under the symbol "KURA".

Holders of Record

As of March 1, 2019, there were approximately 122 holders of record of our common stock, which does not include beneficial owners of our common stock whose shares are held in the name of various dealers, clearing agencies, banks, brokers, and other fiduciaries.

Dividend Policy

We have never paid cash dividends on any of our capital stock and we currently intend to retain our future earnings, if any, to fund the development and growth of our business. We do not intend to pay cash dividends to holders of our common stock in the foreseeable future. In addition, our ability to pay cash dividends is currently prohibited by the terms of our term loan facility, subject to customary exceptions. Any future determination related to our dividend policy will be made at the discretion of our board of directors and will depend on our financial condition, results of operations, capital requirements and other factors our board of directors deems relevant.

Securities Authorized for Issuance Under Equity Compensation Plans

Information about securities authorized for issuance under our equity compensation plans is incorporated herein by reference to Item 12 of Part III of this Annual Report.

Item 6. Selected Financial Data.

Not required for smaller reporting companies.

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

The following discussion of the financial condition and results of operations of Kura Oncology, Inc. should be read in conjunction with the financial statements and the notes to those statements appearing in this Annual Report. Some of the information contained in this discussion and analysis or set forth elsewhere in this Annual Report, including information with respect to our plans and strategy for our business, includes forward-looking statements that involve risks, assumptions and uncertainties. Important factors that could cause actual results to differ materially from the results described in or implied by the forward-looking statements contained in the following discussion and analysis include, but are not limited to, those set forth in "Item 1A. Risk Factors" in this Annual Report. All forward-looking statements included in this Annual Report are based on information available to us as of the time we file this Annual Report and, except as required by law, we undertake no obligation to update publicly or revise any forward-looking statements.

References to "Kura Oncology, Inc.," "we," "us" and "our" refer to Kura Oncology, Inc., a private Delaware corporation incorporated in the State of Delaware in August 2014, for the periods prior to the Merger and Kura Oncology, Inc., a Delaware corporation incorporated in November 2007 and formerly known as Zeta Acquisition Corp. III, for the periods following the Merger.

Overview

We are a clinical-stage biopharmaceutical company committed to realizing the promise of precision medicines for the treatment of cancer. Our pipeline consists of small molecule product candidates that target cancer signaling pathways where there is a strong scientific and clinical rationale to improve outcomes, and we intend to pair them with molecular or cellular diagnostics to identify those patients most likely to respond to treatment. We plan to advance our product candidates through a combination of internal development and strategic partnerships and maintain significant development and commercial rights.

Our lead product candidate, tipifarnib, is a potent, selective and orally bioavailable inhibitor of farnesyl transferase. Tipifarnib was previously studied in more than 5,000 cancer patients and demonstrated compelling and durable anti-cancer activity in certain patients with a manageable side effect profile. We are currently evaluating tipifarnib in multiple solid tumor and hematologic indications.

Our most advanced solid tumor indication is in patients with HNSCC that carry mutations in the HRAS gene. In September 2017, we reported that our ongoing proof-of-concept Phase 2 clinical trial of tipifarnib in patients with HRAS mutant HNSCC achieved its primary efficacy endpoint. Following feedback from the FDA, and other regulatory authorities, we initiated a registration-directed clinical trial of tipifarnib in HRAS mutant HNSCC in November 2018. The global, multicenter, open label, two-cohort, non-comparative trial is designed to enroll at least 59 patients with HRAS mutant HNSCC who have received prior platinum-based therapy and is expected to take approximately two years to fully enroll. Following achievement of the primary efficacy endpoint in our proof-of-concept clinical trial of tipifarnib in patients with HRAS mutant HNSCC, we added a cohort to enroll patients having HRAS mutant SCCs, other than HNSCC. We anticipate having additional data from this Phase 2 clinical trial in the second half of 2019.

In addition to our tipifarnib development program in HRAS mutant solid tumors, we are evaluating the potential utility of tipifarnib using CXCL12 pathway biomarkers in a number of hematologic and solid tumor indications. In December 2018, we reported preliminary data from our Phase 2 clinical trial of tipifarnib in patients with relapsed or refractory PTCL. The data showed a significant association between CXCL12 expression and clinical benefit, as well as clinical proof-of-concept in patients with AITL, an aggressive form of PTCL often characterized by high levels of CXCL12 expression. We anticipate having additional data from this study in mid-2019.

We are also exploring the utility of CXCL12 pathway biomarkers as a strategy for patient enrichment in patients with relapsed or refractory AML and CMML in an ongoing Phase 2 clinical trial. We anticipate having additional data from the CMML clinical trial in 2019. Additionally, in January 2019, we reported the identification of a potential association between CXCL12 expression and clinical benefit from tipifarnib in patients with pancreatic cancer. We believe these findings support the potential use of tipifarnib in a broader set of hematologic and solid tumor indications, including pancreatic cancer, in which the CXCL12 pathway plays a role in tumor initiation and progression, and we are exploring opportunities for further clinical development.

Our second product candidate is KO-947, a potent and selective small molecule inhibitor of ERK, which we are advancing as a potential treatment for patients with tumors that have dysregulated activity due to mutations or other mechanisms in the MAPK pathway. Our preclinical data suggest that KO-947 has anti-tumor activity in KRAS- or BRAF-mutant adenocarcinomas as well as certain subsets of squamous cell carcinomas. Our Phase 1 trial of KO-947 in patients with solid tumors is ongoing, and we anticipate having data from the dose-escalation portion of the trial in 2019.

Our third product candidate is KO-539, a potent and selective small molecule inhibitor of the menin-MLL protein-protein interaction. We have generated preclinical data that support the potential anti-tumor activity of KO-539 in genetically defined subsets of acute leukemia, including those with rearrangements or partial tandem duplications in the MLL gene as well as those with oncogenic driver mutations in genes such as NPM1. Our IND application for KO-539 has been cleared by the FDA and we anticipate initiating our Phase 1 clinical trial in relapsed or refractory AML in the second quarter of 2019.

Liquidity Overview

As of December 31, 2018, we had cash, cash equivalents and short-term investments of $179.0 million. Under the terms of the SVB Loan Agreement as described below, we may, at our sole discretion, borrow from the lender up to an additional $12.5 million at any time until May 1, 2020. In January 2018, we sold an aggregate of 3,136,722 shares of common stock under the ATM facility that generated net proceeds of $57.4 million. The ATM facility was terminated in July 2018. In July 2018, we completed a public offering in which we sold an aggregate of 4,600,000 shares of common stock for net proceeds of $74.5 million. To date, we have not generated any revenues from product sales, and we do not have any approved products. Since our inception, we have funded our operations primarily through equity and debt financings. We anticipate that we will require significant additional financing in the future to continue to fund our operations as discussed more fully below under the heading “Liquidity and Capital Resources.”

Financial Operations Overview

Research and Development Expenses

We focus on the research and development of our product programs. Our research and development expenses consist of costs associated with our research and development activities including salaries, benefits, share-based compensation and other personnel costs, clinical trial costs, manufacturing costs for non-commercial products, contract services and research supply, equipment and facility costs. All such costs are charged to research and development expense as incurred. Payments that we make in connection with in-licensed technology for a particular research and development project that have no alternative future uses in other research and development projects or otherwise and therefore, no separate economic values, are expensed as research and development costs at the time such costs are incurred. As of December 31, 2018, we have no in-licensed technologies that have alternative future uses in research and development projects or otherwise.

We cannot determine with certainty the timing of initiation, the duration or the completion costs of current or future preclinical studies and clinical trials of our product candidates. At this time, due to the inherently unpredictable nature of preclinical and clinical development, we are unable to estimate with any certainty the costs we will incur and the timelines we will require in the continued development of our product candidates and our other pipeline programs. Clinical and preclinical development timelines, the probability of success and development costs can differ materially from expectations. Our future research and development expenses will depend on the preclinical and clinical success of each product candidate that we develop, as well as ongoing assessments of the commercial potential of such product candidates. In addition, we cannot forecast which product candidates may be subject to future collaborations, when such arrangements will be secured, if at all, and to what degree such arrangements would affect our development plans and capital requirements.

Completion of clinical trials may take several years or more, and the length of time generally varies according to the type, complexity, novelty and intended use of a product candidate. The cost of clinical trials may vary significantly over the life of a project as a result of differences arising during clinical development, including, among others:

- per patient clinical trial costs;
- the number of clinical trials required for approval;
- the number of sites included in the clinical trials;
- the length of time required to enroll suitable patients;
- the number of doses that patients receive;

- the number of patients that participate in the clinical trials;
- the drop-out or discontinuation rates of patients;
- the duration of patient follow-up;
- potential additional safety monitoring or other studies requested by regulatory agencies;
- the number and complexity of analyses and tests performed during the clinical trial;
- the phase of development of the product candidate; and
- the efficacy and safety profile of the product candidate.

General and Administrative Expenses

General and administrative expenses consist primarily of salaries, benefits, share-based compensation and other personnel costs for employees in executive, finance, business development and support functions. Other significant general and administrative expenses include the costs associated with obtaining and maintaining our patent portfolio, professional services for audit, legal and investor and public relations, corporate activities and allocated facilities.

Other Income (Expense)

Other income (expense) consists primarily of management fee income, interest income, interest expense and loss on the extinguishment of debt. Management fee income is earned in accordance with the management services agreement, as amended, with Araxes. Interest expense mainly consists of interest on long-term debt. In 2018, we recorded a loss on the extinguishment of debt in connection with our entry into the SVB Loan Agreement in November 2018.

Income Taxes

We have incurred net losses and have not recorded any U.S. federal or state income tax benefits for the losses as they have been offset by valuation allowances.

Results of Operations

Comparison of Fiscal Years Ended December 31, 2018 and 2017

The following table sets forth our results of operations for the years presented, in thousands:

	Years Ended December 31,		
	2018	2017	Change
Research and development expenses	$ 46,787	$ 26,426	$ 20,361
General and administrative expenses	16,096	9,651	6,445
Other income, net	2,436	643	1,793

Research and Development Expenses. The following table illustrates the components of our research and development expenses for the years presented, in thousands:

	Years Ended December 31,		
	2018	2017	Change
Tipifarnib-related costs	$ 27,762	$ 12,889	$ 14,873
KO-947-related costs	3,149	3,183	(34)
KO-539-related costs	3,946	2,160	1,786
Personnel costs and other expenses	7,307	5,146	2,161
Share-based compensation expense	4,623	3,048	1,575
Total research and development expenses	$ 46,787	$ 26,426	$ 20,361

The increase in tipifarnib-related research and development expenses for the year ended December 31, 2018 compared to the prior year was primarily due to increases of $11.1 million in start-up costs related to our registration-directed clinical trial, clinical development expenses related to our other ongoing Phase 2 clinical trials and companion diagnostics activities and $3.7 million in manufacturing activities. The increase in KO-539-related research and development expenses was primarily due to an increase in out-sourced expenses related to IND-enabling studies. Personnel costs and other expenses include employee salaries and related expenses, facilities expense and overhead expenses. The increases in personnel costs and other expenses and share-based compensation expense were to support the increased research and development expenses for our product candidates. We expect our research and development expenses to increase in future periods as we continue clinical development activities for tipifarnib and KO-947 and advance KO-539 towards the clinic.

General and Administrative Expenses. The increase in general and administrative expenses for the year ended December 31, 2018 compared to the prior year was primarily due to increases of $2.5 million in share-based compensation, $1.8 million in personnel costs, $1.0 million in patent related costs and $0.6 million in legal and professional fees and compliance expenses. We expect our general and administrative expenses to increase in future periods to support our planned increase in research and development activities.

