



KEROS
THERAPEUTICS

2021

ANNUAL REPORT

Corporate Headquarters

99 Hayden Avenue, Suite 120, Building E
Lexington, MA 02421
www.kerostx.com

NASDAQ: KROS

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, 2021
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: 001-39264

KEROS THERAPEUTICS, INC.

(Exact name of registrant as specified in its charter)

Delaware

(State or other jurisdiction of
incorporation or organization)

99 Hayden Avenue, Suite 120, Building E
Lexington, Massachusetts

(Address of principal executive offices)

81-1173868

(I.R.S. Employer
Identification Number)

02421

(Zip Code)

Tel: (617) 314-6297

(Registrant's telephone number, including area code)

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

Title of each class	Trading Symbol	Name of each exchange on which registered
Common Stock, \$0.0001 par value per share	KROS	The Nasdaq Stock Market LLC

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

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

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

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

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

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

Large accelerated filer	<input type="checkbox"/>	Accelerated filer	<input checked="" type="checkbox"/>
Non-accelerated filer	<input type="checkbox"/>	Smaller reporting company	<input type="checkbox"/>
		Emerging growth company	<input checked="" type="checkbox"/>

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 has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report.

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

The aggregate market value of the voting and non-voting common equity held by non-affiliates of the registrant as of June 30, 2021, the last business day of the registrant's most recently completed second fiscal quarter, was \$657.3 million, based on a closing price of \$42.47 per share of the registrant's common stock as reported on the Nasdaq Global Market. The calculation does not reflect a determination that certain persons are affiliates of the registrant for any other purpose.

As of March 2, 2022, there were 24,000,453 outstanding shares of the registrant's common stock, par value \$0.0001 per share.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's proxy statement to be filed with the Securities and Exchange Commission pursuant to Regulation 14A in connection with the registrant's 2022 Annual Meeting of Stockholders, which will be filed subsequent to the date hereof, are incorporated by reference into Part III of this Form 10-K. Such proxy statement will be filed with the Securities and Exchange Commission not later than 120 days following the end of the registrant's fiscal year ended December 31, 2021.

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SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. All statements other than statements of historical facts contained in this Annual Report on Form 10-K are forward-looking statements, including statements about:

- the timing of announcement of additional data for our ongoing Phase 2 clinical trial for our lead protein therapeutic product candidate, KER-050, in patients with myelodysplastic syndromes;
- the timing of announcement of data for our Phase 2 clinical trial for KER-050 in patients with myelofibrosis-associated cytopenias;
- the timing of initiation of and announcement of data for our two Phase 2 clinical trials for our lead small molecule product candidate, KER-047;
- the timing of announcement of data for our ongoing Phase 1 clinical trial for our third product candidate, KER-012;
- risks associated with the COVID-19 pandemic, which may adversely impact our business, preclinical studies and clinical trials;
- our ability to receive the required regulatory approvals and clearances to successfully market and sell our products in the United States and certain other countries;
- our ability to successfully advance our pipeline of additional product candidates;
- our ability to develop sales and marketing capabilities;
- the rate and degree of market acceptance of any products we are able to commercialize;
- the effects of increased competition as well as innovations by new and existing competitors in our market;
- our ability to obtain funding for our operations;
- our ability to establish and maintain collaborations;
- our ability to effectively manage our anticipated growth;
- our ability to maintain, protect and enhance our intellectual property rights and proprietary technologies;
- our ability to operate our business without infringing the intellectual property rights and proprietary technology of third parties;
- costs associated with defending intellectual property infringement, product liability and other claims;
- regulatory developments in the United States, Australia, New Zealand and other foreign countries;
- our ability to attract and retain qualified employees;
- our expectations regarding the period during which we qualify as an emerging growth company under the Jumpstart Our Business Startups Act of 2012;
- statements regarding future revenue, hiring plans, expenses, capital expenditures, capital requirements and stock performance; and
- the future trading prices of our common stock and the impact of securities analysts' reports on these prices.

In some cases, you can identify forward-looking statements by the words “anticipate,” “believe,” “continue,” “could,” “estimate,” “expect,” “intend,” “may,” “might,” “objective,” “ongoing,” “plan,” “predict,” “project,” “potential,” “should,” “will,” or “would,” or the negative of these terms, or other comparable terminology intended to identify statements about the future. These statements involve known and unknown risks, uncertainties and other factors that may cause our actual results, levels of activity, performance or achievements to be materially different from the information expressed or implied by these forward-looking statements.

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

You should read the section titled “Risk Factors” set forth in Part I, Item 1A of this Annual Report on Form 10-K for a discussion of important factors that may cause our actual results to differ materially from those expressed or implied by our forward-looking statements. Moreover, we operate in an evolving environment. New risk factors and uncertainties may emerge from time to time, and it is not possible for management to predict all risk factors and uncertainties. As a result of these factors, we cannot assure you that the forward-looking statements in this Annual Report on Form 10-K will prove to be accurate. Except as required by applicable law, we do not plan to publicly update or revise any forward-looking statements contained herein, whether as a result of any new information, future events, changed circumstances or otherwise.

You should read this Annual Report on Form 10-K, completely and with the understanding that our actual future results may be materially different from what we expect. We qualify all of our forward-looking statements by these cautionary statements.

SPECIAL NOTE REGARDING COMPANY REFERENCES

Throughout this Annual Report on Form 10-K, “Keros,” the “Company,” “we,” “us” and “our” refer to Keros Therapeutics, Inc. and its subsidiaries.

SPECIAL NOTE REGARDING TRADEMARKS

All trademarks, trade names and service marks appearing in this Annual Report on Form 10-K are the property of their respective owners.

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PART I

ITEM 1. BUSINESS

Overview

We are a clinical-stage biopharmaceutical company focused on the discovery, development and commercialization of novel treatments for patients suffering from hematological and musculoskeletal disorders with high unmet medical need. We are a leader in understanding the role of the transforming growth factor-beta, or TGF- β , family of proteins, which are master regulators of red blood cell and platelet production as well as of the growth, repair and maintenance of muscle and bone. We have leveraged this understanding and developed a discovery approach to generate large and small molecules to address diseases of these tissues. Targeting TGF- β signaling pathways has been clinically proven to elicit robust changes in blood cells, muscle and bone, which we believe provides a precedent and strong rationale for our strategy. Our lead protein therapeutic product candidate, KER-050, is being developed for the treatment of low blood cell counts, or cytopenias, including anemia and thrombocytopenia, in patients with myelodysplastic syndromes, or MDS, and in patients with myelofibrosis. We have initiated a Phase 2 clinical trial in patients with MDS and reported preliminary data from Part 1 of this trial most recently in December 2021. We expect to report additional data from this ongoing trial in mid-2022. We have also commenced a Phase 2 clinical trial in patients with myelofibrosis and expect to report initial data from this trial by the end of 2022. Our lead small molecule product candidate, KER-047, is being developed for the treatment of anemia resulting from iron imbalance. We have completed our Phase 1 clinical trial of KER-047 and expect to commence two open-label Phase 2 clinical trials in the first half of 2022, one in patients with iron deficiency anemia, or IDA, and one in patients with iron-refractory iron deficiency anemia, or IRIDA. Our third product candidate, KER-012, is being developed for the treatment of pulmonary arterial hypertension, or PAH, and for the treatment of disorders associated with bone loss, such as osteoporosis and osteogenesis imperfecta. We have commenced a Phase 1 clinical trial of KER-012 in healthy volunteers and expect to report initial data from Part 1 of this trial in the second quarter of 2022. We believe KER-047 and KER-012 offer substantial opportunities for us to continue to apply our understanding of TGF- β signaling pathways and expand our development programs in related hematological and musculoskeletal disorders with high unmet medical need.

KER-050 is an engineered ligand trap comprised of a modified ligand-binding domain of the TGF- β receptor known as activin receptor type IIA, or ActRIIA, that is fused to the portion of the human antibody known as the Fc domain. KER-050 is designed to increase red blood cell and platelet production by inhibiting the signaling of a subset of the TGF- β family of proteins to promote hematopoiesis. We believe KER-050 has the potential to provide benefit to patients suffering from red blood cell and platelet differentiation and maturation defects occurring across the spectrum from early through terminal stages of hematopoiesis, and consequently may be effective for many patients that have limited treatment options or are refractory to available therapies. Based on data from our completed Phase 1 clinical trial of KER-050 in healthy volunteers and from our preclinical studies, we believe KER-050 has a differentiated pharmacologic effect on red blood cells and platelets and has the potential to treat multiple cytopenias in diseases of ineffective hematopoiesis. In December 2021, we announced additional preliminary results from Cohorts 1, 2 and 3 of our ongoing Phase 2 clinical trial evaluating KER-050 for the treatment of anemia and thrombocytopenia in patients with very low-, low-, or intermediate-risk MDS. We expect to report additional data from this trial in mid-2022. Additionally, in December 2021, we commenced an open-label Phase 2 clinical trial evaluating KER-050 for the treatment of patients with myelofibrosis-associated cytopenias and expect to report initial data from this trial by the end of 2022.

KER-047 is designed to selectively and potently inhibit activin receptor-like kinase-2, or ALK2, a TGF- β receptor. We believe that KER-047 has the potential to ameliorate excessive ALK2 signaling, which is directly implicated in anemias arising from iron imbalance. We are developing KER-047 for the treatment of anemia resulting from iron imbalance as a direct consequence of elevated ALK2 signaling, including our initial target, IRIDA. In December 2020, we reported topline data from our completed Phase 1 clinical trial of KER-047 in healthy volunteers. We expect to commence two open-label Phase 2 clinical trials in the first half of 2022, one in patients with IDA and one in patients with IRIDA, and expect to report initial data from both trials by the end of 2022.

KER-012 is designed to bind to and inhibit the signaling of TGF- β ligands that suppress bone growth, including activin A and activin B, to potentially promote bone growth. We believe that KER-012 has the potential to increase the signaling of bone morphogenic protein, or BMP, pathways through this inhibition of activin A and activin B signaling, and consequently treat diseases such as PAH that are associated with reduced BMP signaling due to inactivating mutations in the BMP receptors. We are developing KER-012 for the treatment of PAH and for the treatment of disorders associated with bone loss, such as osteoporosis and osteogenesis imperfecta. In a rat model of PAH, a rodent version of KER-012, or RKER-012, reduced PAH-associated inflammation, fibrosis and vascular remodeling was observed. Furthermore, KER-012 did not increase red blood cell production in non-human primates, indicating a lack of a potential dose-limiting red blood cell side effect. Additionally, in a pulmonary arterial banding, or PAB, mouse model of right ventricle overload, mice receiving RKER-012 did not have the changes in cardiac function and tissue remodeling exhibited in the PAB mice that received vehicle. These data support that RKER-012 has a cardio-protective mechanism of action that could potentially provide benefit in diseases such as PAH and other cardiovascular diseases. In addition, rats receiving RKER-012 were protected from PAH-associated bone loss, which we believe demonstrates proof-of-mechanism of KER-012 for the treatment of PAH and bone loss. In September 2021, we commenced a Phase 1 clinical trial of KER-012 in healthy volunteers and expect to report initial data from Part 1 of this trial in the second quarter of 2022 and additional data from Part 2 of this trial in the second half of 2022.

Our strategy focuses on the role of members of the TGF- β family of proteins in the development of blood cells, muscle and bone. Aged and damaged cells are routinely replaced by new cells in normally functioning organs. These new cells are derived from stem cells that have the ability to differentiate into cells with specialized function when appropriate signals are provided to maintain the homeostatic state of the tissue. Members of the TGF- β family of proteins, including activins and bone morphogenetic proteins, or BMPs, provide the necessary signals for this process of self-renewal and repair.

We seek to address the limitations of current therapeutic approaches to treating diseases whose manifestations are linked to dysfunction of TGF- β signaling pathways by:

- Leveraging our comprehensive insights into the TGF- β signaling pathways to discover therapeutics to treat hematological and musculoskeletal disorders.
- Expanding our library of proprietary molecules that are engineered to induce desired biological effects, such as increased blood cell production, inhibit heterotopic ossification and increased muscle and bone mass.
- Engineering proprietary molecules to selectively target specific proteins in the TGF- β signaling pathways to provide therapeutic benefit while potentially minimizing safety risks.
- Developing product candidates for the treatment of diseases where targeting the TGF- β signaling pathways has clinical validation or biological rationale to improve our probability of success in the clinic.
- Targeting the TGF- β family of proteins, which are highly conserved throughout evolution, permitting the use of animal models to potentially predict with high confidence the therapeutic benefit in patients.

We are led by a highly experienced management team and scientific advisory board who have significant experience and expertise researching and developing therapeutics in the TGF- β family of proteins. Our team has collectively worked on marketed therapeutics such as Reblozyl, Rituxan, Benlysta, Skyrizi, Kevzara, Rezurock, Cubicin, Tyzeka and Cosentyx, and led drug discovery and clinical development at companies including Acceleron Pharma Inc. (which was acquired by Merck & Co. Inc. in November 2021), Wyeth Pharmaceuticals Inc., F. Hoffman-La Roche Ltd (Roche), Novartis International AG, AbbVie Inc., Human Genome Sciences (with was acquired by GlaxoSmithKline plc in July 2012), Seres Therapeutics, Inc., Kadmon Holdings, Inc., Anokion SA and Sanofi S.A.

Our Pipeline

The following table sets forth our product candidates, their current development stages and anticipated upcoming milestones.

Program	Asset	Phase of Development				Status	Next Milestones*
		Preclinical	Phase 1	Phase 2	Phase 3		
Hematology	KER-050 (therapeutic protein)	Myelodysplastic syndromes				Phase 2 clinical trial ongoing	Additional data from the Phase 2 clinical trial: mid-2022
		Myelofibrosis				Phase 2 clinical trial ongoing	Initial data: End of 2022
	KER-047 (small molecule)	Iron deficiency anemia				Completed Phase 1 clinical trial	Initiate Phase 2 clinical trial: H1 2022 Initial data: End of 2022
		Anemia from high hepcidin					Initiate Phase 2 clinical trial: H1 2022 Initial data: End of 2022
Musculoskeletal	KER-012 (therapeutic protein)	Bone disorders				Phase 1 clinical trial in healthy volunteers ongoing	Initial data: Q2 2022
Pulmonary		Pulmonary arterial hypertension					
Preclinical Pipeline		Musculoskeletal and hematology					

* Anticipated clinical milestones are subject to the impact of COVID-19 on our business.

Our Strategy

Our mission is to deliver significant clinical benefit to patients suffering from hematological and musculoskeletal diseases by developing differentiated product candidates that are designed to alter TGF- β signaling pathways. The key elements of our strategy include:

- *Rapidly advance the clinical development of KER-050 for the treatment of patients with MDS- and myelofibrosis-associated cytopenias.* We are continuing to progress our ongoing Phase 2 clinical trial evaluating KER-050 for the treatment of anemia and thrombocytopenia in participants with very low-, low-, or intermediate-risk MDS who either have or have not previously received treatment with an erythropoiesis-stimulating agent. We have also commenced an open-label Phase 2 clinical trial evaluating the treatment of patients with myelofibrosis-associated cytopenias and expect to report initial data from this trial by the end of 2022.
- *Rapidly advance the clinical development of KER-047 for the treatment of anemias resulting from iron imbalance.* We expect to commence two open-label Phase 2 clinical trials in the first half of 2022, one in patients with IDA and one in patients with IRIDA and expect to report initial data from both trials by the end of 2022. We also may develop KER-047 as a potential treatment option for patients who manifest anemia caused by iron imbalance as a secondary consequence of more common diseases.
- *Advance the clinical development of KER-012 for the treatment of PAH and for the treatment of disorders associated with bone loss, such as osteoporosis and osteogenesis imperfecta.* We have generated preclinical data that we believe demonstrated proof-of-mechanism of KER-012 for the treatment of PAH and for the treatment of disorders associated with bone loss, such as osteoporosis and osteogenesis imperfecta. We commenced a Phase 1 clinical trial of KER-012 in healthy volunteers and expect to report initial data from Part 1 of this trial in the second quarter of 2022 and additional data from Part 2 of this trial in the second half of 2022.
- *Pursue development and, if approved, commercialization of our product candidates in indications and regions where we believe we can maximize their value independently or through strategic collaborations.* We plan to independently advance our product candidates in indications and regions that we believe have clearly defined regulatory paths and commercialization strategies. We intend to opportunistically evaluate strategic collaborations to maximize the potential commercial value of our product candidates and discovery programs.
- *Leverage our proprietary discovery approach and knowledge base to develop new therapeutics.* Our discovery efforts are focused on expanding our pipeline of wholly-owned assets for the treatment of hematological and musculoskeletal diseases. Accordingly, we intend to identify and develop product candidates to treat diseases where targeting the TGF- β signaling pathways has clinical validation or biological rationale.

Our Hematology Program

Our two lead product candidates, KER-050 and KER-047, are designed to target TGF- β signaling pathways to address diseases that arise from ineffective hematopoiesis as well as anemias that result from iron imbalance.

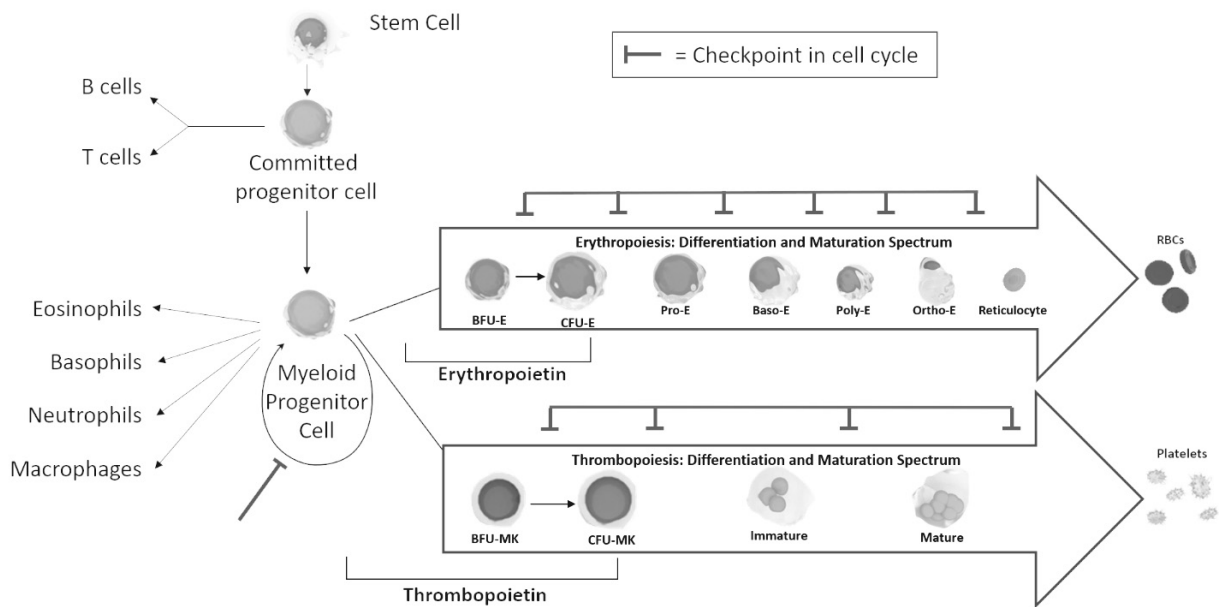
Hematopoiesis

The primary cellular components of blood are red blood cells, white blood cells and platelets. The function of red blood cells is to distribute oxygen to tissues throughout the body and to carry waste carbon dioxide back to the lungs. White blood cells are responsible for the immune response through coordinated surveillance and targeting of pathogens, infected or aberrant cells and cell debris. Platelets are a key component of the coagulation system and are responsible for stopping bleeding by forming a blood clot.

Hematopoiesis is the production of red blood cells, white blood cells and platelets from common progenitor stem cells, or progenitor cells. This process begins when a hematopoietic progenitor cell becomes committed to a specific cellular lineage. These cells progress through a series of intermediate stages before becoming a mature cell with a specialized function. At

any given time, pools of each progenitor cell are maintained and primed to rapidly respond to a reduction of red blood cells, white blood cells and platelets. The graphic below depicts the stages of hematopoiesis for red blood cells and platelets.

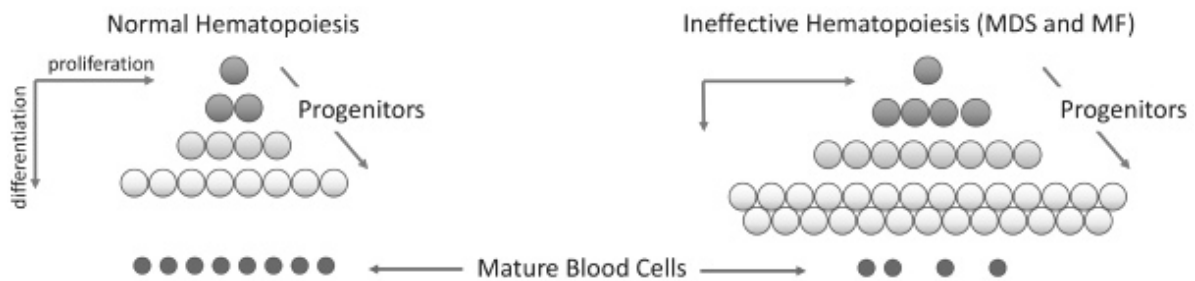
Stages of Hematopoiesis



TGF- β signaling pathways involving activins prevent differentiation in order to maintain progenitor cells in a quiescent state while others involving BMPs promote differentiation of progenitor cells. Homeostasis of this process is essential to ensure all cell types are properly replenished in the blood.

In many hematological disorders, there is abnormal proliferation and differentiation of the progenitor cells for red blood cells, platelets and neutrophils. This failure to produce fully mature cells is termed ineffective hematopoiesis, and may be due to single or multiple defects that can lead to a hyperproliferation or a shortage of progenitor cells.

These changes have clinical consequences: a lack of red blood cells leads to anemia, a lack of platelets hampers clotting, resulting in increased incidence of bleeding events, and a lack of neutrophils increases susceptibility to infection. The failure of progenitor cells to differentiate can also lead to a build-up of these cells, resulting in bone marrow failure and fibrotic disease. The graphic below provides an illustration of the difference in the number of progenitor cells and mature blood cells that are produced in normal hematopoiesis and in ineffective hematopoiesis.



Another critical component in red blood cell development is the production of hemoglobin, an iron-containing protein that delivers oxygen to cells and removes carbon dioxide. The synthesis of hemoglobin requires that sufficient levels of iron are present in the bone marrow and if iron levels are too low, it can result in a failure to produce sufficient numbers of red blood cells. Anemia is a common consequence of diseases where normal iron mobilization is hindered.

KER-050: For the Treatment of Ineffective Hematopoiesis to Address Cytopenias

We are developing KER-050, our lead protein therapeutic product candidate, for the treatment of cytopenias that occur due to ineffective hematopoiesis, including anemia and thrombocytopenia, in patients with MDS and in patients with myelofibrosis. KER-050 is designed to benefit patients suffering from defects in red blood cell and platelet differentiation and maturation across the spectrum from early through terminal stages of hematopoiesis. Consequently, KER-050 may be effective for many patients that have limited treatment options or are refractory to available therapies.

Myelodysplastic Syndromes

Myelodysplastic syndromes, or MDS, is a collection of bone marrow disorders characterized by ineffective hematopoiesis, often with a dramatic expansion of progenitor cells that are unable to mature into functioning blood cells. In the United States, there are 60,000 to 170,000 patients with MDS and 15,000 to 20,000 new cases of MDS reported each year. MDS predominantly affects older adults, with approximately 75% of patients aged 60 years or older at diagnosis. Median survival ranges from approximately nine years for very low-risk patients to less than a year for high-risk patients.

Cytopenias in MDS are caused by defects occurring across the various stages of hematopoiesis, from the self-renewal of progenitor cells to differentiation in early through terminal stages. Anemia is the most frequent consequence of ineffective hematopoiesis in patients with MDS due to low red blood cell production, and impacts 90% of MDS patients, with approximately 40% becoming transfusion dependent. Another consequence is thrombocytopenia, a deficiency of platelets in the blood, which is impaired blood clotting that can cause bleeding. The prevalence of thrombocytopenia in patients with MDS has been reported at 40% to 65%. A deficiency of neutrophils in the blood, or neutropenia, also increases the risk of serious infections in patients with MDS and has been reported to affect approximately 20% of patients with MDS.

To guide decisions on risk stratification and the treatment of patients with MDS, clinicians typically use the International Prognostic Scoring System-Revised, or the IPSS-R. The IPSS-R incorporates information on bone marrow blast percentage, karyotype and presence and severity of cytopenias in order to classify patients with MDS into groups based on the risk of progression to acute myeloid leukemia, ranging from very low-risk to high-risk. Patients are further classified into high transfusion burden and low transfusion burden categories based on the number of units of transfused red blood cells they receive.

A second classification system is the World Health Organization, or WHO, system, which is based on a combination of morphology, immunophenotype, genetics and clinical features. The WHO classification system includes a subgroup of patients with MDS that show the presence of iron deposits around the mitochondria, known as ring sideroblasts. These patients are commonly referred to as RS positive and comprise approximately 15% of incident patients with MDS, and splicing factor mutations, such as *SF3B1*, are highly correlated with these patients. Patients with splicing factor mutations often have been observed to have defects in the differentiation of red blood cells at the terminal stage. The majority of patients with MDS that develop cytopenias lack ring sideroblasts or a single, defining splicing factor mutation and are termed non-RS. These non-RS patients have differentiation and maturation defects occurring across the spectrum from early through terminal stages of hematopoiesis.

Limitations of Current Treatment Options for Cytopenias in Patients with MDS

Patients with MDS-associated anemia are generally treated with red blood cell transfusions and erythroid stimulating agents, or ESAs, which are not approved for such treatment. The treatment of MDS-associated thrombocytopenia is platelet transfusions and platelet-stimulating agents.

Severe cytopenia and transfusion dependence are independent predictors of poor prognosis for patients with MDS and are inversely correlated with quality of life. Red blood cell and platelet transfusions provide temporary benefits to patients with MDS, but are associated with both acute and chronic health risks, including risk of bacterial infection and allergic reactions to the donor blood, and place a significant burden on both the patient and the healthcare system. Red blood cell transfusions are also associated with iron overload, which can lead to organ dysfunction over time. Additionally, the benefit from a platelet transfusion is typically short-lived and availability is limited. Platelet-stimulating agents for the treatment of thrombocytopenia, which are not currently indicated for MDS, carry the risk of thromboembolic events and bone marrow fibrosis.

ESAs are a class of drugs that work on the proliferation stage of red blood cell development by expanding the pool of early-stage progenitor cells. While ESAs have been shown to alleviate anemia in a subset of patients with MDS, patients that have elevated endogenous erythropoietin levels are unlikely to respond. In two controlled Phase 3 clinical trials evaluating darbepoetin alfa (Aranesp) and epoetin alpha (Epogen/Procrit) for the treatment of MDS-associated anemia, 15% to 31% of patients responded, respectively. However, this response was limited to patients with low endogenous erythropoietin levels at baseline and to patients who had a low transfusion burden at baseline. These treatment options also represent a significant burden to patients; epoetin alpha must be administered up to three times a week. Additionally, the effect of ESAs is limited to the red blood cell lineage and, therefore, ESAs only treat MDS-associated anemia and do not provide benefit to cytopenia of other cell lineages, including thrombocytopenia and neutropenia.

Reblozyl, a TGF- β -based erythroid maturation agent, is designed to promote the terminal differentiation of red blood cells through inhibition of selected endogenous TGF- β superfamily ligands. The characteristics of response were defined in a Phase 2 clinical trial of Reblozyl in patients with MDS. Consistent with the mechanism of Reblozyl on the terminal stages of erythropoiesis, the majority of responders were determined to have an *SF3B1* splicing factor mutation. Additionally, the responders were characterized as having increased erythroid progenitor cells in the bone marrow, while patients with fewer erythroid progenitor cells in the bone marrow did not achieve hematological improvement. We believe this indicates that Reblozyl is limited to its effect on terminal differentiation of erythropoiesis and does not affect the early stages of differentiation.

Reblozyl received approval from the U.S. Food and Drug Administration, or the FDA, in April 2020 for the treatment of anemia in adult RS positive patients with very low- to intermediate-risk MDS that failed an erythropoiesis stimulating agent and required two or more units of red blood cells over eight weeks. The approval was based on a single Phase 3 clinical trial of Reblozyl that was conducted in RS positive, very low- to intermediate-risk patients with MDS. This trial included both patients with low transfusion dependence requiring fewer than four units of red blood cells over eight weeks and patients with high transfusion dependence requiring four or more units of red blood cells over eight weeks. In this trial, 37.9% of the RS positive patients treated with Reblozyl achieved the primary endpoint of transfusion independence, compared to 13.2% of patients that received placebo. The highest proportion of responders to Reblozyl were those with low transfusion dependence, while only a few high transfusion burden patients achieved transfusion independence despite being RS positive patients.

Accordingly, we believe that additional treatment options will be needed to address anemia in the heterogeneous non-ringing sideroblast MDS population, to provide clinical benefit to the RS positive population regardless of transfusion burden and to address other cytopenias, such as thrombocytopenia.

KER-050 is designed to alter TGF- β signaling pathways at multiple stages of hematopoietic differentiation in both red blood cells and platelets. Consequently, we believe KER-050 has the potential to provide therapeutic benefit in a broader subset of patients with MDS that have varying defects in commitment, differentiation and maturation of multiple cell types found in blood.

Myelofibrosis

Myelofibrosis is a group of rare cancers of the bone marrow in which the marrow is replaced by scar tissue and is not able to produce healthy blood cells. Myelofibrosis is characterized by ineffective hematopoiesis, an enlarged spleen, bone marrow fibrosis and shortened survival. Patients often experience multiple disease-associated and treatment-emergent cytopenias, including anemia and thrombocytopenia.

The ineffective hematopoiesis in myelofibrosis is driven by molecular abnormalities in the Janus kinase 2, or JAK2, - signal transducers and activators of transcription, or JAK-STAT, signaling pathway of transcriptional activators. Specifically, JAK2 activation leads to proliferation of red blood cell progenitors and platelet progenitors, or megakaryocytes, that fail to mature to platelets. Additionally, megakaryocyte dysplasia/hyperplasia has been implicated in inducing bone marrow fibrosis in patients with myelofibrosis. The inability of megakaryocytes to fully differentiate leads to the release of pro-inflammatory and pro-fibrotic factors that results in scarring of the bone marrow, which further exacerbates the myelofibrosis-associated cytopenias.

Myelofibrosis is a relatively rare condition with an identified prevalence of 16,000 to 18,500 patients in the United States. Approximately 3,000 new patients are diagnosed with myelofibrosis each year, and the median age at diagnosis is approximately 60 years. Currently, there are limited therapeutic options to address the myelofibrosis-associated cytopenias. Within a year of diagnosis, 38% of patients with myelofibrosis are red blood cell transfusion dependent and eventually nearly all will develop transfusion dependence. Additionally, within a year of diagnosis, 26% of patients with myelofibrosis will develop thrombocytopenia and 51% will develop anemia.

Limitations of Current Treatment Options for Cytopenias in Patients with Myelofibrosis

There are no approved pharmacological treatments for myelofibrosis-associated cytopenias. The National Comprehensive Cancer Network describes all therapeutic options to address myelofibrosis-associated cytopenias, including transfusions, as only minimally effective.

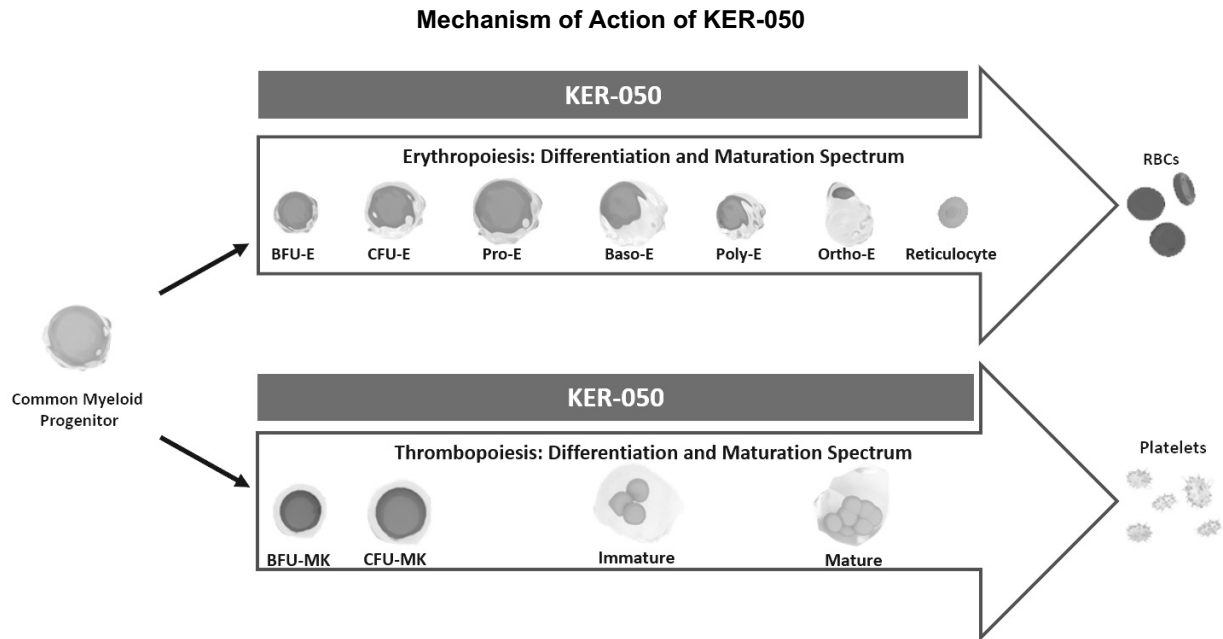
Currently approved products for the treatment of myelofibrosis, including JAK inhibitors ruxolitinib (Jakafi), fedratinib (Inrebic) and pacritinib (Vonjo), have been observed to exacerbate myelofibrosis-associated cytopenias. In a third-party Phase 3 clinical trial of Jakafi and a third-party Phase 3 clinical trial of Inrebic, treatment led to significant reductions in spleen volume and improvement in total symptom scores. However, JAK inhibitors interfere with normal hematopoiesis and treatment with Jakafi and Inrebic also resulted in clinically significant anemia and thrombocytopenia in these Phase 3 trials. Approximately 45% of patients in the Phase 3 clinical trial of Jakafi developed treatment-related grade 3 or 4 anemia. Grade 3 or higher adverse events of anemia and thrombocytopenia were observed in approximately 34% and 12%, respectively, of patients evaluated in the Phase 3 clinical trial of Inrebic. The treatment-related cytopenias led to severe complications, dose reductions and reduced compliance.