Other income, net. The increase in other income, net, for the year ended December 31, 2018 compared to the prior year was primarily due to an increase of $2.4 million in interest income offset by a $0.5 million loss on the extinguishment of debt.

Liquidity and Capital Resources

As of December 31, 2018, we had cash, cash equivalents and short-term investments of $179.0 million. Since our inception, we have funded our operations primarily through equity and debt financings. We have devoted our resources to funding research and development programs, including discovery research, preclinical and clinical development activities.

In November 2018, we entered into a loan and security agreement, or the SVB Loan Agreement, with Silicon Valley Bank, or the Lender, providing for up to $20.0 million in a series of term loans. Upon entering into the SVB Loan Agreement, we borrowed the Term A Loan of $7.5 million, the proceeds of which, in part, were used to pay off the outstanding balance of the debt under the loan and security agreement with Oxford Finance LLC and Silicon Valley Bank dated April 27, 2016, as amended in May 2017 and October 2017, or the SVB-Oxford Term Loan. Net proceeds from the Term A Loan, after payoff of the SVB-Oxford Term Loan, were approximately $0.6 million. Under the terms of the SVB Loan Agreement, we may, at our sole discretion, borrow the Term B Loan, which provides for up to an additional $12.5 million at any time until May 1, 2020. In addition, each Term B Loan must be in an amount equal to the lesser of $5.0 million or the amount that is remaining under the Term B Loan. All of the Term Loans will be due on the scheduled maturity date of May 1, 2023, or Maturity Date. Repayment of the Term Loans is interest only through November 30, 2020, followed by 30 equal monthly payments of principal plus accrued interest commencing on December 1, 2020. The per annum interest rate for the Term Loans is the greater of (i) 5.50% and (ii) the sum of (a) the prime rate reported in The Wall Street Journal plus (b) 0.25%. In addition, a final payment of 7.75% of the amounts of the Term Loans drawn will be due on the earlier of the Maturity Date, acceleration or prepayment of the Term Loans. If we elect to prepay the Term Loans, a prepayment fee equal to 1%, 2% or 3% of the then outstanding principal balance also will be due, depending upon when the prepayment occurs. See Note 8, Long-Term Debt, in the Notes to Financial Statements for further details of the term loan facility.

Our obligations under the SVB Loan Agreement are secured by substantially all of our assets other than our intellectual property, but including proceeds from the sale, licensing or other disposition of our intellectual property. Our intellectual property is subject to negative covenants, which, among other things, prohibit us from selling, transferring, assigning, mortgaging, pledging, leasing, granting a security interest in or otherwise encumbering our intellectual property, subject to limited exceptions.

In July 2018, we completed a public offering in which we sold an aggregate of 4,600,000 shares of common stock at a price of $16.75 per share. Net proceeds from the public offering, after deducting underwriting discounts, commissions and offering expenses, were approximately $74.5 million.

In January 2018, we sold an aggregate of 3,136,722 shares of our common stock under the ATM facility at a weighted average price per share of $18.85, for net proceeds of approximately $57.4 million, after deducting commissions and offering expenses. We entered into the ATM facility with Cowen in January 2017, which was amended in November 2017 and March 2018, under which we could offer and sell, from time to time, in our sole discretion, shares of common stock having aggregate proceeds of up to $160.0 million through Cowen as our sales agent. We terminated the ATM facility in July 2018.

In August 2017, we completed a public offering in which we sold an aggregate of 8,805,000 shares of common stock at a price of $6.50 per share. Net proceeds from the public offering, after deducting underwriting discounts, commissions and offering expenses, were approximately $53.5 million.

We believe that our existing cash, cash equivalents and short-term investments, including the proceeds available under our term loan facility, will be sufficient to fund our current operations into 2021. However, we will require significant additional financing in the future to continue to fund our operations. We may need to raise additional funds sooner than expected to pursue other development activities related our pipeline programs. We may seek to obtain additional financing in the future through equity or debt financings or through collaborations, strategic partnerships or licensing arrangements with other companies. If we are unable to obtain additional financing on commercially reasonable terms, our business, financial condition and results of operations will be materially adversely affected.

We have incurred operating losses since inception and negative cash flows from operating activities. As of December 31, 2018, we had an accumulated deficit of $149.7 million. We expect to continue to incur significant losses for the foreseeable future, and we expect the losses to increase as we continue the development of, and seek regulatory approvals for, our product candidates and begin to commercialize any approved products. Our net losses may fluctuate significantly from quarter-to-quarter and year-to-year. To date, we have not generated any revenues from product sales, and we do not have any approved products. We do not know when, or if, we will generate any revenue from product sales. We do not expect to generate significant revenue from product sales unless and until we obtain regulatory approval of and commercialize one of our current or future product candidates. We are subject to all of the risks incident in the development of new therapeutic products, and we may encounter unforeseen expenses, difficulties, complications, delays and other unknown factors that may adversely affect our business. We anticipate that we will need substantial additional funding in connection with our continuing operations.

Until such time, if ever, as we can generate substantial product revenues, we expect to finance our cash needs through a combination of stock offerings, debt financings, collaborations, strategic partnerships or licensing arrangements. Other than our term loan facility, we do not have any committed external source of funds. Additional capital may not be available on reasonable terms, if at all. Subject to limited exceptions, our term loan facility also prohibits us from incurring indebtedness without the prior written consent of the Lender. To the extent that we raise additional capital through the sale of stock or convertible debt securities, the ownership interest of our stockholders will be diluted, and the terms of these securities may include liquidation or other preferences that adversely affect the rights of our common stockholders. Debt financing, if available, may involve agreements that include increased fixed payment obligations and covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures, declaring dividends, selling or licensing intellectual property rights and other operating restrictions that could adversely impact our ability to conduct our business. If we raise additional funds through collaborations, strategic partnerships or licensing arrangements with third parties, we may have to relinquish valuable rights to our product candidates, including our other technologies, future revenue streams or research programs, or grant licenses on terms that may not be favorable to us. If we are unable to raise additional funds when needed, we may be unable to carry out our business plan. As a result, we may be required to delay, limit, reduce or terminate our product development or future commercialization efforts or grant rights to develop and commercialize our product candidates even if we would otherwise prefer to develop and commercialize such product candidates ourselves, and our business, financial condition and results of operations would be materially adversely affected.

The following table provides a summary of our net cash flow activities for the years presented, in thousands:

	Years Ended December 31,		
	2018	2017	Change
Net cash used in operating activities	$ (48,655)	$ (28,441)	$ (20,214)
Net cash used in investing activities	(79,300)	(23,418)	(55,882)
Net cash provided by financing activities	132,641	53,567	79,074

Operating Activities – The increase of $20.2 million in net cash used in operating activities for the year ended December 31, 2018 compared to the prior year was primarily due to a higher net loss of $25.0 million and an increase of $1.7

million in amortization of premiums and accretions of discounts on marketable securities, offset by increases of $4.1 million in share-based compensation, $2.1 million in payments of accounts payable and accrued expenses and a $0.5 million loss on extinguishment of debt.

Investing Activities –The increase of $55.9 million in net cash used in investing activities for the year ended December 31, 2018 as compared to the prior year was primarily due to an increase of $136.8 million in purchases of marketable securities, offset by an increase of $80.9 million in maturities of marketable securities.

Financing Activities – Net cash provided by financing activities for the year ended December 31, 2018 consisted primarily of proceeds from the sale of common stock under the ATM facility in January 2018 and our July 2018 public offering totaling approximately $132.2 million. Net cash provided by financing activities for the year ended December 31, 2017 consisted primarily of approximately $53.5 million in net proceeds from the sale of common stock from our August 2017 public offering.

Off-Balance Sheet Arrangements

We do not have any off-balance sheet arrangements, as defined by applicable regulations of the SEC, that are reasonably likely to have a current or future material effect on our financial condition, results of operations, liquidity, capital expenditures or capital resources.

Critical Accounting Policies and Management Estimates

The SEC defines critical accounting policies as those that are, in management's view, important to the portrayal of our financial condition and results of operations and demanding of management's judgment. Management's discussion and analysis of our financial condition and results of operations are based on our financial statements, which have been prepared in accordance with U.S. generally accepted accounting principles. The preparation of these financial statements required estimates and judgments that affect the reported amounts of assets, liabilities, and expenses and the disclosure of contingent assets and liabilities in the financial statements. On an ongoing basis, we evaluate our estimates and judgments, including those related to accrued expenses and share-based compensation. We base our estimates on historical experience, known trends and events, and various other factors that are believed to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

While our significant accounting policies are described in more detail in Note 2 to Financial Statements of this Annual Report, we believe the following accounting policies are critical to the judgments and estimates used in the preparation of our financial statements.

Research and Development Expenses

We make estimates of our accrued expenses as of each balance sheet date in our financial statements based on facts and circumstances known to us at that time. If the actual timing of the performance of services or the level of effort varies from the estimate, we will adjust the accrual accordingly. Nonrefundable advance payments for goods and services, including fees for process development or manufacturing and distribution of clinical supplies that will be used in future research and development activities, are deferred and recognized as expense in the period that the related goods are consumed or services are performed. Payments that we make in connection with in-licensed technology for a particular research and development project that have no alternative future uses, in other research and development projects or otherwise, and therefore no separate economic values are expensed as research and development costs at the time such costs are incurred.

Clinical Trial Costs and Accruals

We accrue clinical trial costs based on work performed. In determining the amount to accrue, we rely on estimates of total costs incurred based on enrollment, the completion of clinical trials and other events. We follow this method because we believe reasonably dependable estimates of the costs applicable to various stages of a clinical trial can be made. However, the actual costs and timing of clinical trials are highly uncertain, subject to risks and may change depending on a number of factors. Differences between the actual clinical trial costs and the estimated clinical trial costs that we have accrued in any prior period are recognized in the subsequent period in which the actual costs become known. Historically, our estimated accrued expenses have approximated actual expense incurred; however, material differences could occur in the future.

Share-Based Payments

We account for share-based compensation expense related to stock options granted to employees, members of our board of directors, and non-employee consultants by estimating the fair value of each stock option on the date of grant using the Black-Scholes options-pricing model, or Black-Scholes model. The Black-Scholes model requires the use of subjective assumptions, including fair value of the underlying common stock, volatility, expected term, risk free interest rate, and the expected dividend yield. The fair value of awards expected to vest are recognized and amortized on a straight-line basis over the requisite service period of the award less actual forfeitures. In accordance with authoritative guidance, the fair value of non-employee share-based awards is remeasured as the awards vest, and the resulting change in value, if any, is recognized as expense during the period the related services are rendered.

Recently Adopted Accounting Pronouncements

See Note 3, Recent Accounting Pronouncements, in the Notes to Financial Statements of this Annual Report.

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

Not required for smaller reporting companies.

Item 8. Financial Statements and Supplementary Data.

The financial statements required pursuant to this item are included in Item 15 of this Annual Report and are presented beginning on page F-1.

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

None.

Item 9A. Controls and Procedures.

We maintain disclosure controls and procedures that are designed to ensure that information required to be disclosed in our reports required by the Exchange Act is recorded, processed, summarized and reported within the timelines specified in the SEC's rules and forms, and that such information is accumulated and communicated to our management, including our Chief Executive Officer and Chief Financial Officer, as appropriate, to allow timely decisions regarding required disclosure. In designing and evaluating the disclosure controls and procedures, management recognized that any controls and procedures, no matter how well designed and operated, can only provide reasonable assurance of achieving the desired control objectives, and in reaching a reasonable level of assurance, management was required to apply its judgment in evaluating the cost-benefit relationship of possible controls and procedures.