We believe KER-050 has the potential to ameliorate myelofibrosis-associated cytopenias.

Our Solution: KER-050

KER-050 is a ligand trap comprised of a modified ligand-binding domain of ActRIIA that is fused to the portion of the human antibody known as the Fc domain. KER-050 is designed to bind to and inhibit the signaling of TGF- β ligands involved in the regulation of hematopoiesis, resulting in increased red blood cell and platelet production. Combined data from our preclinical studies, our Phase 1 clinical trial in healthy volunteers and our Phase 2 clinical trial in patients with MDS demonstrate that treatment with KER-050 increased red blood cell and platelet production. These data indicate that KER-050 is differentiated from available therapies because it appears to have both sustained and rapid effects on multiple cellular lineages in the

hematopoietic pathway. We believe KER-050's promotion of differentiation of early- and terminal-stage progenitor cells contributes to these sustained and rapid effects, respectively, and consequently, KER-050 may be effective for many patients that are refractory to available therapies and may potentially provide benefit in multiple cytopenias simultaneously.



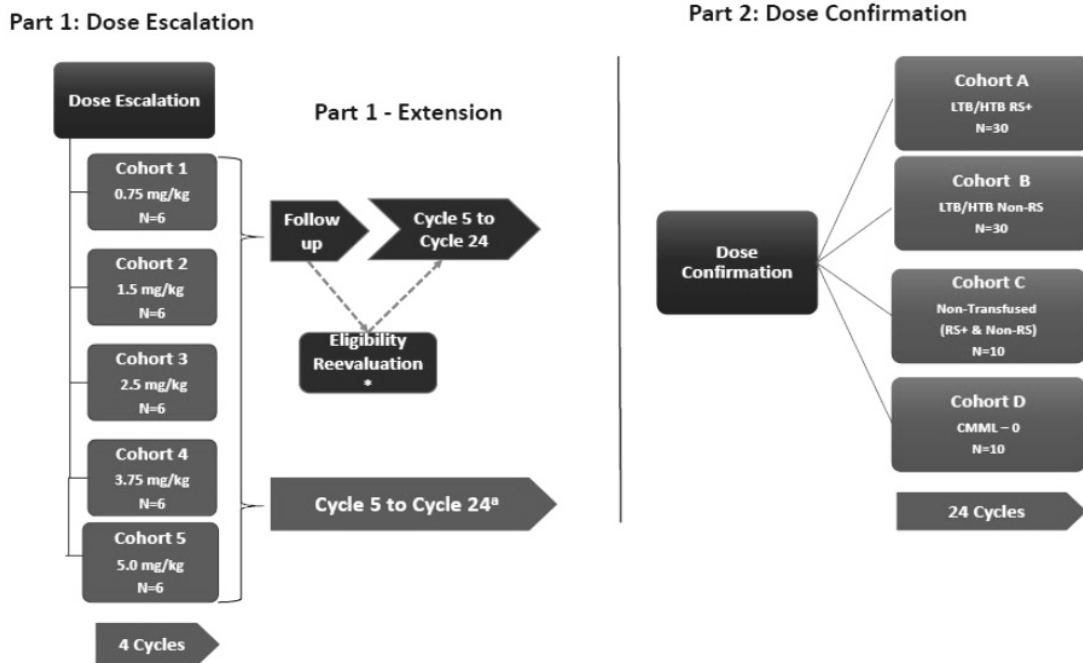
We intend to develop KER-050 for the treatment of both MDS- and myelofibrosis-associated cytopenias. We believe KER-050 has the potential to overcome limitations of current treatment options for MDS- and myelofibrosis-associated cytopenias. We believe the potential advantages of KER-050 compared to current treatment options include:

- *Dual mechanism affecting both the early and terminal stages of erythropoiesis.* Patients with MDS can have defects occurring anywhere along the differentiation and maturation spectrum of erythropoiesis, and often have multiple mutations that cause ineffective erythropoiesis. By acting on cell types throughout the erythropoiesis pathway, KER-050 may lead to robust responses in RS positive patients who have a characteristic defect in terminal maturation, and may also address anemia in the broader MDS population that has defects in earlier-stage erythroid cell development.
- *Increased platelet counts in blood.* Ineffective hematopoiesis in patients with MDS and in patients with myelofibrosis can result in thrombocytopenia, which can lead to an increased risk of bleeding events. We believe treatment with KER-050 has the potential to address the MDS- and myelofibrosis-associated thrombocytopenia.
- *Reduced accumulation of progenitor cells.* Ineffective hematopoiesis in patients with MDS and in patients with myelofibrosis can be caused by excessive production of blood cell progenitors that are unable to complete differentiation and ultimately become mature blood cells. We believe treatment with KER-050 will stimulate these progenitors to progress to maturation, ameliorating the accumulation of these cells that lead to MDS- and myelofibrosis-associated cytopenias.
- *Robust and sustained increase in red blood cells, hemoglobin and reticulocytes, supporting monthly or less frequent dosing.* ESAs can require dosing up to three times a week. We believe that treatment with KER-050 has the potential to reduce the frequency of dosing to every four weeks or less frequently, thereby decreasing the burden on patients and potentially improving compliance.

Ongoing Phase 2 Clinical Trial in Patients with Myelodysplastic Syndromes

We are conducting an open label, two-part, multiple ascending dose Phase 2 clinical trial to evaluate KER-050 in participants with very low-, low-, or intermediate-risk MDS who either have or have not previously received treatment with an ESA. The primary objective of this trial is to assess the safety and tolerability of KER-050 in participants with MDS that either have ring sideroblasts, or RS positive, or do not have ring sideroblasts, or non-RS. The primary objective of Part 2 of this trial is confirmation of the safety and tolerability of the selected dose levels. The secondary objectives of this trial are to evaluate the pharmacokinetics, pharmacodynamics and efficacy of KER-050. The trial design is summarized in the figure below. .

Phase 2 Clinical Trial Design



KER-050 is being administered to patients subcutaneously once every four weeks.

In December 2021, we presented additional data from this ongoing trial at the 63rd American Society of Hematology, or ASH, Annual Meeting and Exposition. As of October 25, 2021, which was the data cut-off date, 24 patients in Cohorts 1, 2, 3 and 4 had received at least one dose of KER-050, 16 of whom, in Cohorts 1, 2 and 3, had completed eight weeks of treatment and evaluation, which we refer to as the evaluable patients. The 16 evaluable patients were comprised of four non-transfused, or NT, three low transfusion burden, or LTB, and nine high transfusion burden, or HTB, patients. Of the 12 LTB and HTB patients, six were non-RS and six were RS positive.

As of the data cut-off date, 50% (n=8/16) of the evaluable patients, three of whom were non-RS and five of whom were RS positive, achieved an overall erythroid response, which is defined as meeting one of the following two endpoints:

- IWG 2006 Hematological improvement-erythroid, or HI-E, which is defined as either:
 - a ≥ 1.5 g/dL increase in hemoglobin for eight weeks in LTB and NT patients; or
 - a reduction by ≥ 4 red blood cell units transfused during any eight-week period during the trial, compared with the eight-week period prior to Cycle 1, Day 1 in HTB patients.
- Transfusion independence, or TI, for at least eight weeks in transfusion-dependent patients who required ≥ 2 red blood cell units transfused at baseline.

Additional data from the evaluable patients in Cohorts 1, 2 and 3 of the trial, as of the data cut-off date, include:

- 43.8% (n=7/16) of the evaluable population achieved HI-E over an eight-week period.
- 45.5% (n=5/11) of the transfused patients receiving ≥ 2 red blood cell units at baseline achieved TI for at least eight weeks.

In addition, the following pharmacodynamic effects were observed:

- Reticulocyte increases observed in patients achieving HI-E or TI endpoints.
- Increases in serum soluble transferrin receptor and decreases in serum ferritin observed in patients achieving HI-E or TI endpoints.
- Increases in platelets observed in patients achieving HI-E or TI.

Together, these data demonstrate the effects of KER-050 on both erythropoiesis and thrombopoiesis and support the continued development of KER-050 as a potential treatment option for ineffective hematopoiesis in MDS.

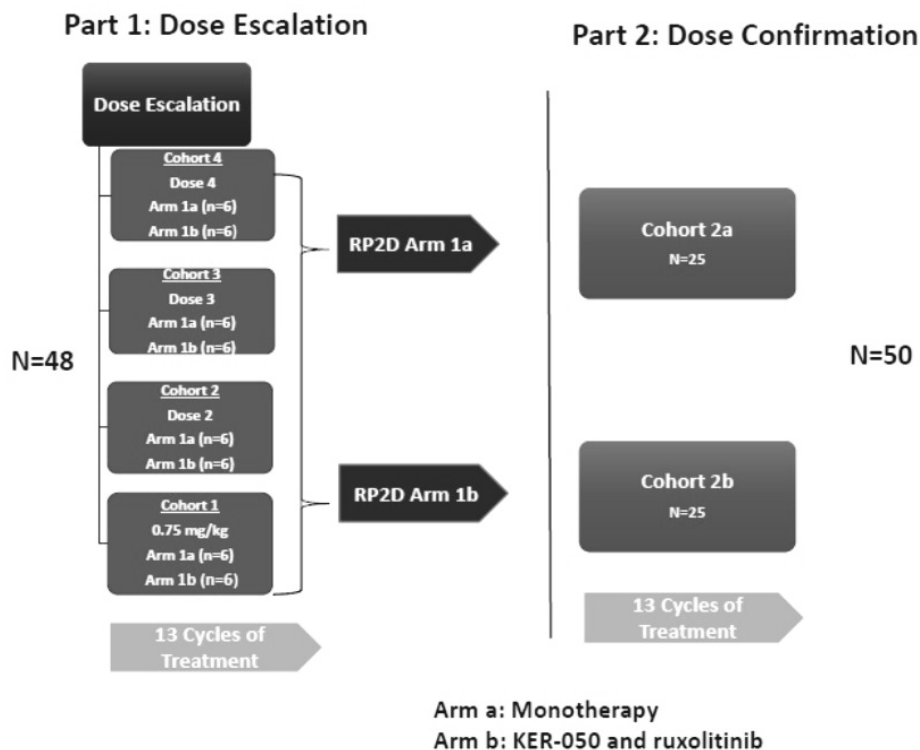
As of the data cut-off date, 24 patients in Cohorts 1, 2, 3 and 4 had received at least one dose of KER-050. KER-050 was observed to be generally well-tolerated as of the data cut-off date in these 24 patients. No drug-related serious adverse events or dose-limiting toxicities were reported. The most commonly reported treatment-emergent adverse events were nausea, fatigue, diarrhea and dyspnea, none of which were deemed related to study drug. Treatment-related adverse events

were reported in four patients, which were mild or moderate in severity, and did not lead to dose modification or treatment discontinuation. No patients developed high-risk MDS or acute myeloid leukemia. Two patients withdrew from the trial prior to completing eight weeks of treatment with KER-050, one due to death deemed unrelated to study drug and one due to withdrawn patient consent.

Ongoing Phase 2 Clinical Trial in Patients with Myelofibrosis-Associated Cytopenias

We are conducting an open label, two-part, multiple ascending dose Phase 2 clinical trial to evaluate KER-050 as a monotherapy and in combination with ruxolitinib in participants with myelofibrosis-associated cytopenias. The primary objective of this trial is to assess the safety and tolerability of KER-050 in participants with myelofibrosis-associated cytopenias. The primary objective of Part 2 of this trial is confirmation of the safety and tolerability of the selected dose levels. The secondary objectives of this trial are to evaluate the pharmacokinetics, pharmacodynamics and efficacy of KER-050 administered with or without ruxolitinib. The trial design is summarized in the figure below.

Phase 2 Clinical Trial Design



Clinical Development Strategy

We expect to report additional data from the Phase 2 clinical trial in patients with MDS in mid-2022 and initial data from the Phase 2 clinical trial in patients with myelofibrosis-associated cytopenias by the end of 2022.

Completed Phase 1 Clinical Trial

In January 2020, we completed a randomized, double-blind, placebo-controlled, two-part, dose-escalation Phase 1 clinical trial of KER-050 in 48 healthy post-menopausal women. The primary objectives of this trial were safety, tolerability and pharmacokinetics. We also investigated changes in hematology and bone biomarkers in this clinical trial.

In Part 1 of this trial, 30 subjects received a single dose of KER-050 and eight subjects received a single dose of placebo, each administered subcutaneously with a 12-week safety follow-up. The subjects were enrolled in sequential single-ascending dose escalation cohorts of up to ten subjects each. In Part 2 of this trial, eight subjects received KER-050 and two received placebo, administered subcutaneously, on two occasions 28 days apart, with a 12-week safety follow-up after the second dose. In Part 2 of this trial, only one dose level was evaluated, as it was deemed to provide the necessary data, in addition to that from Part 1 of the trial, to inform the design of the Phase 2 clinical trials of KER-050 in patients with MDS and in patients with myelofibrosis.

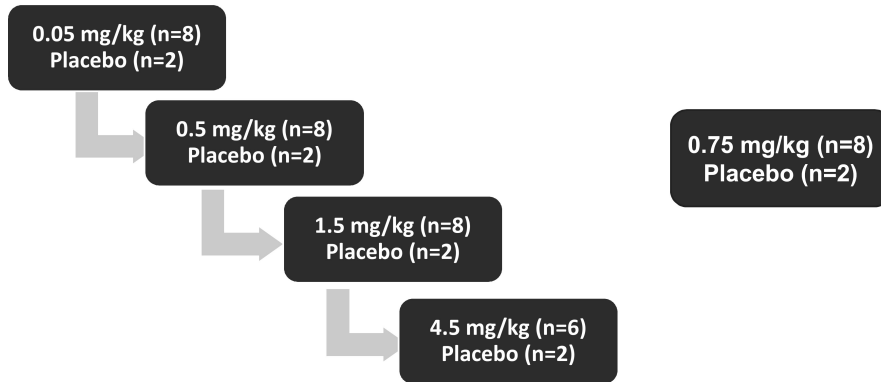
The trial design is summarized in the figure below.

Part 1: Single Ascending Dose

Treatment: Single subcutaneous dose
Safety follow up: 12 weeks

Part 2: Multiple Ascending Dose

Treatment: Two subcutaneous doses (28 days apart)
Safety follow up: 12 weeks



Observed tolerability data

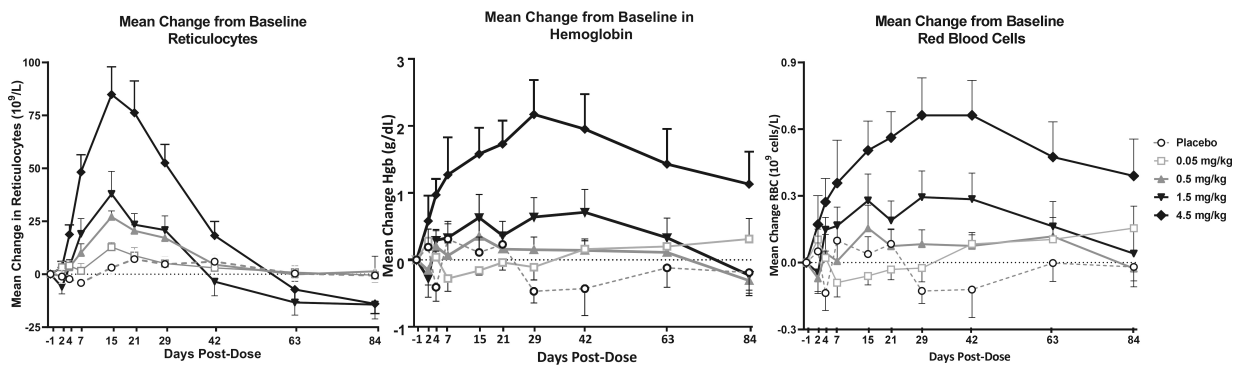
KER-050 was well tolerated in this Phase 1 clinical trial at dose levels up to 4.5 mg/kg, the highest dose level tested, and multiple doses of 0.75 mg/kg. While one subject in the placebo group withdrew consent, there were no discontinuations due to treatment-related adverse events. No treatment-related serious adverse events were reported. The most common adverse events observed in subjects in this trial were nausea, gastroenteritis, injection site erythema and, consistent with the mechanism of action of KER-050, increased hemoglobin and hypertension. The reversible, mild hypertension events were observed in subjects with an approximately 3 g/dL increase in hemoglobin.

Long half-life observed, potentially supporting monthly or less frequent dosing

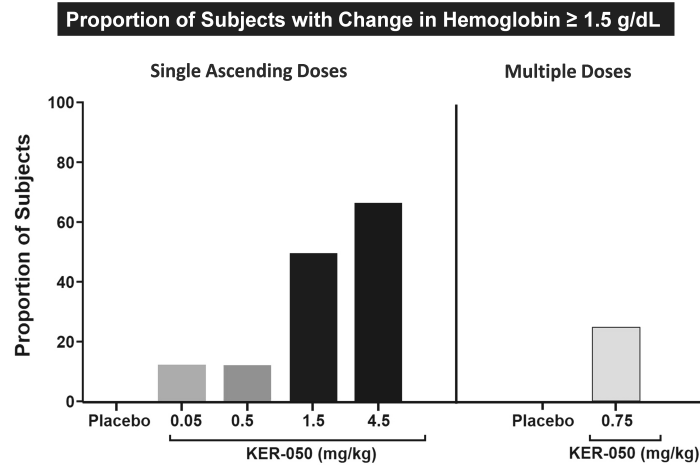
We observed that KER-050 drug levels were dose proportional in Part 1 of this trial, with a mean half-life of approximately ten to 12 days. The half-life coupled with the pharmacodynamic effect observed in the hematologic parameters support the potential for administration of monthly or less frequent dosing, which we believe will decrease the burden on patients and improve compliance.

Rapid and sustained increases in mean reticulocyte counts, hemoglobin, red blood cell counts and platelet counts observed

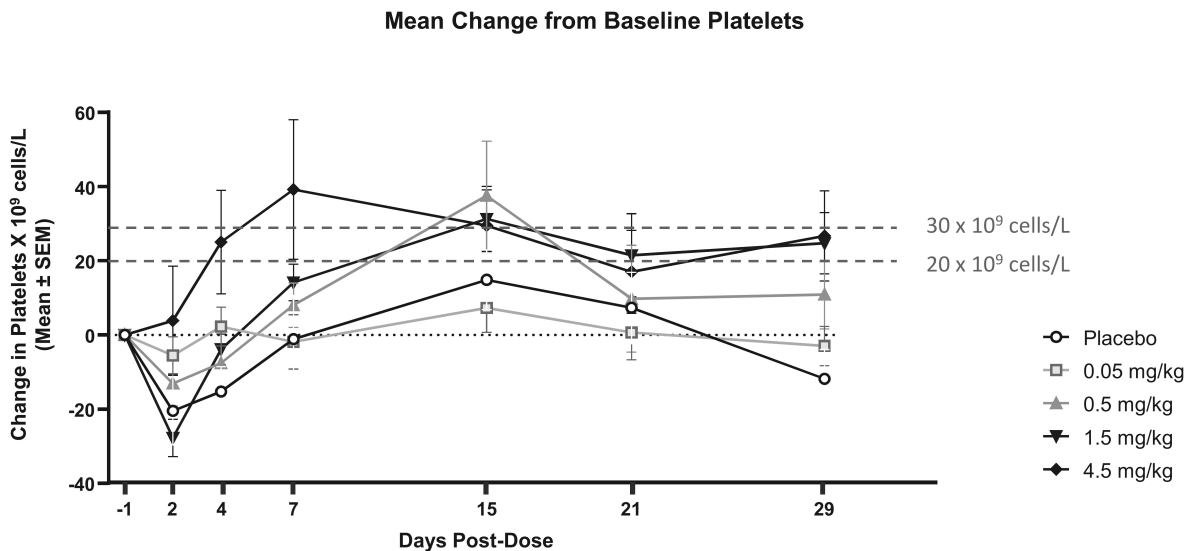
In Part 1 of this trial, we observed rapid and sustained increases in mean reticulocyte counts, hemoglobin, red blood cell counts and platelet counts. Consistent with the underlying biology, increases in reticulocytes were observed early with increases of hemoglobin following thereafter. Increases in reticulocytes were observed as early as Day 2 and reached a peak around Day 15. Increases in hemoglobin concentration were also observed as early as Day 2, reached a peak around Day 29 and remained elevated for several weeks.



We also observed a dose-dependent increase in the proportion of subjects with hemoglobin increases of at least 1.5 g/dL. We believe a 1.5 g/dL increase would be considered clinically meaningful in patients with low red blood cell counts.



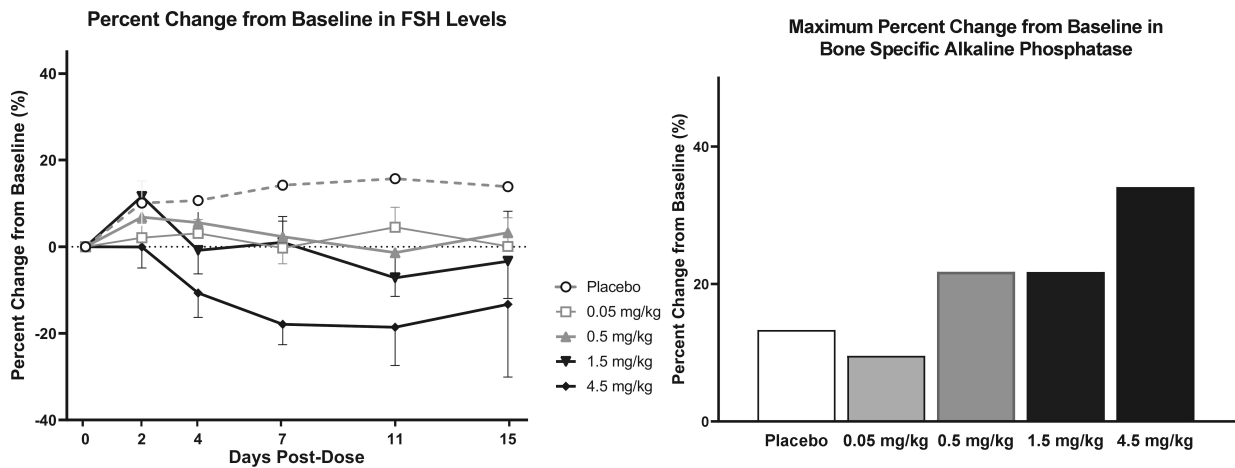
In addition to the changes in erythroid parameters, robust, dose-dependent increases in platelet count were observed after a single dose of KER-050. All subjects who received a 4.5 mg/kg dose of KER-050, the highest dose evaluated, demonstrated an increase of 30×10^9 cells/L or greater at any one point in the trial, which we believe would be considered clinically meaningful in patients with low platelet counts.



We believe the rapid onset and durability of increased hemoglobin and platelet count observed in our Phase 1 clinical trial supports the potential for a dual effect of KER-050 on both early-stage differentiation and terminal maturation.

Additionally, we observed reductions in follicle-stimulating hormone, a biomarker of activin inhibition, following administration of KER-050, which we believe is indicative of target engagement and activin inhibition. We also observed an increase in

bone-specific alkaline phosphatase, a biomarker of bone remodeling, which we believe demonstrates that KER-050 has the potential to increase bone mass.



Preclinical Data

KER-050 was observed to inhibit ligands that signal through activin receptors in *in vitro* assays, and to potently regulate hematopoiesis in *in vivo* studies. Specifically, KER-050 demonstrated in these studies:

- high affinity for and potent inhibition of ligands involved in the regulation of hematopoiesis;
- increased maturation of early- and terminal-stage erythroid progenitors in wild-type mice;
- increased serum erythropoietin levels in wild-type mice;
- increased red blood cell production in mice and non-human primates; and
- increased platelets in wild-type mice.

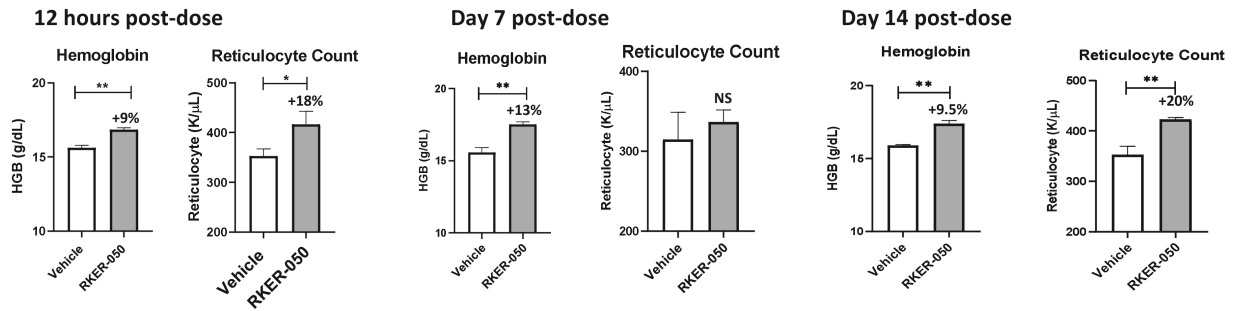
KER-050 observed to target ligands that signal through ActRIIA and ActRIIB

KER-050 is a modified ActRIIA ligand trap that contains sequences from both wild-type ActRIIA and wild-type ActRIIB. KER-050 was observed to bind to and inhibit multiple ligands that signal through these cell surface receptors, including activin A, activin B and growth differentiation factor 11. These ligands are key regulators of hematopoiesis that restrict blood cell progenitors from continuing through differentiation and developing into mature cells with specialized function. The KER-050-mediated inhibition of these regulators stimulated the progenitors to progress to maturation and, consequently, increased the number of mature cells in the blood.

Mouse version of KER-050 observed to potently stimulate red blood cell parameters and to increase the populations of erythroid progenitors

In a preclinical study conducted in mice, a single, subcutaneous 10 mg/kg dose of a mouse version of KER-050, or RKER-050, increased red blood cell parameters, including red blood cell number and reticulocytes, as early as 12 hours. We believe the rapid onset of the effect is consistent with terminal maturation of late-stage erythroid precursors. RKER-050 has been modified to have a murine Fc domain in place of the human Fc domain present in KER-050, in order to minimize results confounded by the development of anti-drug antibodies in mice treated with a human protein.

Increase in Red Blood Cells and Reticulocytes in Mice



* P value <0.05; ** P value <0.01; NS = not significant

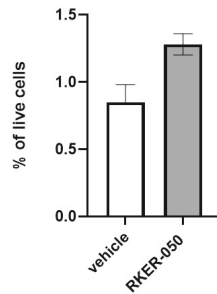
We also observed increases in colony forming unit-erythroid progenitors as soon as Day 2, consistent with an effect on early stages of erythropoiesis, followed by changes in polychromatophilic/early-orthochromatic erythroid precursors as soon as

Day 4 and late orthochromatic erythroblasts/reticulocytes by Day 7, which is consistent with progression of cells through erythropoiesis.

RKER-050 also observed to increase numbers of erythroid progenitors in mice

To evaluate the mechanism of action of RKER-050 in erythropoiesis, we collected and analyzed bone marrow from RKER-050-treated mice for erythroid progenitors. We observed a RKER-050-mediated increase in the proerythroblast, or Pro-E, population in a flow cytometry analysis that used antibodies directed against cell surface markers to label-specific cell populations.

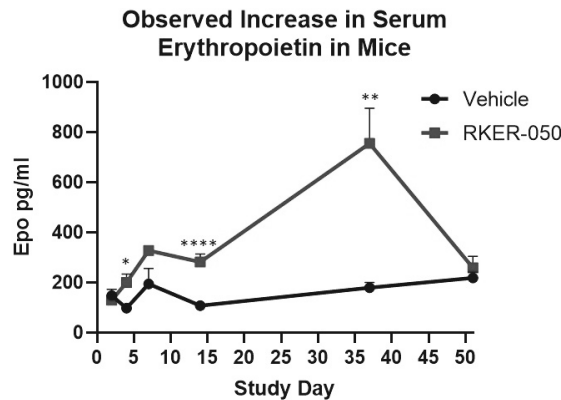
Increase in Overall Numbers of Proerythroblasts in Mice



The rapid expansion of the Pro-E population also coincided with decreased numbers of erythroid burst-forming units and erythroid colony-forming units, the cells that give rise to Pro-E cells, which demonstrates that treatment with RKER-050 stimulated the erythroid burst-forming units and erythroid colony-forming units into erythroid differentiation. Since treatment with RKER-050 stimulated the earliest progenitors in the erythroid lineage to progress to maturation and increased the Pro-E pool, the first cells to start synthesis of hemoglobin, we believe RKER-050 has the potential to affect the early stages of erythropoiesis.

RKER-050 also observed to increase serum erythropoietin and bone marrow erythropoietin receptor expression in mice

In addition, a single dose of RKER-050 increased red blood cells and hemoglobin through at least Day 51 (+8.5% and +3%, respectively). Concurrently, despite increased erythropoiesis, erythropoietin levels were greater than two-fold higher than controls, starting at Day 4, continuing through Day 37 and returning to baseline by Day 51.



* P value <0.05; ** P value <0.01; **** P value <0.0001

We believe that these results suggest that RKER-050 potentially elicits the combined effects of stimulating terminal maturation of late-stage erythroid precursors to rapidly increase red blood cells and potentially mobilizes a prolonged supply of progenitors through expansion of early-stage precursor populations that allows for sustained upregulation of erythropoiesis. Additionally, we believe the observed increase in erythropoietin could contribute to the durability in red blood cell production we observed in preclinical studies and supports the durability of the red blood cell increase we observed in our Phase 1 clinical trial of RKER-050 in healthy post-menopausal women.

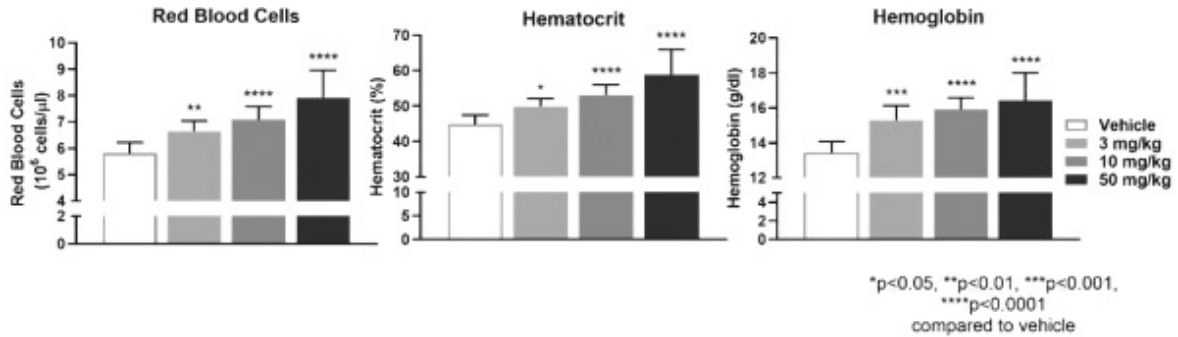
Given that RKER-050 increased early erythroid precursor cell pools in this preclinical study and its effect on upregulating serum erythropoietin, we believe RKER-050 has the potential to treat patients with MDS that have hypocellular bone marrow. We believe the observed increases in serum erythropoietin in mice that were dosed with RKER-050 support the potential of

KER-050 as a therapy for patients with low serum erythropoietin across a diverse set of diseases, including chronic kidney diseases and polycythemia.

KER-050 also observed to increase red blood cells in non-human primates

We believe that our observations in preclinical studies of KER-050 in non-human primates indicate that the red blood cell effects of KER-050 also translate to higher-order species. In this study, cynomolgus monkeys received subcutaneous administration every other week for three months of either vehicle or doses of 3 mg/kg, 10 mg/kg or 50 mg/kg of KER-050. Hematology was measured at baseline and on Day 92. Red cell mass, including red blood cell number, hematocrit and hemoglobin were dose-dependently increased in the cohorts receiving KER-050. These data demonstrate the translatability of red blood cell, hematocrit and hemoglobin increases observed in preclinical studies of KER-050 from mice to non-human primates.

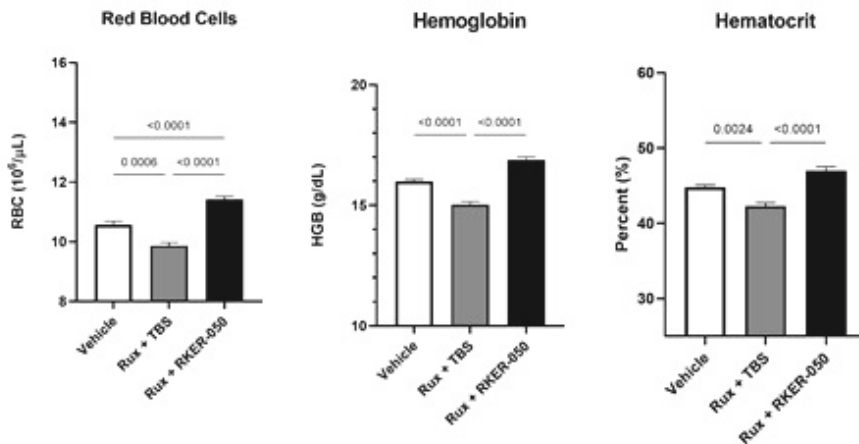
Increase in Red Blood Cells, Hematocrit and Hemoglobin in Cynomolgus Monkeys



RKER-050 observed to rescue ruxolitinib-induced reduction in red blood cell parameters in mice

In a preclinical study conducted in mice, 37 days of daily treatment with 120 mg/kg ruxolitinib, or Rux, a JAK2 inhibitor, resulted in reductions in red blood cells, hemoglobin and hematocrit. RKER-050 dosed twice weekly between study days 41 and 55 in combination with continued Rux treatment reversed the Rux-induced effects on red cell parameters. These data indicate RKER-050 potentially functions independently of the JAK-STAT pathway, a system known to be defective in patients with myelofibrosis. Further, we believe that these data observed in mice support the potential that treatment with KER-050 has the potential to mitigate the dose-limiting effects of Rux and enhance the duration of therapy in patients.

Observed Increase in Red Blood Cells, Hemoglobin and Hematocrit in Mice Treated with RKER-050 in Combination with Ruxolitinib

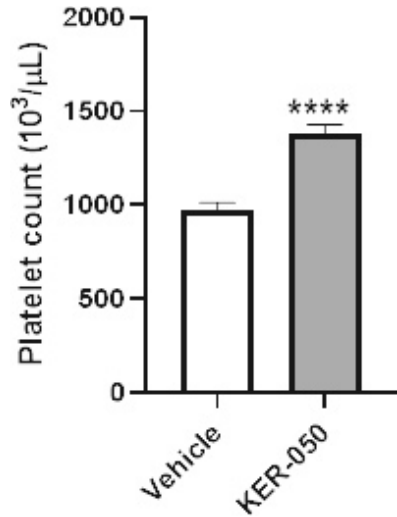


KER-050 observed to stimulate platelet release into circulation in wild-type mice

To evaluate the effect of KER-050 on blood cell types other than red blood cells, mice were administered a single, subcutaneous 7.5 mg/kg dose of KER-050 and had blood sampled and analyzed 4 days post-dose. Mice that received KER-050 were observed to have increased platelet counts compared to mice in the vehicle cohort. In a separate preclinical study conducted in mice, changes in platelets after a single intraperitoneal dose of 10 mg/kg RKER-050 were observed as

early as 12 hours post-dose. These data suggest that RKER-050 potentially increases terminal maturation of proplatelets into platelets.

Observed Increase in Platelet Count in Mice

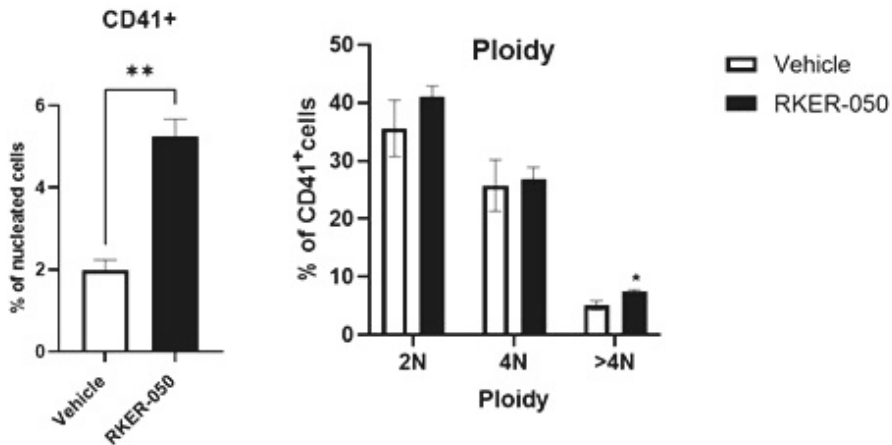


**** P value <0.005

RKER-050 observed to affect the early precursors in thrombopoiesis in mice

To evaluate the effect of RKER-050 on platelet precursors, mice were administered a single, intraperitoneal 10 mg/kg dose of RKER-050. Bone marrow analysis performed 24 hours post-dose demonstrated that RKER-050 treatment increased the CD41+ megakaryocyte precursor population, and that these cells had increased ploidy compared to vehicle-treated mice. These data suggest that RKER-050 promoted the maturation of early megakaryocyte populations and primed megakaryocytes for proplatelet production.

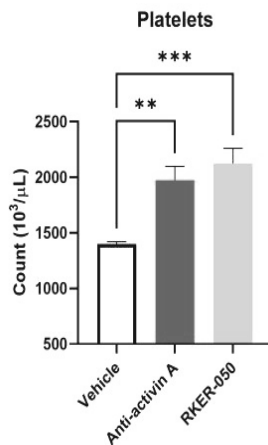
Observed Levels of CD41+ Cells and Degree of Ploidy in Mice Treated with Vehicle or RKER-050



* P value < 0.05, ** P value < 0.01

Additionally, to understand the potential contribution that inhibiting activin A has on RKER-050's potential effect on the thrombopoiesis pathway, we compared the effects of RKER-050 and an activin A neutralizing antibody on platelet levels after 24 hours.

Observed Platelet Levels in Mice Treated with Vehicle, Activin A Neutralizing Antibody or RKER-050



** P value < 0.01, *** P value < 0.001

Treatment with either RKER-050 or an activin A antibody both led to an increase in platelet count. These results suggest that inhibition of activin A may be partially responsible for the platelet effects observed in mice treated with RKER-050.

We believe that the findings from our preclinical studies and from our Phase 1 clinical trial of KER-050 in healthy postmenopausal women demonstrate the translation of biological action from rodents to humans. We also believe that data from our preclinical studies and clinical trials support that treatment with KER-050 has the potential to address ineffective hematopoiesis in diseases where multiple cytopenias arise from the blockage in progression of progenitor cells to mature blood cells, such as in MDS and myelofibrosis.

KER-047: For the Treatment of Anemia Arising from Iron Imbalance

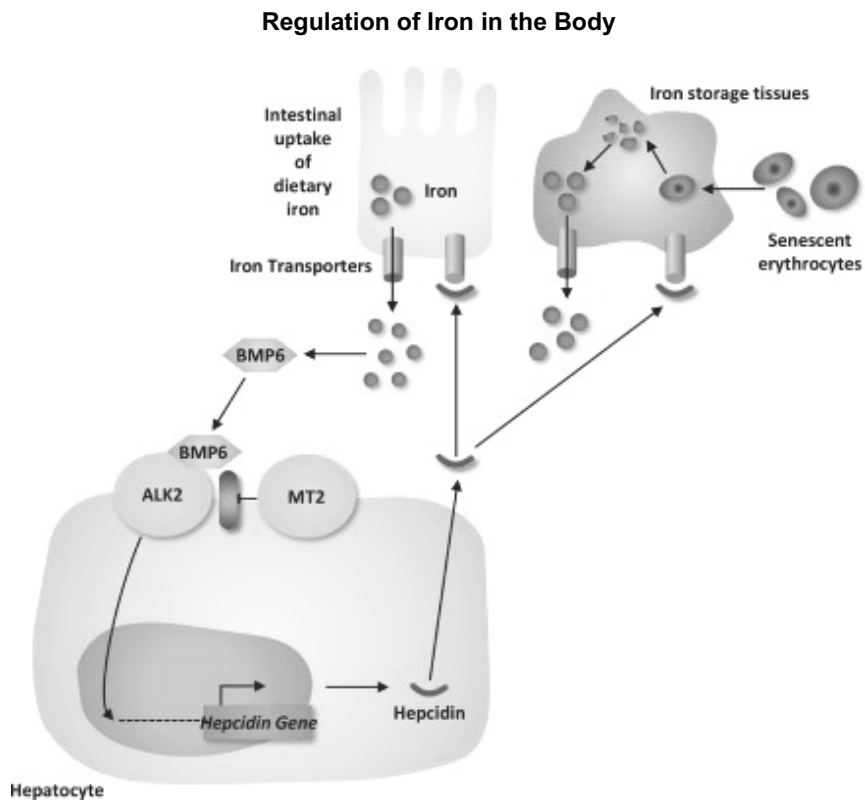
We are developing KER-047, our lead small molecule product candidate, for the treatment of anemia resulting from iron imbalance. We believe KER-047 is a potent and selective inhibitor of ALK2, a receptor whose excessive signaling is the underlying cause of the elevated levels of hepcidin, the key regulator of iron absorption and recycling, that leads to low iron bioavailability and anemia in a broad range of diseases. In December 2020, we reported topline data from our completed Phase 1 clinical trial of KER-047 in healthy volunteers.

Hepcidin and Iron Homeostasis

Iron supply in the bone marrow is critical for erythropoiesis, as iron is an essential component of hemoglobin. Although iron is required for many functions in the body, including erythropoiesis, high iron levels are toxic, so circulating levels are regulated to avoid iron overload. To maintain this balance, absorption of dietary iron is tightly controlled and recycled iron is held in the liver and macrophages, which we refer to as the storage tissues, to be mobilized quickly when circulating iron levels are too low. These storage tissues also act to sequester away iron when levels are too high. Hepcidin, a hormone produced by the liver, is the key regulator of iron absorption and recycling, and controls both the recirculation of iron from storage tissues as well as the absorption of dietary iron from the intestine.

Hepcidin levels are upregulated through activation of the ALK2 receptor, which is a BMP receptor belonging to the broader TGF- β family of proteins. Hepcidin levels are tightly regulated by liver cells through BMP6 signaling via ALK2. High serum iron triggers the expression of BMP6, which then acts to increase hepcidin expression, resulting in iron sequestration, decreased iron absorption and reduced serum iron. Hepcidin is controlled by a feedback loop, and serum hepcidin levels are inversely related to serum iron levels. This feedback loop prevents this system from shifting out of balance. The system is down regulated through the activity of matriptase-2, or MT-2, a cell surface protease, which is encoded by the TMPRSS6

gene. This protein reduces the ability of BMP6 to signal through ALK2. The below graphic illustrates a normal functioning of the negative feedback loop.



Anemia Arising from Iron Imbalance, including Iron Deficiency Anemia and IRIDA

Failure to suppress ALK2 signaling can result in elevated hepcidin levels, which are associated with decreased dietary iron absorption, increased iron sequestration in storage tissues and low iron bioavailability in the bone marrow. These effects culminate in a shortage of serum iron, which leads to insufficient red blood cell production that manifests as mild to moderate anemia.

Iron deficiency anemia, or IDA, is a common form of anemia that is caused by patients not having enough iron to manufacture healthy red blood cells. IDA is associated with fatigue, lethargy, decreased quality of life, cardiovascular complications, hospitalizations and increased mortality. IDA is prevalent in many different patient populations, including patients with IDA due to chronic kidney disease, chemotherapy-induced anemia and gastrointestinal diseases or disorders. It is estimated that approximately five million people in the United States have IDA and we believe that a small fraction of the patients who are diagnosed with IDA regardless of the underlying cause are currently being treated with intravenous, or IV, iron.

According to a 2021 Grand View Research, Inc. report, the global IV iron market size was approximately \$2.2 billion in 2020 and was forecasted to reach \$4.2 billion by 2028 at a compound annual growth rate of 8.5% during the forecast period. Approximately \$685 million, or 31%, of the total IV iron market in 2020 was associated with the treatment of patients with IDA due to chronic kidney disease, which represented the largest segment. Additionally, the same report estimated that, in 2020, the North American IV iron market share was approximately \$887.7 million, or 40%, the European market share was approximately \$699.0 million, or 31.5%, the Asia Pacific market share was approximately \$456.0 million, or 20.5%, and the Latin American and Middle Eastern/African market share were each approximately \$85.0 million to \$94.0 million, or 4%.

High hepcidin levels can also be the result of genetic disease. Iron-refractory iron deficiency anemia, or IRIDA, is a rare, inherited form of IDA that results in loss of function of MT-2, resulting in elevated ALK2 signaling and high hepcidin levels. Patients with IRIDA have the typical symptoms of anemia, including fatigue, weakness and shortness of breath, in addition to other symptoms associated with low iron. These symptoms are most pronounced during childhood, although they tend to be mild.

The prevalence of IRIDA worldwide is estimated to be less than one person in 1,000,000. IRIDA was first described in 1981 with the observation that patients with anemia were refractory to treatment with oral iron. However, the association of mutations in the Tmprss6 gene with IRIDA was not identified until 2008, and genetic testing for IRIDA is not widely available. Furthermore, affected individuals usually have normal growth and development, so IRIDA is poorly diagnosed. All these factors contribute to an inability to accurately determine the prevalence of IRIDA.

Proinflammatory cytokines can also result in inappropriately high ALK2 signaling, increased hepcidin expression and anemia. Patients with chronic inflammation have mild to moderate anemia resulting from low serum iron that is driven by abnormally high hepcidin levels through sustained cytokine-mediated ALK2 activation. Anemia of inflammation is the second most common cause of anemia worldwide. The prevalence of anemia varies among different inflammatory rheumatic diseases. In the United States, approximately 1,000,000 people older than age 65 suffer from diseases of chronic inflammation, including rheumatoid arthritis, systemic lupus erythematosus and ankylosing spondylitis. Anemia with high hepcidin levels has also been reported in patients with primary myelofibrosis.

Limitations of Current Treatment Options for Anemia Arising from Iron Imbalance, including IRIDA

There are no current treatments that address the underlying cause of anemia arising from iron imbalance, including in patients with IDA associated with co-morbidities and in patients with IRIDA.

Currently, there are two common methods of iron therapy used to treat IDA: oral iron supplements and IV iron. While oral iron supplements are used as first-line iron replacement therapy for most patients, they are poorly absorbed and not well tolerated by some patients, which may adversely impact their effectiveness. The beneficial effect of oral iron supplements on increasing hemoglobin levels can require an extended treatment period, and, at times, treatment is inadequate to achieve the targeted hemoglobin levels. Conversely, iron administered by IV infusion allows larger amounts of iron to be delivered to patients in a shorter time frame, which can result in faster rises in hemoglobin levels. However, for patients with IDA associated with co-morbidities, neither of these treatments address the underlying cause of the disease. Additionally, these treatments can also cause mild side effects, such as constipation, diarrhea and cramping, and can increase the risk of very serious, life-threatening side effects, such as hypersensitivity reactions, opportunistic infections and the deposition of excess iron in organs in patients with co-morbidities such as chronic kidney disease.

Separately, patients with anemia due to ineffective erythropoiesis that require frequent red blood cell transfusions may have elevated levels of hepcidin with accompanying iron overload in multiple organ systems. This chronic iron overload can lead to multiple organ dysfunction, including in the liver, heart and endocrine. Accordingly, iron chelation therapy is used to reduce iron deposits in those organs.

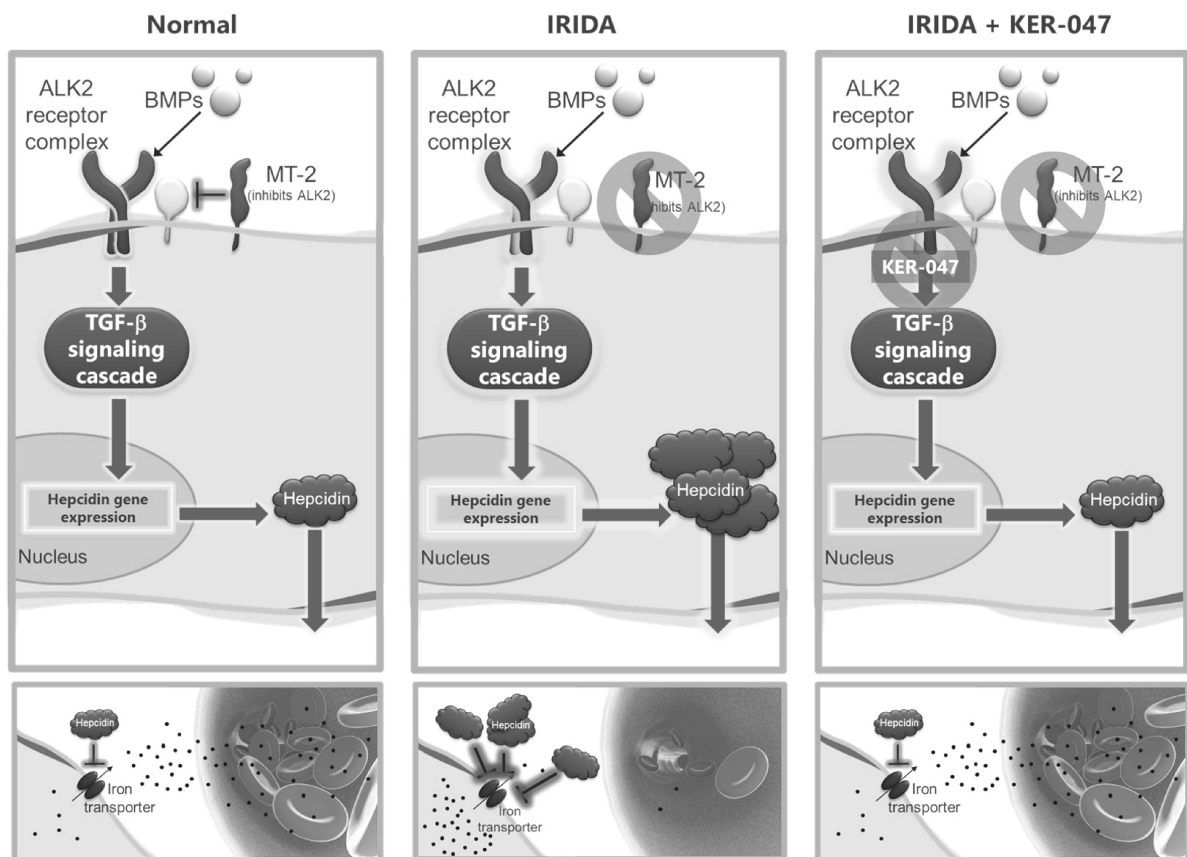
According to a 2021 GlobalInfoResearch report, the global iron chelation market was estimated to be \$1.1 billion in 2019, approximately 82% of which was associated with the treatment of patients with transfusional iron overload. Additionally, approximately 48% and 41% of the market share was in North America and Europe, respectively, in 2019.

We believe that a treatment option that reestablishes normal iron homeostasis has the potential to benefit a broad range of patients, from patients with IDA to patients with anemia associated with iron overload.

Our Solution: KER-047

KER-047 is an orally-available small molecule ALK2 inhibitor designed to potently inhibit ALK2 signaling, with high selectivity for ALK2 relative to other structurally-similar TGF- β receptors as well as other kinase families.

Mechanism of Action of KER-047



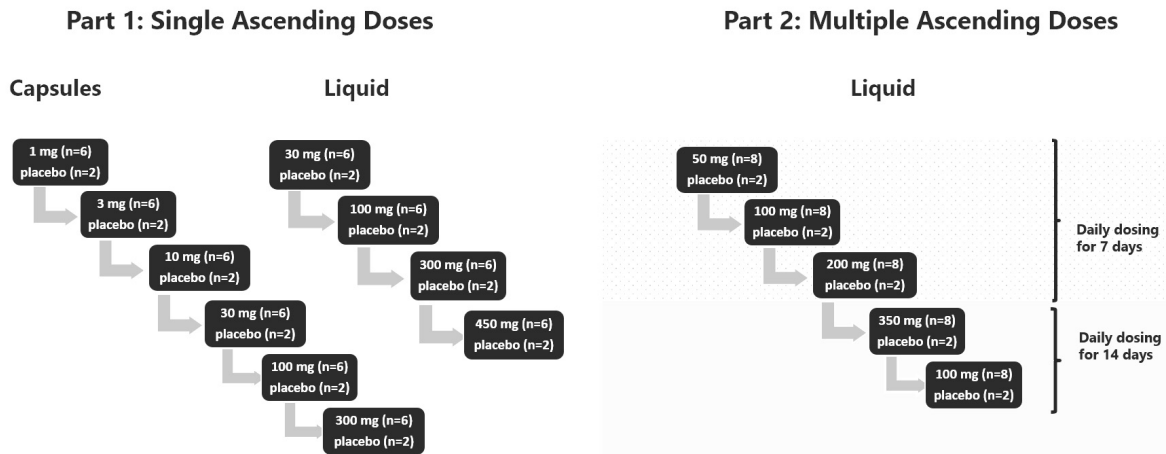
We believe that KER-047 has the potential to address the underlying cause of diseases arising from iron imbalance, including IDA, IRIDA and iron overload, by suppressing ALK2 signaling to normalize hepcidin expression and mobilizing iron out of tissues. We believe this effect will result in increased iron bioavailability, resulting in restoration of the production of red blood cells and a reversal of anemia in patients with IDA and patients with IRIDA. By ameliorating anemia arising from iron imbalance, we believe KER-047 can potentially eliminate the need for excessive supplementary iron or IV iron treatments and avoid the adverse events associated with those treatment options. In addition, we believe KER-047, if approved, has the potential to be beneficial in diseases of iron overload by mobilizing excess iron being stored in tissues into the serum. By ameliorating the excess iron in tissues, we believe KER-047 can potentially eliminate or reduce the need for phlebotomy and/or treatment with iron chelators, while allowing patients to avoid the adverse events associated with these treatments and providing benefit to patients where the current treatment options are largely ineffective.

In August 2020, we announced the completion of our planned single and multiple ascending dose cohorts in a Phase 1 clinical trial of KER-047 in healthy volunteers, as well as the expansion of this trial to evaluate additional cohorts of healthy volunteers. One additional cohort of healthy volunteers was evaluated in the trial expansion. We terminated the trial after determining that the data from this cohort, in addition to the data from the planned cohorts, were sufficient to inform the design of the expected Phase 2 clinical trials of KER-047, and reported topline data from this trial in December 2020. We expect to commence two open-label Phase 2 clinical trials of KER-047 in the first half of 2022, one in patients with IDA and one in patients with IRIDA, and expect to report initial data from both trials by the end of 2022. Additionally, we intend to develop KER-047 as a potential treatment for patients who manifest anemia caused by high hepcidin levels as a secondary consequence of more common diseases.

Completed Phase 1 Clinical Trial

In November 2020, we completed a randomized, double-blind, placebo-controlled, two-part Phase 1 clinical trial to evaluate single and multiple ascending doses of KER-047 in healthy volunteers. The primary objectives of this trial were to assess safety, tolerability and pharmacokinetics of KER-047. The trial design is summarized in the figure below.

Phase 1 Clinical Trial Design

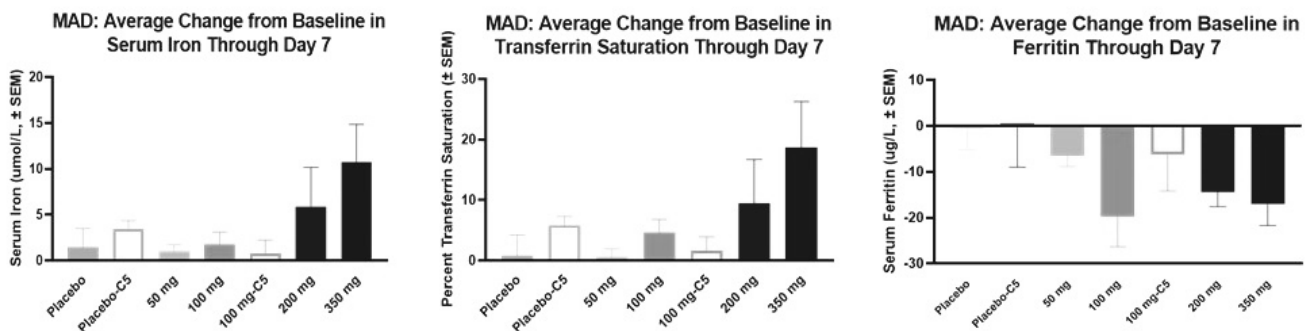


Observed tolerability data

The majority of adverse events observed in this Phase 1 clinical trial were mild or moderate in severity, and only two were severe. There were no serious adverse events reported in this trial. The most common adverse events observed in healthy volunteers in this trial were abdominal discomfort, chills, decreased appetite, diarrhea, dizziness, fatigue, gastroenteritis, headache, lymphopenia, myalgia, nausea, neutropenia, pyrexia, rhinorrhea, tonsillitis, upper abdominal pain and vomiting. In Part 2 of this trial, ten of 40 participants administered KER-047 and one of 11 participants administered placebo discontinued study drug due to adverse events. Adverse events that led to study drug discontinuation in three or more participants in the KER-047 groups included lymphopenia and chills. Lymphopenia, which we believe is consistent with KER-047's mechanism of action, was observed after multiple doses and was reversible after discontinuation of study drug.

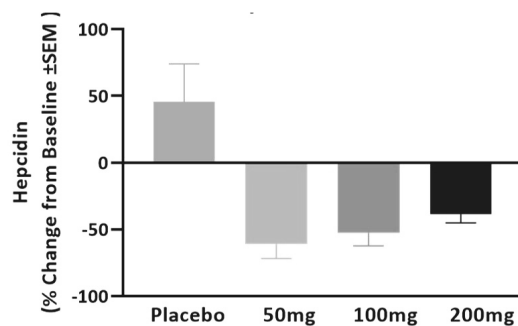
Rapid mobilization of iron stores resulted in increased reticulocyte hemoglobin content of newly-produced immature red blood cells

In this Phase 1 clinical trial, we observed rapid, robust and sustained dose-related increases in serum iron and transferrin saturation in the volunteers who received KER-047, which was associated with decreases in ferritin, an effect that is consistent with mobilization of iron stores.



We also observed a reduction in serum hepcidin in Cohorts 1 through 3 of Part 2 of this trial (50 mg, 100 mg and 200 mg dose groups), which we believe is consistent with KER-047's mechanism of action. These data were not collected in Part 1 of this trial or in Cohort 4 of Part 2 of this trial (350 mg dose group).

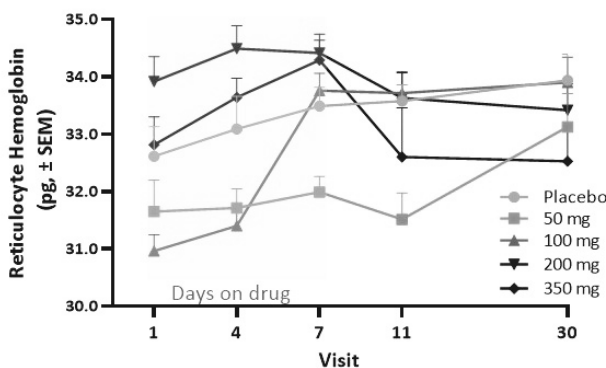
Part 2 of the Trial: Hepcidin Percent Change from Baseline at Day 7, 8 Hours Post-Dose



Additionally, we observed a decrease in hepcidin as early as four hours after administration of the first dose in Cohort 5 of Part 2 of this trial (100 mg dose group).

We also observed an increase in reticulocyte hemoglobin in Cohorts 1 through 4 of Part 2 of this trial, starting on Day 4 of treatment.

Mean Reticulocyte Hemoglobin at Each Visit



We believe the observed decrease in ferritin and hepcidin coupled with the observed increases in reticulocyte hemoglobin content are indicative of increased iron mobilization. Importantly, we believe the mobilized iron is available for incorporation into hemoglobin as evidenced by the increase in reticulocyte hemoglobin, a measure of hemoglobin content from newly-produced immature red blood cells. These erythroid precursors potentially would continue maturation into hemoglobin-rich red blood cells.

We also observed decreases in lymphocytes following peak increases in serum iron in this trial, which we believe is consistent with KER-047's mechanism of action and suggestive of depletion of tissue iron.

We believe the data from this Phase 1 clinical trial support the potential for KER-047 to be developed as a treatment for diseases arising from iron imbalance.

Observed reductions in total cholesterol

Reductions in total cholesterol, low-density lipoproteins, or LDL, and high-density lipoproteins were observed in Part 2 of this trial. The reductions in total cholesterol and LDL were achieved rapidly with a mean reduction of greater than 20% at the highest dose, following seven days of dosing.

Clinical Development Strategy

In December 2020, we reported topline data from our completed Phase 1 clinical trial of KER-047 in healthy volunteers. We expect to commence two open-label Phase 2 clinical trials in the first half of 2022, one in patients with IDA and one in patients with IRIDA, and expect to report initial data from both trials by the end of 2022.

Preclinical Data

KER-047 was observed in preclinical studies to be a potent and highly selective ALK2 inhibitor and to change serum iron levels. Specifically, KER-047 demonstrated in these studies:

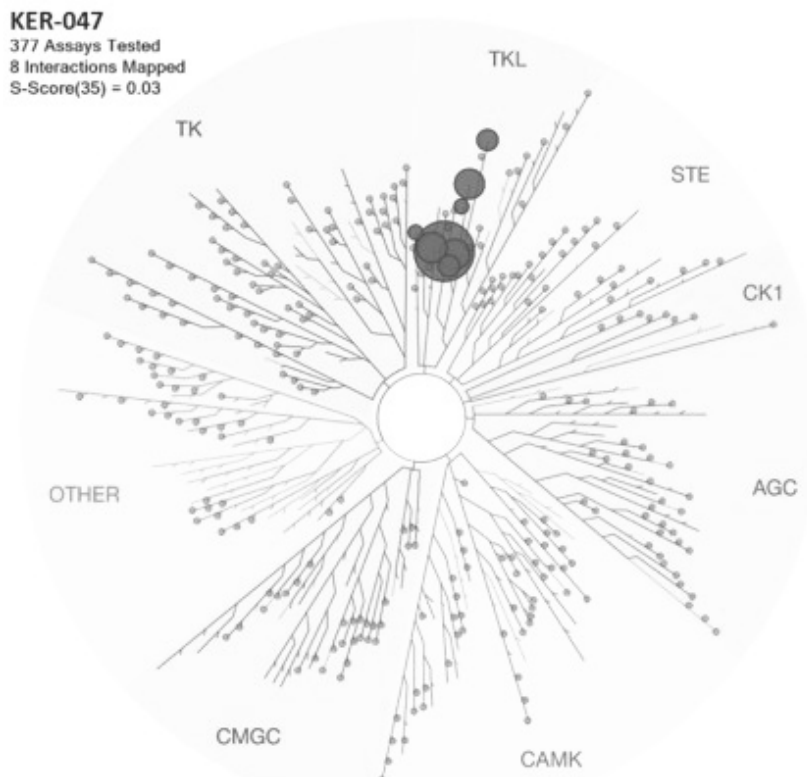
- selectivity for ALK2 compared to other structurally-related TGF- β and non-TGF- β kinases;
- increased serum iron levels in rat studies; and
- reversal of high hepcidin levels and low hemoglobin levels in a mouse model of IRIDA.

KER-047 observed to be a potent and highly selective ALK2 receptor inhibitor in a biochemical assay

In standard biochemical kinase screenings, *KER-047* exhibited low nanomolar potency for ALK2. Under the conditions of this assay, *KER-047* exhibited at least an eight-fold selectivity over the other structurally-related TGF- β kinases. In a 370-member kinase panel, only two non-TGF- β kinases were inhibited less than 75% at a *KER-047* concentration of 1 μ M. We believe these preclinical data further support the potency and selectivity of *KER-047* for the ALK2 domain.

Highly Selective ALK2 Receptor Inhibitor

Invitrogen kinase screen (1 μ M)



The kinase selectivity of *KER-047* is shown in the dendrogram above. Compounds were screened at 1 μ M against a panel of over 370 kinases and disease-relevant mutants. Each branch of the dendrogram represents an individual human kinase. Kinases bound by the compound are indicated by red circles on the kinome tree. The degree of binding corresponds to the size of the circle. As illustrated by the largest red circle in the above graphic, *KER-047* was observed to be a potent ALK2 inhibitor and a weak inhibitor of other members of the TGF- β family of receptors.

In cell-based assays that more directly tested the functional ability of *KER-047* to suppress receptor signaling, *KER-047* exhibited low nanomolar potency. In assays evaluating the effect of *KER-047* on receptors with the highest structural homology to ALK2, *KER-047* had at least 20-fold selectivity for ALK2, compared to ALK1 and ALK5, which have 77% and 65% homology to ALK2, respectively.