As required by SEC Rule 13a-15(b), we carried out an evaluation, under the supervision and with the participation of our management, including our Chief Executive Officer and Chief Financial Officer, of the effectiveness of the design and operation of our disclosure controls and procedures as of the end of the period covered by this Annual Report. Based on the foregoing, our Chief Executive Officer and Chief Financial Officer concluded that our disclosure controls and procedures were effective at the reasonable assurance level.

Management's Report on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act. Under the supervision and with the participation of our management, including our Chief Executive Officer and Chief Financial Officer, we conducted an evaluation of the effectiveness of our internal control over financial reporting based on criteria established in the framework in *Internal Control — Integrated Framework (2013 Framework)* issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on this evaluation, our management concluded that our internal control over financial reporting was effective as of December 31, 2018.

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 risks that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

This Annual Report does not include an attestation report of our independent registered public accounting firm due to a transition period established by the JOBS Act for emerging growth companies.

Change in Internal Control Over Financial Reporting

There were no changes in our internal control over financial reporting identified in connection with management's evaluation of such internal control that occurred during the quarter ended December 31, 2018 that have materially affected, or are reasonably likely to material 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 and not set forth below will be set forth in the sections headed "Election of Directors" and "Executive Officers" in our definitive proxy statement for our 2019 Annual Meeting of Stockholders, or Proxy Statement, to be filed with the SEC within 120 days after the end of the fiscal year ended December 31, 2018, and is incorporated herein by reference.

We have adopted a written code of ethics for directors, officers, including our principal executive officer and our principal financial and accounting officer, and employees, known as the Code of Business Conduct and Ethics. The Code of Business Conduct and Ethics is available on our website at *www.kuraoncology.com* under the Corporate Governance section of our Investors and Media page. We will promptly disclose on our website (i) the nature of any amendment to the Code of Business Conduct and Ethics that applies to our principal executive officer, principal financial officer, principal accounting officer or controller, or persons performing similar functions and (ii) the nature of any waiver, including an implicit waiver, from a provision of the Code of Business Conduct and Ethics that is granted to one of these specified individuals that is required to be disclosed pursuant to SEC rules and regulations, the name of such person who is granted the waiver and the date of the waiver.

Item 11. Executive Compensation.

The information required by this item will be set forth in the sections headed "Executive Compensation" and "Non-Employee Director Compensation" in our Proxy Statement 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 will be set forth in the section headed "Security Ownership of Certain Beneficial Owners and Management" in our Proxy Statement and is incorporated herein by reference.

The information required by Item 201(d) of Regulation S-K will be set forth in the section headed "Executive Compensation" in our Proxy Statement and is incorporated herein by reference.

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

The information required by this item will be set forth in the sections headed "Certain Relationships and Related Party Transactions" and "Information Regarding the Board of Directors and Corporate Governance" in our Proxy Statement and is incorporated herein by reference.

Item 14. Principal Accounting Fees and Services.

The information required by this item will be set forth in the section headed "Ratification of Selection of Independent Registered Public Accounting Firm" in our Proxy Statement and is incorporated herein by reference.

PART IV

Item 15. Exhibits, Financial Statement Schedules.

1. *Financial Statements*. We have filed the following documents as part of this Annual Report:

	Page
Report of Independent Registered Public Accounting Firm	F-2
Balance Sheets	F-3
Statements of Operations and Comprehensive Loss	F-4
Statements of Stockholders' Equity	F-5
Statements of Cash Flows	F-6
Notes to Financial Statements	F-7

2. *Financial Statement Schedules.*

There are no financial statement schedules provided because the information called for is either not required or is shown either in the financial statements or the notes thereto.

3. *Exhibits*

Exhibit Number	Description	Filed Herewith	Incorporated by Reference herein from Form or Schedule	Filing Date	SEC File/Reg. Number
2.1	Agreement and Plan of Merger, dated March 6, 2015, by and among the Registrant, Kura Operations, Inc. and Kura Oncology, Inc.		8-K (Exhibit 2.1)	3/12/2015	000-53058
2.2	Agreement and Plan of Merger, dated March 6, 2015, by and between the Registrant and Kura Oncology, Inc., relating to the name change of the Registrant.		8-K (Exhibit 2.2)	3/12/2015	000-53058
3.1	Amended and Restated Certificate of Incorporation of the Registrant, as amended.		8-K (Exhibit 3.1)	6/14/2017	001-37620
3.2	Amended and Restated Bylaws of the Registrant.		8-K (Exhibit 3.2)	6/14/2017	001-37620
4.1	Form of Common Stock certificate.		8-K (Exhibit 4.1)	3/12/2015	000-53058
4.2	Warrant to Purchase Stock by Registrant on April 27, 2016 to Oxford Finance LLC.		10-Q (Exhibit 4.3)	8/10/2016	001-37620
10.1+	Kura Oncology, Inc. Amended and Restated 2014 Equity Incentive Plan and Forms of Stock Option Agreement, Notice of Exercise and Stock Option Grant Notice thereunder.		8-K (Exhibit 10.1)	3/12/2015	000-53058
10.2+	Form of Restricted Stock Purchase Agreement and Restricted Stock Purchase Award Notice under the Kura Oncology, Inc. Amended and Restated 2014 Equity Incentive Plan.		8-K (Exhibit 10.2)	3/12/2015	000-53058
10.3+	Kura Oncology, Inc. 2015 Employee Stock Purchase Plan.		8-K (Exhibit 10.3)	3/12/2015	000-53058

Exhibit Number	Description	Filed Herewith	Incorporated by Reference herein from Form or Schedule	Filing Date	SEC File/Reg. Number
10.4+	Form of Indemnification Agreement by and between the Registrant and each of its directors and officers.		8-K (Exhibit 10.4)	3/12/2015	000-53058
10.5*	License Agreement, dated December 18, 2014, by and between the Registrant and Janssen Pharmaceutica NV.		8-K/A (Exhibit 10.6)	7/2/2015	000-53058
10.6*	Amended and Restated Asset Purchase Agreement, dated February 12, 2015, by and between the Registrant and Araxes Pharma LLC.		8-K (Exhibit 10.7)	3/12/2015	000-53058
10.7	Sublease, dated December 20, 2016, by and between the Registrant and Wellspring Biosciences, Inc.		10-K (Exhibit 10.11)	3/14/2017	001-37620
10.8*	Patent License Agreement, effective as of December 22, 2014, by and between the Registrant and the Regents of the University of Michigan, as amended on March 3, 2015, July 22, 2015, September 29, 2016, February 1, 2017.		10-K (Exhibit 10.12)	3/14/2017	001-37620
10.9*	Fifth Amendment to Patent License Agreement, effective as of May 24, 2017, by and between the Registrant and the Regents of the University of Michigan.		10-Q (Exhibit 10.2)	8/7/2017	001-37620
10.10+	Kura Oncology, Inc. Amended and Restated Non-Employee Director Compensation Policy.		10-K (Exhibit 10.10)	3/12/2018	001-37620
10.11*	Services Agreement, effective as of October 1, 2014, by and between the Registrant and Wellspring Biosciences, Inc.		S-1/A (Exhibit 10.13)	6/2/2015	333-203503
10.12*	Management Services Agreement, effective as of October 1, 2014, by and between the Registrant and Araxes Pharma LLC.		S-1/A (Exhibit 10.14)	6/2/2015	333-203503
10.13	Office Lease Agreement, dated August 1, 2015, by and between the Registrant and 55 Cambridge Parkway, LLC.		S-1 (Exhibit 10.16)	10/20/2015	333-207534
10.14+	Amended and Restated Executive Employment Agreement, effective as of January 29, 2016, by and between the Registrant and Troy E. Wilson, Ph.D., J.D.		10-K (Exhibit 10.15)	3/17/2016	001-37620
10.15+	Amended and Restated Executive Employment Agreement, effective as of January 29, 2016, by and between the Registrant and Antonio Gualberto, M.D., Ph.D.		10-K (Exhibit 10.16)	3/17/2016	001-37620
10.16+	Amended and Restated Executive Employment Agreement, effective as of January 29, 2016, by and between the Registrant and Annette North.		10-K (Exhibit 10.17)	3/17/2016	001-37620
10.17	First Amendment to Management Services Agreement, effective as of April 1, 2016, by and between the Registrant and Araxes Pharma LLC.		10-Q (Exhibit 10.1)	8/10/2016	001-37620

Exhibit Number	Description	Filed Herewith	Incorporated by Reference herein from Form or Schedule	Filing Date	SEC File/Reg. Number
10.18	Amendment No. 1 to License Agreement, dated June 6, 2016, by and between the Registrant and Janssen Pharmaceutica NV.		10-Q (Exhibit 10.3)	8/10/2016	001-37620
10.19*	Sixth Amendment to Patent License Agreement, effective as of August 24, 2017, by and between the Registrant and the Regents of the University of Michigan.		10-K (Exhibit 10.23)	3/12/2018	001-37620
10.20	Second Amendment to Management Services Agreement, effective as of April 1, 2018, by and between the Registrant and Araxes Pharma LLC.		10-Q (Exhibit 10.1)	5/8/2018	001-37620
10.21+	Executive Employment Agreement, effective as of July 1, 2018, by and between the Registrant and John Farnam.		10-Q (Exhibit 10.5)	8/6/2018	001-37620
10.22+	Executive Employment Agreement, effective as of August 21, 2018, by and between the Registrant and Marc Grasso, M.D.		10-Q (Exhibit 10.2)	11/5/2018	001-37620
10.23	Loan and Security Agreement, dated as of November 1, 2018, by and between the Registrant and Silicon Valley Bank.		10-Q (Exhibit 10.3)	11/5/2018	001-37620
10.24	First Amendment to Sublease, dated March 1, 2019, by and between the Registrant and Wellspring Biosciences, Inc.	X			
23.1	Consent of Independent Registered Public Accounting Firm.	X			
24.1	Power of Attorney (see signature page).	X			
31.1	Certification of Principal Executive Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.	X			
31.2	Certification of Principal Financial Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.	X			
32.1	Certifications of Principal Executive Officer and Principal Financial Officer pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, 18 U.S.C. 1350.	X			
101.INS	XBRL Instance Document.	X			
101.SCH	XBRL Taxonomy Extension Schema Document.	X			
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document.	X			
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document.	X			
101.LAB	XBRL Taxonomy Extension Label Linkbase Document.	X			

Exhibit Number	Description	Filed Herewith	Incorporated by Reference herein from Form or Schedule	Filing Date	SEC File/Reg. Number
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document.	X			

+ Indicates management contract or compensatory plan.

* Confidential treatment has been granted with respect to certain portions of this exhibit. Omitted portions have been filed separately with the SEC.

Item 16. Form 10-K Summary.

None.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, as amended, the registrant has duly caused this Annual Report to be signed on its behalf by the undersigned, thereunto duly authorized**.**

Kura Oncology, Inc.

Date: March 5, 2019

By: /s/ Troy E. Wilson, Ph.D., J.D.
Troy E. Wilson, Ph.D., J.D.
President and Chief Executive Officer

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints Troy E. Wilson, Ph.D., J.D. and Marc Grasso, M.D., and each of them, as his or her true and lawful attorneys-in-fact, each with full power of substitution, for him or her in any and all capacities, to sign any amendments to this Annual Report on Form 10-K and to file the same, with exhibits thereto and other documents in connection therewith, with SEC, hereby ratifying and confirming all that each of said attorneys-in-fact or their substitute or substitutes may do or cause to be done by virtue hereof.