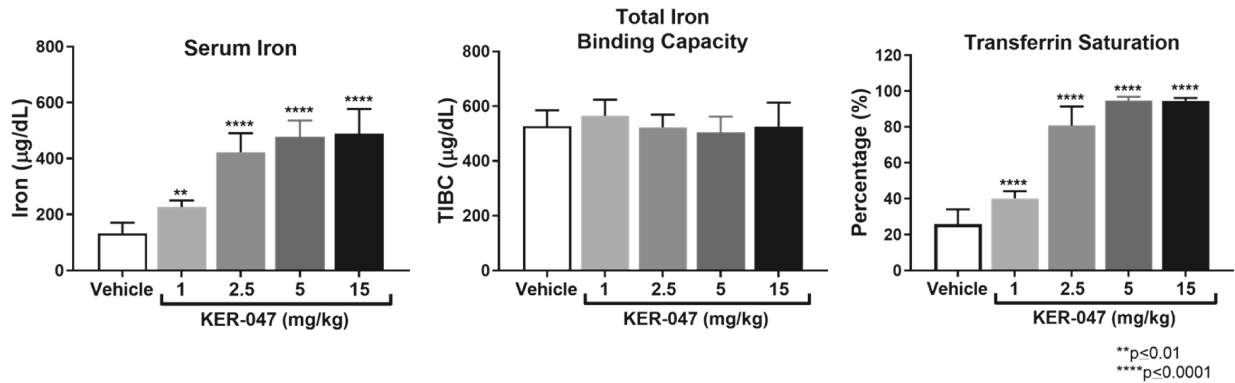
KER-047 inhibition of ALK2 signaling resulted in increased serum iron and transferrin saturation in multiple animal models

We believe that data from preclinical studies support a link between ALK2 signaling, hepcidin expression and serum iron across multiple preclinical species in both healthy and disease models. Serum iron is an indicator of whether there is adequate iron available in the body. Total iron binding capacity is the measure of the maximum amount of iron that can be bound by transferrin, an iron-binding protein, and is a surrogate measurement of serum transferrin levels. Transferrin saturation is calculated by dividing serum iron by total iron binding capacity and is an indicator of how well the body is transporting the iron in blood. Taken together, these values are an indication of the state of iron balance in the body.

We evaluated serum iron, total iron binding capacity and transferrin saturation in Sprague-Dawley rats that received daily, oral administration of either vehicle or doses of 1 mg/kg, 2.5 mg/kg, 5 mg/kg or 15 mg/kg of *KER-047* for three months. Rats

that were treated with KER-047 were observed to have a dose-dependent increase in serum iron levels and a concomitant increase in transferrin saturation, with no change in total iron binding capacity.

Increased Serum Iron, Total Iron Binding Capacity and Transferrin Saturation in Rats

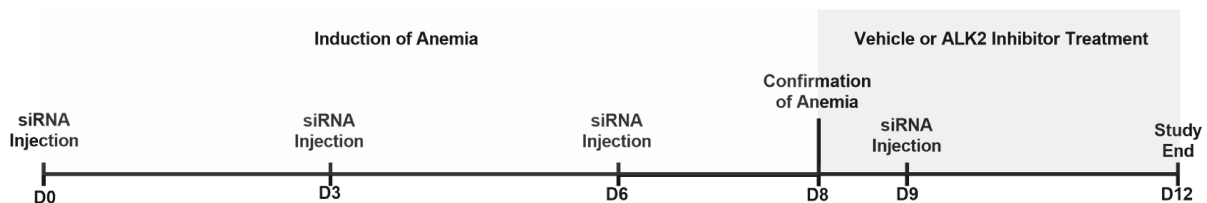


These data demonstrate that ALK2 inhibition resulted in increased serum iron and that KER-047 acts by releasing iron into blood without altering the expression or functionality of iron binding proteins. We believe that these data demonstrate that treatment with KER-047 has the potential to alter ALK2 signaling and release iron from storage tissue for transport to other tissues, including in the bone marrow.

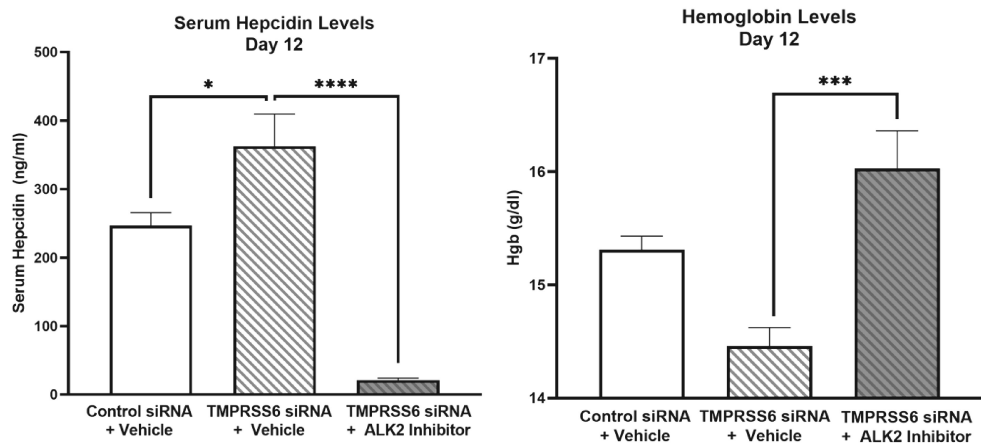
Treatment with an ALK2 inhibitor closely related to KER-047 was also observed to reverse anemia in a mouse model of IRIDA. To generate this mouse model, we used an siRNA directed against TMPRSS6, the same gene that is defective in patients with IRIDA, to render the mice TMPRSS6-deficient. We confirmed that mice receiving the TMPRSS6 siRNA had a greater than 85% reduction of target gene expression relative to the control siRNA cohort. This model recapitulated the increased hepcidin levels and reduced hemoglobin that are characteristic of patients with IRIDA. Treatment of the mice receiving the TMPRSS6 siRNA with an ALK2 inhibitor normalized levels of both hepcidin gene expression and hemoglobin levels compared to the control siRNA cohort receiving vehicle treatment, which we believe indicates that ALK2 inhibition can reverse anemia resulting from iron imbalance.

Serum Hepcidin and Hemoglobin Levels in Mice with siRNA-induced IRIDA

Mouse IRIDA Model Protocol Timeline



Mouse IRIDA Model Data



*p<0.05, ***p<0.001, ****p<0.0001 (Two-way ANOVA followed by Sidak post-test)

The sequence of the ALK2 receptor has been highly conserved through evolution, with greater than 98% amino acid sequence homology between mice and humans. Likewise, the finding that the mouse models with changes in ALK2 signaling recapitulate human disease also provides evidence that the function of the ALK2 receptor is conserved across species. For example, knockdown of the Tmprss6 gene results in a phenocopy of the disease observed in patients with IRIDA. We believe that the conservation of biology provides confidence that treatments that are efficacious in preclinical models will have similar effects in humans.

We further explored the results we observed in a mouse model of IRIDA by using a mouse model of anemia of inflammation via induced chronic kidney disease. Inflammatory cytokines in chronic kidney diseases results in increased hepcidin, iron imbalance and anemia, and we believe a mouse model of chronic kidney disease is predictive of the broader indication of anemia of inflammation. To generate this mouse model, mice were dosed daily for six weeks with 50 mg/kg of adenine to induce kidney damage, and subsequently developed inflammation-mediated anemia, with corresponding elevated levels of hepcidin and decreased serum iron. Thereafter, mice continued to receive either vehicle or adenine daily, but also received daily treatment of either vehicle or 5 mg/kg of an ALK2 inhibitor closely related to KER-047 for ten days.

At termination of the preclinical study, mice receiving adenine in combination with the ALK2 inhibitor had serum iron values 108.2% higher than the vehicle-treated mice receiving adenine and vehicle. Additionally, serum hepcidin was decreased by 85.4% over vehicle-treated mice. These data substantiate the role of ALK2 signaling in anemia arising from high hepcidin and illustrate the potential therapeutic benefit of specific ALK2 inhibition in these diseases, including anemia of inflammation.

Our Musculoskeletal and Pulmonary Program

KER-012

KER-012 is a ligand trap comprised of a modified ligand-binding domain of ActRIIB that is fused to the portion of the human antibody known as the Fc domain. KER-012 is designed to bind to and inhibit the signaling of TGF- β ligands, including activin A and activin B, which are key regulators of bone remodeling that act to suppress bone growth, to potentially increase bone mass. We believe that KER-012 has the potential to increase the signaling of BMP pathways through this inhibition of activin A and activin B signaling, and consequently treat diseases such as PAH that are associated with reduced BMP signaling due to inactivating mutations in the BMP receptors. We are developing KER-012 for the treatment of pulmonary arterial hypertension, or PAH, and for the treatment of disorders associated with bone loss, such as osteoporosis and osteogenesis imperfecta. We have commenced a Phase 1 clinical trial of KER-012 in healthy volunteers and expect to report initial data from Part 1 of this trial in the second quarter of 2022 and additional data from Part 2 of this trial in the second half of 2022.

Pulmonary Arterial Hypertension

PAH is a debilitating disorder characterized by elevated pulmonary vascular resistance due to severe constriction and progressive obliteration of the pulmonary vessels. PAH results in diminished oxygenation, impaired cardiac output and symptoms stemming from overload of the right ventricle, such as shortness of breath, fatigue, fainting, chest pain, palpitations and swelling of extremities and abdomen. We estimate that there are approximately 40,000 addressable patients in the United States living with this condition. Despite current treatment options, survival with PAH remains only slightly above 50% at five years, with mortality typically resulting from right ventricle failure.

Loss-of-function mutations in the gene encoding the BMP type II receptor, or BMPR2, are present in over 70% of cases of heritable PAH, or HPAH, while loss-of-function mutations in certain BMPR2 co-receptors are present in other cases of HPAH and idiopathic PAH. Histology and gene expression studies from the lungs of human and experimental PAH showed diminished BMPR2 expression and BMP signaling even in the absence of loss-of-function mutations, as well as enhanced TGF- β signaling. Consistent with an imbalance in the signaling of these families of ligands, it was recently found that PAH due to cirrhosis and portal hypertension is marked by a severe deficiency of circulating BMP9, while circulating TGF- β , activin and growth differentiation factor, or GDF, ligands were found to be increased in PAH, even in the absence of causative mutations. Multiple experimental third-party models also demonstrated the efficacy of augmenting BMP signaling or suppressing TGF- β , activin or GDF signaling, which we believe supports the notion that imbalanced homeostatic BMP and pathogenic TGF- β , activin and GDF signaling drive the development and progression of pulmonary vascular disease.

Limitations of Current Treatment Options for PAH

All of the currently-approved therapies for PAH are vasodilators, which are medications that dilate blood vessels. These vasodilators fall into one of three categories: (i) prostanoids, which are agonists of the prostacyclin signaling pathway; (ii) endothelin receptor antagonists, or ERAs; or (iii) (a) phosphodiesterase 5 inhibitors, or PDE5i, which are agents that enhance nitric oxide metabolism, or (b) soluble guanylate cyclase activators, which cause downstream cGMP signaling.

One common approach to treating early-stage or mild PAH is an oral combination therapy using ERA and PDE5i medications. More severe PAH generally requires the addition of prostanoid, via oral or inhaled administration, while advanced PAH typically requires continuous parenteral administration. Each of these individual therapies may modestly improve a patient's functional status and in some cases survival, but is limited by systemic hypotension, systemic side effects and tachyphylaxis, which is an acute, sudden decrease in response to a product after its administration. Additionally, combination therapy is

limited by the combined side effect profiles. Although existing treatments may modestly slow the progression of PAH, none appear to halt or reverse the disease's progression.

While the key physiologic and pathologic features of PAH include vasoconstriction, scar tissue and vascular smooth muscle cell proliferation and inflammation, the main pharmacological effect for all currently approved therapies is believed to be vasodilation. Accordingly, we believe there is a significant unmet need for a treatment that primarily targets the proliferative pathological processes and can be used alone or in combination with other PAH therapies. We believe that potent therapies that do not exhibit tachyphylaxis, are orally bioavailable or do not require continuous infusion therapy would have advantages over the currently available treatments for PAH.

Therapies that arrest pulmonary vascular remodeling could have a long-term clinical stabilizing effect in PAH, or reverse vascular obliteration. We believe that KER-012 has the potential to increase the signaling of BMP pathways through the inhibition of activin A and activin B signaling, and consequently treat diseases such as PAH that are associated with reduced BMP signaling due to inactivating mutations in the BMP receptors.

Osteoporosis

Osteoporosis is a highly prevalent disease characterized by low bone mineral density and deterioration of bone structure, which leads to an increase in bone fractures. It is estimated that more than 200 million people worldwide, including approximately 30% of all post-menopausal women in the United States and Europe, suffer from osteoporosis. It is also estimated that 50% of women and 20% of men over the age of 50 will suffer at least one osteoporosis-related fracture in their remaining lifetime. These fractures can lead to increased morbidity and mortality. With the number of individuals over the age of 50 expected to increase, the incidence of osteoporosis-related fractures is predicted to double or triple in the upcoming decades.

Limitations of Current Treatment Options for Osteoporosis

Patients with osteoporosis are generally treated with anti-resorptive agents and anabolic agents. Anti-resorptive agents act to prevent further bone loss by inhibiting the breakdown of bone, while anabolic agents stimulate bone formation to build new, high-quality bone.

Bisphosphonate anti-resorptive agents, including Aredia (pamidronate), Fosamax (alendronate) and Reclast (zoledronic acid), are the current standard of care, and these treatments inhibit the cells that resorb or take away bone. However, bisphosphonates have limited efficacy for non-vertebral fractures, and gains in bone mineral density have been observed to plateau after a few years of treatment. Additionally, bisphosphonate use has been associated with infrequent but serious adverse events, such as osteonecrosis of the jaw and atypical femoral fractures. These side effects, although rare, have created increasing concern among physicians and patients. Accordingly, the number of bisphosphonate prescriptions has declined over 50% in the last decade and physicians are seeking alternatives.

There are several alternatives to bisphosphonates that are approved for the treatment of osteoporosis, including anti-resorptive agents and anabolic agents. The most potent anti-resorptive product that is approved for treatment is Prolia (denosumab). Given twice a year via subcutaneous injection by a physician, Prolia increases bone density and reduces hip, spine and non-vertebral fractures. However, in the past five years, there have been numerous reports about fractures, especially those of the spine, occurring after the cessation of Prolia, which we believe has caused many patients with osteoporosis to refrain from commencing treatment with Prolia.

Anabolic therapies approved for treatment of osteoporosis include Forteo (teriparatide) and Tymlos (abaloparatide). Delivered by daily subcutaneous injection, these products have been observed to improve bone density and reduce vertebral fractures, but have limited evidence for reduction of hip fracture, which is frequently a debilitating fracture for patients. Additionally, use of these products is restricted to two years and their labels include a black-box warning regarding the occurrence of bone cancer in rats treated with Forteo, which is a key deterrent to using these products for many patients.

Evenity (romosozumab-aqqg), an anabolic therapy, increases bone formation briefly while also reducing bone resorption. The reason for the short-term nature of the anabolic effect is unclear. Evenity is delivered via two subcutaneous injections monthly at a doctor's office, with use restricted to 12 months. Although Evenity exhibited robust anti-fracture efficacy and large gains in bone mineral density in a third-party Phase 3 clinical trial, the Evenity label includes a black-box warning that the product may increase the risk of heart attack, stroke or death from a cardiovascular event.

We believe there is a large unmet need for patients with osteoporosis, as existing therapies have shortcomings in efficacy, tolerability, convenience and safety. Given these shortcomings, we believe there is a significant market opportunity for an anabolic agent such as KER-012, which is designed to be a potent and selective inhibitor of certain TGF- β ligands, including activin A and activin B, that are key regulators of bone remodeling that act to suppress bone growth. Additionally, with a growing population of older adults, the number of patients with osteoporosis is predicted to expand in the coming years.

Osteogenesis Imperfecta

Osteogenesis imperfecta is a group of genetic disorders that mainly affect the bones. People with osteogenesis imperfecta have bones that fracture easily, often from mild trauma or with no apparent cause. Osteogenesis imperfecta affects

approximately one out of every 10,000 to 20,000 people worldwide, while an estimated 25,000 to 50,000 people in the United States are living with the condition.

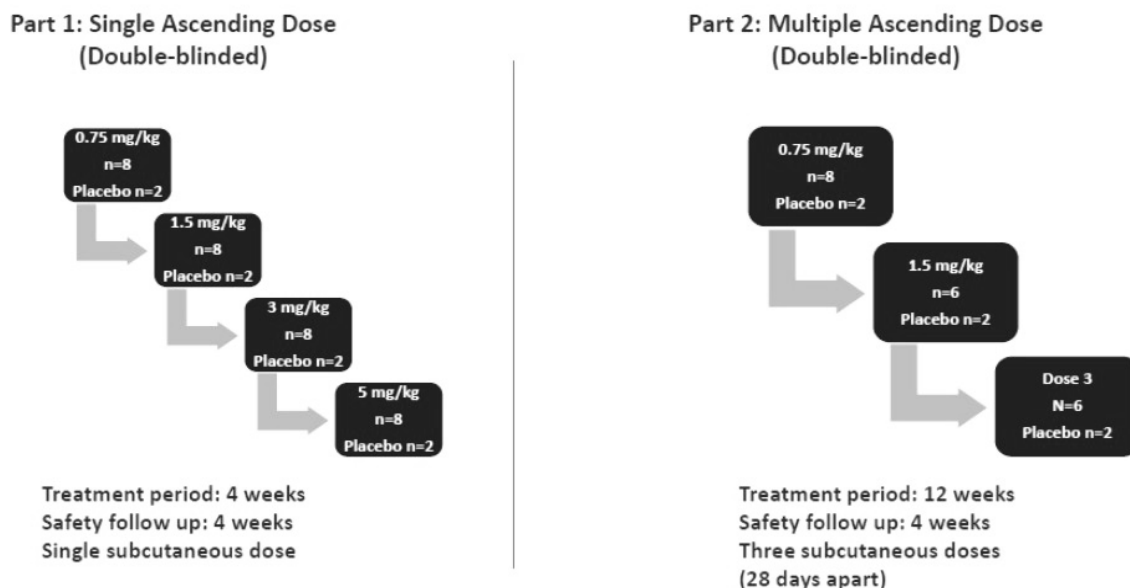
Limitations of Current Treatment Options for Osteogenesis Imperfecta

There are no approved therapies for the treatment of osteogenesis imperfecta in the United States or the European Union. Current treatment of osteogenesis imperfecta is directed towards the management of fractures with casting or surgical fixation, followed by physical therapy. Preventative surgeries, such as intramedullary, or in-bone, nailing fixation, in which a permanent nail or rod is placed into the center of the bone, are also undertaken. However, these surgical options do not treat the underlying cause of osteogenesis imperfecta. Additionally, bisphosphonates, which are not approved for osteogenesis imperfecta, are commonly used off-label in children. A meta-analysis of randomized trials demonstrated that there was no evidence that current treatments, including bisphosphonates, reduce fracture risk in patients with osteogenesis imperfecta. Controlled clinical trials also showed no improvement in bone pain, a key disability in children with osteogenesis imperfecta. Additionally, we are not aware of any long-term clinical trials demonstrating a reduction in fractures in adults, and the effect of long-term therapy with these existing products remains unclear.

Ongoing Phase 1 Clinical Trial in Healthy Volunteers

We have initiated a randomized, double-blind, placebo-controlled, two-part Phase 1 clinical trial to evaluate single and multiple ascending doses of KER-012 in healthy volunteers. The primary objectives of this trial are to assess safety, tolerability and pharmacokinetics of KER-012. The trial design is summarized in the figure below.

Phase 1 Clinical Trial Design



Clinical Development Strategy

We expect to report initial data from Part 1 of this trial in the second quarter of 2022 and additional data from Part 2 of this trial in the second half of 2022.

Preclinical Data

We have generated preclinical data that we believe demonstrated proof-of-mechanism of KER-012 for the treatment of PAH and for the treatment of disorders associated with bone loss, such as osteoporosis and osteogenesis imperfecta. Specifically, in preclinical studies, KER-012:

- Demonstrated effects on bone, including:
 - Exhibited high affinity for, and potent inhibition of, ligands involved in the regulation of bone homeostasis;
 - Increased bone mineral density and trabecular bone volume in wild-type mice and mice with established osteoporosis; and
 - Rats receiving a rodent version of KER-012, or RKER-012, were protected from hypoxia-associated bone loss.
- Demonstrated benefit in models of PAH, including:
 - In a rat model of PAH, rats receiving RKER-012 were protected from the thickening of the right ventricular wall; and
 - In a mouse model of pulmonary arterial banding, or PAB, RKER-012 was observed to protect against both the PAB-related cardiac dysfunction and remodeling.
- Did not increase red blood cell production in cynomolgus monkeys.

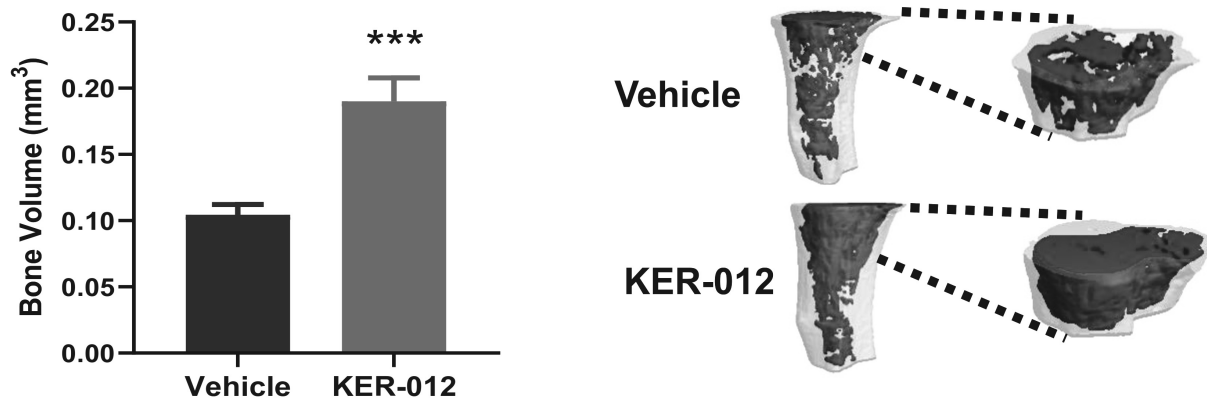
KER-012 targeted ligands that signal through ActRIIA and ActRIIB in preclinical studies

KER-012 is a modified ActRIIB ligand trap that contains sequences from both wild-type ActRIIB and wild-type ActRIIA. In preclinical studies, KER-012 bound to and inhibited multiple ligands that signal through these cell surface receptors, including activin A, activin B and growth differentiation factor 11. These ligands are key regulators of bone remodeling that act to suppress bone growth. BMP9 is a ligand capable of signaling through the ActRIIB and bone morphogenetic receptor II. Inhibition of BMP9 results in disruption of vascular remodeling, which can lead to the development of epistaxis and telangiectasias. KER-012 did not bind BMP9 or inhibit BMP9 signaling in preclinical studies. Consequently, we believe KER-012 has the potential to avoid negative effects on vascular remodeling.

Treatment with KER-012 increased bone mineral density

In preclinical studies conducted in wild-type mice, twice weekly intraperitoneal 20 mg/kg dosing of KER-012 increased bone mineral density compared to vehicle-treated mice 31 days post-treatment. Additionally, we observed that treatment with KER-012 statistically significantly increased trabecular bone formation and mineral apposition rate, which we believe is consistent with an anabolic effect on bone.

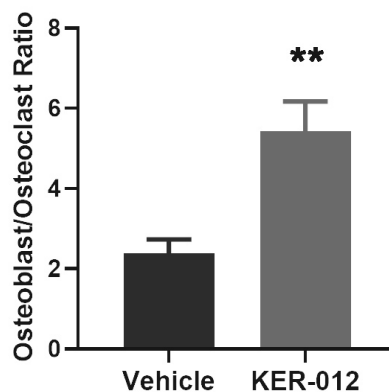
Bone Mineral Density in Mice and Representative Microct Scans



*** P value <0.001

In a separate preclinical study, we observed that treatment with KER-012 increased the ratio of osteoblasts, which are bone forming cells, to osteoclasts, which are bone resorbing cells, which further supports that KER-012 acts via an anabolic effect on bone. We also observed in preclinical studies conducted in mice with established osteoporosis that twice weekly intraperitoneal 20 mg/kg dosing of KER-012 increased bone mass compared to vehicle-treated mice 46 days post-treatment.

Osteoblast-to-Osteoclast Ratio in Mice

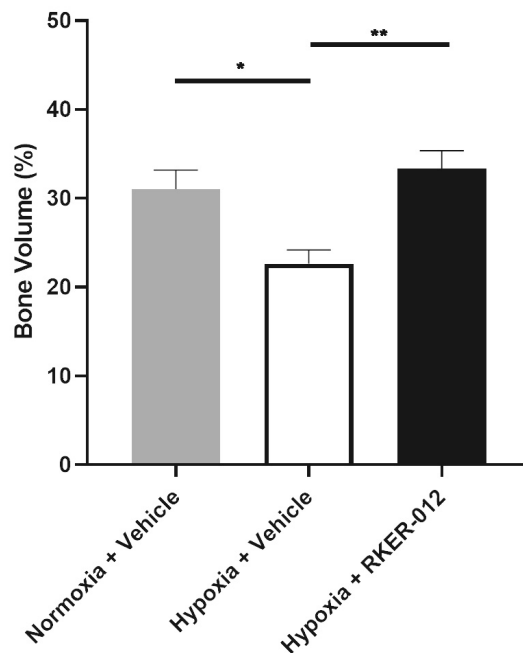


** P value <0.01

Treatment with RKER-012 prevented bone loss from hypoxia in the rat model of PAH

In the rat model of PAH, chronic hypoxia induced a catabolic state that resulted in wasting of tissue, including bone and muscle. Treatment with a subcutaneous 10 mg/kg dose of RKER-012 was observed to prevent bone loss in the rat model of PAH.

Bone Volume Changes as a Result of Hypoxia in the Rat Model of PAH



* P value <0.05; ** P value <0.01

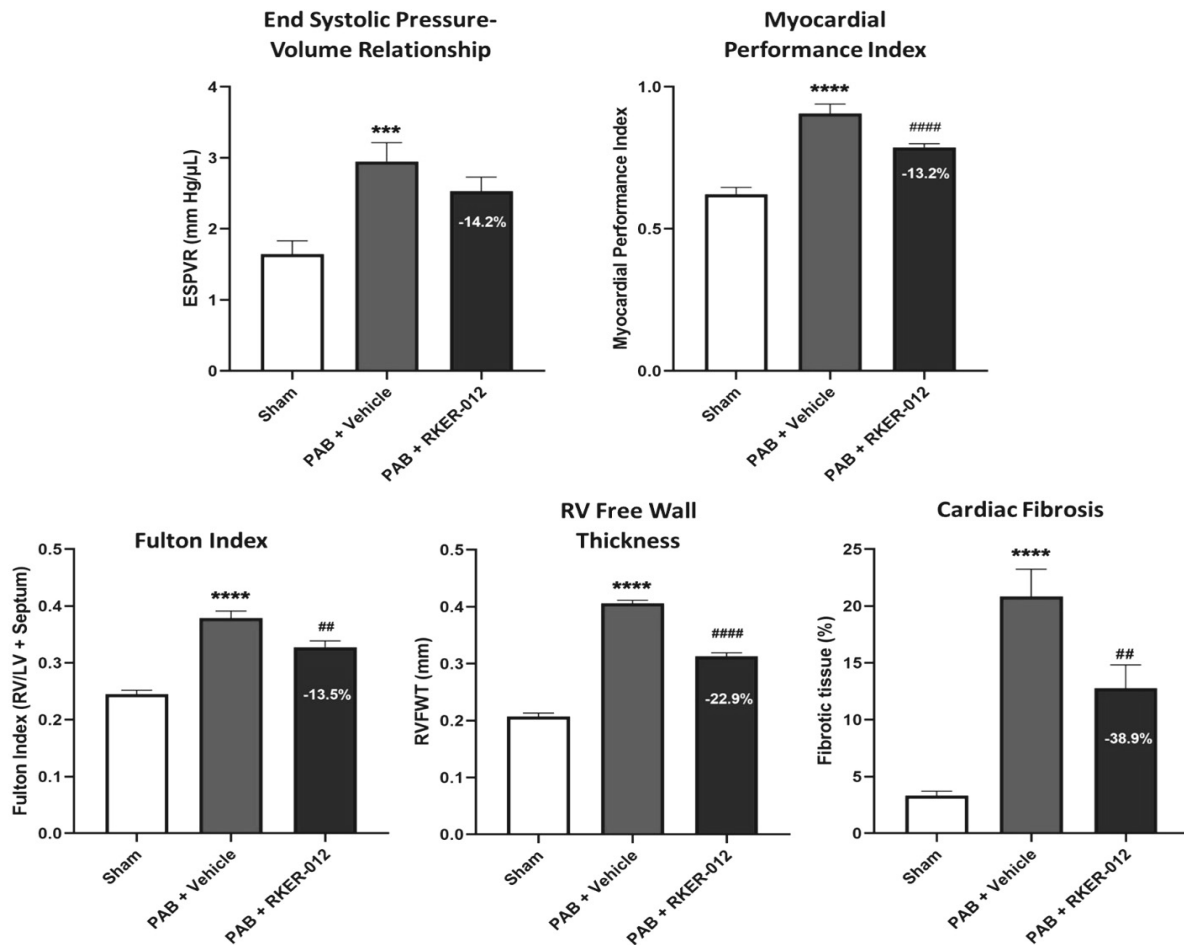
Treatment with RKER-012 prevented cardiac hypertrophy in a rat model of PAH

We combined administration of SUGEN5416, a tyrosine kinase inhibitor of vascular endothelial growth factor receptors 1 and 2, with exposure to chronic hypoxia to recapitulate the biology in PAH. In this model, remodeling of the arterial wall results in wall thickening, increased arterial pressure and impairment of heart function through a thickening of the right ventricle. Treatment with twice weekly subcutaneous 10 mg/kg dosing of RKER-012 was observed to protect against a thickening of the right ventricular wall, which we believe demonstrates that KER-012 has the potential to treat PAH.

Treatment with RKER-012 prevented cardiac dysfunction and remodeling in a mouse PAB model

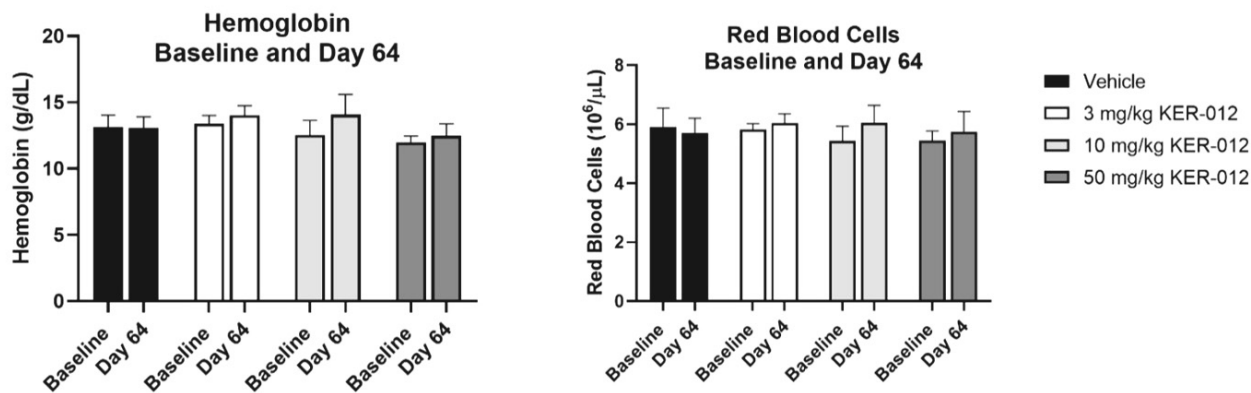
We used mechanical restriction of the pulmonary artery in mice to increase pressure in the right ventricular of the heart. In this model, increased ventricular pressure resulted in cardiac dysfunction, as demonstrated by increased end systolic pressure-volume relationship, or ESPVR, and increased myocardial performance index, or MPI. The increased ventricular pressure also results in cardiac remodeling, as evidenced by an increase in the Fulton index, an increase in the right ventricular free wall thickness, or RVFWT, and increased fibrosis in the heart. Treatment with twice weekly subcutaneous 10 mg/kg dosing of RKER-012 was observed to protect against both the PAB-related cardiac dysfunction and remodeling, which we believe demonstrates that KER-012 has the potential to have a cardioprotective effect that could potentially provide benefit in diseases such as PAH and other cardiovascular diseases in patients.

ESPVR, MPI, Fulton Index, RVFWT and Cardiac Fibrosis in a Mouse PAB Model



*** P value <0.001; **** P value <0.0001 vs. Sham; ## P value <0.01, #### P value <0.0001 vs. Vehicle

KER-012 did not increase red blood cells in non-human primates



In a preclinical study, male cynomolgus monkeys received subcutaneous administration every other week for two months of either vehicle or 3, 10 or 50 mg/kg of KER-012. We measured hematology at baseline and on Day 64. Changes in hemoglobin and red blood cells over the 64-day study were not statistically significantly different compared to changes observed in the vehicle-treated cohort. Based on these findings that KER-012 did not increase red blood cell production in monkeys, we believe KER-012 has the potential not to increase red blood cell production in humans.

Based on the findings from our preclinical studies, we believe KER-012 has the potential to treat disorders associated with bone loss, such as osteoporosis and osteogenesis imperfecta. Additionally, inhibition of BMP9 signaling can result in endothelial cell apoptosis, remodeling and arterial occlusion in diseases such as PAH. We believe that KER-012 has the potential to increase the signaling of BMP pathways through this inhibition of activin A and activin B signaling, and

consequently treat diseases such as PAH that are associated with reduced BMP signaling due to inactivating mutations in the BMP receptors.