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

Name	Title	Date
/s/ Troy E. Wilson, Ph.D., J.D. **Troy E. Wilson, Ph.D., J.D.**	President, Chief Executive Officer and Chairman of the Board of Directors *(Principal Executive Officer)*	March 5, 2019
/s/ Marc Grasso, M.D. **Marc Grasso, M.D.**	Chief Financial Officer and Chief Business Officer *(Principal Financial and Accounting Officer)*	March 5, 2019
/s/ Faheem Hasnain **Faheem Hasnain**	Director	March 5, 2019
/s/ Robert E. Hoffman **Robert E. Hoffman**	Director	March 5, 2019
/s/ Thomas Malley **Thomas Malley**	Director	March 5, 2019
/s/ Steven H. Stein, M.D. **Steven H. Stein, M.D.**	Director	March 5, 2019
/s/ Mary Szela **Mary Szela**	Director	March 5, 2019

KURA ONCOLOGY, INC.

INDEX TO FINANCIAL STATEMENTS

Report of Independent Registered Public Accounting Firm F-2

Balance Sheets as of December 31, 2018 and 2017 ..... F-3

Statements of Operations and Comprehensive Loss for the Years Ended December 31, 2018 and 2017 ..... F-4

Statements of Stockholders' Equity for the Years Ended December 31, 2018 and 2017 ..... F-5

Statements of Cash Flows for the Years Ended December 31, 2018 and 2017 ..... F-6

Notes to Financial Statements F-7

Report of Independent Registered Public Accounting Firm

The Board of Directors and Stockholders of Kura Oncology, Inc.

Opinion on the Financial Statements

We have audited the accompanying balance sheets of Kura Oncology, Inc. (the Company) as of December 31, 2018 and 2017, the related statements of operations and comprehensive loss, stockholders' equity and cash flows for each of the two years in the period ended December 31, 2018, and the related notes (collectively referred to as the "financial statements"). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2018 and 2017, and the results of its operations and its cash flows for each of the two years in the period ended December 31, 2018, in conformity with U.S. generally accepted accounting principles.

Basis for Opinion

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

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion.

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

/s/ Ernst & Young LLP

We have served as the Company's auditor since 2015
San Diego, California
March 5, 2019

KURA ONCOLOGY, INC.
BALANCE SHEETS
(In thousands, except par value data)

	December 31,	
	2018	**2017**
Assets		
Current assets:		
Cash and cash equivalents	$ 16,119	$ 11,433
Short-term investments	162,866	81,712
Accounts receivable, related party	224	216
Prepaid expenses and other current assets	1,988	1,280
Total current assets	181,197	94,641
Property and equipment, net	—	10
Other long-term assets	1,182	1,200
Total assets	$ 182,379	$ 95,851
Liabilities and Stockholders' Equity		
Current liabilities:		
Accounts payable and accrued expenses	$ 13,385	$ 8,284
Accounts payable and accrued expenses, related party	230	216
Current portion of long-term debt, net	—	1,531
Total current liabilities	13,615	10,031
Long-term debt, net	7,500	5,567
Other long-term liabilities	279	388
Total liabilities	21,394	15,986
Commitments and contingencies (Note 10)		
Stockholders' equity:		
Preferred stock, $0.0001 par value; 10,000 shares authorized; no shares issued and outstanding	—	—
Common stock, $0.0001 par value; 200,000 shares authorized; 38,148 and 30,217 shares issued as of December 31, 2018 and 2017, respectively; and 38,148 and 29,424 shares outstanding as of December 31, 2018 and 2017, respectively, excluding zero and 793 shares subject to repurchase as of December 31, 2018 and 2017, respectively	4	3
Additional paid-in capital	310,849	169,201
Accumulated other comprehensive loss	(131)	(49)
Accumulated deficit	(149,737)	(89,290)
Total stockholders' equity	160,985	79,865
Total liabilities and stockholders' equity	$ 182,379	$ 95,851

See accompanying notes to financial statements.

KURA ONCOLOGY, INC.
STATEMENTS OF OPERATIONS AND COMPREHENSIVE LOSS
(In thousands, except per share data)

	Years Ended December 31,	
	2018	**2017**
Operating Expenses:		
Research and development	$ 45,766	$ 25,114
Research and development, related party	1,021	1,312
General and administrative	15,823	9,404
General and administrative, related party	273	247
Total operating expenses	62,883	36,077
Other Income (Expense):		
Management fee income, related party	735	780
Interest income	3,169	751
Interest expense	(970)	(888)
Loss from extinguishment of debt	(498)	—
Total other income	2,436	643
Net Loss	$ (60,447)	$ (35,434)
Net loss per share, basic and diluted	$ (1.72)	$ (1.52)
Weighted average number of shares used in computing net loss per share, basic and diluted	35,191	23,237
Comprehensive Loss:		
Net loss	$ (60,447)	$ (35,434)
Other comprehensive loss	(82)	(31)
Comprehensive loss	$ (60,529)	$ (35,465)

See accompanying notes to financial statements.

KURA ONCOLOGY, INC.
STATEMENTS OF STOCKHOLDERS' EQUITY
(In thousands)

	Common Stock		Additional Paid-In	Unrealized	Accumulated	Total Stockholders'
	Shares	Par Value	Capital	Loss	Deficit	Equity
Balance at December 31, 2016	19,348	2	110,748	(18)	(53,856)	56,876
Restricted stock awards vested	1,193	—	3	—	—	3
Share-based compensation expense	—	—	4,545	—	—	4,545
Issuance of common stock from exercise of options	47	—	232	—	—	232
Issuance of common stock, net of offering costs	8,836	1	53,673	—	—	53,674
Unrealized loss on marketable securities	—	—	—	(31)	—	(31)
Net loss	—	—	—	—	(35,434)	(35,434)
Balance at December 31, 2017	29,424	$ 3	$ 169,201	$ (49)	$ (89,290)	$ 79,865
Restricted stock awards vested	793	—	2	—	—	2
Share-based compensation expense	—	—	8,654	—	—	8,654
Issuance of common stock from exercise of options and employee stock purchase plan	194	—	1,092	—	—	1,092
Issuance of common stock, net of offering costs	7,737	1	131,900	—	—	131,901
Unrealized loss on marketable securities	—	—	—	(82)	—	(82)
Net loss	—	—	—	—	(60,447)	(60,447)
Balance at December 31, 2018	38,148	$ 4	$ 310,849	$ (131)	$ (149,737)	$ 160,985

See accompanying notes to financial statements.

KURA ONCOLOGY, INC.
STATEMENTS OF CASH FLOWS
(In thousands)

	Years Ended December 31,	
	2018	**2017**
Operating Activities		
Net loss	$ (60,447)	$ (35,434)
Adjustments to reconcile net loss to net cash used in operating activities:		
Share-based compensation expense	8,654	4,545
Non-cash interest expense	184	118
Loss on debt extinguishment	498	—
Depreciation expense	10	30
Amortization of premium and accretion of discounts on marketable securities, net	(1,935)	(260)
Changes in operating assets and liabilities:		
Accounts receivable, related party	(8)	79
Prepaid expenses and other current assets	(457)	(196)
Other long-term assets	(504)	(593)
Accounts payable and accrued expenses	5,102	3,606
Accounts payable and accrued expenses, related party	14	(554)
Other long-term liabilities	234	218
Net cash used in operating activities	(48,655)	(28,441)
Investing Activities		
Purchases of marketable securities	(237,443)	(100,635)
Maturities of marketable securities	158,143	77,217
Net cash used in investing activities	(79,300)	(23,418)
Financing Activities		
Proceeds from issuances of common stock, net	132,172	53,679
Proceeds from exercise of stock options and purchases under employee stock purchase plan	1,092	232
Proceeds from issuance of long-term debt, net	627	—
Repayment of long-term debt	(1,250)	—
Payment of fee related to long-term debt	—	(344)
Net cash provided by financing activities	132,641	53,567
Net increase in cash and cash equivalents	4,686	1,708
Cash and cash equivalents at beginning of period	11,433	9,725
Cash and cash equivalents at end of period	$ 16,119	$ 11,433
Supplemental disclosure of cash flow information:		
Interest paid	$ 641	$ 627

See accompanying notes to financial statements.

1. Organization and Basis of Presentation

Kura Oncology, Inc., is a clinical-stage biopharmaceutical company committed to realizing the promise of precision medicines for the treatment of cancer. Our pipeline consists of small molecule product candidates that target cancer signaling pathways where there is a strong scientific and clinical rationale to improve outcomes, and we intend to pair them with molecular or cellular diagnostics to identify those patients most likely to respond to treatment. We plan to advance our product candidates through a combination of internal development and strategic partnerships and maintain significant development and commercial rights.

References in these Notes to Financial Statements to "Kura Oncology, Inc.," "we," "our" or "us," refer to Kura Oncology, Inc., a private Delaware corporation incorporated in the State of Delaware in August 2014, for the periods prior to our reverse merger transaction which took place on March 6, 2015, or the Merger, and Kura Oncology, Inc., a Delaware corporation incorporated in November 2007 and formerly known as Zeta Acquisition Corp. III, for the periods following the Merger.

2. Summary of Significant Accounting Policies

Use of Estimates

Our financial statements are prepared in accordance with accounting principles generally accepted in the United States. The preparation of our financial statements requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of expenses during the reporting period.

Reported amounts and note disclosures reflect the overall economic conditions that are most likely to occur and anticipated measures management intends to take. Actual results could differ materially from those estimates. All revisions to accounting estimates are recognized in the period in which the estimates are revised and in any future periods affected.

Segment Reporting

Operating segments are identified as components of an enterprise about which separate discrete financial information is available for evaluation by our president and chief executive officer, the chief operating decision-maker, in making decisions regarding resource allocation and assessing performance. We operate in a single industry segment which is the discovery and development of precision medicines for the treatment of cancer. Our chief operating decision-maker reviews the operating results on an aggregate basis and manages the operations as a single operating segment.

Cash and Cash Equivalents

Cash and cash equivalents consist of checking, money market and highly liquid investments that are readily convertible to cash and that have an original maturity of three months or less. The carrying amounts approximate fair value due to the short maturities of these instruments.

Short-Term Investments

Short-term investments are marketable securities with maturities greater than three months from date of purchase that are specifically identified to fund current operations. These investments are classified as current assets, even though the stated maturity date may be one year or more beyond the current balance sheet date, which reflects management's intention to use the proceeds from sales of these securities to fund our operations, as necessary. The cost of short-term investments is adjusted for amortization of premiums or accretion of discounts to maturity, and such amortization or accretion is included in interest income. Dividend and interest income is recognized as interest income on the statements of operations and comprehensive loss when earned. Short-term investments are classified as available-for-sale securities and carried at fair value with unrealized gains and losses recorded in other comprehensive loss and included as a separate component of stockholders' equity. Realized gains and losses from the sale of available-for-sale securities and declines in value judged to be other than temporary on short-term investments, if any, are determined on a specific identification basis and are reclassified out of comprehensive loss and included in interest income on the statements of operations and comprehensive loss.

Fair Value Measurements

Fair value is defined as the exit price, representing the amount that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants. As such, fair value is a market-based measurement that should be determined based on assumptions that market participants would use in pricing an asset or liability. As a basis for considering such assumptions, the guidance establishes a three-tier fair value hierarchy, which prioritizes the inputs used in measuring fair value as follows:

- Level 1 - Quoted prices (unadjusted) in active markets for identical assets or liabilities;
- Level 2 - Inputs other than quoted prices included within Level 1 that are either directly or indirectly observable;
- Level 3 - Unobservable inputs in which little or no market activity exists, therefore requiring an entity to develop its own assumptions about the assumptions that market participants would use in pricing.

Concentration of Credit Risk

Financial instruments that potentially subject us to significant concentrations of credit risk consist primarily of cash, cash equivalents and short-term investments. We maintain deposits in federally insured financial institutions in excess of federally insured limits. We have established guidelines to limit our exposure to credit risk by placing investments with high credit quality financial institutions, diversifying our investment portfolio and placing investments with maturities that maintain safety and liquidity.

Property and Equipment

Property and equipment are stated at cost and depreciated using the straight-line method over the estimated useful lives of the assets. Computer software and equipment are depreciated over their estimated useful lives of three years.

Impairment of Long-Lived Assets

We review our long-lived assets for impairment whenever events or changes in circumstances indicate that the carrying value of an asset may not be recoverable. If such circumstances are determined to exist, an estimate of undiscounted future cash flows produced by the long-lived asset, including its eventual residual value, is compared to the carrying value to determine whether impairment exists. In the event that such cash flows are not expected to be sufficient to recover the carrying amount of the assets, the assets are written-down to their estimated fair values. While our current and historical operating losses and negative cash flows are indicators of impairment, we believe that future cash flows to be received support the carrying value of our long-lived assets and, accordingly, have not recognized any impairment losses through December 31, 2018.

Research and Development Expenses

Research and development expenses consist of costs associated with our research and development activities including salaries, benefits, share-based compensation and other personnel costs, clinical trial costs, manufacturing costs for non-commercial products, contract services and research supply, equipment and facility costs. All such costs are charged to research and development expense as incurred when these expenditures have no alternative future uses. We are obligated to make upfront payments upon execution of certain research and development agreements. Advance payments, including nonrefundable amounts, for goods or services that will be used or rendered for future research and development activities are deferred. Such amounts are recognized as expense as the related goods are delivered or the related services are performed or such time when we do not expect the goods to be delivered or services to be performed. Payments that we make in connection with in-licensed technology for a particular research and development project that have no alternative future uses, in other research and development projects or otherwise, and therefore no separate economic values are expensed as research and development costs at the time such costs are incurred. As of December 31, 2018, we have no in-licensed technologies that have alternative future uses in research and development projects or otherwise.

Clinical Trial Costs and Accruals

A significant portion of our clinical trial costs relate to contracts with contract research organizations, or CROs. The financial terms of our CRO contracts may result in payment flows that do not match the periods over which materials or services are provided to us under such contracts. Our objective is to reflect the appropriate clinical trial expenses in our financial statements by matching those expenses with the period in which services and efforts are expended. As part of the process of preparing our financial statements, we rely on cost information provided by our CROs, concerning monthly expenses as well as reimbursement for pass through costs. We are also required to estimate certain of our expenses resulting from our obligations under our CRO contracts. Accordingly, our clinical trial accrual is dependent upon the timely and accurate reporting of CROs and other third-party vendors. If the contracted amounts are modified, for instance, as a result of changes in the clinical trial protocol or scope of work to be performed, we modify our accruals accordingly on a prospective basis. Revisions in the scope of a contract are charged to expense in the period in which the facts that give rise to the revision become reasonably certain. Historically, we have had no material changes in clinical trial expense that had a material impact on our results of operations or financial position.

Patent Costs

We expense all costs as incurred in connection with patent applications, including direct application fees, and the legal and consulting expenses related to making such applications, and such costs are included in general and administrative expenses on the statements of operations and comprehensive loss.

Share-Based Payments

Our share-based awards are measured at fair value on the date of grant based upon the estimated fair value of common stock. The fair value of awards expected to vest are recognized and amortized on a straight-line basis over the requisite service period of the award less actual forfeitures. The fair value of each stock option is estimated on the date of grant using the Black-Scholes option pricing model, or Black-Scholes model, that requires the use of subjective assumptions including volatility, expected term, risk-free rate and the fair value of the underlying common stock.

Awards granted to non-employees are subject to periodic revaluation over their vesting terms. The fair value of non-employee awards is remeasured at each reporting period as the underlying awards vest unless the instruments are fully vested, immediately exercisable and nonforfeitable on the date of grant. We record the expense for stock option grants to non-employees based on the estimated fair value of the stock options using the Black-Scholes model. Estimated fair value of the restricted stock awards granted to non-employees is recorded on the earlier of the performance commitment date or the date the services required are completed and are remeasured at fair value during the service period. As non-employee restricted stock awards vest, they are remeasured at fair value and expensed based on the intrinsic value method which is measured as the difference between the exercise price paid for the restricted stock award and the fair value of the shares as the right of the repurchase lapses each vesting period.

Income Taxes

Income taxes are accounted for using the asset and liability method. Under the asset and liability method, deferred tax assets and liabilities are recognized for the future tax consequences attributable to differences between the financial carrying amounts of existing assets and liabilities and their respective tax bases and operating loss and tax credit carryforwards. Deferred tax assets and liabilities are measured using enacted tax rates applicable to taxable income in the years in which those temporary differences are expected to be recovered or settled. The effect on deferred tax assets and liabilities of a change in tax rates is recognized in income in the period that includes the enactment date. A valuation allowance against deferred tax assets is recorded if, based upon the weight of all available evidence, it is more likely than not that some or all of the deferred tax assets will not be realized. For uncertain tax positions that meet “a more likely than not” threshold, we recognize the benefit of uncertain tax positions in the financial statements.

Comprehensive Loss

Comprehensive loss is defined as the change in equity during the period from transactions and other events and non-owner sources. For the periods presented, accumulated other comprehensive loss consists of unrealized losses on marketable securities and foreign currency translation adjustments.

Net Loss per Share

Net loss per common share is calculated by dividing the net loss by the weighted-average number of common shares outstanding for the period, without consideration for common stock equivalents. Diluted net loss per share is calculated by dividing the net loss by the weighted-average number of common shares and common stock equivalents outstanding for the period determined using the treasury-stock method. Dilutive common stock equivalents are comprised of unvested restricted stock awards, outstanding stock options, outstanding warrants and employee stock purchase plan rights.

For all periods presented, there is no difference in the number of shares used to calculate basic and diluted shares outstanding due to the antidilutive effect of the securities. Because of our net loss, unvested restricted stock awards, outstanding stock options, outstanding warrants and employee stock purchase plan rights are excluded from the calculation of diluted net loss per common share for the periods presented, due to the anti-dilutive effect of the securities.

The following table summarizes the number of potentially dilutive securities that were excluded from our calculation of diluted net loss per share, in thousands:

	Years Ended December 31,	
	2018	**2017**
Stock options	3,186	2,233
Unvested restricted stock awards	—	793
Warrants	34	34
Employee stock purchase plan rights	5	—
Total	3,225	3,060

3. Recent Accounting Pronouncements

In February 2016, the Financial Accounting Standards Board, or FASB, issued Accounting Standards Update, or ASU, 2016-02, Leases (Topic 842), which provides principles for the recognition, measurement, presentation and disclosure of leases for both lessees and lessors. ASU 2016-02 was required to be adopted at the earliest period presented using a modified retrospective approach. Subsequently, the FASB issued practical expedients providing an alternative modified transition method for adoption of the new lease standard by recognizing a cumulative-effect adjustment to the opening balance sheet of retained earnings in the period of adoption and allowing issuers to carry forward their historical assessment of whether existing agreements are or contain a lease and the classification of existing lease arrangements. We adopted the new standard along with the available practical expedients on January 1, 2019 using the alternative modified transition method and will recognize a right-to-use asset and lease liability for all leases with terms greater than 12 months. We are still in the process of finalizing our assessment of the impact of ASC 842 on our financial statements and related disclosures.

4. Investments

We invest in available-for-sale securities consisting of money market funds, U.S. Treasury securities, corporate debt securities and commercial paper. Available-for-sale securities are classified as part of either cash and cash equivalents or short-term investments on the balance sheets.

The following tables summarize, by major security type, our investments that are measured at fair value on a recurring basis, in thousands:

		As of December 31, 2018			
	Maturities (years)	Amortized Cost	Unrealized Gains	Unrealized Losses	Fair Value
Cash equivalents:					
Money market funds	1 or less	$ 8,508	$ —	$ —	$ 8,508
Short-term investments:					
Commercial paper	1 or less	66,435	—	—	66,435
Corporate debt securities	1 or less	56,779	6	(77)	56,708
U.S. Treasury securities	1 or less	39,780	—	(57)	39,723
Total short-term investments		162,994	6	(134)	162,866
Total		$ 171,502	$ 6	$ (134)	$ 171,374

		As of December 31, 2017			
	Maturities (years)	Amortized Cost	Unrealized Gains	Unrealized Losses	Fair Value
Cash equivalents:					
Money market funds	1 or less	$ 5,848	$ —	$ —	$ 5,848
Commercial paper	1 or less	2,993	—	—	2,993
Total cash equivalents		8,841	—	—	8,841
Short-term investments:					
Commercial paper	1 or less	50,929	—	—	50,929
Corporate debt securities	1 or less	7,903	—	(7)	7,896
U.S. Treasury securities	2 or less	22,929	—	(42)	22,887
Total short-term investments		81,761	—	(49)	81,712
Total		$ 90,602	$ —	$ (49)	$ 90,553

The available-for-sale investments are classified as current assets, even though the stated maturity date may be one year or more beyond the current balance sheet date, which reflects management's intention to use the proceeds from sales of these securities to fund our operations, as necessary. As of December 31, 2018, all of our short-term investments had maturities less than one year. As of December 31, 2017, $76.7 million of our short-term investments had maturities less than one year and $5.0 million had maturities between one to two years. There were no realized gains or losses for the years ended December 31, 2018 and 2017. As of December 31, 2018, $93.5 million of our marketable securities were in gross unrealized loss positions, of which $5.0 million of U.S. Treasury securities had been in such position for greater than 12 months and subsequently matured in January 2019. As of December 31, 2017, $30.8 million of our marketable securities were in gross unrealized loss position, all of which had been in such position for less than 12 months.

At each reporting date, we perform an evaluation of our marketable securities to determine if any unrealized losses are other-than-temporary. Factors considered in determining whether a loss is other-than-temporary include (i) the financial strength of the issuing institution, (ii) the length of time and extent for which fair value has been less than the cost basis and (iii) our intent and ability to hold our investments in unrealized loss positions until their amortized cost basis has been recovered. Based on our evaluation, we determined that our unrealized losses were not other-than-temporary at December 31, 2018 and 2017.

5. Fair Value Measurements

As of December 31, 2018 and 2017, we had cash equivalents and short-term investments measured at fair value on a recurring basis. The carrying amounts of our financial instruments, which include cash equivalents, prepaid expenses, accounts payable, accrued expenses and all related party amounts approximate their fair values as of December 31, 2018 and 2017, primarily due to their short-term nature. Fair value estimates of these instruments are made at a specific point in time, based on relevant market information. These estimates may be subjective in nature and involve uncertainties and matters of significant judgment and therefore cannot be determined with precision.

Available-for-sale marketable securities consist of U.S. Treasury securities, which were measured at fair value using Level 1 inputs, and corporate debt securities and commercial paper, which were measured at fair value using Level 2 inputs. We determine the fair value of Level 2 related securities with the aid of valuations provided by third parties using proprietary valuation models and analytical tools. These valuation models and analytical tools use market pricing or prices for similar instruments that are both objective and publicly available, including matrix pricing or reported trades, benchmark yields, broker/dealer quotes, issuer spreads, two-sided markets, benchmark securities, bids and/or offers. We validate the fair values of Level 2 financial instruments by comparing these fair values to a third-party pricing source. No transfers between levels have occurred during the periods presented.