Our Preclinical Pipeline

Our Proprietary Discovery Approach

We believe, based on our previous experience with ActRII ligand traps using the endogenous and wild-type sequences, that observations in preclinical rodent models have the potential to translate to humans in the clinic. Specifically:

- Wild-type ActRIIA-Fc was associated with increased bone growth and red blood cell production in rodents and non-human primates. In a third-party clinical trial of ActRIIA-Fc, increased bone mineral density and red blood cell production was reported in healthy post-menopausal women. In this clinical trial, it was also reported that lower doses elicited the effect on red blood cells compared to bone, and thus, the dominant effect on red blood cell production prevented development in diseases with bone loss.
- In third-party preclinical studies in rodents and non-human primates, ActRIIB-Fc was associated with increased bone mineral density and lean muscle mass, but was not associated with changes in red blood cells. However, ActRIIB-Fc was also observed to cause nose and gum bleeding, which we believe is due to its effect of disrupting normal vascular remodeling. BMP9 signaling is required for normal vascular remodeling, but is not involved in regulation of muscle or bone tissues. ActRIIB-Fc potentially inhibits BMP9 signaling, which is the mechanism behind the bleeding events observed with ActRIIB-Fc treatment.

We have developed a proprietary library of ActRII ligand traps by combining sequences from ActRIIA and ActRIIB. We have engineered molecules that are designed to have the therapeutic properties of either or both parent molecules without the dose-limiting effect on red blood cells observed with ActRIIA-Fc or the negative effect on blood vessels observed with wild-type ActRIIB-Fc. Our ActRII program has produced a broader pipeline of engineered ligand traps and currently contains more than 20 unique variants in preclinical development. These include:

- Molecules designed to increase bone mass without the dose-limiting effect on red blood cells observed with wild-type ActRIIA-Fc; and
- Molecules designed to increase muscle and bone mass with reduced BMP9 binding without impacting vascular remodeling that leads to weak blood vessels observed with the wild-type ActRIIB-Fc.

Our discovery approach has built on these initial observations to generate product candidates designed to target ActRII receptors without the liabilities observed in third-party preclinical studies and clinical trials of ActRIIA-Fc and ActRIIB-Fc.

We believe that we are well positioned to advance our product candidates and realize the commercial opportunities in diseases where muscle and bone loss result in a debilitating impact on survival and quality of life, if our product candidates are successfully developed and approved. Our deep knowledge and expertise of the TGF- β family of proteins provides a streamlined approach to screen and develop novel product candidates for hematological and musculoskeletal diseases.

Manufacturing

We rely, and expect to continue to rely for the foreseeable future, on third-party contract manufacturing organizations, or CMOs, to produce our product candidates for preclinical and clinical testing, as well as for commercial manufacture if our product candidates receive marketing approval. We require that our CMOs produce bulk drug substances and finished drug products in accordance with current Good Manufacturing Practices, or cGMPs, and all other applicable laws and regulations. We maintain agreements with our manufacturers that include confidentiality and intellectual property provisions to protect our proprietary rights related to our product candidates.

We have engaged CMOs to manufacture supply for preclinical and clinical use. Additional CMOs are used to label, package and distribute drug product for preclinical and clinical use. We obtain our supplies from these CMOs on a purchase order basis and do not have any long-term supply arrangements in place. We do not currently have arrangements in place for redundant supply. We have been and are continuing to closely monitor the impact of the COVID-19 pandemic on our ability to procure sufficient supplies for the development of our product candidates, and are working with our CMOs to manage this process. However, we could be unable to find alternative suppliers of acceptable quality, in the appropriate volumes and at an acceptable cost, if needed. As our development programs expand and we build new process efficiencies, we expect to continually evaluate this strategy with the objective of satisfying demand for registration trials and, if approved, the manufacture, sale and distribution of commercial products.

Competition

The biotechnology and pharmaceutical industries are characterized by rapidly advancing technologies, intense competition and a strong emphasis on proprietary rights. While we believe that our product candidates, discovery programs, technology, knowledge, experience and scientific resources provide us with competitive advantages, we compete in the highly competitive markets and face significant competition from many sources, including pharmaceutical and biotechnology companies, as well as academic institutions, governmental agencies and private and public research institutions.

We compete in the segments of the biotechnology, pharmaceutical and other related industries that develop and market therapies for the treatment of hematological and musculoskeletal disorders. There are many other companies, including large biotechnology and pharmaceutical companies, that have commercialized and/or are developing therapies for the same therapeutic areas that our product candidates target. For example, FibroGen Inc. and Astellas Pharma Inc. are developing product candidates for the treatment of anemia, and Acceleron Pharma Inc. (which was acquired by Merck & Co. Inc. in November 2021), or Acceleron, Bristol-Myers Squibb Company and Disc Medicine are developing product candidates targeting diseases associated with MDS and myelofibrosis, including chronic anemia. Additionally, in April 2020, Acceleron received FDA approval of its product, Reblozyl, for the treatment of anemia failing an erythropoiesis stimulating agent and requiring two or more red blood cell units over eight weeks in adult patients with very low- to intermediate-risk MDS with ring sideroblasts or with myelodysplastic/myeloproliferative neoplasm with ring sideroblasts and thrombocytosis. In June 2020, Acceleron further announced that the European Commission approved Reblozyl for the treatment of transfusion-dependent anemia in adult patients with MDS or beta thalassemia and in September 2020, Acceleron announced that Health Canada approved Reblozyl for the treatment of adult patients with red blood cell transfusion-dependent anemia associated with beta thalassemia. Geron Corporation is developing imetelstat as a treatment for MDS and for myelofibrosis. Sierra Oncology, Inc. is developing momelotinib as a treatment for myelofibrosis. Additionally, Constellation Pharmaceuticals, Inc. (which was acquired by MorphoSys AG in July 2021) is also developing a product candidate as a treatment for myelofibrosis and Incyte Corporation is developing an ALK2 inhibitor product candidate for the treatment of myelofibrosis. In March 2022, CTI BioPharma Corp. received FDA accelerated approval of its product, pacritinib (Vonjo), for the treatment of adults with intermediate or high-risk primary or secondary (post-polycythemia vera or post-essential thrombocythemia) myelofibrosis with a platelet count below $50 \times 10^9/L$.

Other companies that are developing product candidates that are designed to target the TGF- β signaling pathways include Scholar Rock Holding Corporation, Biogen Inc. and Regeneron Pharmaceuticals, Inc.

There are currently no approved drugs for the treatment of osteogenesis imperfecta. However, Mereo BioPharma Group plc, in collaboration with Ultragenyx Pharmaceutical Inc., is developing an anti-sclerostin product candidate for the treatment of osteogenesis imperfecta.

All of the currently-approved therapies for PAH are vasodilators, which are medications that dilate blood vessels. However, Acceleron is developing sotatercept, an activin receptor ligand trap, for the treatment of PAH.

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

We could see a reduction or elimination of our commercial opportunity 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. The availability of reimbursement from government and other third-party payors will also significantly affect the pricing and competitiveness of our products. 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.

Collaborations and License Agreement

2021 License Agreement with Hansoh (Shanghai) Healthtech Co., Ltd.

In December 2021, we entered into a license agreement with Hansoh (Shanghai) Healthtech Co., Ltd., or Hansoh. Under the terms of the license agreement with Hansoh, or the Hansoh Agreement, we granted to Hansoh the exclusive right to develop, manufacture and commercialize KER-050 and licensed products containing KER-050 within the territories of mainland China, Hong Kong and Macau, which we refer to collectively as the Territory.

In connection with the Hansoh Agreement, Hansoh will purchase clinical trial supply of KER-050 from us, and the parties will also negotiate in good faith to enter into an agreement for commercial supply prior to any anticipated commercialization in the Territory. In addition, Hansoh will use commercially reasonable efforts to develop, obtain regulatory approval for, and commercialize licensed products in any region in the Territory.

Pursuant to the terms of the Hansoh Agreement, we received a net \$18.0 million upfront payment in 2022. In addition to the upfront payment, we are entitled to receive up to an aggregate of (i) \$26.5 million upon the achievement of specified development milestones and (ii) \$144.0 million upon the achievement of specified net sales thresholds for all licensed products in the Territory. If a licensed product is approved for marketing in the Territory, we will be entitled to receive royalty

payments based on a tiered percentage of annual net sales in each region within the Territory, with such percentage ranging from the low double digit to high teens, subject to specified potential royalty reductions.

Hansoh's obligation to pay royalties for a given licensed product in a given region in the Territory will begin on the date of the first commercial sale for such licensed product in such region and continue until the latest of (i) ten years from the date of the first commercial sale for such licensed product in such region, (ii) the expiration of the last valid claim of certain licensed patents or joint patents, and (iii) expiration of regulatory exclusivity in such region. During the royalty term, neither party will directly or indirectly commercialize a competing product in the Territory.

The Hansoh Agreement will continue in force on a region-by-region basis until the expiration of the royalty term. Hansoh may terminate the Hansoh Agreement in its entirety for convenience, with notice. We may terminate the Hansoh Agreement in its entirety for a patent challenge brought by Hansoh or its affiliates or their sublicensees. Either party may terminate the Hansoh Agreement in its entirety (i) if the other party materially breaches the Hansoh Agreement and fails to cure such breach or (ii) upon the bankruptcy of the other party.

2016 Exclusive Patent License Agreement with The General Hospital Corporation

In April 2016, we entered into an exclusive patent license agreement with The General Hospital Corporation, or MGH, which was subsequently amended in May 2017 and February 2018. Under the license agreement with MGH, or the MGH Agreement, we obtained an exclusive, worldwide license, with the right to sublicense, under certain patents and technical information of MGH, to make, have made, use, have used, sell, have sold, lease, have leased, import, have imported or otherwise transfer licensed products and processes for use in the treatment, diagnosis, palliation and prevention of diseases and disorders in humans and animals. We are required to use commercially reasonable efforts to develop and commercialize licensed products and processes, and must achieve certain required diligence milestones.

Under the terms of the MGH Agreement, we made an initial license payment of \$100,000 and reimbursed MGH approximately \$280,000 of prior patent prosecution expenses related to the licensed patents. We also issued MGH an aggregate of 358,674 shares of our common stock. Additionally, we are required to pay a low-five digit to mid-five digit annual maintenance fee prior to the first commercial sale of our first product or process, a mid-five digit annual maintenance fee after the first commercial sale of our first product or process that is creditable against royalties, certain clinical and regulatory milestone payments for the first three products or indications to achieve such milestones, which milestone payments are \$8.6 million in the aggregate, and certain commercial milestone payments for the first three products or indications to achieve such milestones, which milestone payments are \$18.0 million in the aggregate. We made payments of \$50,000 and \$300,000 in 2020 and 2021, respectively, for the achievement of the clinical and regulatory milestones of (i) filing of an IND in the first country and (ii) the completion of a Phase 1 clinical trial, respectively. We are also obligated to pay tiered royalties on net sales of licensed products ranging in the low-single digits to mid-single digits. The royalty rates are subject to up to a maximum 50% reduction for lack of a valid claim, in the event that it is necessary for us to obtain a license to any third-party intellectual property related to the licensed products, and generic competition. The obligation to pay royalties under the MGH Agreement expires on a licensed product-by-licensed product and country-by-country basis upon the later of expiry of the last valid claim of the licensed patents that cover such licensed product in such country and ten years from the first commercial sale of such product in such country. We are also obligated to pay a percentage of non-royalty related payments received by us from sublicensees ranging in the sub-teen double digits and a change of control fee equal to a low-single digit percentage of the payments received as part of any completed transaction up to a low-seven digit amount.

The MGH Agreement expires upon expiry of the last remaining royalty obligation for a licensed product or process. Under the MGH Agreement, MGH may terminate the agreement upon our uncured material breach or insolvency, a challenge by us of the licensed patents and certain other specified breaches of the MGH Agreement. We may terminate the agreement for any reason upon specified prior written notice to MGH.

Intellectual Property

Overview

We strive to protect the proprietary technology, inventions and improvements that we believe are commercially important to our business, including obtaining, maintaining, enforcing and defending our intellectual property rights, including patent rights, whether developed internally or licensed from third parties. We rely, in part, on trade secrets and know-how relating to our proprietary technology and drug candidates and continuing innovation to develop, strengthen and maintain our proprietary position. We also plan to rely, in part, on data exclusivity, market exclusivity and patent term extensions if and when available. Our commercial success will depend in part on our ability to obtain and maintain patent and other intellectual property protection for our technology, inventions and improvements; to preserve the confidentiality of our trade secrets; to defend and enforce our proprietary rights, including any patents that we own or may obtain in the future; and to operate without infringing, misappropriating or otherwise violating the valid and enforceable patents and other intellectual property rights of third parties. Intellectual property rights may not address all potential threats to our competitive advantage

As of February 28, 2022, our patent portfolio consisted of eight issued U.S. patents, 39 pending U.S. patent applications, three issued ex-U.S. patents and 81 pending ex-U.S. applications, with expected expiry dates not earlier than between March 13, 2029 and November 2, 2042. Of these, three issued patents and 93 patent applications relate to KER-050, KER-047 and

KER-012, and eight issued patents and 27 patent applications relate to other technologies, in each case as described in more detail below. Each of our pending international patent applications has been filed under the Patent Cooperation Treaty and has not yet entered any national jurisdictions. Our policy is to file patent applications to protect technology, inventions and improvements to inventions that may be commercially important to the development of our business.

We seek U.S. and international patent protection for a variety of technologies, and own patent applications with claims directed to ActRIIA ligand traps, ActRIIB ligand traps, ActRII chimera ligand traps, GDNF fusion polypeptides, ALK2 antibodies, crystal forms of an ALK2 inhibitor, and uses thereof. We also intend to seek patent protection or rely upon trade secret rights to protect other technologies that may be used to discover and validate targets, and that may be used to manufacture and develop novel products. We are a party to license agreements that give us rights to use specific technologies in our products and in manufacturing our products.

Patent applications directed to our most advanced programs are summarized below.

KER-050

KER-050 is a modified ActRIIA ligand trap that is designed to bind to different TGF- β ligands that signal through a TGF- β signaling pathway. We own two issued U.S. patents, 14 pending U.S. patent applications and 39 pending ex-U.S. applications that contain claims or supporting disclosure directed to ActRIIA ligand traps and use thereof to treat muscle disease, bone disease, metabolic disease, anemia, fibrosis, pulmonary hypertension, thrombocytopenia, and neutropenia, among others. Any patents issuing from these applications will have expiration dates between November 9, 2037 and August 19, 2042, absent any patent term adjustments or extensions.

KER-047

KER-047 is an orally available small molecule ALK2 inhibitor designed to potently and selectively inhibit ALK2 signaling. We own 15 pending U.S. patent applications and seven pending ex-U.S. applications that contain claims or supporting disclosure directed to crystal forms of an ALK2 inhibitor and uses thereof. Any patents issuing from these applications will have expiration dates between October 25, 2039 and November 2, 2042, absent any patent term adjustments or extensions.

We have exclusively licensed from The General Hospital Corporation rights in one patent family related to novel ALK2 inhibitors. Patents in this family are expected to expire on April 26, 2038, absent any patent term adjustments or extensions.

KER-012

KER-012 is a modified ActRIIB ligand trap that is designed to bind to different TGF- β ligands that signal through a TGF- β signaling pathway. We own nine pending U.S. patent applications and 11 pending ex-U.S. applications that contain claims or supporting disclosure directed to ActRIIB ligand traps and use thereof to treat muscle disease, bone disease, anemia, fibrosis, pulmonary hypertension, metabolic disease, thrombocytopenia, and neutropenia, among others. Any patents issuing from these applications will have expiration dates between January 11, 2039 and August 19, 2042, absent any patent term adjustments or extensions.

Other

We plan to seek United States and international patent protection for a variety of additional technologies. We own 23 pending U.S. patent applications and 20 pending ex-U.S. applications that contain claims or supporting disclosure directed to GDNF fusion polypeptides, ALK2 antibodies, and ActRII chimera ligand traps. Any patents issuing from these applications will have expiration dates between November 9, 2037 and August 19, 2042, absent any patent term adjustments or extensions.

Intellectual Property Protection

Individual patents extend for varying periods depending on the date of filing of the patent application or the date of patent issuance and the legal term of patents in the countries in which they are obtained. Generally, patents issued for regularly filed applications in the United States are granted a term of 20 years from the earliest effective non-provisional filing date. In addition, in certain instances, a patent term can be extended to recapture a portion of the U.S. Patent and Trademark Office, or the USPTO, delay in issuing the patent as well as a portion of the term effectively lost as a result of the FDA regulatory review period. However, as to the FDA component, the restoration period cannot be longer than five years and the total patent term including the restoration period must not exceed 14 years following FDA approval. The duration of patents outside of the United States varies in accordance with provisions of applicable local law, but typically is also 20 years from the earliest effective filing date. However, the actual protection afforded by a patent varies on a product by product basis, from country to country and depends upon many factors, including the type of patent, the scope of its coverage, the availability of regulatory-related extensions, the availability of legal remedies in a particular country and the validity and enforceability of the patent.

Furthermore, we rely upon 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, employees and consultants and invention assignment agreements with our employees. We also have confidentiality agreements or invention assignment agreements with our collaborators and consultants. These agreements are designed to protect our proprietary information and, in the case of the invention assignment agreements, to grant us

ownership of technologies that are developed through a relationship with a third party. These agreements may be breached, and we may not have adequate remedies for any breach. In addition, our trade secrets may otherwise become known or be independently discovered by competitors. To the extent that our collaborators, employees and consultants use intellectual property owned by others in their work for us, disputes may arise as to the rights in related or resulting know-how and inventions.

Our commercial success will also depend in part on not infringing upon the proprietary rights of third parties. It is uncertain whether the issuance of any third-party patent would require us to alter our development or commercial strategies, or our product candidates or processes, obtain licenses or cease certain activities. Our breach of any license agreements or failure to obtain a license to proprietary rights that we may require to develop or commercialize our future product candidates may have an adverse impact on us. If third parties have prepared and filed patent applications prior to March 16, 2013 in the United States that also claim technology to which we have rights, we may have to participate in interference proceedings in the USPTO, to determine priority of invention. For more information, please see “Risk Factors—Risks Related to Intellectual Property.”

Government Regulation

The FDA and other regulatory authorities at federal, state and local levels, as well as in foreign countries, extensively regulate, among other things, the research, development, testing, manufacture, quality control, import, export, labeling, packaging, storage, distribution, record keeping, approval, advertising, promotion, marketing, post-approval monitoring and post-approval reporting of drug and biological products such as those we are developing.

Our product candidates are subject to regulation under the Food, Drug, and Cosmetic Act and the Public Health Service Act, and other federal, state, local and foreign statutes and regulations. We, along with third-party contractors, will be required to navigate the various preclinical, clinical and commercial approval requirements of the governing regulatory agencies of the countries in which we wish to conduct studies or seek approval or licensure of our product candidates.

U.S. Drug and Biological Product Regulation

Our product candidates must be approved by the FDA through either a New Drug Application, or NDA, or a Biologics License Application, or BLA. The process required by the FDA before biopharmaceutical product candidates may be marketed in the United States generally involves the following:

- completion of extensive preclinical laboratory tests and animal studies performed in accordance with applicable regulations, including the FDA's Good Laboratory Practice, or GLP, requirements;
- submission to the FDA of an Investigational New Drug, or IND, application which must become effective before human clinical trials may begin;
- approval by an independent institutional review board, or IRB, or ethics committee at each clinical site before the trial may be initiated;
- performance of adequate and well-controlled human clinical trials in accordance with applicable IND regulations, good clinical practice, or GCP, requirements and other clinical trial-related regulations to establish the safety and efficacy of the investigational drug product for each proposed indication and to establish the safety, purity and potency of the investigational biologic product candidate for each proposed indication;
- preparation of and submission to the FDA of an NDA for a small molecule product candidate or a BLA for a biologic after completion of all pivotal clinical trials;
- payment of user fees for FDA review of the NDA or BLA;
- a determination by the FDA within 60 days of its receipt of the NDA or BLA to file the application for review;
- satisfactory completion of one or more FDA pre-approval inspections of the manufacturing facility or facilities at which the proposed product will be produced to assess compliance with current Good Manufacturing Practice, or cGMP, requirements and to assure that the facilities, methods and controls are adequate to preserve the product's continued identity, strength, quality and purity;
- potential FDA audit of the preclinical study and/or clinical trial sites that generated the data in support of the NDA or BLA;
- satisfactory completion of an FDA Advisory Committee review, if applicable;
- FDA review and approval of an NDA or licensure of a BLA, including consideration of the views of any FDA Advisory Committee, prior to any commercial marketing or sale of the product for particular indications for use in the United States; and
- compliance with any post-approval requirements, including the potential requirement to conduct post-approval studies.

Preclinical and Clinical Development

Before testing any drug or biologic candidate in humans in the United States, the product candidate must undergo rigorous preclinical testing. Preclinical studies include laboratory evaluation of product chemistry and formulation, as well as *in vitro* and animal studies to assess safety and in some cases to establish a rationale for therapeutic use. The conduct of preclinical studies is subject to federal and state regulations and requirements, including GLP regulations for safety/toxicology studies.

Prior to beginning the first clinical trial with a product candidate, we must submit the results of the preclinical studies, together with manufacturing information, analytical data, any available clinical data or literature and a proposed clinical protocol, to the FDA as part of an IND. An IND is a request for authorization from the FDA to administer an investigational new drug product to humans. The IND submission contains the general investigational plan and the protocol or protocols for preclinical studies and clinical trials, as well as results of in vitro and animal studies assessing the toxicology, pharmacokinetics, pharmacology and pharmacodynamic characteristics of the product, chemistry, manufacturing and controls information, and any available human data or literature to support the use of the investigational product. The IND automatically becomes effective 30 days after receipt by the FDA, unless the FDA, within the 30-day period, raises safety concerns or questions related to one or more proposed clinical trials and places the trial on clinical hold. In such a case, the IND sponsor and the FDA must resolve any outstanding concerns or questions before the clinical trial can begin. Submission of an IND therefore may or may not result in FDA authorization to begin a clinical trial.

The clinical stage of development involves the administration of the investigational product to human subjects under the supervision of qualified investigators in accordance with GCP requirements, which include the requirement that all research subjects provide their informed consent for their participation in any clinical study. These investigators are generally physicians who are not employed by or under the trial sponsor's control. Clinical trials are conducted under protocols detailing, among other things, the objectives of the study, dosing procedures, subject selection and exclusion criteria, and the parameters to be used in monitoring subject safety and assessing efficacy. Each protocol, and any subsequent amendments to the protocol, must be submitted to the FDA as part of the existing IND. Furthermore, each clinical trial must be reviewed and approved by an independent IRB for each institution at which the clinical trial will be conducted to ensure that the risks to individuals participating in the clinical trials are minimized and are reasonable in relation to anticipated benefits. The IRB also approves the informed consent form that must be provided to each clinical trial subject or his or her legal representative, and must monitor the study until completed. Regulatory authorities, the IRB or the sponsor may suspend a clinical trial at any time on various grounds, including a finding that the subjects are being exposed to an unacceptable health risk or that the trial is unlikely to meet its stated objectives. Some studies also include oversight by an independent group of qualified experts organized by the clinical study sponsor, known as a data safety monitoring board, which provides authorization for whether or not a study may move forward at designated check points based on access to certain data from the study and may halt the clinical trial if it determines that there is an unacceptable safety risk for subjects or other grounds, such as no demonstration of efficacy. There are also requirements governing the reporting of ongoing preclinical studies and clinical trials and clinical study results to public registries.

A sponsor who wishes to conduct a clinical trial outside of the United States may, but need not, obtain FDA authorization to conduct the clinical trial under an IND. If a foreign clinical trial is not conducted under an IND, the sponsor may submit data from the clinical trial to the FDA in support of an NDA. The FDA will accept a well-designed and well-conducted foreign clinical trial not conducted under an IND if the trial was conducted in accordance with GCP requirements and the FDA is able to validate the data through an onsite inspection, if deemed necessary, and the practice of medicine in the foreign country is consistent with the United States.

Human clinical trials in the United States are typically conducted in three sequential phases that may overlap or be combined:

- Phase 1 clinical trials generally involve a small number of healthy volunteers or patients with the target disease or condition. These studies are designed to test the safety, dosage tolerance, absorption, metabolism and distribution of the investigational product in humans, the side effects associated with increasing doses, and, if possible, to gain early evidence on effectiveness.
- Phase 2 clinical trials involve studies in a limited population of disease-affected patients to evaluate the preliminary efficacy, optimal dosages and dosing schedule and to identify possible adverse side effects and safety risks.
- Phase 3 clinical trials generally involve a large number of patients at multiple geographically dispersed clinical trial sites and are designed to further evaluate dosage, to provide statistically significant evidence of clinical efficacy and to further test for safety. These clinical trials are intended to establish the overall risk/benefit ratio of the investigational product and to provide an adequate basis for product approval.

When these phases overlap or are combined, the trials may be referred to as Phase 1/2 or Phase 2/3. A Phase 1/2 clinical trial is a human trial that investigates both safety and preliminary efficacy of an investigational therapy. A Phase 2/3 clinical trial is a human trial that investigates both preliminary and confirmatory efficacy and safety to potentially support submission of a marketing application with the applicable regulatory authorities.

In some cases, the FDA may require, or companies may voluntarily pursue, additional clinical trials after a product is approved to gain more information about the product. These so-called Phase 4 studies, are used to gain additional experience from the treatment of patients in the intended therapeutic indication and are commonly intended to generate additional safety data regarding use of the product in a clinical setting. In certain instances, the FDA may mandate the performance of Phase 4 clinical trials as a condition to FDA approval of an NDA or BLA.

Concurrent with clinical trials, companies may complete additional animal studies and develop additional information about the chemistry and physical characteristics of the product candidate, and must finalize a process for manufacturing the product in commercial quantities in accordance with cGMP requirements. The manufacturing process must be capable of consistently

producing quality batches of the product candidate and, among other things, must develop methods for testing the identity, strength, quality and purity of the final product, or for biologics, the safety, purity and potency. Additionally, appropriate packaging must be selected and tested and stability studies must be conducted to demonstrate that the product candidate does not undergo unacceptable deterioration over its shelf life.

During all phases of clinical development, regulatory agencies require extensive monitoring and auditing of all clinical activities, clinical data, and clinical study investigators. The FDA or the sponsor or its data safety monitoring board may suspend a clinical study at any time on various grounds, including a finding that the research subjects or patients are being exposed to an unacceptable health risk. Similarly, an IRB can suspend or terminate approval of a clinical study at its institution if the clinical study is not being conducted in accordance with the IRB's requirements or if the biological product candidate has been associated with unexpected serious harm to patients. There are also requirements governing the reporting of ongoing clinical trials and completed clinical trial results to public registries. Sponsors of clinical trials of FDA-regulated products, including biologics, are required to register and disclose certain clinical trial information, which is publicly available at www.clinicaltrials.gov.

FDA Review Process

Assuming successful completion of all required testing in accordance with all applicable regulatory requirements, the results of product development, nonclinical studies and clinical trials are submitted to the FDA as part of an NDA or BLA. The NDA or BLA is a request for approval to market the drug or biologic for one or more specified indications and must contain proof of safety and efficacy for a drug or safety, purity and potency for a biologic. The application must include all relevant data available from pertinent preclinical studies and clinical trials, including negative or ambiguous results of preclinical studies and clinical trials, as well as positive findings, together with detailed information relating to the product's chemistry, manufacturing, controls, and proposed labeling, among other things. Data may come from company-sponsored clinical trials intended to test the safety and efficacy of a product's use or from a number of alternative sources, including studies initiated by investigators. To support marketing approval, the data submitted must be sufficient in quality and quantity to establish the safety and efficacy of the investigational product to the satisfaction of FDA.

Under the Prescription Drug User Fee Act, or PDUFA, as amended, each submission of an NDA or BLA requires payment of a substantial application user fee to the FDA, unless a waiver or exemption applies. The FDA adjusts the PDUFA user fees on an annual basis. Fee waivers or reductions are available in certain circumstances, including a waiver of the application fee for the first application filed by a small business. Additionally, no user fees are assessed on NDAs or BLAs for products designated as orphan drugs, unless the product application also includes a non-orphan indication.

The FDA reviews all submitted NDAs and BLAs before it accepts them for filing, and may request additional information rather than accepting the NDA or BLA for filing. The FDA must make a decision on accepting an NDA or BLA for filing within sixty days of receipt. Such decision could include either issue a refusal to file letter or acceptance of the NDA or BLA for filing, indicating that it is sufficiently complete to permit substantive review.

Once an NDA or BLA has been accepted for filing, the FDA begins an in-depth review of the NDA or BLA. Under the goals and policies agreed to by the FDA under PDUFA, the FDA aims to review standard applications within ten months from the filing date, during which it will complete its initial review of a new molecular entity NDA or original BLA and respond to the applicant, or within six months from the filing date of a new molecular entity NDA or original BLA designated for priority review. In both standard and priority reviews, the FDA does not always meet its PDUFA goal dates, and the review process is often significantly extended by FDA requests for additional information or clarification. The FDA reviews the application to determine, among other things, whether a product is safe and effective, or for a biologic, safe, pure and potent for its intended use, and whether the facility in which it is manufactured, processed, packed or held meets standards designed to assure and preserve the product's identity, safety, strength, quality, potency and purity.

The FDA generally accepts data from foreign clinical trials in support of an NDA or BLA if the trials were conducted under an IND, and the IND requirements, unless waived, were met. If a foreign clinical trial is not conducted under an IND, the FDA nevertheless may accept the data in support of an NDA or BLA if the trial was conducted in accordance with GCPs and the FDA is able to validate the data through an on-site inspection, if deemed necessary. Although the FDA generally requests that marketing applications be supported by some data from domestic clinical studies, the FDA may accept foreign data as the sole basis for marketing approval if (1) the foreign data are applicable to the U.S. population and U.S. medical practice, (2) the trials were performed by clinical investigators with recognized competence, and (3) the data may be considered valid without the need for an on-site inspection or, if the FDA considers the inspection to be necessary, the FDA is able to validate the data through an on-site inspection or other appropriate means.

Before approving an NDA or BLA, the FDA will conduct a pre-approval inspection of the manufacturing facility or facilities for the new product to determine whether they comply with cGMP requirements. The FDA will not approve an application unless it determines that the manufacturing processes and facilities are in compliance with cGMP requirements and adequate to assure consistent production of the product within required specifications. The FDA also may audit data from clinical trials to ensure compliance with GCP requirements. Additionally, the FDA may refer applications for novel products or products which present difficult questions of safety or efficacy to an advisory committee, typically a panel that includes clinicians and other experts, for review, evaluation and a recommendation as to whether the application should be approved and under what

conditions, if any. The FDA is not bound by recommendations of the advisory committee, but it considers such recommendations when making decisions on approval. Additionally, before approving an NDA or BLA, the FDA will typically inspect one or more clinical sites to assure compliance with GCPs. If the FDA determines that the application, manufacturing process or manufacturing facilities are not acceptable, it will outline the deficiencies in the submission and often will request additional testing or information. Notwithstanding the submission of any requested additional information, the FDA ultimately may decide that the application does not satisfy the regulatory criteria for approval.

After the FDA evaluates an NDA or BLA and conducts inspections of manufacturing facilities where the investigational product and/or its drug substance will be manufactured, the FDA will issue an approval letter or a Complete Response letter. An approval letter authorizes commercial marketing of the product with specific prescribing information for specific indications. A Complete Response letter indicates that the review cycle of the application is complete and the application will not be approved in its present form. A Complete Response letter usually describes all of the specific deficiencies that the FDA has identified in the NDA or BLA, except that where the FDA determines that the data supporting the application are inadequate to support approval, the FDA may issue the Complete Response letter without first conducting required inspections, testing submitted product lots and/or reviewing proposed labeling. In issuing the Complete Response letter, the FDA may recommend actions that the applicant might take to place the application in condition for approval, including requests for additional information or clarification, which may include the potential requirement for additional clinical studies, including the potential requirement to conduct additional clinical trial(s) and/or to complete other significant and time-consuming requirements related to clinical trials, or to conduct additional preclinical studies or manufacturing activities. If a Complete Response Letter is issued, the applicant may either resubmit the NDA or BLA, addressing all of the deficiencies identified in the letter, or withdraw the application or request an opportunity for a hearing. Even if such data and information are submitted, the FDA may decide that the NDA or BLA does not satisfy the criteria for approval. Data obtained from clinical trials are not always conclusive and the FDA may interpret data differently than we interpret the same data.

Orphan Drug Designation

Under the Orphan Drug Act, the FDA may grant orphan designation to a drug or biologic intended to treat a rare disease or condition, which is 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 for which there is no reasonable expectation that the cost of developing and making available in the United States a drug or biologic for this type of disease or condition will be recovered from sales in the United States for that drug or biologic. Orphan drug designation must be requested before submitting an NDA or BLA. After the FDA grants orphan drug designation, the generic identity of the therapeutic agent and its potential orphan use are disclosed publicly by the FDA. The orphan drug designation does not convey any advantage in, or shorten the duration of, the regulatory review or approval process.

If a product that has orphan drug designation subsequently receives the first FDA approval for the disease for which it has such designation, the product is entitled to orphan drug exclusivity, which means that the FDA may not approve any other applications, including a full NDA or BLA, to market the same product for the same indication for seven years, except in limited circumstances, such as a showing of clinical superiority to the product with orphan drug exclusivity or if the FDA finds that the holder of the orphan drug exclusivity has not shown that it can assure the availability of sufficient quantities of the orphan drug to meet the needs of patients with the disease or condition for which the drug was designated. Orphan drug exclusivity does not prevent the FDA from approving a different drug or biologic for the same disease or condition, or the same drug or biologic for a different disease or condition. Among the other benefits of orphan drug designation are tax credits for certain research and a waiver of the application fee.