The following tables summarize, by major security type, our cash equivalents and short-term investments that are measured at fair value on a recurring basis and are categorized using the fair value hierarchy, in thousands:

	As of December 31, 2018		
	Balance	Level 1	Level 2
Cash equivalents:			
Money market funds	$ 8,508	$ 8,508	$ —
Short-term investments:			
Commercial paper	66,435	—	66,435
Corporate debt securities	56,708	—	56,708
U.S. Treasury securities	39,723	39,723	—
Total short-term investments	162,866	39,723	123,143
Total	$ 171,374	$ 48,231	$ 123,143

	As of December 31, 2017		
	Balance	Level 1	Level 2
Cash equivalents:			
Money market funds	$ 5,848	$ 5,848	$ —
Commercial paper	2,993	—	2,993
Total cash equivalents	8,841	5,848	2,993
Short-term investments:			
Commercial paper	50,929	—	50,929
Corporate debt securities	7,896	—	7,896
U.S. Treasury securities	22,887	22,887	—
Total short-term investments	81,712	22,887	58,825
Total	$ 90,553	$ 28,735	$ 61,818

We believe that our term loan facility bears interest at a rate that approximates prevailing market rates for instruments with similar characteristics and, accordingly, the carrying value of the term loan facility approximates fair value. The fair value of our term loan facility is determined using Level 2 inputs in the fair value hierarchy. See Note 8, Long-Term Debt, for further discussion of our term loan facility.

6. Property and Equipment, Net

Property and equipment consisted of the following, in thousands:

	December 31,	
	2018	2017
Computer software and equipment	$ 92	$ 92
Less: accumulated depreciation	(92)	(82)
Property and equipment, net	$ —	$ 10

Depreciation expense was $10,000 and $30,000 for the years ended December 31, 2018 and 2017, respectively.

7. Accounts Payable and Accrued Liabilities

Accounts payable and accrued liabilities consisted of the following, in thousands:

	December 31,	
	2018	2017
Accounts payable	$ 3,890	$ 1,248
Accrued compensation and benefits	3,437	2,345
Accrued research and development expenses	5,550	3,852
Other accrued expenses	508	839
Total accounts payable and accrued expenses	$ 13,385	$ 8,284

8. Long-Term Debt

In April 2016, we entered into a loan and security agreement with Oxford Finance LLC, or Oxford, and Silicon Valley Bank, or SVB, which was amended in May 2017 and October 2017, pursuant to which we borrowed $7.5 million, or SVB-Oxford Term Loan. We could, at our sole discretion, borrow up to an additional $12.5 million at a certain specified time. On October 31, 2017, the draw period for the additional loan expired without us drawing down the additional loan; therefore, we paid an unused fee of approximately $0.3 million on November 1, 2017. The unused fee was recorded as a debt discount in the year ended December 31, 2017 and was amortized to interest expense using the effective interest method.

The SVB-Oxford Term Loan would have matured on November 1, 2020. Repayment of the SVB-Oxford Term Loan was interest only through May 1, 2018, followed by 30 equal monthly payments of principal plus accrued interest commencing on June 1, 2018. The per annum interest rate for the SVB-Oxford Term Loan was the greater of (i) 7.75% and (ii) the sum of (a) the prime rate reported in The Wall Street Journal on the last business day of the month that immediately precedes the month in which the interest will accrue, plus (b) 4.25%. In addition, a final payment of 7.50% of the Term Loan, or approximately $0.6 million, was due upon prepayment of the SVB-Oxford Term Loan, as discussed below. The final payment was being accrued through interest expense using the effective interest method. In connection with the SVB-Oxford Term Loan, we issued warrants to purchase shares of our common stock. As of December 31, 2018, the warrant issued to Oxford to purchase up to 33,988 shares of our common stock at an exercise price of $3.31 per share remains outstanding.

On November 1, 2018, we entered into a loan and security agreement, or the SVB Loan Agreement, with SVB, or the Lender, providing for up to $20.0 million in a series of term loans. Upon entering into the SVB Loan Agreement, we borrowed $7.5 million, or Term A Loan. We used approximately $6.9 million of the proceeds from the Term A Loan to repay all amounts owed under the SVB-Oxford Loan Agreement, which included a prepayment charge of $0.1 million. The SVB Loan Agreement has substantially different terms than the SVB-Oxford Loan Agreement. In accordance with ASC 405, *Extinguishment of Liabilities* and ASC 470-50, *Debt Modifications and Extinguishments*, we accounted for the transaction as a debt extinguishment. Accordingly, we recorded a loss of approximately $0.5 million for the year ended December 31, 2018.

Under the terms of the SVB Loan Agreement, we may, at our sole discretion, borrow from the Lender up to an additional $12.5 million at any time between November 1, 2018 and May 1, 2020, or Term B Loan, and together with Term A Loan, the Term Loans. In addition, each Term B Loan must be in an amount equal to the lesser of $5.0 million or the amount that is remaining under the Term B Loan.

All of the Term Loans will be due on the scheduled maturity date of May 1, 2023, or Maturity Date. Repayment of the Term Loans will be interest only through November 30, 2020, followed by 30 equal monthly payments of principal plus accrued interest commencing on December 1, 2020. The per annum interest rate for any outstanding Term Loans is the greater of (i) 5.50% and (ii) the sum of (a) the prime rate reported in The Wall Street Journal plus (b) 0.25%. The interest rate as of December 31, 2018 was 5.75%. In addition, a final payment of 7.75% of the amounts of the Term Loans drawn will be due on the earlier of the Maturity Date, acceleration of any Term Loans, or prepayment of the Term Loans. If we elect to prepay the Term Loans, a prepayment fee equal to 1%, 2% or 3% of the then outstanding principal balance will also be due, depending upon when the prepayment occurs.

We are subject to customary affirmative and restrictive covenants under the term loan facility. Our obligations under the SVB Loan Agreement are secured by a first priority security interest in substantially all of our current and future assets, other than our intellectual property. We have also agreed not to encumber our intellectual property assets, except as permitted by the SVB Loan Agreement.

The SVB Loan Agreement also contains customary indemnification obligations and customary events of default, including, among other things, our failure to fulfill certain obligations under the SVB Loan Agreement and the occurrence of a material adverse change in our business, operations, or condition (financial or otherwise), a material impairment of the prospect of repayment of any portion of the loan, or a material impairment in the perfection or priority of Lender's lien in the collateral or in the value of such collateral. In the event of default by us under the SVB Loan Agreement, the Lender would be entitled to exercise their remedies thereunder, including the right to accelerate the debt, upon which we may be required to repay all amounts then outstanding under the SVB Loan Agreement. The conditional exercisable call option related to the event of default is considered to be an embedded derivative which is required to be bifurcated and accounted for as a separate financial instrument. In the periods presented, the value of the embedded derivative is not material, but could become material in future periods if an event of default became more probable than is currently estimated. As of December 31, 2018, we were in compliance with all financial covenants under the SVB Loan Agreement and there had been no material adverse change.

The following table summarizes future minimum payments under the term loan facility as of December 31, 2018, in thousands:

Year Ending December 31,	
2019	$ 436
2020	689
2021	3,342
2022	3,168
2023	1,849
Total future minimum payments	9,484
Less: interest payments	(1,984)
Principal amount of long-term debt	7,500
Current portion of long-term debt	—
Long-term debt, net	$ 7,500

9. License Agreements

Janssen License Agreement

In December 2014, we entered into a license agreement with Janssen Pharmaceutica NV, or Janssen, which was amended in June 2016, under which we received certain intellectual property rights related to tipifarnib in all indications other than virology for a non-refundable $1.0 million upfront license fee and payments upon achievement of certain development and sales-based milestones. Tipifarnib is a clinical stage compound and all ongoing development, regulatory and commercial work will be completed fully and at our sole expense. Under the license agreement, Janssen has a first right to negotiate for an exclusive license back from us to develop and commercialize tipifarnib on terms to be negotiated in good faith. Janssen could exercise this right of first negotiation during a 60-day period following delivery of clinical data as specified in the agreement. In June 2018, Janssen declined to exercise this first right to negotiate.

The agreement will terminate upon the last-to-expire patent rights or last-to-expire royalty term, or may be terminated by us with 180 days written notice of termination. Either party may terminate the agreement in the event of material breach of the agreement that is not cured within 45 days. Janssen may also terminate the agreement due to our lack of diligence that is not cured within a three-month period.

The University of Michigan License Agreement

In December 2014, we entered into a license agreement with the Regents of the University of Michigan, or the University of Michigan, which was amended in March 2015, July 2015, September 2016, February 2017, May 2017 and August 2017, under which we received certain license rights for a non-refundable upfront license, annual maintenance fees and payments upon achievement of certain development and sales-based milestones. The licensed asset consists of several compounds, including our development candidate KO-539. All future development, regulatory and commercial work on the asset will be completed fully and at our sole expense. The University of Michigan retains the right to use the asset for non-commercial research, internal and/or educational purposes, with the right to grant the same limited rights to other non-profit research institutions.

The agreement will terminate upon the last-to-expire patent rights, or may be terminated by us at any time with 90 days written notice of termination or terminated by the University of Michigan upon a bankruptcy by us, payment failure by us that is not cured within 30 days or a material breach of the agreement by us that is not cured within 60 days.

Future Milestone Payments under License Agreements

Collectively, all of our license agreements provide for specified development, regulatory and sales-based milestone payments up to a total of $80.0 million payable upon occurrence of each stated event, of which $0.5 million relates to the initiation of certain development activities, $28.7 million relates to the achievement of specified regulatory approvals for the first indication and up to $50.8 million for the achievement of specified levels of product sales. Additional payments will be due for each subsequent indication if specified regulatory approvals are achieved. All milestone payments under the agreements will be recognized as research and development expense upon completion of the required events because the triggering events are not considered to be probable until they are achieved. As of December 31, 2018, we have not achieved any milestones under the agreements. Furthermore, if all the programs are successfully commercialized, we will be required to pay tiered royalties on annual net product sales ranging from the low single digits to the low teens, depending on the volume of sales and the respective agreement.

Araxes Asset Purchase Agreement

In December 2014, we entered into an asset purchase agreement with Araxes Pharma LLC, or Araxes, which was amended and restated in February 2015, under which we purchased certain early stage patent rights related to compounds in the field of oncology for a purchase price of $0.5 million payable under a convertible promissory note. All ongoing development, regulatory and commercial work will be completed fully and at our sole expense. The agreement allows for contingent milestone payments of $9.7 million throughout development and commercialization of the asset, of which $1.2 million relates to the initiation of certain development activities, and $8.5 million relates to the submission of certain regulatory filings and receipt of certain regulatory approvals. Additional payments will be due for each subsequent indication if specified regulatory approvals are achieved. We will recognize the milestones as expense when each event occurs. Furthermore, if the program is successfully commercialized, we will be required to pay tiered royalties on annual net product sales ranging in the low single digits, depending on the volume of sales. All milestone payments under the agreement will be recognized upon completion of the required events because the triggering events will not be considered to be probable until they are achieved. For the year ended December 31, 2017, we paid to Araxes milestone payments of $0.2 million upon the dosing of the first patient in the first KO-947 Phase 1 clinical trial in the second quarter of 2017. There were no milestone payments to Araxes in 2018.

10. Commitments and Contingencies

Sponsored Research Agreement with the University of Michigan

In February 2015, we entered into a sponsored research agreement with the University of Michigan, as amended in May 2017, under which we agreed to sponsor up to $2.1 million of research at the University of Michigan over a three-year period. We received a non-exclusive right to any technology developed under the agreement and had an option right for an exclusive license to invention made under the agreement. The sponsored research agreement expired by its terms in February 2018. Costs incurred for the sponsored research agreement were expensed as incurred. For the years ended December 31, 2018 and 2017, we recorded approximately $0.1 million and $0.2 million, respectively, in research and development expense under this sponsored research agreement.

Operating Leases

In August 2014, we entered into a sublease agreement, or the Sublease, with Wellspring Biosciences, Inc., or Wellspring, a wholly owned subsidiary of Araxes, for office space located on North Torrey Pines Road in La Jolla, California. The Sublease was amended effective September 1, 2014 to provide for a monthly rent of $4,820 per month. The Sublease included rent escalation of 3.0% per year. In addition to the base monthly rent, we were obligated to pay for operating expenses, taxes, insurance and utilities applicable to the subleased property. Pursuant to the terms of the Sublease, as amended again in June 2016, the Sublease would have expired on October 31, 2019. In December 2016, we entered into a third amendment to Sublease pursuant to which the Sublease expired in June 2017.

In December 2016, we entered into a sublease agreement, or the New Sublease, with Wellspring for 5,216 square feet of office space located on Science Park Road in San Diego, California for a monthly rent of approximately $16,000 per month and security deposit of approximately $16,000. The New Sublease includes rent escalation of 3.0% per year. In addition to the base monthly rent, we will be obligated to pay for operating costs, amenities fees and all other costs applicable to the subleased property. The terms of the New Sublease commenced in June 2017 and would have expired on October 31, 2019. In March 2019, the New Sublease was amended to extend until April 30, 2020 with the monthly rent increased to approximately $24,000 per month effective November 1, 2019.

In August 2015, we entered into a lease agreement for approximately 3,766 square feet of office space located in Cambridge, Massachusetts. We paid a security deposit of approximately $44,000. The lease is subject to a 60 month term expiring on August 1, 2020, with initial monthly rent of approximately $21,000 per month, and subject to a 1.4% annual rent increase. Total base rent payable over the lease period is $1.3 million. In addition to base monthly rent, we are obligated to pay for taxes, insurance and utilities applicable to the leased property.

Future minimum payments required under the facility leases as of December 31, 2018 are summarized as follows, in thousands:

Year Ending December 31,		
2019	$	485
2020		256
Total future minimum lease payments	$	741

Rent expense for the years ended December 31, 2018 and 2017 was approximately $0.5 million and $0.4 million, respectively.

Litigation

From time to time, we may be involved in disputes, including litigation, relating to claims arising out of operations in the normal course of our business. Any of these claims could subject us to costly legal expenses and, while we generally believe that we have adequate insurance to cover many different types of liabilities, our insurance carriers may deny coverage or our policy limits may be inadequate to fully satisfy any damage awards or settlements. If this were to happen, the payment of any such awards could have a material adverse effect on our results of operations and financial position. Additionally, any such claims, whether or not successful, could damage our reputation and business. We currently are not a party to any legal proceedings, the adverse outcome of which, in management's opinion, individually or in the aggregate, would have a material adverse effect on our results of operations or financial position.

11. Stockholders' Equity

In August 2017, we completed a public offering in which we sold an aggregate of 8,805,000 shares of common stock at a price of $6.50 per share. Net proceeds from the public offering, after deducting underwriting discounts, commissions and offering expenses, were approximately $53.5 million.

In January 2017, we entered into an at-the-market issuance sales agreement with Cowen and Company, LLC, or Cowen, which was amended in November 2017 and March 2018, under which we may offer and sell, from time to time, in our sole discretion, shares of our common stock having an aggregate offering price of up to $160.0 million through Cowen as our sales agent, or the ATM facility. In January 2018, we sold an aggregate of 3,136,722 shares of our common stock under the ATM facility at a weighted-average price per share of $18.85, for net proceeds of approximately $57.4 million, after deducting commissions and offering expenses. In July 2018, we terminated the ATM facility.

In July 2018, we completed a public offering in which we sold an aggregate of 4,600,000 shares of common stock at a price of $16.75 per share. Net proceeds from the public offering, after deducting underwriting discounts, commissions and offering expenses, were approximately $74.5 million.

12. Share-Based Compensation

Equity Incentive Plan

As of December 31, 2018, under our Amended and Restated 2014 Equity Incentive Plan, or 2014 Plan, a total of up to 8,893,214 shares of common stock have been reserved for issuance under incentive stock options, non-statutory stock options, restricted stock awards, restricted stock unit awards, performance-based stock awards and other forms of equity compensation to our employees and other service providers. As of December 31, 2018, there were 586,559 shares of common stock reserved for future equity awards under the 2014 Plan. The number of shares available for future grant under the 2014 Plan will automatically increase on January 1 of each year through January 1, 2025 by 4% of the total number of shares of our common stock outstanding on December 31 of the preceding calendar year, subject to the ability of our board of directors to take action to reduce the size of the increase in any given year. On January 1, 2019, an automatic increase pursuant to the 2014 Plan occurred, resulting in 1,525,906 additional shares available for future grant under the 2014 Plan. We issue shares of common stock upon the exercise of options with the source of those shares of common stock being newly issued shares.

Stock Options

The exercise price of all stock options granted was equal to no less than the estimated fair market value of such stock on the date of grant. Stock options generally vest over a three to four-year period. The maximum contractual term for all options is ten years. The following is a summary of stock option activity for the year ended December 31, 2018, in thousands (except per share and years data):

	Number of Shares	Weighted-Average Exercise Price per Share	Weighted-Average Remaining Contractual Term (years)	Aggregate Intrinsic Value
Outstanding at December 31, 2017	2,233	$ 6.77		
Granted	1,492	$ 18.91		
Exercised	(190)	$ 5.65		
Canceled	(349)	$ 12.19		
Outstanding at December 31, 2018	3,186	$ 11.93	8.2	$ 13,421
Vested and expected to vest at December 31, 2018	3,186	$ 11.93	8.2	$ 13,421
Exercisable at December 31, 2018	1,396	$ 8.59	7.3	$ 8,740

The aggregate intrinsic value in the above table is calculated as the difference between the closing price of our common stock at December 31, 2018 of $14.04 per share and the exercise price of stock options that had strike prices below the closing price. For the years ended December 31, 2018 and 2017, the total intrinsic value of stock options exercised was approximately $1.8 million and $0.2 million, respectively, and cash received from stock option exercises was approximately $1.1 million and $0.2 million, respectively.

The assumptions used to estimate the fair value of stock options granted to employees using the Black-Scholes model were as follows:

	Years Ended December 31,	
	2018	2017
Weighted average grant date fair value per share	$ 12.95	$ 4.76
Expected volatility	76.5% — 79.4%	75.4% — 77.7%
Expected term (in years)	5.50 — 6.08	5.50 — 6.08
Risk free interest rate	2.1% — 2.8%	1.4% — 2.0%
Expected dividend yield	—	—

In estimating fair value for stock options issued under the 2014 Plan, expected volatility was based, in part, on our historical volatility and the historical volatility of comparable publicly-traded companies because our common stock has only been publicly traded since September 16, 2015. Due to the lack of historical option exercise data, we estimated the expected term using the simplified method. The risk-free interest rates are based on the U.S. Treasury zero-coupon bonds with maturities similar to those of the expected term of the award being valued. The expected dividend yield of zero reflects that we have not paid cash dividends since inception and do not intend to pay cash dividends in the foreseeable future. Actual forfeitures are applied as they occur, and any compensation cost previously recognized for awards for which the requisite service has not been completed is reversed in the period that the award is forfeited.

For the years ended December 31, 2018 and 2017, we recognized $5.9 million and $2.3 million expense related to options, respectively. As of December 31, 2018, unrecognized estimated compensation expense related to options was $16.7 million, which is expected to be recognized over the weighted-average remaining requisite service period of approximately 2.6 years.

Restricted Stock Awards

Restricted stock awards were granted at a price equal to the estimated fair market value on the date of grant. The restricted stock awards generally vest over four years from the original vesting date, with certain grants subject to one-year cliff vesting. The vesting provisions of individual awards may vary as approved by our board of directors. In connection with the issuance of restricted common stock, we maintain a repurchase right where shares of restricted common stock are released from such repurchase right over a period of time of continued service by the recipient. The repurchase price for unvested stock awards will be the lower of (i) the fair market value of the shares of common stock on the date of repurchase or (ii) their original purchase price. As of December 31, 2018, there were no shares subject to repurchase.

The following is a summary of restricted stock awards activity for the year ended December 31, 2018, in thousands (except weighted-average grant date fair value data):

	Number of Shares	Employee	Non-employee	Weighted-Average Grant Date Fair Value of Employee Awards
Unvested at December 31, 2017	793	663	130	$ 0.002
Granted	—	—	—	$ —
Vested	(793)	(663)	(130)	$ 0.002
Canceled	—	—	—	$ —
Unvested at December 31, 2018	—	—	—	$ —
Vested at December 31, 2018	4,885	4,038	847	$ 0.002

The total fair value of restricted stock awards vested during the years ended December 31, 2018 and 2017 were $14.8 million and $12.7 million, respectively. As of December 31, 2018, there was no unrecognized compensation expense related to employee restricted stock awards.

Employee Stock Purchase Plan

In March 2015, our board of directors adopted the 2015 Employee Stock Purchase Plan, or ESPP. The ESPP permits eligible employees to purchase our common stock at a discount through payroll deductions during defined offering periods. Eligible employees may have up to 15% of their base earnings to purchase up to $25,000 of our common stock during each fiscal year. The price at which stock is purchased under the ESPP is equal to 85% of the fair market value of the common stock on the first day of the offering period or purchase date, whichever is lower. Successive six-month offering periods under the ESPP began on May 21, 2018. For the year ended December 31, 2018, cash received from the exercise of purchase rights was approximately $0.1 million. As of December 31, 2018, we issued 5,611 shares under the ESPP.

As of December 31, 2018, 233,094 shares of common stock are reserved for future issuance. The number of shares of our common stock reserved for issuance under the ESPP will automatically increase on January 1 of each calendar year through January 1, 2025 by the lesser of 1% of the total number of shares of our common stock outstanding on December 31 of the preceding calendar year and 2,000,000 shares, subject to the ability of our board of directors to take action to reduce the size of the increase in any given year. In November 2018, our board of directors elected not to increase the total number of shares of our common stock reserved for issuance under the ESPP for 2019.

The assumptions used to estimate the fair value of ESPP stock purchase rights using the Black-Scholes model were as follows:

	Year Ended December 31, 2018
Weighted average grant date fair value per share	$ 3.87
Weighted average exercise price per share	$ 10.15
Expected volatility	53.8% — 54.4%
Expected term (in years)	0.50
Risk free interest rate	1.8% — 2.3%
Expected dividend yield	—

In estimating fair value for ESPP purchase rights issued, expected volatility was based on our historical volatility. The expected term is six months, which represents the length of each purchase period. The risk-free interest rates are based on the U.S. Treasury zero-coupon bonds with maturities similar to those of the expected term. The expected dividend yield of zero reflects that we have not paid cash dividends since inception and do not intend to pay cash dividends in the foreseeable future.

The following table summarizes share-based compensation expense for all share-based compensation arrangements, in thousands:

	Years Ended December 31,	
	2018	2017
Research and development	$ 4,623	$ 3,048
General and administrative	4,031	1,497
Total share-based compensation expense	$ 8,654	$ 4,545
Restricted stock awards:		
Employee	$ 95	$ 132
Nonemployee	2,627	2,077
Total	$ 2,722	$ 2,209
Stock options:		
Employee	$ 5,581	$ 2,190
Nonemployee	308	146
Total	$ 5,889	$ 2,336
Employee stock purchase plan:		
Employee	$ 43	$ —
Total	$ 43	$ —

13. Related Party Transactions

Our president and chief executive officer is also the sole managing member of Araxes, and is a significant stockholder of each of us and Araxes. The following is a summary of transactions with Araxes for the years ended December 31, 2018 and 2017:

- *Asset Purchase Agreement*

Under the asset purchase agreement with Araxes, for the year ended December 31, 2017, we paid to Araxes a milestone payment of $0.2 million upon dosing of the first patient in the first KO-947 Phase 1 clinical trial in April 2017. There was no payment to Araxes under the asset purchase agreement for the year ended December 31, 2018.