A designated orphan drug may not receive orphan drug exclusivity if it is approved for a use that is broader than the indication for which it received orphan designation. In addition, exclusive marketing rights in the United States may be lost if the FDA later determines that the request for designation was materially defective or if the manufacturer is unable to assure sufficient quantities of the product to meet the needs of patients with the rare disease or condition.

Post-Approval Requirements

Following approval of a new product, the manufacturer and the approved product are subject to pervasive and continuing regulation by the FDA, including, among other things, requirements relating to monitoring and record-keeping, reporting of adverse experiences, periodic reporting, product sampling and distribution, compliance with advertising and promotion requirements, which include restrictions on promoting the product for unapproved uses or patient populations, known as “off-label use,” and limitations on industry-sponsored scientific and educational activities. Further, after approval, if there are any changes or modifications to the approved product, including changes in indications, labeling or manufacturing processes or facilities, the applicant may be required to submit and obtain FDA review and approval of a new NDA/BLA or NDA/BLA supplement, which may require the development of additional data or preclinical studies and clinical trials.

The FDA may also place other conditions on approvals including the requirement for a Risk Evaluation and Mitigation Strategy, or REMS, to assure the safe use of the product. If the FDA concludes a REMS is needed, the sponsor of the NDA or BLA must submit a proposed REMS. A REMS is a safety strategy to manage a known or potential serious risk associated with a product and to enable patients to have continued access to such medicines by managing their safe use, and could include medication guides, physician communication plans, or elements to assure safe use, such as restricted distribution

methods, patient registries and other risk minimization tools. The FDA will not approve the NDA or BLA without an approved REMS, if required. The FDA also may condition approval on, among other things, changes to proposed labeling or the development of adequate controls and specifications. Once approved, the FDA may withdraw the product approval if compliance with pre- and post-marketing requirements is not maintained or if problems occur after the product reaches the marketplace. The FDA may require one or more Phase 4 post-market studies and surveillance to further assess and monitor the product's safety and effectiveness after commercialization, and may limit further marketing of the product based on the results of these post-marketing studies. Product approvals may be withdrawn for non-compliance with regulatory standards or if problems occur following initial marketing.

The FDA may withdraw approval if compliance with regulatory requirements and standards is not maintained or if problems occur after the product reaches the market. Later discovery of previously unknown problems with a product, including adverse events of unanticipated severity or frequency, or with manufacturing processes, or failure to comply with regulatory requirements, may result in revisions to the approved labeling to add new safety information; imposition of post-market studies or clinical studies to assess new safety risks; or imposition of distribution restrictions or other restrictions under a REMS program. Other potential consequences include, among other things:

- restrictions on the marketing or manufacturing of the product, complete withdrawal of the product from the market or product recalls;
- fines, warning or untitled letters or holds on post-approval clinical studies;
- refusal of the FDA to approve pending applications or supplements to approved applications, or suspension or revocation of existing product approvals;
- product seizure or detention, or refusal of the FDA to permit the import or export of products;
- consent decrees, corporate integrity agreements, debarment or exclusion from federal healthcare programs;
- mandated modification of promotional materials and labeling and the issuance of corrective information;
- the issuance of safety alerts, Dear Healthcare Provider letters, press releases and other communications containing warnings or other safety information about the product; or
- injunctions or the imposition of civil or criminal penalties.

The FDA closely regulates the marketing, labeling, advertising and promotion of drugs and biologics. Drugs and biologics may be promoted only for the approved indications and in accordance with the provisions of the approved label. However, companies may share truthful and not misleading information that is otherwise consistent with a product's FDA approved labeling. The FDA and other agencies actively enforce the laws and regulations prohibiting the promotion of off-label uses. Failure to comply with these requirements can result in, among other things, adverse publicity, warning letters, corrective advertising and potential civil and criminal penalties. Physicians may prescribe legally available products for uses that are not described in the product's labeling and that differ from those tested by us and approved by the FDA. Such off-label uses are common across medical specialties. Physicians may believe that such off-label uses are the best treatment for many patients in varied circumstances. The FDA does not regulate the behavior of physicians in their choice of treatments. The FDA does, however, restrict manufacturer's communications on the subject of off-label use of their products.

Biosimilars and Exclusivity

The Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act of 2010, or collectively the ACA, includes a subtitle called the Biologics Price Competition and Innovation Act of 2009, or BPCIA Act, which created an abbreviated approval pathway for biological products shown to be similar to, or interchangeable with, an FDA-licensed reference biological product. To date, only a handful of biosimilars have been licensed under the BPCIA, although numerous biosimilars have been approved in Europe. The FDA has issued several guidance documents outlining an approach to review and approval of biosimilars.

Biosimilarity, which requires that there be no clinically meaningful differences between the biological product and the reference product in terms of safety, purity, and potency, can be shown through analytical studies, animal studies, and a clinical study or studies. Interchangeability requires that a product is biosimilar to the reference product and the product must demonstrate that it can be expected to produce the same clinical results as the reference product and, for products administered multiple times, the biologic and the reference biologic may be switched after one has been previously administered without increasing safety risks or risks of diminished efficacy relative to exclusive use of the reference biologic. However, complexities associated with the larger, and often more complex, structure of biological products, as well as the process by which such products are manufactured, pose significant hurdles to implementation that are still being worked out by the FDA.

Under the BPCIA, an application for a biosimilar product may not be submitted to the FDA until four years following the date that the reference product was first licensed by the FDA. In addition, the approval of a biosimilar product may not be made effective by the FDA until 12 years from the date on which the reference product was first licensed. During this 12-year period of exclusivity, another company may still market a competing version of the reference product if the FDA approves a full BLA for the competing product containing the sponsor's own preclinical data and data from adequate and well-controlled clinical trials to demonstrate the safety, purity and potency of their product. The BPCIA also created certain exclusivity periods for

biosimilars approved as interchangeable products. At this juncture, it is unclear whether products deemed “interchangeable” by the FDA will, in fact, be readily substituted by pharmacies, which are governed by state pharmacy law.

A biological product can also obtain pediatric market exclusivity in the United States. Pediatric exclusivity, if granted, adds six months to existing exclusivity periods and patent terms. This six-month exclusivity, which runs from the end of other exclusivity protection or patent term, may be granted based on the voluntary completion of a pediatric study in accordance with an FDA-issued “Written Request” for such a study.

Foreign Regulation

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

Australia

Our Phase 1 trial for KER-047 and our Phase 1 trial for KER-050 were both conducted in Australia, and our Phase 2 trial for KER-050 in patients with MDS and our Phase 1 clinical trial for KER-012 are being conducted in Australia, among other countries. The Therapeutic Goods Administration, or the TGA, and the National Health and Medical Research Council set the GCP requirements for clinical research in Australia, and compliance with these codes is mandatory. Australia has also adopted international codes, such as those promulgated by the International Council for Harmonization of Technical Requirements for Registration of Pharmaceuticals for Human Use, or the ICH. The ICH guidelines must be complied with across all fields of clinical research, including those related to pharmaceutical quality, nonclinical and clinical data requirements and trial designs. The basic requirements for preclinical data to support a first-in-human trial under ICH guidelines are applicable in Australia. Requirements related to adverse event reporting in Australia are similar to those required in other major jurisdictions.

Clinical trials conducted using “unapproved therapeutic goods” in Australia, being those which have not yet been evaluated by the TGA for quality, safety and efficacy must occur pursuant to either the Clinical Trial Notification Scheme, or the CTN Scheme, or the Clinical Trial Exemption Scheme, or the CTX Scheme. In each case, the trial is supervised by a Human Research Ethics Committee, or HREC, an independent review committee set up under guidelines of the Australian National Health and Medical Research Council that ensures the protection of rights, safety and well-being of human subjects involved in a clinical trial. A HREC does this by reviewing, approving and providing continuing examination of trial protocols and amendments, and of the methods and material to be used in obtaining and documenting informed consent of the trial subjects.

The CTN Scheme broadly involves:

- completion of preclinical laboratory and animal testing;
- submission to a HREC, of all material relating to the proposed clinical trial, including the trial protocol;
- the institution or organization at which the trial will be conducted, referred to as the “Approving Authority”, giving final approval for the conduct of the trial at the site, having regard to the advice from the HREC; and
- the investigator submitting a ‘Notification of Intent to Conduct a Clinical Trial’ form, or CTN Form, to the TGA. The CTN form must be signed by the sponsor, the principal investigator, the chairman of the HREC and a person responsible from the Approving Authority. The TGA does not review any data relating to the clinical trial however CTN trials cannot commence until the trial has been notified to the TGA.

Under the CTX Scheme:

- a sponsor submits an application to conduct a clinical trial to the TGA for evaluation and comment; and
- a sponsor must forward any comments made by the TGA Delegate to the HREC(s) at the sites where the trial will be conducted.

A sponsor cannot commence a trial under the CTX Scheme until written advice has been received from the TGA regarding the application and approval for the conduct of the trial has been obtained from an ethics committee and the institution at which the trial will be conducted.

Approval for inclusion in the Australian Register of Therapeutic Goods, or ARTG, is required before a pharmaceutical product may be marketed (or imported, exported or manufactured) in Australia. In order to obtain registration of the product on the ARTG, it is required that:

- adequate and well-controlled clinical trials demonstrate the quality, safety and efficacy of the therapeutic product;
- evidence is compiled which demonstrates that the manufacture of the therapeutic product complies with the principles of cGMP;

- manufacturing and clinical data is derived to submit to the Advisory Committee on Prescription Medicines, which makes recommendations to the TGA as to whether or not to grant approval to include the therapeutic product in the ARTG; and
- an ultimate decision is made by the TGA whether to include the therapeutic product in the ARTG.

Other Healthcare Laws and Compliance Requirements

Pharmaceutical companies are subject to additional healthcare regulation and enforcement by the federal government and by authorities in the states and foreign jurisdictions in which they conduct their business. Such laws include, without limitation: the U.S. federal Anti-Kickback Statute, the civil False Claims Act, U.S. federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, and similar foreign, federal and state fraud and abuse, transparency and privacy laws.

The U.S. federal Anti-Kickback Statute prohibits, among other things, persons and entities from knowingly and willfully soliciting, receiving, offering or paying remuneration, to induce, or in return for, either the referral of an individual, or the purchase or recommendation of an item or service for which payment may be made under any federal healthcare program. The term remuneration has been interpreted broadly to include anything of value, including stock options. The U.S. federal Anti-Kickback Statute has been interpreted to apply to arrangements between pharmaceutical manufacturers on one hand and prescribers, purchasers, and others on the other hand. There are a number of statutory exceptions and regulatory safe harbors protecting some common activities from prosecution, but they are drawn narrowly, and practices that involve remuneration, such as consulting agreements, that may be alleged to be intended to induce prescribing, purchasing or recommending may be subject to scrutiny if they do not qualify for an exception or safe harbor. Failure to meet all of the requirements of a particular applicable statutory exception or regulatory safe harbor does not make the conduct per se illegal under the U.S. federal Anti-Kickback Statute. Instead, the legality of the arrangement will be evaluated on a case-by-case basis based on a cumulative review of all of its facts and circumstances. Our practices may not in all cases meet all of the criteria for protection under a statutory exception or regulatory safe harbor. A person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation. In addition, a claim including items or services resulting from a violation of the U.S. federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the civil False Claims Act.

Civil and criminal false claims laws, including the civil False Claims Act, which can be enforced through civil whistleblower or *qui tam* actions, and civil monetary penalty laws prohibit, among other things, individuals or entities from knowingly presenting, or causing to be presented, claims for payment to the federal government, including federal healthcare programs, that are false or fraudulent. For example, the civil False Claims Act prohibits any person or entity from knowingly presenting, or causing to be presented, a false claim for payment to the federal government or knowingly making, using or causing to be made or used a false record or statement material to a false or fraudulent claim to the federal government. A claim includes “any request or demand” for money or property presented to the U.S. government. Pharmaceutical and other healthcare companies have been prosecuted under these laws for allegedly providing free product to customers with the expectation that the customers would bill federal programs for the product.

HIPAA created additional federal civil and criminal liability for, among other things, executing a scheme to defraud any healthcare benefit program, including private third-party payors, and making false statements relating to healthcare matters. Similar to the U.S. federal Anti-Kickback Statute, a person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation. In addition, HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act, or HITECH, and their implementing regulations, impose certain requirements on HIPAA covered entities, which include certain healthcare providers, healthcare clearing houses and health plans, and individuals and entities that provide services on their behalf that involve individually identifiable health information, known as business associates, as well as their covered subcontractors, relating to the privacy, security and transmission of individually identifiable health information.

The U.S. federal Physician Payments Sunshine Act requires certain manufacturers of drugs, devices, biologics and medical supplies that are reimbursable 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 certain payments and other transfers of value made in the prior year to physicians (defined to include doctors, dentists, optometrists, podiatrists, and chiropractors), other healthcare professionals (such as physician assistants and nurse practitioners), and teaching hospitals, as well as ownership and investment interests held by such physicians and their immediate family members.

We are also subject to additional similar U.S. state and foreign law equivalents of each of the above federal laws, such as 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, or that apply regardless of payor, state laws which require pharmaceutical companies to comply with the pharmaceutical industry’s voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government, state and local laws which require pharmaceutical companies to report information related to payments and other transfers of value to physicians and other healthcare providers or marketing expenditures, state laws which require the reporting of information related to drug pricing, state and local laws requiring the registration of pharmaceutical sales representatives, and state and foreign laws governing

the privacy and security of health information which, in some cases, differ from each other in significant ways, and may not have the same effect, thus complicating compliance efforts. If our operations are found to be in violation of any of such laws or any other governmental regulations that apply, we may be subject to penalties, including, without limitation, significant civil, criminal and administrative penalties, damages, fines, exclusion from government-funded healthcare programs, such as Medicare and Medicaid or similar programs in other countries or jurisdictions, integrity oversight and reporting obligations to resolve allegations of non-compliance, disgorgement, imprisonment, contractual damages, reputational harm, diminished profits and the curtailment or restructuring of our operations.

Coverage and Reimbursement

Significant uncertainty exists as to the coverage and reimbursement status of any pharmaceutical or biological product for which we obtain regulatory approval. Sales of any product, if approved, depend, in part, on the extent to which such product will be covered by third-party payors, such as federal, state, and foreign government healthcare programs, commercial insurance and managed healthcare organizations, and the level of reimbursement, if any, for such product by third-party payors. No uniform policy for coverage and reimbursement exists in the United States, and coverage and reimbursement can differ significantly from payor to payor. Decisions regarding whether to cover any of our product candidates, if approved, the extent of coverage and amount of reimbursement to be provided are made on a plan-by-plan basis. Third-party payors often rely upon Medicare coverage policy and payment limitations in setting their own reimbursement rates, but also have their own methods and approval process apart from Medicare determinations. As a result, the coverage determination process is often a time-consuming and costly process that will require us to provide scientific and clinical support for the use of our product candidates to each payor separately, with no assurance that coverage and adequate reimbursement will be applied consistently or obtained in the first instance.

For products administered under the supervision of a physician, obtaining coverage and adequate reimbursement may be particularly difficult because of the higher prices often associated with such drugs. Additionally, separate reimbursement for the product itself or the treatment or procedure in which the product is used may not be available, which may impact physician utilization. In addition, companion diagnostic tests require coverage and reimbursement separate and apart from the coverage and reimbursement for their companion pharmaceutical or biological products. Similar challenges to obtaining coverage and reimbursement, applicable to pharmaceutical or biological products, will apply to companion diagnostics.

In addition, the U.S. government, state legislatures and foreign governments have continued implementing cost-containment programs, including price controls, restrictions on coverage and reimbursement and requirements for substitution of generic products. Third-party payors are increasingly challenging the prices charged for medical products and services, examining the medical necessity and reviewing the cost effectiveness of pharmaceutical or biological products, medical devices and medical services, in addition to questioning safety and efficacy. Adoption of price controls and cost-containment measures, and adoption of more restrictive policies in jurisdictions with existing controls and measures, could further limit sales of any product that receives approval. Decreases in third-party reimbursement for any product or a decision by a third party not to cover a product could reduce physician usage and patient demand for the product. No regulatory authority has granted approval for a personalized cancer immunotherapy based on a vaccine approach, and there is no model for reimbursement of this type of product.

Healthcare Reform

The United States and some foreign jurisdictions are considering or have enacted a number of reform proposals to change the healthcare system. There is significant interest in promoting changes in healthcare systems with the stated goals of containing healthcare costs, improving quality or expanding access. In the United States, the pharmaceutical industry has been a particular focus of these efforts and has been significantly affected by federal and state legislative initiatives, including those designed to limit the pricing, coverage, and reimbursement of pharmaceutical and biopharmaceutical products, especially under government-funded healthcare programs, and increased governmental control of drug pricing.

The ACA, which was enacted in March 2010, substantially changed the way healthcare is financed by both governmental and private insurers in the United States, and significantly affected the pharmaceutical industry. The ACA contains a number of provisions of particular import to the pharmaceutical and biotechnology industries, including, but not limited to, those governing enrollment in federal healthcare programs, a new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for drugs that are inhaled, infused, instilled, implanted or injected, and annual fees based on pharmaceutical companies' share of sales to federal healthcare programs. Since its enactment, there have been judicial, Congressional and executive branch challenges to certain aspects of the ACA. For example, Congress considered legislation to repeal or repeal and replace all or part of the ACA. While Congress has not passed comprehensive repeal legislation, it has enacted laws that modify certain provisions of the ACA such as removing penalties, which started on January 1, 2019, for not complying with the ACA's individual mandate to carry health insurance. On June 17, 2021 the U.S. Supreme Court dismissed a challenge on procedural grounds that argued the ACA is unconstitutional in its entirety because the "individual mandate" was repealed by Congress. Thus, the ACA will remain in effect in its current form. Further, prior to the U.S. Supreme Court ruling, on January 28, 2021, President Biden issued an executive order that initiated a special enrollment period for purposes of obtaining health insurance coverage through the ACA marketplace, which began on February 15, 2021 and remained open through August 15, 2021. The executive order also instructed certain governmental agencies to review and reconsider their existing policies and rules that limit access to healthcare, including among others,

reexamining Medicaid demonstration projects and waiver programs that include work requirements, and policies that create unnecessary barriers to obtaining access to health insurance coverage through Medicaid or the ACA. It is possible that the ACA will be subject to judicial or Congressional challenges in the future. It is unclear how any such challenges and the healthcare reform measures of the Biden administration will impact the ACA and our business.

Other legislative changes have been proposed and adopted since the ACA was enacted, including aggregate reductions of Medicare payments to providers of 2% per fiscal year and reduced payments to several types of Medicare providers. These reductions went into effect in April 2013 and, due to subsequent legislative amendments to the statute, including the Infrastructure Investment and Jobs Act, will remain in effect through 2031, with the exception of a temporary suspension from May 1, 2020 through March 31, 2022, unless additional action is taken by Congress. Under current legislation the actual reduction in Medicare payments will vary from 1% in 2022 to up to 3% in the final fiscal year of this sequester. Another sequester, the PAYGO Sequester, effective with the passage of the American Rescue Plan, will add another 4% reduction in Medicare spending in 2023, unless additional Congressional action is taken. Additionally, on March 11, 2021, President Biden signed the American Rescue Plan Act of 2021 into law, which eliminates the statutory Medicaid drug rebate cap, currently set at 100% of a drug's average manufacturer price, for single source and innovator multiple source drugs, beginning January 1, 2024. In addition, Congress is considering additional health reform measures as part of the other reform measures.

Moreover, there has recently been heightened governmental scrutiny over the manner in which manufacturers set prices for their marketed products, which has resulted in several Congressional inquiries and proposed and enacted federal and state legislation designed to, among other things, bring more transparency to product pricing, review the relationship between pricing and manufacturer patient programs, and reform government program reimbursement methodologies for drug products. At the federal level, the Trump administration used several means to propose or implement drug pricing reform, including through federal budget proposals, executive orders and policy initiatives. For example, on July 24, 2020 and September 13, 2020, the Trump administration announced several executive orders related to prescription drug pricing that seek to implement several of the administration's proposals. As a result, the FDA concurrently released a final rule and guidance in September 2020 providing pathways for states to build and submit importation plans for drugs from Canada. Further, on November 20, 2020, the Department of Health and Human Services, or HHS, finalized a regulation removing safe harbor protection for price reductions from pharmaceutical manufacturers to plan sponsors under Medicare Part D, either directly or through pharmacy benefit managers, unless the price reduction is required by law. The implementation of the rule has been delayed by the Biden administration from January 1, 2022 to January 1, 2023 in response to ongoing litigation. The rule also creates a new safe harbor for price reductions reflected at the point-of-sale, as well as a new safe harbor for certain fixed fee arrangements between pharmacy benefit managers and manufacturers, the implementation of which have also been delayed until January 1, 2023. On November 20, 2020, CMS issued an interim final rule implementing the Trump administration's Most Favored Nation executive order, which would tie Medicare Part B payments for certain physician-administered drugs to the lowest price paid in other economically advanced countries, effective January 1, 2021. As a result of litigation challenging the Most Favored Nation model, on December 27, 2021, CMS published a final rule that rescinded the Most Favored Nation model interim final rule. In July 2021, the Biden administration released an executive order, "Promoting Competition in the American Economy," with multiple provisions aimed at prescription drugs. In response to Biden's executive order, on September 9, 2021, HHS released a Comprehensive Plan for Addressing High Drug Prices that outlines principles for drug pricing reform and sets out a variety of potential legislative policies that Congress could pursue as well as potential administrative actions HHS can take to advance these principles. No legislation or administrative actions have been finalized to implement these principles. At the state level, legislatures have increasingly passed legislation and implemented regulations designed to control pharmaceutical product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing. Further, it is possible that additional governmental action is taken in response to the COVID-19 pandemic.

Additional Regulation

In addition to the foregoing, state and federal laws regarding environmental protection and hazardous substances, including the Occupational Safety and Health Act, the Resource Conservation and Recovery Act and the Toxic Substances Control Act, affect our business. These and other laws govern the use, handling and disposal of various biologic, chemical and radioactive substances used in, and wastes generated by, operations. If our operations result in contamination of the environment or expose individuals to hazardous substances, we could be liable for damages and governmental fines. Equivalent laws have been adopted in other countries that impose similar obligations.

U.S. Foreign Corrupt Practices Act

The U.S. Foreign Corrupt Practices Act, or FCPA, prohibits U.S. corporations and individuals from engaging in certain activities to obtain or retain business abroad or to influence a person working in an official capacity. It is illegal to pay, offer to pay or authorize the payment of anything of value to any foreign government official, government staff member, political party or political candidate in an attempt to obtain or retain business or to otherwise influence a person working in an official capacity. The scope of the FCPA includes interactions with certain healthcare professionals in many countries. Equivalent laws have been adopted in other foreign countries that impose similar obligations.

Employees and Human Capital Resources

As of December 31, 2021, we had 60 full-time employees, including 15 who hold Ph.D. or M.D. degrees. Of these full-time employees, 45 employees are engaged in research and development and 15 employees are engaged in management or general and administrative activities. None of our employees are subject to a collective bargaining agreement or represented by a trade or labor union. We consider our relationship with our employees to be good.

Diversity and Inclusion

At Keros, diversity means making a conscious effort to reflect the many experiences and identities of the world outside, while treating each other with fairness and without bias. Inclusion is the choice we make every day to foster an environment where people of all backgrounds not only belong but excel, so that together, as a company, we can succeed. Keros strives to foster an inclusive community, both inside and out of the office.

Retention, Training and Development

The development, attraction and retention of our employees is a critical success factor for Keros. We cultivate a culture of learning and offer formal and informal training and development opportunities for employees at all levels. We actively promote from within and continue to fill our team with strong and experienced management talent.

Compensation and Benefits

An important part of attracting and retaining key talent is competitive pay and benefits. To ensure our compensation and benefits programs are competitive, we engage a nationally recognized outside compensation and benefits consulting firm to independently evaluate the effectiveness of our programs and to provide benchmarking against our peers within the industry. Our pay for performance philosophy seeks to motivate and reward employees while accomplishing our short and long-term strategic goals. As part of our performance management process, employees are evaluated both on what they accomplished and on their experience managing and mentoring other employees. Annual salary increases and incentive bonuses are based on merit and include individual and corporate performance factors.

To encourage our employees to think like owners and share in the Company's success, all employees are granted stock options. All employees are eligible for health insurance, paid and unpaid leaves including paid parental leave, retirement plans with an employer contribution match, life and disability/accident coverage and access to convenient COVID-19 testing.

Conduct and Ethics

At Keros, we are committed to fostering a culture of integrity and ensuring each of our employees is equipped with resources to help them do the right thing. We believe it is imperative that the board of directors and senior management strongly support a no-tolerance stance for workplace harassment, biases and unethical behavior. All employees are required to abide by, review and confirm compliance to the Company's Code of Business Conduct and Ethics and Insider Trading policies upon hire and on an annual basis thereafter.

Corporate Information

We were originally incorporated under the laws of the State of Delaware under the name Keros Therapeutics, Inc. in December 2015. Our principal executive office is located at 99 Hayden Avenue, Suite 120, Building E, Lexington, Massachusetts 02421. Our telephone number is (617) 314-6297. We completed our initial public offering in April 2020 and our common stock is listed on the Nasdaq Global Market under the symbol "KROS."

Available Information

Our website address is www.kerostx.com and our investor relations website address is <https://ir.kerostx.com/>. Our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, current reports on Form 8-K and amendments to those reports filed or furnished pursuant to Sections 13(a) and 15(d) of the Securities Exchange Act of 1934, as amended, or the Exchange Act, are available free of charge on our investor relations website as soon as reasonably practicable after we electronically file such material with, or furnish it to, the Securities and Exchange Commission, or the SEC. The SEC maintains an internet site that contains reports, proxy and information statements and other information. The address of the SEC's website is www.sec.gov.

Further corporate governance information, including our corporate governance guidelines and board committee charters, is also available on our investor relations website under the heading "Corporate Governance." The contents of our websites are not intended to be incorporated by reference into this Annual Report on Form 10-K or in any other report or document we file with the SEC, and any references to our websites are intended to be inactive textual references only.

ITEM 1A. RISK FACTORS

Our business is subject to numerous risks. You should consider carefully the risks and uncertainties described below, in addition to other information contained in this Annual Report on Form 10-K as well as our other public filings with the Securities and Exchange Commission, or the SEC. Any of the following risks could have a material adverse effect on our

business, financial condition, results of operations and growth prospects and cause the trading price of our common stock to decline.

SUMMARY OF SELECTED RISKS ASSOCIATED WITH OUR BUSINESS

Our business faces significant risks and uncertainties. If any of the following risks are realized, our business, financial condition and results of operations could be materially and adversely affected. Some of the more significant risks include the following:

- We have a limited operating history, have incurred net losses in every year since our inception and anticipate that we will continue to incur net losses in the future.
- We will need substantial additional funding in order to complete the development and commence commercialization of our product candidates. Failure to obtain this necessary capital when needed may force us to delay, reduce or eliminate certain of our product development or research operations.
- We are heavily dependent on the success of our product candidates, which are in early clinical development. If we are unable to advance our current or future product candidates through clinical trials, obtain marketing approval and ultimately commercialize any product candidates we develop, or experience significant delays in doing so, our business will be materially harmed.
- All of our product candidates are in preclinical or early clinical development stages. Clinical trials are difficult to design and implement, and they involve a lengthy and expensive process with uncertain outcomes. We may experience delays in completing, or ultimately be unable to complete, the development and commercialization of KER-050, KER-047, KER-012 or any future product candidates.
- If we are unable to successfully commercialize any product candidate for which we receive regulatory approval, or experience significant delays in doing so, our business will be materially harmed.
- We face significant competition from other biotechnology and pharmaceutical companies, and our operating results will suffer if we fail to compete effectively.
- Our success depends in part on our ability to protect our intellectual property. It is difficult and costly to protect our proprietary rights and technology, and we may not be able to ensure their protection.
- We rely, and expect to continue to rely, on third parties, including independent clinical investigators, contracted laboratories and contract research organizations, to conduct our preclinical studies and clinical trials. If these third parties do not successfully carry out their contractual duties or meet expected deadlines, we may not be able to obtain regulatory approval for or commercialize our product candidates and our business could be substantially harmed.
- We rely on third parties to supply and manufacture our product candidates, and we expect to continue to rely on third parties to manufacture our products, if approved. The development of such product candidates and the commercialization of any products, if approved, could be stopped, delayed or made less profitable if any such third party fails to provide us with sufficient quantities of product candidates or products or fails to do so at acceptable quality levels or prices or fails to maintain or achieve satisfactory regulatory compliance.
- Our future collaborations will be important to our business. If we are unable to enter into new collaborations, or if these collaborations are not successful, our business could be adversely affected.
- The COVID-19 pandemic could adversely impact our business, including the timing or results of our preclinical studies and clinical trials.

Risks Related to Our Financial Position and Need for Additional Capital

We have a limited operating history, have incurred net losses in every year since our inception and anticipate that we will continue to incur net losses in the future.

We are a clinical-stage biopharmaceutical company with a limited operating history. Since our inception in 2015, we have invested most of our resources in developing our product candidates, building our intellectual property portfolio, developing our supply chain, conducting business planning, raising capital and providing general and administrative support for these operations. Consequently, we have no meaningful operations upon which to evaluate our business and predictions about our future success or viability may not be as accurate as they could be if we had a longer operating history or a history of successfully developing and commercializing drug products. Investment in biopharmaceutical product development is highly speculative because it entails substantial upfront capital expenditures and significant risk that any potential product candidate will fail to demonstrate adequate effect or an acceptable safety profile, gain regulatory approval and become commercially viable. We have not yet demonstrated the ability to progress any product candidate through late-stage clinical trials, we have

no products approved for commercial sale and we have not generated any revenue from product sales to date. We continue to incur significant research and development and other expenses related to our ongoing operations. As a result, we are not profitable and have incurred losses in each period since our inception. For the years ended December 31, 2021 and 2020, we reported a net loss of \$58.7 million and \$45.4 million, respectively. As of December 31, 2021, we had an accumulated deficit of \$123.8 million. We expect to continue to incur significant losses for the foreseeable future, and we expect these losses to increase as we continue our research and development of, and seek regulatory approvals for, our lead protein therapeutic product candidate, KER-050, our lead small molecule product candidate, KER-047, our third product candidate, KER-012, and any future product candidates we may develop.

We anticipate that our expenses will increase substantially if, and as, we:

- complete our Phase 2 clinical trial of KER-050 evaluating the treatment of cytopenias, including anemia and thrombocytopenia, in patients with myelodysplastic syndrome, or MDS;
- progress our Phase 2 clinical trial of KER-050 evaluating the treatment of cytopenias, including anemia and thrombocytopenia, in patients with myelofibrosis;
- commence two open-label Phase 2 clinical trials of KER-047 in the first half of 2022, one in patients with iron deficiency anemia, or IDA, and one in patients with iron-refractory iron deficiency anemia, or IRIDA;
- complete our Phase 1 clinical trial of KER-012 in healthy volunteers;
- continue the research and development of our other clinical- and preclinical-stage product candidates and discovery-stage programs;
- increase the amount of research and development activities to identify and develop product candidates using our proprietary discovery approach;
- make milestone, royalty or other payments under in-license or collaboration agreements;
- maintain, expand and protect our intellectual property portfolio;
- expand our operational, financial and management systems and increase personnel, including personnel to support our clinical development, manufacturing and commercialization efforts and our operations as a public company;
- establish a sales, marketing, medical affairs and distribution infrastructure to commercialize any products for which we may obtain marketing approval and intend to commercialize on our own or jointly with third parties;
- invest in or in-license other technologies; and
- experience any delays or encounter any issues with any of the above, including but not limited to failed studies, complex results, manufacturing challenges, safety issues or other regulatory challenges.

To become and remain profitable, we, our collaborators and any potential future collaborators must develop and eventually commercialize products with significant market potential. This will require us to be successful in a range of challenging activities, including completing preclinical studies and clinical trials, obtaining marketing approval for product candidates, manufacturing, marketing and selling products for which we may obtain marketing approval and satisfying any post-marketing requirements. We may never succeed in any or all of these activities and, even if we do, we may never generate revenue that is significant or large enough to achieve profitability. If we do achieve profitability, we may not be able to sustain or increase profitability on a quarterly or annual basis. Our failure to become and remain profitable would decrease the value of our 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 also could cause you to lose all or part of your investment.

Even if we succeed in commercializing one or more of our product candidates, we will continue to incur substantial research and development and other expenditures to develop and market additional product candidates. We may encounter unforeseen expenses, difficulties, complications, delays and other unknown factors that may adversely affect our business. The size of our future net losses will depend, in part, on the rate of future growth of our expenses and our ability to generate revenue. Our prior losses and expected future losses have had and will continue to have an adverse effect on our stockholders' equity and working capital.

We will need substantial additional funding in order to complete the development and commence commercialization of our product candidates. Failure to obtain this necessary capital when needed may force us to delay, reduce or eliminate certain of our product development or research operations.

To date, we have funded our operations primarily through private placements of our equity securities, upfront and expense reimbursement payments received from our collaborators, from our initial public offering, or IPO, in April 2020, from our public offering of common stock in November 2020 and from our "at the market offering," in connection with our Sales Agreement with SVB Leerink LLC, as agent, pursuant to which we may offer and sell, from time to time, shares of our common stock having an aggregate offering price of up to \$150.0 million through SVB Leerink LLC. We expect our expenses to increase in connection with our ongoing activities, particularly as we complete our Phase 2 clinical trial of KER-050 in patients with MDS, progress our Phase 2 clinical trial of KER-050 in patients with myelofibrosis, initiate two Phase 2 clinical trials of KER-047, one in patients with IDA and one in patients with IRIDA, progress our Phase 1 clinical trial of KER-012 in healthy volunteers and initiate later-stage clinical development, and continue to research, develop and initiate clinical trials of any other future product candidates. In addition, if we obtain regulatory approval for any of our product candidates, we expect to incur significant commercialization expenses related to product manufacturing, marketing, sales and distribution. Furthermore, we expect to incur additional costs associated with operating as a public company. Accordingly, we will need to obtain substantial

additional funding in connection with our continuing operations. If we are unable to raise capital when needed or on attractive terms, we could be forced to delay, reduce or eliminate our product development programs or any future commercialization efforts.

As of December 31, 2021, we had \$230.0 million in cash and cash equivalents. We expect that our existing cash and cash equivalents as of December 31, 2021 along with the net \$18.0 million upfront payment pursuant to the license agreement with Hansoh (Shanghai) Healthtech Co., Ltd., or Hansoh, which we received in January 2022, will enable us to fund our operating expenses and capital expenditure requirements into the first quarter of 2024. We have based this estimate on assumptions that may prove to be wrong, and we could use our capital resources sooner than we currently expect. Our future capital requirements for KER-050, KER-047, KER-012 or our other preclinical programs will depend on many factors, including:

- the progress, timing and completion of preclinical studies and clinical trials for our current or any future product candidates, as well as the associated costs, including any unforeseen costs we may incur as a result of preclinical study or clinical trial delays due to the COVID-19 pandemic or other causes;
- the timing and amount of milestone and royalty payments we are required to make or are eligible to receive under our license agreements with each of The General Hospital Corporation and Hansoh;
- the number of potential new product candidates we identify and decide to develop;
- the need for additional or expanded preclinical studies and clinical trials beyond those that we plan to conduct with respect to our current and future product candidates;
- the costs involved in growing our organization to the size needed to allow for the research, development and potential commercialization of our current or any future product candidates;
- the costs involved in filing patent applications, maintaining and enforcing patents or defending against infringement or other claims raised by third parties;
- the maintenance of our existing license and collaboration agreements and the entry into new license and collaboration agreements;
- the time and costs involved in obtaining regulatory approval for our product candidates and any delays we may encounter as a result of evolving regulatory requirements or adverse results with respect to any of our product candidates;
- the effect of competing technological and market developments;
- the cost of manufacturing KER-050, KER-047, KER-012 and future product candidates for clinical trials in preparation for marketing approval and in preparation for commercialization;
- the cost of establishing sales, marketing and distribution capabilities for any product candidates for which we may receive regulatory approval in regions where we choose to commercialize our products on our own;
- the amount of revenues, if any, we may derive either directly or in the form of royalty payments from future sales of our product candidates, if approved; and
- market acceptance of any approved product candidates.

We do not have any committed external source of funds or other support for our development efforts and we cannot be certain that additional funding will be available on acceptable terms, or at all. Until we can generate sufficient product or royalty revenue to finance our cash requirements, which we may never do, we expect to finance our future cash needs through a combination of public or private equity offerings, debt financings, collaborations, strategic alliances, licensing arrangements and other marketing or distribution arrangements.

Our ability to raise additional funds will depend on financial, economic and market conditions and other factors, over which we may have no or limited control. For example, the COVID-19 pandemic continues to evolve and has already resulted in a significant disruption of the global financial markets. If the disruption persists and deepens, we could experience an inability to access additional capital when and if needed. If we are unable to obtain additional funding, we could be forced to delay, reduce or eliminate some or all of our research and development programs and clinical development efforts, which would adversely affect our business prospects, or we may be unable to continue operations.

Raising additional capital may cause dilution to holders of our common stock, restrict our operations or require us to relinquish rights to our technologies or product candidates.

Until such time, if ever, as we can generate substantial product revenues, we expect to finance our operations with our existing cash and cash equivalents and revenue from our collaborations. In order to further advance development of our product candidates, discover additional product candidates and pursue our other business objectives, we will need to seek additional funds.

We cannot guarantee that future financing will be available in sufficient amounts or on commercially reasonable terms, if at all. Moreover, the terms of any financing may adversely affect the holdings or the rights of holders of our common stock and the issuance of additional securities, whether equity or debt, by us, or the possibility of such issuance, may cause the market price of our common stock to decline. The sale of additional common stock or securities convertible or exchangeable into common stock would dilute all of our existing stockholders and the terms of these securities may include liquidation or other preferences that adversely affect your rights as a holder of our common stock. The incurrence of indebtedness could result in

increased fixed payment obligations and we may be required to agree to certain restrictive covenants, such as limitations on our ability to incur additional debt or declare dividends, limitations on our ability to acquire, sell or license intellectual property rights and other operating restrictions that could adversely impact our ability to conduct our business. If we raise additional capital through marketing and distribution arrangements or other collaborations, strategic alliances or licensing arrangements with third parties, we may have to relinquish certain valuable rights to our product candidates, technologies, future revenue streams or research programs or grant licenses on terms that may not be favorable to us. We also could be required to seek collaborators for KER-050, KER-047, KER-012 or any future product candidate at an earlier stage than otherwise would be desirable or relinquish our rights to product candidates or technologies that we otherwise would seek to develop or commercialize ourselves. Further, any additional fundraising efforts may divert our management from its day-to-day activities, which may adversely affect our ability to develop and commercialize our product candidates.

If we are unable to raise additional capital in sufficient amounts or on terms acceptable to us, we may have to significantly delay, scale back or discontinue the development or commercialization of one or more of our product candidates or one or more of our other research and development initiatives. Any of the above events could significantly harm our business, prospects, financial condition and results of operations and cause the price of our common stock to decline.

Risks Related to the Discovery, Development and Regulatory Approval of our Product Candidates

We are heavily dependent on the success of our product candidates, which are in early clinical development. If we are unable to advance our current or future product candidates through clinical trials, obtain marketing approval and ultimately commercialize any product candidates we develop, or experience significant delays in doing so, our business will be materially harmed.

Before obtaining marketing approval from regulatory authorities for the sale of our product candidates, we must conduct extensive clinical trials to demonstrate the safety and efficacy of the product candidates in humans. We are early in our product candidate development efforts, as KER-050, KER-047 and KER-012 are still in early-stage clinical trials. Because KER-050 and KER-047 are our lead product candidates, if either KER-050 or KER-047 encounters safety or efficacy problems, development delays or regulatory issues or other problems, our development plans and business would be significantly harmed.

Our ability to generate product revenues, which we do not expect will occur for several years, if ever, will depend heavily on the successful development and eventual commercialization of KER-050, KER-047, KER-012 and any future product candidates we develop, which may never occur. KER-050, KER-047, KER-012 and any future product candidates we develop will require additional preclinical and clinical development, management of clinical, preclinical and manufacturing activities, marketing approval in the United States and other jurisdictions for specific indications for use, demonstrating effectiveness to pricing and reimbursement authorities, obtaining sufficient manufacturing supply for both clinical development and commercial production, building of a commercial organization and substantial investment and significant marketing efforts before we generate any revenues from product sales. The success of our current and future product candidates will depend on several factors, including the following:

- successful and timely completion of clinical trials and preclinical studies for which the U.S. Food and Drug Administration, or the FDA, or any comparable foreign regulatory authority agree with the design, endpoints or implementation;
- sufficiency of our financial and other resources to complete the necessary preclinical studies and clinical trials;
- receiving regulatory approvals or authorizations for conducting our planned clinical trials or future clinical trials;
- initiation and successful patient enrollment in, and completion of, additional clinical trials on a timely basis;
- our ability to demonstrate to the satisfaction of the FDA or any comparable foreign regulatory authority that the applicable product candidate is safe and effective as a treatment for our targeted indications or, in the case of an applicable product candidates which is regulated as a biological product, that the applicable product is safe, pure, and potent for our targeted indications;
- our ability to demonstrate to the satisfaction of the FDA or any comparable foreign regulatory authority that the applicable product candidate's risk-benefit ratio for its proposed indication is acceptable;
- timely receipt of marketing approvals for our product candidates from applicable regulatory authorities;
- the extent of any required post-marketing approval commitments to applicable regulatory authorities;
- establishing and scaling up, either alone or with third-party manufacturers, manufacturing capabilities of clinical supply for our clinical trials and commercial manufacturing, if any of our product candidates are approved;
- obtaining and maintaining patent and trade secret protection or regulatory exclusivity for our product candidates, both in the United States and internationally;
- successfully scaling a sales and marketing organization and launching commercial sales of our product candidates, if approved;
- acceptance of our product candidates' benefits and uses, if approved, by patients, the medical community and third-party payors;
- maintaining a continued acceptable safety profile of our product candidates following approval;
- effectively competing with companies developing and commercializing other therapies in the indications which our product candidates target;
- obtaining and maintaining healthcare coverage and adequate reimbursement from third-party payors; and

- enforcing and defending intellectual property rights and claims.

If we are not successful with respect to one or more of these factors in a timely manner or at all, we could experience significant delays or an inability to successfully commercialize KER-050, KER-047, KER-012 or any future product candidates we develop, which would materially harm our business. If we do not receive marketing approvals for our current and future product candidates, we may not be able to continue our operations.

All of our product candidates are in preclinical or early clinical development stages. Clinical trials are difficult to design and implement, and they involve a lengthy and expensive process with uncertain outcomes. We may experience delays in completing, or ultimately be unable to complete, the development and commercialization of KER-050, KER-047, KER-012 or any future product candidates.

Clinical testing is expensive and can take many years to complete, and its outcome is inherently uncertain. Failure can occur at any time during the clinical trial process and our future clinical trial results may not be successful. We cannot guarantee that any of our ongoing and planned clinical trials will be conducted as planned or completed on schedule, if at all. Moreover, even if these trials are initiated or conducted on a timely basis, issues may arise that could result in the suspension or termination of such clinical trials.

To date, we have not completed any clinical trials required for the approval of any of our product candidates. Although we have completed our Phase 1 clinical trial of KER-050 and our Phase 1 clinical trial of KER-047, each in healthy volunteers, we may experience delays in our ongoing clinical trials or preclinical studies and we do not know whether planned clinical trials will begin on time, need to be redesigned, enroll patients on time, have sufficient drug supply for our product candidates on a timely basis or be completed on schedule, if at all. A failure of one or more clinical trials can occur at any stage of testing, and our ongoing and future clinical trials may not be successful. We also may experience numerous unforeseen events during our clinical trials that could delay or prevent our ability to receive marketing approval or commercialize KER-050, KER-047, KER-012 or any future product candidates, including:

- delays in or failure to obtain regulatory authorizations to commence a trial;
- delays in reaching a consensus with regulatory agencies as to the design or implementation of our clinical trials;
- delays in or failure to reach agreement on acceptable terms with prospective contract research organizations, or CROs, and clinical trial sites, the terms of which can be subject to extensive negotiation and may vary significantly among different CROs and trial sites;
- delays in or failure to obtain institutional review board, or IRB, or ethics committee approval at each site;
- delays in or failure to recruit a sufficient number of suitable patients to participate in a trial;
- failure to have patients complete a trial or return for post-treatment follow-up, including disruptions in our ability to treat patients or conduct post-treatment follow-up due to the COVID-19 pandemic;
- clinical sites deviating from trial protocol, missing data or dropping out of a trial;
- delays in adding new clinical trial sites;
- failure to manufacture sufficient quantities of our product candidates for use in clinical trials in a timely manner;
- occurrence of adverse events associated with the product candidate that are viewed to outweigh its potential benefits, or safety or tolerability concerns that could cause us or our collaborators, as applicable, to suspend or terminate a trial if we or our collaborators find that the participants are being exposed to unacceptable health risks;
- failure to perform clinical trials in accordance with the FDA's or any other regulatory authority's good clinical practices, or GCP, requirements, or regulatory guidelines in other countries;
- changes in regulatory requirements, policies and guidelines;
- failure of our third-party research contractors to comply with regulatory requirements or meet their contractual obligations to us in a timely manner, or at all;
- delays in establishing the appropriate dosage levels and frequency of dosing in clinical trials;
- the quality or stability of our product candidates falling below acceptable standards; and
- business interruptions resulting from geopolitical actions, including war, such as the current situation with Ukraine and Russia, and terrorism, another outbreak of a contagious disease or natural disasters including earthquakes, typhoons, floods and fires.

In addition, disruptions caused by the COVID-19 pandemic have resulted in difficulties and delays in initiating, enrolling, conducting or completing our planned and ongoing preclinical studies and clinical trials, as applicable, and may increase the likelihood that we encounter additional difficulties and delays in the future. We could also encounter delays if a clinical trial is suspended or terminated by us, the IRBs of the institutions in which such trials are being conducted, or the FDA or comparable foreign regulatory authorities, or recommended for suspension or termination by the Safety Review Committee for such trial. A suspension or termination may be imposed due to a number of factors, including failure to conduct the clinical trial in accordance with regulatory requirements or our clinical protocols, inspection of the clinical trial operations or trial site by the FDA or comparable foreign regulatory authorities resulting in the imposition of a clinical hold, unforeseen safety issues or adverse side effects, failure to demonstrate a benefit from using a product or treatment, failure to establish or achieve clinically meaningful trial endpoints, changes in governmental regulations or administrative actions or lack of adequate funding to continue the clinical trial. Many of the factors that cause, or lead to, a delay in the commencement or completion of clinical trials may also ultimately lead to the denial of regulatory approval of our product candidates. Further, the FDA or

comparable foreign regulatory authorities may disagree with our clinical trial design and our interpretation of data from clinical trials, or may change the requirements for approval even after they have reviewed and commented on the design for our clinical trials.

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

Our clinical trials may fail to demonstrate substantial evidence of the safety and efficacy or safety, purity and potency of our product candidates or any future product candidates, which would prevent or delay or limit the scope of regulatory approval and commercialization.

To obtain the requisite regulatory approvals to market and sell any of our product candidates, including KER-050, KER-047, KER-012 and any other future product candidates, we must demonstrate through extensive preclinical studies and clinical trials that our investigational drug products, such as KER-047, are safe and effective for use in each targeted indication, and in the case of our product candidates regulated as biological products, such as KER-050 and KER-012, that the product candidate is safe, pure and potent for use in its targeted indication. Clinical testing is expensive and can take many years to complete, and its outcome is inherently uncertain. Failure can occur at any time during the clinical development process. Most product candidates that begin clinical trials are never approved by regulatory authorities for commercialization. We may be unable to establish clinical endpoints that applicable regulatory authorities would consider clinically meaningful, and a clinical trial can fail at any stage of testing. Further, the process of obtaining regulatory approval is expensive, often takes many years following the commencement of clinical trials and can vary substantially based upon the type, complexity and novelty of the product candidates involved, as well as the target indications, patient population and regulatory agency. Prior to obtaining approval to commercialize KER-050, KER-047, KER-012 and any future product candidates in the United States or abroad, we, our collaborators or our potential future collaborators must demonstrate with substantial evidence from adequate and well-controlled clinical trials, and to the satisfaction of the FDA or comparable foreign regulatory authorities, that such product candidates are safe and effective for their intended uses.

Clinical trials that we conduct may not demonstrate the efficacy and safety necessary to obtain regulatory approval to market our product candidates. In some instances, there can be significant variability in safety or efficacy results between different clinical trials of the same product candidate due to numerous factors, including changes in trial procedures set forth in protocols, differences in the size and type of the patient populations, changes in and adherence to the clinical trial protocols and the rate of dropout among clinical trial participants. If the results of our ongoing or future clinical trials are inconclusive with respect to the efficacy of our product candidates, if we do not meet the clinical endpoints with statistical and clinically meaningful significance, or if there are safety concerns associated with our product candidates, we may be delayed in obtaining marketing approval, if at all. Additionally, any safety concerns observed in any one of our clinical trials in our targeted indications could limit the prospects for regulatory approval of our product candidates in those and other indications.

Even if the trials are successfully completed, clinical data are often susceptible to varying interpretations and analyses, and we cannot guarantee that the FDA or comparable foreign regulatory authorities will interpret the results as we do, and more trials could be required before we submit our product candidates for approval. We cannot guarantee that the FDA or comparable foreign regulatory authorities will view our product candidates as having efficacy even if positive results are observed in clinical trials. Moreover, results acceptable to support approval in one jurisdiction may be deemed inadequate by another regulatory authority to support regulatory approval in that other jurisdiction. To the extent that the results of the trials are not satisfactory to the FDA or comparable foreign regulatory authorities for support of a marketing application, approval of KER-050, KER-047, KER-012 and any future product candidates may be significantly delayed, or we may be required to expend significant additional resources, which may not be available to us, to conduct additional trials in support of potential approval of our product candidates. Even if regulatory approval is secured for a product candidate, the terms of such approval may limit the scope and use of the specific product candidate, which may also limit its commercial potential.

The results of preclinical studies and early-stage clinical trials of our product candidates may not be predictive of the results of later-stage clinical trials. Initial success in our ongoing clinical trials may not be indicative of results obtained when these trials are completed or in later-stage trials.

The results of nonclinical and preclinical studies and clinical trials may not be predictive of the results of later-stage clinical trials. Product candidates in later stages of clinical trials may fail to show the desired safety and efficacy traits despite having progressed through preclinical studies and initial clinical trials. Furthermore, there can be no assurance that any of our clinical trials will ultimately be successful or support further clinical development of any of our product candidates. There is a high failure rate for product candidates proceeding through clinical trials. Many companies in the biotechnology and pharmaceutical industries have suffered significant setbacks in late-stage clinical trials after achieving positive results in early-stage development and we cannot be certain that we will not face similar setbacks. These setbacks have been caused by, among other things, preclinical findings made while clinical trials were underway, or safety or efficacy observations made

in preclinical studies and clinical trials, including previously unreported adverse events. Moreover, preclinical and clinical data are often susceptible to varying interpretations and analyses and many companies that believed their product candidates performed satisfactorily in preclinical studies and clinical trials nonetheless failed to obtain FDA approval. Any such setbacks in our clinical development could have a material adverse effect on our business, financial condition and results of operations.

Additionally, some of the clinical trials we conduct may include open-label trials conducted at a limited number of clinical sites on a limited number of patients. For example, our ongoing Phase 2 clinical trial for KER-050 in patients with MDS is an open-label trial. An “open-label” clinical trial is one where both the patient and investigator know whether the patient is receiving the investigational product candidate or either an existing approved product or placebo. Most typically, open-label clinical trials test only the investigational product candidate and sometimes may do so at different dose levels. For example, in our ongoing Phase 2 clinical trial for KER-050 in patients with MDS, the dose levels for Cohorts 1, 2, 3, 4 and 5 are 0.75 mg/kg, 1.5 mg/kg, 2.5 mg/kg, 3.75 mg/kg and 5.0 mg/kg, respectively.

Open-label clinical trials are also subject to various limitations that may exaggerate any therapeutic effect as patients in open-label clinical trials are aware when they are receiving treatment. Open-label clinical trials may be subject to a “patient bias” where patients perceive their symptoms to have improved merely due to their awareness of receiving an experimental treatment. Moreover, patients selected for early-stage clinical trials often include the most severe sufferers and their symptoms may have been bound to improve notwithstanding the new treatment. In addition, open-label clinical trials may be subject to an “investigator bias” where those assessing and reviewing the physiological outcomes of the clinical trials are aware of which patients have received treatment and may interpret the information of the treated group more favorably given this knowledge. Given that open-label Phase 2 clinical trials are ongoing for KER-050 and planned for KER-047, the results from these clinical trials may not be predictive of future clinical trial results with these or other product candidates for which we include an open-label clinical trial when studied in a controlled environment with a placebo or active control.

Our product candidates may be associated with serious adverse, undesirable or unacceptable side effects or other properties or safety risks, which may delay or halt their clinical development, or prevent marketing approval. If such side effects are identified during the development of our product candidates or following approval we may suspend or abandon our development of such product candidates, the commercial profile of any approved label may be limited, or we may be subject to other significant negative consequences following marketing approval.

Undesirable side effects that may be caused by our product candidates could cause us or regulatory authorities to interrupt, delay or halt clinical trials and could result in a more restrictive label or the delay or denial of regulatory approval by the FDA or comparable foreign regulatory authorities. While our lead product candidates, KER-050 and KER-047, have generally been well tolerated in our preclinical studies and clinical trials to date, the results from future preclinical studies and clinical trials, including of KER-012 and our other product candidates, may identify safety concerns or other undesirable properties of our product candidates.

The results of our ongoing Phase 2 clinical trials of KER-050, our planned Phase 2 clinical trials of KER-047, our ongoing Phase 1 clinical trial of KER-012 and future clinical trials of these and other product candidates may show that our product candidates cause undesirable or unacceptable side effects or even death. In such an event, our trials could be suspended or terminated and the FDA or comparable foreign regulatory authorities could order us to cease further development of or deny approval of our product candidates for any or all targeted indications. The drug-related side effects could affect patient recruitment or the ability of enrolled patients to complete the trial or result in potential product liability claims. Any of these occurrences may harm our business, financial condition and results of operations significantly.

Moreover, if our product candidates are associated with undesirable side effects in preclinical studies or clinical trials or have characteristics that are unexpected, we may elect to abandon their development or limit their 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, which may limit the commercial expectations for the product candidate, if approved.

Additionally, adverse developments in clinical trials of pharmaceutical and biopharmaceutical products conducted by others may cause the FDA or other regulatory oversight bodies to suspend or terminate our clinical trials or to change the requirements for approval of any of our product candidates.

Additionally, if any of our product candidates receives marketing approval and we or others later identify undesirable or unacceptable side effects caused by such products, a number of potentially significant negative consequences could result, including:

- regulatory authorities may withdraw approvals of such product and require us to take our approved product off the market;
- regulatory authorities may require the addition of labeling statements, specific warnings, a contraindication or field alerts to physicians and pharmacies;
- regulatory authorities may require a medication guide outlining the risks of such side effects for distribution to patients, or that we implement a risk evaluation and mitigation strategy, or REMS, plan to ensure that the benefits of the product outweigh its risks;

- we may be required to conduct additional clinical trials, which may lead to additional interactions with regulatory authorities;
- we may be required to change the way the product is administered, conduct additional clinical trials or change the labeling of the product;
- we may be subject to limitations on how we may promote the product;
- sales of the product may decrease significantly;
- we may be subject to litigation or product liability claims; and
- our reputation may suffer.

Any of these events could prevent us, our collaborators or our potential future partners from achieving or maintaining market acceptance of the affected product or could substantially increase commercialization costs and expenses, which in turn could delay or prevent us from generating significant revenue from the sale of our product candidates, if approved.

We may find it difficult to enroll patients in our clinical trials, which could delay or prevent us from proceeding with, or otherwise adversely affect, clinical trials of our product candidates.

Identifying and qualifying patients to participate in clinical trials of our product candidates is critical to our success. The timely completion of our clinical trials in accordance with their protocols depends, among other things, on our ability to recruit a sufficient number of eligible patients to participate and remain in the trial until its conclusion. Patients may be unwilling to participate in our clinical trials because of negative publicity from adverse events related to novel therapeutic approaches, competitive clinical trials for similar patient populations, the existence of current treatments or for other reasons, including the ongoing COVID-19 pandemic. Any delays related to patient enrollment or difficulties related to patient retention could result in increased costs, delays in advancing our product candidates, delays in testing the effectiveness of our product candidates or termination of the clinical trials altogether. We may not be able to identify, recruit and enroll a sufficient number of patients, or those with the required or desired characteristics, to complete our clinical trials in a timely manner. Patient enrollment and trial completion is affected by many factors, including the:

- size and nature of the patient population and process for identifying patients;
- proximity and availability of clinical trial sites for prospective patients;
- ability of patients to travel to clinical trial sites;
- eligibility and exclusion criteria for the trial;
- design of the clinical trial;
- safety profile, to date, of the product candidate under study;
- perceived risks and benefits of the product candidate under study;
- perceived risks and benefits of our approach;
- approval of competing product candidates currently under investigation for the treatment of similar diseases or conditions, or competing clinical trials for similar product candidates or targeting patient populations meeting our patient eligibility criteria;
- severity of the disease under investigation;
- degree of progression of the patient's disease at the time of enrollment and throughout the clinical trial;
- ability to obtain and maintain patient consent;
- risk that enrolled patients will drop out before completion of the trial;
- patient referral practices of physicians; and
- ability to adequately monitor patients during and after treatment.

Enrollment risks are heightened with respect to indications that are rare or orphan diseases, which may limit the pool of patients that may be enrolled in our planned clinical trials. For example, we are developing KER-047 for the treatment of IRIDA, which is a rare, inherited form of IDA with a worldwide prevalence estimated to be less than one person in 1,000,000. As a result, we have encountered difficulties enrolling participants in our planned clinical trial evaluating KER-047 for the treatment of IRIDA due, in part, to the small size of this patient population. In addition, our clinical trials will compete with other clinical trials for product candidates that are in the same therapeutic areas as our product candidates, and this competition will reduce the number and types of patients available to us, because some patients who might have opted to enroll in our trials may instead opt to enroll in a trial being conducted by one of our competitors. Since the number of qualified clinical investigators is limited, we expect to conduct some of our clinical trials at the same clinical trial sites that some of our competitors use, which will reduce the number of patients who are available for our clinical trials in such clinical trial site.

Delays related to patient enrollment and difficulties related to patient retention may result in increased costs or may affect the timing or outcome of our future clinical trials, which could prevent completion of these trials and adversely affect our ability to advance the development of our product candidates.

Interim, topline and preliminary data from our clinical trials that we announce or publish from time to time may change as more patient data become available and are subject to audit and verification procedures that could result in material changes in the final data.

From time to time, we may publish interim, topline or preliminary data from our clinical trials. Preliminary and interim data from our clinical trials may change as more participant data become available. For example, in June 2021, we announced

preliminary results from Cohorts 1 and 2 of our Phase 2 clinical trial evaluating KER-050 for the treatment of anemia and thrombocytopenia in patients with very low-, low-, or intermediate-risk MDS, which only included a small subset of the patients expected to be enrolled in the trial. Preliminary or interim data from our clinical trials are not necessarily predictive of final results. Preliminary and interim data are subject to the risk that one or more of the clinical outcomes may materially change as enrollment continues, more trial data become available and we issue our final clinical trial report. Interim, topline and preliminary data also remain subject to audit and verification procedures that may result in the final data being materially different from the preliminary data we previously published. As a result, preliminary, topline and interim data should be viewed with caution until the final data are available. Material adverse changes in the final data compared to the interim data could significantly harm our business prospects.

Further, others, including regulatory agencies, may not accept or agree with our assumptions, estimates, calculations, conclusions or analyses or may interpret or weigh the importance of data differently, which could impact the value of the particular program, the approvability or commercialization of the particular product candidate or product, if any, and our company in general. In addition, the information we choose to publicly disclose regarding a particular preclinical study or clinical trial is based on what is typically extensive information, and you or others may not agree with what we determine is the material or otherwise appropriate information to include in our disclosure, and any information we determine not to disclose may ultimately be deemed significant with respect to future decisions, conclusions, views, activities or otherwise regarding a particular product, if any, product candidate or our business. If the preliminary and interim data that we report differ from actual results, or if others, including regulatory authorities, disagree with the conclusions reached, our ability to obtain approval for, and commercialize, our product candidates may be harmed, which could harm our business, operating results, prospects or financial condition.

Preclinical development is uncertain. Our preclinical programs may experience delays or may never advance to clinical trials, which would adversely affect our ability to obtain regulatory approvals or commercialize these programs on a timely basis or at all, which would have an adverse effect on our business.

Before we can commence clinical trials for any product candidate, we must complete extensive preclinical studies that support any future Investigational New Drug, or IND, applications in the United States, or similar applications in other jurisdictions. We have not submitted any IND to the FDA and all of our clinical trials have, to date, been conducted in Australia and New Zealand. Conducting preclinical testing is a lengthy, time-consuming and expensive process and delays associated with product candidates for which we are directly conducting preclinical testing and studies may cause us to incur additional operating expenses. While we are conducting two Phase 2 clinical trials for KER-050, one in patients with MDS and one in patients with myelofibrosis, and a Phase 1 clinical trial for KER-012 in healthy volunteers, and plan to initially conduct two Phase 2 clinical trials for KER-047, one in patients with IDA and one in patients with IRIDA, outside of the United States, we cannot be certain of the timely completion or outcome of our preclinical testing and studies for our other product candidates and cannot predict if the FDA will accept our proposed clinical programs or if the outcome of our preclinical testing and foreign clinical trials will ultimately support the further development of our other product candidates. As a result, we cannot be sure that we will be able to submit INDs or similar applications for our preclinical programs on the timelines we expect, if at all, and we cannot be sure that submission of INDs or similar applications will result in the FDA or comparable foreign regulatory authorities allowing clinical trials to begin.

Our research and development activities could be affected or delayed as a result of possible restrictions on animal testing.

Certain laws and regulations require us to test our product candidates on animals before initiating clinical trials involving humans. Animal testing activities have been the subject of controversy and adverse publicity. Animal rights groups and other organizations and individuals have attempted to stop animal testing activities by pressing for legislation and regulation in these areas and by disrupting these activities through protests and other means. To the extent the activities of these groups are successful, our research and development activities may be interrupted, delayed or become more expensive.

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

The time required to obtain approval by the FDA and comparable foreign regulatory authorities is unpredictable but typically takes many years following the commencement of clinical trials and depends upon numerous factors, including the substantial discretion of the regulatory authorities. In addition, approval policies, laws or regulations, or the type and amount of clinical data necessary to gain approval may change during the course of a product candidate's clinical development and may vary among jurisdictions. We have not obtained regulatory approval for any product candidate and it is possible that none of our existing product candidates or any product candidates we may seek to develop in the future will ever obtain regulatory approval.

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

- the FDA or comparable foreign regulatory authorities may disagree with the design or implementation of our clinical trials;

- we may be unable to demonstrate to the satisfaction of the FDA or comparable foreign regulatory authorities that a product candidate is safe and effective as a treatment for our targeted indications, or, in the case of a product candidate regulated as a biological product, that the product candidate is safe, pure and potent for its proposed indication;
- the population studied may not be sufficiently broad or representative to assure safety or efficacy in the population for which we seek approval;
- the results of clinical trials may not meet the level of statistical significance required by the FDA or comparable foreign regulatory authorities for approval;
- we may be unable to demonstrate that a product candidate's clinical and other benefits outweigh its safety risks;
- the FDA or comparable foreign regulatory authorities may disagree with our interpretation of data from preclinical studies or clinical trials;
- the FDA or comparable foreign regulatory authorities may require additional preclinical studies or clinical trials beyond those that we currently anticipate;
- the data collected from clinical trials of our product candidates may not be sufficient to support the submission of a New Drug Application, or NDA, or a Biologics License Application, or BLA, as applicable, to the FDA or other submission or to obtain regulatory approval in the United States or elsewhere;
- the FDA or comparable foreign regulatory authorities may find deficiencies with or fail to approve the manufacturing processes or facilities of third-party manufacturers with which we contract for clinical and commercial supplies; and
- the approval policies or regulations of the FDA or any comparable foreign regulatory authorities or the laws they enforce may significantly change in a manner rendering our clinical data insufficient for approval.

This lengthy approval process as well as the unpredictability of future clinical trial results may result in our failing to obtain regulatory approval to market any of our product candidates, which would significantly harm our business, financial condition and results of operations. The FDA and comparable foreign regulatory authorities have substantial discretion in the approval process, and determining when or whether regulatory approval will be obtained for any of our product candidates. Even if we believe the data collected from clinical trials of our product candidates are promising, such data may not be sufficient to support approval by the FDA or comparable foreign regulatory authorities. Separately, in response to the COVID-19 pandemic, the FDA had postponed most inspections of foreign and domestic manufacturing facilities and products, and as of July 2021, has restarted inspections on a risk-based basis. Regulatory authorities outside the United States may continue to adopt similar restrictions or other policy measures in response to the COVID-19 pandemic. If global health concerns continue to prevent the FDA or other regulatory authorities from conducting their regular inspections, reviews or other regulatory activities, it could significantly impact the ability of the FDA to timely review and process our regulatory submissions, which could have a material adverse effect on our business.

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

The FDA and any comparable foreign regulatory authorities may not accept data from trials conducted in locations outside of their jurisdiction.

We are presently conducting clinical development solely in Australia and New Zealand and anticipate conducting additional international clinical trials in additional countries in the near future. We have not submitted any IND to the FDA. The acceptance of trial data by the FDA or any comparable foreign regulatory authority from clinical trials conducted outside of their respective jurisdictions may be subject to certain conditions or may not be accepted at all. In cases where data from foreign clinical trials are intended to serve as the basis for marketing approval in the United States, the FDA will generally not approve the application on the basis of foreign data alone unless (i) the data are applicable to the United States population and United States medical practice, (ii) the trials are performed by clinical investigators of recognized competence and pursuant to compliance with current GCP requirements and (iii) the FDA is able to validate the data through an on-site inspection or other appropriate mean. Additionally, the FDA's clinical trial requirements, including the adequacy of the patient population studied and statistical powering, must be met. In addition, such foreign trials are subject to the applicable local laws of the foreign jurisdictions where the trials are conducted. There can be no assurance that the FDA or any applicable foreign regulatory authority will accept data from trials conducted outside of its applicable jurisdiction. If the FDA or any applicable foreign regulatory authority does not accept such data, it would result in the need for additional trials, which would be costly and time-consuming and delay aspects of our business plan, and which may result in our product candidates not receiving approval for commercialization in the applicable jurisdiction.