- *Facility Sublease*

We sublease office space in San Diego, California from Wellspring, a wholly owned subsidiary of Araxes. Rent expense, including operating costs, related to the Sublease and the New Sublease, as applicable, for each of the years ended December 31, 2018 and 2017 was approximately $0.3 million and $0.2 million, respectively. Pursuant to the terms of the Sublease, as amended in June 2016, the Sublease would have expired on October 31, 2019. In December 2016, we entered into a third amendment to Sublease pursuant to which the Sublease expired in June 2017.

In December 2016, we entered into the New Sublease with Wellspring for office space in San Diego, California. The New Sublease commenced in June 2017 and would have expired on October 31, 2019. In March 2019, the New Sublease was amended to extend until April 30, 2020, and the monthly rent increased to approximately $24,000 per month effective November 1, 2019. See Note 10, Commitments and Contingencies, for further details of the terms of the Sublease and New Sublease.

- *Management Fees*

We have a management services agreement with Araxes pursuant to which Araxes pays us monthly fees for management services calculated based on costs incurred by us in the provision of services to Araxes, plus a reasonable mark-up. For the years ended December 31, 2018 and 2017, we recorded approximately $0.7 million and $0.8 million, respectively, of management fee income. In addition, the agreement allows for Araxes to reimburse us an amount equal to the number of full-time equivalents, or FTE, performing research and development services for Araxes, at an annual FTE rate of approximately $367,000, plus actual expenses as reasonably incurred. The initial term of this agreement expired on December 31, 2015 but, pursuant to the terms of the agreement, renews automatically for additional consecutive one-year periods. The agreement may be terminated by either party with a notice of at least 30 days prior to the expiration of the then-renewal term. For the years ended December 31, 2018 and 2017, we recorded reimbursements of approximately $0.2 million and $0.3 million, respectively, for research and development services provided to Araxes, which was recorded as a reduction to research and development expenses on the statements of operations and comprehensive loss. As of December 31, 2018 and 2017, approximately $0.2 million in both periods related to management fees and reimbursements of research and development services are included in accounts receivable, related party on the balance sheets.

- *Services Agreement*

We have a services agreement with Wellspring pursuant to which we pay Wellspring for research and development services provided to us in an amount equal to the number of FTE's performing the services, at an annual FTE rate of $400,000, plus actual expenses as reasonably incurred. The initial term of this services agreement expired on December 31, 2015 but, pursuant to the terms of the agreement, renews automatically for additional consecutive one-year periods. The agreement may be terminated by either party with a notice of at least 30 days prior to the expiration of the then-renewal term. For the years ended December 31, 2018 and 2017, we recognized approximately $1.0 million and $1.2 million, respectively, from research and development services provided to us under this agreement as research and development expense, related party on the statements of operations and comprehensive loss. As of December 31, 2018 and 2017, approximately $0.2 million in both periods related to research and development services under this agreement are included in accounts payable and accrued expenses, related party on the balance sheets.

14. Employee Benefit Plan

We have a defined contribution 401(k) plan for all employees. Under the terms of the plan, employees may make voluntary contributions as a percentage or defined amount of compensation. We provide a safe harbor contribution of 3.0% of the employee's compensation, not to exceed eligible limits. For the years ended December 31, 2018 and 2017, we incurred approximately $0.2 million in expenses in each year related to the safe harbor contribution.

15. Income Taxes

We file tax returns as prescribed by the tax laws of the jurisdictions in which we operate. In the normal course of business, our 2014 through 2018 tax years will be subject to examination by the federal and state jurisdictions where applicable. We have not been, nor are we currently, under examination by the federal or any state tax authority.

Our effective income tax rate differs from the statutory federal rate of 21% and 34% for the years ended December 31, 2018 and 2017, respectively, due to the following, in thousands:

	Years Ended December 31,	
	2018	2017
Income taxes at statutory federal rate	$ (12,694)	$ (12,048)
State income tax, net of federal benefit	(4,447)	(2,226)
Research and development tax credits	(1,469)	(476)
Share-based compensation	870	1,046
Other	(8)	(209)
Impact of Tax Act	—	9,517
Valuation allowance	17,748	4,396
Income tax expense	$ —	$ —

Significant components of our deferred tax assets are shown below, in thousands:

	December 31,	
	2018	2017
Deferred tax assets		
Net operating loss carryforwards	$ 37,329	$ 22,050
Research and development tax credit carryforwards	3,140	1,690
Share-based compensation	1,426	601
Accruals	931	692
Intangibles	642	708
Other	131	110
Total deferred tax assets	43,599	25,851
Less valuation allowance	(43,599)	(25,851)
Net deferred tax assets	$ —	$ —

In accordance with the Tax Cut and Jobs Act, or the Tax Act, that was enacted on December 22, 2017 we provisionally recorded a $9.5 million reduction related to the remeasurement of our deferred tax balance. As of December 22, 2018, our accounting for the remeasurement of deferred tax balances was complete and there were no changes to the amount previously recorded.

As of December 31, 2018, we had federal net operating loss, or NOL, carryforwards of $128.3 million, of which $52.9 million were generated in fiscal year 2018 and can be carried forward indefinitely under the Tax Act. The remaining federal net operating loss carryforwards of $75.4 million, which were generated prior to 2018, will begin to expire in 2034, unless previously utilized. We had state loss carryforwards of $151.3 million, of which $150.8 million begin to expire in 2034 and $0.5 million begin to expire in 2030, unless previously utilized. We also have federal and state research and development credit carryforwards of $2.9 million (net of $0.8 million utilized as a payroll tax offset) and $1.6 million, respectively. The federal research and development credits will begin to expire in 2034, unless previously utilized. Of the state research and development credits, $1.2 million will carryforward indefinitely and approximately $0.4 million will begin to expire in 2032, unless previously utilized. In 2018, 2017 and 2016, pursuant to Section 41(h) of the Internal Revenue Code of 1986, as

amended, or IRC, which was added as part of the Protecting Americans from Tax Hikes Act of 2015, we qualified to elect approximately $0.3 million federal research and development credits to be utilized as an offset against future payroll taxes. Accordingly, in 2018, 2017 and 2016, we have recognized benefit of approximately $0.3 million in each year as an offset to research and development expenses.

Management assesses the available positive and negative evidence to estimate if sufficient future taxable income will be generated to use existing deferred tax assets. Based on the weight of the evidence, including our limited existence and losses since inception, management has determined that it is more likely than not that the deferred tax assets will not be realized. The valuation allowance increased by $17.7 million and $4.4 million from December 31, 2017 to December 31, 2018 and from December 31, 2016 to December 31, 2017, respectively.

Pursuant to Sections 382 and 383 of the IRC annual use of our NOL or research and development credit carryforwards may be limited in the event a cumulative change in ownership of more than 50% occurs within a three-year period. We previously completed a study to assess whether an ownership change, as defined by IRC Section 382, had occurred from our formation through March 31, 2016. Based upon this study, we determined that an ownership change occurred but concluded the annual utilization limitation would be sufficient to utilize our pre-ownership change NOLs and research and development credits prior to expiration. We completed additional studies and concluded no further ownership changes occurred through December 31, 2018. Future ownership changes may limit our ability to utilize remaining tax attributes. Any carryforwards that will expire prior to utilization as a result of such additional limitations will be removed from deferred tax assets, with a corresponding reduction of the valuation allowance.

In accordance with authoritative guidance, the impact of an uncertain income tax position is recognized at the largest amount that is "more likely than not" to be sustained upon audit by the relevant taxing authority. An uncertain tax position will not be recognized if it has less than a 50% likelihood of being sustained.

The following table summarizes the activity related to our unrecognized tax benefits, in thousands:

	December 31,	
	2018	2017
Gross unrecognized tax benefits at the beginning of the year	$ 615	$ 358
Increases related to prior year tax positions	—	42
Increases from tax positions taken in the current year	448	215
Gross unrecognized tax benefits at the end of the year	$ 1,063	$ 615

Our practice is to recognize interest and penalties related to income tax matters in income tax expense. We did not have any accrued interest or penalties included on the balance sheets and have not recognized interest and penalties on the statements of operations and comprehensive loss for the years ended December 31, 2018 or 2017.

We do not expect that there will be a significant change in the unrecognized tax benefits over the next 12 months. Due to the existence of the valuation allowance, future changes in our unrecognized tax benefits will not impact our effective tax rate.

16. Subsequent Event

In March 2019, we entered into an amendment to the New Sublease pursuant to which the New Sublease will expire on April 30, 2020, with monthly rent increased to approximately $24,000 effective November 1, 2019.

Corporate Information

EXECUTIVE MANAGEMENT

Troy E. Wilson, Ph.D., J.D.
President and Chief Executive Officer

John Farnam
Chief Operating Officer

Marc Grasso, M.D.
Chief Financial Officer and Chief Business Officer

Antonio Gualberto, M.D., Ph.D.
Head of Development and Chief Medical Officer

Pingda Ren, Ph.D.
Senior Vice President, Chemistry and Pharmaceutical Sciences

Francis Burrows, Ph.D.
Vice President, Translational Research

Pete De Spain
Vice President, Investor Relations and Corporate Communications

Michael Kurman, M.D.
Vice President, Clinical Development

Bridget Martell, M.A., M.D.
Vice President, Clinical Development

Catherine Scholz, Pharm.D, R.Ph.
Vice President, Clinical Development

Blake Tomkinson, Ph.D., MBA
Vice President, Clinical Development

Jackie Tran
Vice President, Finance

BOARD OF DIRECTORS

Troy E. Wilson, Ph.D., J.D.
President, Chief Executive Officer and Chairman of the Board of Directors

Faheem Hasnain
Director

Robert E. Hoffman
Director

Thomas Malley
Director

Steven Stein, M.D.
Director

Mary Szela
Director

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INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

Ernst & Young LLP
San Diego, California

CORPORATE COUNSEL

Cooley LLP
San Diego, California

INVESTOR RELATIONS CONTACT

Pete De Spain
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The letter to shareholders along with the Form 10-K in this Annual Report contains certain forward-looking statements that involve risks and uncertainties that could cause actual results to be materially different from historical results or from any future results expressed or implied by such forward-looking statements. Such forward-looking statements include statements regarding, among other things, the efficacy, safety and therapeutic potential of tipifarnib, KO-947 and KO-539, progress and expected timing of Kura Oncology's drug development programs and clinical trials, plans regarding future clinical trials and development activities, the regulatory approval path for tipifarnib and expectations regarding biomarkers for tipifarnib. Factors that may cause actual results to differ materially include the risk that compounds that appeared promising in early research or clinical trials do not demonstrate safety and/or efficacy in later preclinical studies or clinical trials, the risk that Kura Oncology may not obtain approval to market its product candidates, uncertainties associated with performing clinical trials, regulatory filings and applications, risks associated with reliance on third parties to successfully conduct clinical trials, the risks associated with reliance on outside financing to meet capital requirements, and other risks associated with the process of discovering, developing and commercializing drugs that are safe and effective for use as human therapeutics, and in the endeavor of building a business around such drugs. You are urged to consider statements that include the words "may," "will," "would," "could," "should," "believes," "estimates," "projects," "promise," "potential," "expects," "plans," "anticipated," "intends," "continues," "designed," "goal," or the negative of those words or other comparable words to be uncertain and forward-looking. For a further list and description of the risks and uncertainties the company faces, please refer to the company's periodic and other filings with the Securities and Exchange Commission, which are available at www.sec.gov. Such forward-looking statements are current only as of the date they are made, and Kura Oncology assumes no obligation to update any forward-looking statements, whether as a result of new information, future events or otherwise.

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