Even if we receive regulatory approval of a product candidate, we will be subject to ongoing regulatory obligations and continued regulatory review, which may result in significant additional expense and we may be subject to penalties if we fail to comply with regulatory requirements or experience unanticipated problems with such product candidate.

If any of our product candidates are approved, they will be subject to ongoing regulatory requirements for manufacturing, labeling, packaging, storage, advertising, promotion, sampling, record-keeping, conduct of post-marketing studies and

submission of safety, efficacy and other post-market information, including both federal and state requirements in the United States and requirements of comparable foreign regulatory authorities. In addition, we will be subject to continued compliance with current Good Manufacturing Practices, or cGMPs, and GCP requirements for any clinical trials that we conduct post-approval.

Manufacturers and manufacturers' facilities are required to comply with extensive FDA and comparable foreign regulatory authority requirements, including ensuring that quality control and manufacturing procedures conform to cGMP regulations. As such, we and our contract manufacturers will be subject to continual review and inspections to assess compliance with cGMP and adherence to commitments made in any NDA or BLA, other marketing application, and previous responses to inspection observations. Accordingly, we and others with whom we work must continue to expend time, money, and effort in all areas of regulatory compliance, including manufacturing, production and quality control.

Any regulatory approvals that we receive for our product candidates may be subject to limitations on the approved indicated uses for which the product may be marketed or to the conditions of approval, or contain requirements for potentially costly post-marketing testing, including Phase 4 clinical trials and surveillance to monitor the safety and efficacy of the product candidate. The FDA may also require a REMS program as a condition of approval of our product candidates, which could entail requirements for long-term patient follow-up, a medication guide, physician communication plans or additional elements to ensure safe use, such as restricted distribution methods, patient registries and other risk minimization tools. In addition, if the FDA or a comparable foreign regulatory authority approves our product candidates, we will have to comply with requirements including submissions of safety and other post-marketing information and reports and registration.

The FDA may impose consent decrees or withdraw approval if compliance with regulatory requirements and standards is not maintained or if problems occur after the product reaches the market. Later discovery of previously unknown problems with our product candidates, including adverse events of unanticipated severity or frequency, or with our third-party manufacturers or manufacturing processes, or failure to comply with regulatory requirements, may result in revisions to the approved labeling to add new safety information; imposition of post-market studies or clinical trials to assess new safety risks; or imposition of distribution restrictions or other restrictions under a REMS program. Other potential consequences include, among other things:

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

The FDA strictly regulates marketing, labeling, advertising, and promotion of products that are placed on the market. Products may be promoted only for the approved indications and in accordance with the provisions of the approved label. The FDA and other agencies actively enforce the laws and regulations prohibiting the promotion of off-label uses and a company that is found to have improperly promoted off-label uses may be subject to significant liability including, among other things, adverse publicity, warning letters, corrective advertising and potential civil and criminal penalties. Physicians may prescribe, in their independent professional medical judgment, legally available products for uses that are not described in the product's labeling and that differ from those tested by us and approved by the FDA. Physicians may believe that such off-label uses are the best treatment for many patients in varied circumstances. The FDA does not regulate the behavior of physicians in their choice of treatments. The FDA does, however, restrict manufacturer's communications on the subject of off-label use of their products. The federal government has levied large civil and criminal fines against companies for alleged improper promotion of off-label use and has enjoined companies from engaging in off-label promotion. The FDA and other regulatory agencies have also required that companies enter into consent decrees or permanent injunctions under which specified promotional conduct is changed or curtailed. However, companies may share truthful and not misleading information that is otherwise consistent with a product's FDA approved labeling.

The holder of an NDA or BLA must submit new or supplemental applications and obtain approval for certain changes to the approved product, product labeling, or manufacturing process. We could also be asked to conduct post-marketing clinical trials to confirm the safety and efficacy of our products in general or in specific patient subsets. If original marketing approval was obtained via the accelerated approval pathway, we could be required to conduct a successful post-marketing clinical trial to confirm clinical benefit for our products. An unsuccessful post-marketing study or failure to complete such a study could result in the withdrawal of marketing approval.

The policies of the FDA and of comparable foreign regulatory authorities may change and additional government regulations may be enacted that could prevent, limit or delay regulatory approval of our product candidates. We cannot predict the likelihood, nature or extent of government regulation that may arise from future legislation or administrative action, either in the United States or abroad. If we are slow or unable to adapt to changes in existing requirements or the adoption of new requirements or policies, or if we are not able to maintain regulatory compliance, we may lose any marketing approval that we may have obtained and we may not achieve or sustain profitability.

If approved, our investigational products regulated as biologics, including KER-050 and KER-012, may face competition from biosimilars approved through an abbreviated regulatory pathway.

We are developing KER-050 for the treatment of cytopenias, including anemia and thrombocytopenia, in patients with MDS and myelofibrosis and KER-012 for the treatment of pulmonary arterial hypertension, or PAH, and for the treatment of disorders associated with bone loss, such as osteoporosis and osteogenesis imperfecta, both of which we anticipate will be regulated as a biological product. The Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act of 2010, or collectively the ACA, includes a subtitle called the Biologics Price Competition and Innovation Act of 2009, or BPCIA, which created an abbreviated approval pathway for biological products that are biosimilar to or interchangeable with an FDA-licensed reference biological product. Under the BPCIA, an application for a biosimilar product may not be submitted to the FDA until four years following the date that the reference product was first licensed by the FDA. In addition, the approval of a biosimilar product may not be made effective by the FDA until 12 years from the date on which the reference product was first licensed. During this 12-year period of exclusivity, another company may still market a competing version of the reference product if the FDA approves a BLA for the competing product containing the sponsor's own preclinical data and data from adequate and well-controlled clinical trials to demonstrate the safety, purity, and potency of the other company's product. The law is complex and is still being interpreted and implemented by the FDA. As a result, its ultimate impact, implementation, and meaning are subject to uncertainty.

We believe that any of our product candidates approved as a biological product under a BLA should qualify for the 12-year period of exclusivity. However, there is a risk that this exclusivity could be shortened due to congressional action or otherwise, or that the FDA will not consider our investigational medicines to be reference products for competing products, potentially creating the opportunity for generic competition sooner than anticipated. Other aspects of the BPCIA, some of which may impact the BPCIA exclusivity provisions, have also been the subject of litigation. Moreover, the extent to which a biosimilar, once licensed, will be substituted for any one of our reference products in a way that is similar to traditional generic substitution for non-biological products is not yet clear, and will depend on a number of marketplace and regulatory factors that are still developing.

If competitors are able to obtain marketing approval for biosimilars referencing our products, our products may become subject to competition from such biosimilars, with the attendant competitive pressure and consequences.

We may become exposed to costly and damaging liability claims, either when testing our product candidates in the clinic or at the commercial stage, and our product liability insurance may not cover all damages from such claims.

We are exposed to potential product liability and professional indemnity risks that are inherent in the research, development, manufacturing, marketing and use of biopharmaceutical products. Currently, we have no products that have been approved for commercial sale; however, the current and future use of product candidates by us and our collaborators in clinical trials, and the potential sale of any approved products in the future, may expose us to liability claims. These claims might be made by patients who use the product, healthcare providers, pharmaceutical companies, our collaborators or others selling such products. Any claims against us, regardless of their merit, could be difficult and costly to defend and could materially adversely affect the market for our product candidates or any prospects for commercialization of our product candidates. Regardless of the merits or eventual outcome, liability claims may result in:

- decreased demand for our products due to negative public perception;
- injury to our reputation;
- withdrawal of clinical trial participants or difficulties in recruiting new trial participants;
- initiation of investigations by regulators;
- costs to defend or settle the related litigation;
- a diversion of management's time and our resources;
- substantial monetary awards to trial participants or patients;
- product recalls, withdrawals or labeling, marketing or promotional restrictions;
- loss of revenues from product sales; and
- the inability to commercialize any of our product candidates, if approved.

Although we believe we maintain adequate product liability insurance for our product candidates, it is possible that our liabilities could exceed our insurance coverage. We intend to expand our insurance coverage to include the sale of commercial products if we obtain marketing approval for any of our product candidates. However, we may not be able to maintain insurance coverage at a reasonable cost or obtain insurance coverage that will be adequate to satisfy any liability that may arise. If a successful product liability claim or series of claims is brought against us for uninsured liabilities or in excess of insured liabilities, our assets may not be sufficient to cover such claims and our business operations could be impaired. Should any of the events described above occur, this could have a material adverse effect on our business, financial condition and results of operations.

Due to our limited resources and access to capital, we must, and have in the past decided to, prioritize development of certain product candidates over other potential product candidates. These decisions may prove to have been

wrong and may adversely affect our ability to develop our own programs, our attractiveness as a commercial partner and may ultimately have an impact on our commercial success.

Because we have limited resources and access to capital to fund our operations, we must decide which product candidates to pursue and the amount of resources to allocate to each. Our decisions concerning the allocation of research, collaboration, management and financial resources toward particular proprietary molecules in our library, product candidates or therapeutic areas may not lead to the development of viable commercial products and may divert resources away from better opportunities. Similarly, our decisions to delay, terminate or collaborate with third parties in respect of certain product development programs may also prove not to be optimal and could cause us to miss valuable opportunities. If we make incorrect determinations regarding the market potential of our product candidates or misread trends in the biopharmaceutical industry, in particular for our lead product candidates, KER-050, KER-047, as well as for KER-012, our business, financial condition and results of operations could be materially adversely affected.

We may seek orphan drug designation for product candidates we develop, and we may be unsuccessful or may be unable to maintain the benefits associated with orphan drug designation, including the potential for market exclusivity.

As part of our business strategy, we may seek orphan drug designation for any product candidates we develop, and we may be unsuccessful. While we have not made a determination regarding whether we intend to seek orphan drug designation for any of our product candidates at this time, we may do so in the future. Regulatory authorities in some jurisdictions, including the United States, may designate drugs for relatively small patient populations as orphan drugs. Under the Orphan Drug Act in the United States, the FDA may designate a drug as an orphan drug if it is a drug intended to treat a rare disease or condition, which is generally defined as a patient population of fewer than 200,000 individuals annually in the United States, or a patient population greater than 200,000 in the United States where there is no reasonable expectation that the cost of developing the drug will be recovered from sales in the United States. In the United States, orphan drug designation entitles a party to financial incentives such as opportunities for grant funding towards certain clinical trial costs, tax advantages and user-fee waivers.

Generally in the United States, if a drug with an orphan drug designation subsequently receives the first marketing approval for the indication for which it has such designation, the drug is entitled to a period of marketing exclusivity, which precludes the FDA from approving another marketing application for the same drug and indication for seven years, except in limited circumstances.

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

Risks Related to Commercialization of Our Product Candidates

If we are unable to successfully commercialize any product candidate for which we receive regulatory approval, or experience significant delays in doing so, our business will be materially harmed.

If we are successful in obtaining marketing approval from applicable regulatory authorities for KER-050, KER-047, KER-012 or any other product candidate, our ability to generate revenues from any such products will depend on our success in:

- launching commercial sales of such products, whether alone or in collaboration with others;
- receiving approved labels with claims that are necessary or desirable for successful marketing, and that do not contain safety or other limitations that would impede our ability to market such products;
- creating market demand for such products through marketing, sales and promotion activities;
- hiring, training, and deploying a sales force or contracting with third parties to commercialize such products in the United States;
- creating strategic collaborations with, or offering licenses to, third parties to promote and sell such products in foreign markets where we receive marketing approval;
- manufacturing such products in sufficient quantities and at acceptable quality and cost to meet commercial demand at launch and thereafter;
- establishing and maintaining agreements with wholesalers, distributors, and group purchasing organizations on commercially reasonable terms;

- maintaining patent and trade secret protection and regulatory exclusivity for such products;
- achieving market acceptance of such products by patients, the medical community, and third-party payors;
- achieving coverage and adequate reimbursement from third-party payors for such products;
- patients' willingness to pay out-of-pocket in the absence of such coverage and adequate reimbursement from third-party payors;
- effectively competing with other therapies; and
- maintaining a continued acceptable safety profile of such products following launch.

To the extent we are not able to do any of the foregoing, our business, financial condition, results of operations, stock price and prospects will be materially harmed.

We face significant competition from other biotechnology and pharmaceutical companies, and our operating results will suffer if we fail to compete effectively.

The biopharmaceutical industry is characterized by intense competition and rapid innovation. Our competitors may be able to develop other compounds or drugs that are able to achieve similar or better results. Our potential competitors include major multinational pharmaceutical companies, established biotechnology companies, specialty pharmaceutical companies and universities and other research institutions. Many of our competitors have substantially greater financial, technical and other resources, such as larger research and development staff and experienced marketing and manufacturing organizations and well-established sales forces. Smaller or early-stage companies may also prove to be significant competitors, particularly as they develop novel approaches to treating disease indications that our product candidates are also focused on treating. Established pharmaceutical companies may also invest heavily to accelerate discovery and development of novel therapeutics or to in-license novel therapeutics that could make the product candidates that we develop obsolete. Mergers and acquisitions in the biotechnology and pharmaceutical industries may result in even more resources being concentrated in our competitors. Competition may increase further as a result of advances in the commercial applicability of technologies and greater availability of capital for investment in these industries. Our competitors, either alone or with collaborative partners, may succeed in developing, acquiring or licensing on an exclusive basis drug or biologic products that are more effective, safer, more easily commercialized or less costly than our product candidates or may develop proprietary technologies or secure patent protection that we may need for the development of our technologies and products. We believe the key competitive factors that will affect the development and commercial success of our product candidates are efficacy, safety, tolerability, reliability, convenience of use, price and reimbursement.

We compete in the segments of the biotechnology, pharmaceutical and other related industries that develop and market therapies for the treatment of hematological and musculoskeletal disorders. There are many other companies, including large biotechnology and pharmaceutical companies, that have commercialized and/or are developing therapies for the same therapeutic areas that our product candidates target. For example, FibroGen Inc. and Astellas Pharma Inc. are developing product candidates for the treatment of anemia, and Acceleron Pharma Inc. (which was acquired by Merck & Co. Inc. in November 2021), or Acceleron, Bristol-Myers Squibb Company and Disc Medicine are developing product candidates targeting diseases associated with MDS and myelofibrosis, including chronic anemia. Additionally, in April 2020, Acceleron received FDA approval of its product, Reblozyl, for the treatment of anemia failing an erythropoiesis stimulating agent and requiring two or more red blood cell units over eight weeks in adult patients with very low- to intermediate-risk MDS with ring sideroblasts or with myelodysplastic/myeloproliferative neoplasm with ring sideroblasts and thrombocytosis. In June 2020, Acceleron further announced that the European Commission approved Reblozyl for the treatment of transfusion-dependent anemia in adult patients with MDS or beta thalassemia and in September 2020, Acceleron announced that Health Canada approved Reblozyl for the treatment of adult patients with red blood cell transfusion-dependent anemia associated with beta thalassemia. Geron Corporation is developing imetelstat as a treatment for MDS and for myelofibrosis. Sierra Oncology, Inc. is developing momelotinib as a treatment for myelofibrosis. Additionally, Constellation Pharmaceuticals, Inc. (which was acquired by MorphoSys AG in July 2021) is also developing a product candidate as a treatment for myelofibrosis and Incyte Corporation is developing an ALK2 inhibitor product candidate for the treatment of myelofibrosis. In March 2022, CTI BioPharma Corp. received FDA accelerated approval of its product, pacritinib (Vonjo), for the treatment of adults with intermediate or high-risk primary or secondary (post-polycythemia vera or post-essential thrombocythemia) myelofibrosis with a platelet count below $50 \times 10^9/L$.

Other companies that are developing product candidates that are designed to target the TGF- β signaling pathways include Scholar Rock Holding Corporation, Biogen Inc. and Regeneron Pharmaceuticals, Inc.

There are currently no approved drugs for the treatment of osteogenesis imperfecta. However, Mereo BioPharma Group plc, in collaboration with Ultragenyx Pharmaceutical Inc., is developing an anti-sclerostin product candidate for the treatment of osteogenesis imperfecta.

All of the currently-approved therapies for PAH are vasodilators, which are medications that dilate blood vessels. However, Acceleron is developing sotatercept, an activin receptor ligand trap, for the treatment of PAH.

We anticipate that we will continue to face intense and increasing competition as new treatments enter the market and advanced technologies become available. There can be no assurance that our competitors are not currently developing, or will not in the future develop, products that are equally or more effective or are more economically attractive than any of our

current or future product candidates. Competing products may gain faster or greater market acceptance than our products, if any, and medical advances or rapid technological development by competitors may result in our product candidates becoming non-competitive or obsolete before we are able to recover our research and development and commercialization expenses. If we or our product candidates do not compete effectively, it may have a material adverse effect on our business, financial condition and results of operations.

We do not have a sales or marketing infrastructure and have no experience in the sale or marketing of biopharmaceutical products. To achieve commercial success for any approved product, we must develop or acquire a sales and marketing organization, outsource these functions to third parties or enter into strategic collaborations.

We may decide to establish our own sales and marketing capabilities and promote our product candidates if and when regulatory approval has been obtained in the United States or in other jurisdictions. There are risks involved if we decide to establish our own sales and marketing capabilities or enter into arrangements with third parties to perform these services. Even if we establish sales and marketing capabilities, we may fail to launch our products effectively or to market our products effectively since we have no experience in the sales and marketing of biopharmaceutical products. In addition, recruiting and training a sales force is expensive and time consuming and could delay any product launch. In the event that any such launch is delayed or does not occur for any reason, we would have prematurely or unnecessarily incurred these commercialization expenses, and our investment would be lost if we cannot retain or reposition our sales and marketing personnel. Factors that may inhibit our efforts to commercialize our products on our own include:

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

If we enter into arrangements with third parties to perform sales and marketing services, our product revenues or the profitability of these product revenues to us could be lower than if we were to market and sell any products that we develop ourselves. Such collaborative arrangements with partners may place the commercialization of our products outside of our control and would make us subject to a number of risks including that we may not be able to control the amount or timing of resources that our collaborative partner devotes to our products or that our collaborator's willingness or ability to complete its obligations, and our obligations under our arrangements may be adversely affected by business combinations or significant changes in our collaborator's business strategy. In addition, we may not be successful in entering into arrangements with third parties to sell and market our products or may be unable to do so on terms that are favorable to us. Acceptable third parties may fail to devote the necessary resources and attention to sell and market our products effectively.

If we do not establish sales and marketing capabilities successfully, either on our own or in collaboration with third parties, we may not be successful in commercializing our products, if any, which in turn would have a material adverse effect on our business, financial condition and results of operations.

Even if a product candidate we develop 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. The revenues that we generate from their sales may be limited, and we may never become profitable.

We have never commercialized a product candidate for any indication. Even if our product candidates are approved by the appropriate regulatory authorities for marketing and sale, they may not gain acceptance among physicians, patients, third-party payors and others in the medical community. If any product candidates for which we obtain regulatory approval does not gain an adequate level of market acceptance, we could be prevented from or significantly delayed in achieving profitability. Market acceptance of our product candidates by the medical community, patients and third-party payors will depend on a number of factors, some of which are beyond our control. For example, physicians are often reluctant to switch their patients and patients may be reluctant to switch from existing therapies even when new and potentially more effective or safer treatments enter the market.

Efforts to educate the medical community and third-party payors on the benefits of our product candidates may require significant resources and may not be successful. If any of our product candidates are approved but do not achieve an adequate level of market acceptance, we could be prevented from or significantly delayed in achieving profitability. The degree of market acceptance of any product for which we receive marketing approval will depend on a number of factors, including:

- the clinical indications for which our product candidates are approved;
- physicians, hospitals and patients considering our product candidates as a safe and effective treatment;
- the potential and perceived advantages of our product candidates over alternative treatments;
- the prevalence and severity of any side effects;

- product labeling or product insert requirements of the FDA or comparable foreign regulatory authorities;
- limitations or warnings contained in the labeling approved by the FDA or comparable foreign regulatory authorities;
- the timing of market introduction of our product candidates in relation to other potentially competitive products;
- the cost of our product candidates in relation to alternative treatments;
- the amount of upfront costs or training required for physicians to administer our product candidates;
- the availability of coverage and adequate reimbursement from third-party payors and government authorities;
- the willingness of patients to pay out-of-pocket in the absence of comprehensive coverage and reimbursement by third-party payors and government authorities;
- the relative convenience and ease of administration, including as compared to alternative treatments and competitive therapies;
- the effectiveness of our sales and marketing efforts and distribution support; and
- the presence or perceived risk of potential product liability claims.

Enacted and future healthcare legislation may increase the difficulty and cost for us to progress our clinical programs and obtain marketing approval of and commercialize our product candidates and may affect the prices we may set.

In the United States and other jurisdictions, there have been, and we expect there will continue to be, a number of legislative and regulatory changes and proposed changes to the healthcare system that could affect our future results of operations. In particular, there have been and continue to be a number of initiatives at the U.S. federal and state levels that seek to reduce healthcare costs and improve the quality of healthcare. For example, in March 2010, the ACA was enacted, which substantially changed the way healthcare is financed by both governmental and private insurers. Among the provisions of the ACA, those of greatest importance to the pharmaceutical and biotechnology industries include the following:

- an annual, non-deductible fee payable by any entity that manufactures or imports certain branded prescription drugs and biologic agents (other than those designated as orphan drugs), which is apportioned among these entities according to their market share in certain government healthcare programs;
- a new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for drugs that are inhaled, infused, instilled, implanted or injected;
- expansion of eligibility criteria for Medicaid programs by, among other things, allowing states to offer Medicaid coverage to certain individuals with income at or below 133% of the federal poverty level, thereby potentially increasing a manufacturer's Medicaid rebate liability;
- a licensure framework for follow on biologic products;
- a Patient-Centered Outcomes Research Institute to oversee, identify priorities in and conduct comparative clinical effectiveness research, along with funding for such research; and
- establishment of a Center for Medicare & Medicaid Innovation at the Centers for Medicare & Medicaid Services, or CMS, to test innovative payment and service delivery models to lower Medicare and Medicaid spending, potentially including prescription drug spending.

Since its enactment, there have been judicial, Congressional and executive branch challenges to certain aspects of the ACA. For example, on June 17, 2021, the U.S. Supreme Court dismissed a challenge on procedural grounds that argued the ACA is unconstitutional in its entirety because the "individual mandate" was repealed by Congress. Thus, the ACA will remain in effect in its current form. Further, prior to the U.S. Supreme Court ruling, on January 28, 2021, President Biden issued an executive order that initiated a special enrollment period for purposes of obtaining health insurance coverage through the ACA marketplace, which began on February 15, 2021 and remained open through August 15, 2021. The executive order also instructed certain governmental agencies to review and reconsider their existing policies and rules that limit access to healthcare, including among others, reexamining Medicaid demonstration projects and waiver programs that include work requirements, and policies that create unnecessary barriers to obtaining access to health insurance coverage through Medicaid or the ACA. It is possible that the ACA will be subject to additional challenges in the future. It is unclear how any such challenges and the healthcare reform measures of the Biden administration will impact the ACA and our business. In addition, other legislative changes have been proposed and adopted in the United States since the ACA was enacted. In August 2011, the Budget Control Act of 2011, among other things, led to aggregate reductions of Medicare payments to providers of 2% per fiscal year. These reductions went into effect in April 2013 and, due to subsequent legislative amendments to the statute, including the Infrastructure Investment and Jobs Act, will remain in effect through 2031, with the exception of a temporary suspension from May 1, 2020 through March 31, 2022, unless additional action is taken by Congress. Under current legislation the actual reduction in Medicare payments will vary from 1% in 2022 to up to 3% in the final fiscal year of this sequester. Additionally, on March 11, 2021, President Biden signed the American Rescue Plan Act of 2021 into law, which eliminates the statutory Medicaid drug rebate cap, currently set at 100% of a drug's average manufacturer price, for single source and innovator multiple source drugs, beginning January 1, 2024. Congress is also considering additional health reform measures as part of the other reform measures. In January 2013, the American Taxpayer Relief Act of 2012 was signed into law, which, among other things, further reduced Medicare payments to several types of providers, including hospitals, imaging centers and cancer treatment centers, and increased the statute of limitations period for the government to recover overpayments to providers from three to five years. These new laws or any other similar laws introduced in the future may result in additional reductions in Medicare and other health care funding, which could negatively affect our customers and accordingly, our financial operations.

Moreover, payment methodologies may be subject to changes in healthcare legislation and regulatory initiatives. For example, CMS may develop new payment and delivery models, such as bundled payment models. In addition, recently there has been heightened governmental scrutiny over the manner in which manufacturers set prices for their marketed products, which has resulted in several U.S. Congressional inquiries and proposed and enacted federal legislation designed to, among other things, bring more transparency to drug pricing, reduce the cost of prescription drugs under Medicare and review the relationship between pricing and manufacturer patient programs. At the federal level, the Trump administration used several means to propose or implement drug pricing reform, including through federal budget proposals, executive orders and policy initiatives. For example, on July 24, 2020 and September 13, 2020, the Trump administration announced several executive orders related to prescription drug pricing that seek to implement several of the administration's proposals. As a result, the FDA concurrently released a final rule and guidance in 2020 providing pathways for states to build and submit importation plans for drugs from Canada. Further, on November 20, 2020, the U.S. Department of Health and Human Services, or HHS, finalized a regulation removing safe harbor protection for price reductions from pharmaceutical manufacturers to plan sponsors under Medicare Part D, either directly or through pharmacy benefit managers, unless the price reduction is required by law. The implementation of the rule has been delayed by the Biden administration from January 1, 2022 to January 1, 2023 in response to ongoing litigation. The rule also creates a new safe harbor for price reductions reflected at the point-of-sale, as well as a new safe harbor for certain fixed fee arrangements between pharmacy benefit managers and manufacturers, the implementation of which have also been delayed until January 1, 2023. On November 20, 2020, CMS issued an interim final rule implementing the Trump administration's Most Favored Nation executive order, which would tie Medicare Part B payments for certain physician-administered drugs to the lowest price paid in other economically advanced countries, effective January 1, 2021. As a result of litigation challenging the Most Favored Nation model, on December 27, 2021, CMS published a final rule that rescinded the Most Favored Nation Model interim final rule. Additionally, on March 11, 2021, President Biden signed the American Rescue Plan Act of 2021 into law, which eliminates the statutory Medicaid drug rebate cap, currently set at 100% of a drug's average manufacturer price, for single source and innovator multiple source drugs, beginning January 1, 2024. Further, in July 2021, the Biden administration released an executive order that included multiple provisions aimed at prescription drugs. In response to Biden's executive order, on September 9, 2021, HHS released a Comprehensive Plan for Addressing High Drug Prices that outlines principles for drug pricing reform. The plan sets out a variety of potential legislative policies that Congress could pursue as well as potential administrative actions HHS can take to advance these principles. No legislation or administrative actions have been finalized to implement these principles. In addition, Congress is considering drug pricing as part of the budget reconciliation process. We expect that additional U.S. federal healthcare reform measures will be adopted in the future, any of which could limit the amounts that the U.S. federal government will pay for healthcare products and services, which could result in reduced demand for our product candidates or additional pricing pressures.

Individual states in the United States have also 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. Legally mandated price controls on payment amounts by third-party payors or other restrictions could harm our business, results of operations, financial condition and prospects. In addition, regional healthcare authorities and individual hospitals are increasingly using bidding procedures to determine what pharmaceutical products and which suppliers will be included in their prescription drug and other healthcare programs. This could reduce the ultimate demand for our product candidates or put pressure on our product pricing.

In markets outside of the United States, reimbursement and healthcare payment systems vary significantly by country, and many countries have instituted price ceilings on specific products and therapies.

We cannot predict the likelihood, nature or extent of government regulation that may arise from future legislation or administrative action in the United States or any other jurisdiction. Further, it is possible that additional governmental action is taken in response to the COVID-19 pandemic. If we or any third parties we may engage are slow or unable to adapt to changes in existing requirements or the adoption of new requirements or policies, or if we or such third parties are not able to maintain regulatory compliance, our product candidates may lose any regulatory approval that may have been obtained and we may not achieve or sustain profitability.

Disruptions at the FDA, the SEC and other government agencies caused by funding shortages or global health concerns could hinder their ability to hire and retain key leadership and other personnel, otherwise prevent new products and services from being developed, approved or commercialized in a timely manner or at all, or otherwise prevent those agencies from performing normal business functions on which the operation of our business may rely, which could negatively impact our business.

The ability of the FDA to review and approve new products can be affected by a variety of factors, including government budget and funding levels, ability to hire and retain key personnel and accept the payment of user fees, statutory, regulatory and policy changes, and other events that may otherwise affect the FDA's ability to perform routine functions. Average review times at the agency have fluctuated in recent years as a result. In addition, government funding of the Securities and Exchange Commission, or the SEC, and other government agencies on which our operations may rely, including those that fund research and development activities is subject to the political process, which is inherently fluid and unpredictable.

Disruptions at the FDA and other agencies may also slow the time necessary for new drugs to be reviewed and/or approved by necessary government agencies, which would adversely affect our business. For example, in recent years, including in 2018 and 2019, the U.S. government shut down several times and certain regulatory agencies, such as the FDA and the SEC, had to furlough critical employees and stop critical activities. Regulatory authorities outside the United States may continue to adopt similar restrictions or other policy measures in response to the COVID-19 pandemic. If a prolonged government shutdown occurs, or if global health concerns continue to prevent the FDA or other regulatory authorities from conducting their regular inspections, reviews, or other regulatory activities, it could significantly impact the ability of the FDA to timely review and process our regulatory submissions, which could have a material adverse effect on our business. Further, future government shutdowns or delays could impact our ability to access the public markets and obtain necessary capital in order to properly capitalize and continue our operations.

Our business operations and current and future relationships with investigators, healthcare professionals, consultants, third-party payors, patient organizations and customers may be subject to applicable healthcare regulatory laws, which could expose us to penalties.

Our business operations and current and future arrangements with investigators, healthcare professionals, consultants, third-party payors, patient organizations and customers, may expose us to broadly applicable fraud and abuse and other healthcare laws and regulations. These laws may constrain the business or financial arrangements and relationships through which we conduct our operations, including how we research, market, sell and distribute our product candidates, if approved. Such laws include:

- the U.S. federal Anti-Kickback Statute, which prohibits, among other things, persons or entities from knowingly and willfully soliciting, offering, receiving or providing any remuneration (including any kickback, bribe, or certain rebate), directly or indirectly, overtly or covertly, in cash or in kind, to induce or reward, or in return for, either the referral of an individual for, or the purchase, lease, order or recommendation of, any good, facility, item or service, for which payment may be made, in whole or in part, under U.S. federal and state healthcare programs such as Medicare and Medicaid. A person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation;
- the U.S. federal civil and criminal false claims laws, including the civil False Claims Act, which can be enforced by private individuals on behalf of the government through civil whistleblower or qui tam actions, and civil monetary penalties laws prohibit, among other things, individuals or entities from knowingly presenting, or causing to be presented, to the U.S. federal government, claims for payment or approval that are false or fraudulent, knowingly making, using or causing to be made or used, a false record or statement material to a false or fraudulent claim, or from knowingly making a false statement to avoid, decrease or conceal an obligation to pay money to the U.S. federal government. In addition, the government may assert that a claim including items and services resulting from a violation of the U.S. federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the civil False Claims Act;
- the U.S. federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, which created additional federal civil and criminal liability for, among other things, knowingly and willfully executing, or attempting to execute, a scheme to defraud any healthcare benefit program, or knowingly and willfully falsifying, concealing or covering up a material fact or making any materially false statement, in connection with the delivery of, or payment for, healthcare benefits, items or services. Similar to the U.S. federal Anti-Kickback Statute, a person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation;
- HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act of 2009, or HITECH, and their implementing regulations, which impose certain obligations, including mandatory contractual terms, with respect to safeguarding the privacy, security and transmission of individually identifiable health information without appropriate authorization by covered entities subject to the rule, such as health plans, healthcare clearinghouses and certain healthcare providers and their business associates, independent contractors of a covered entity that perform certain services involving the use or disclosure of individually identifiable health information, as well as their covered subcontractors;
- the Federal Food, Drug, and Cosmetic Act, which prohibits, among other things, the adulteration or misbranding of drugs, biologics and medical devices;
- the U.S. Public Health Service Act, which prohibits, among other things, the introduction into interstate commerce of a biological product unless a biologics license is in effect for that product;
- the U.S. Physician Payments Sunshine Act and its implementing regulations, which require certain manufacturers of drugs, devices, biologics and medical supplies that are reimbursable under Medicare, Medicaid, or the Children's Health Insurance Program, with specific exceptions, to report annually to CMS information related to certain payments and other transfers of value made in the prior year to physicians (defined to include doctors, dentists, optometrists, podiatrists, and chiropractors), other healthcare professionals (such as physician assistants and nurse practitioners), and teaching hospitals, as well as ownership and investment interests held by such physicians and their immediate family members; and
- analogous U.S. state laws and regulations, including: state anti-kickback and false claims laws, which may apply to our business practices, including but not limited to, research, distribution, sales and marketing arrangements and claims involving healthcare items or services reimbursed by any third-party payor, including private insurers; state laws that require pharmaceutical companies to comply with the pharmaceutical industry's voluntary compliance

guidelines and the relevant compliance guidance promulgated by the U.S. federal government, or otherwise restrict payments that may be made to healthcare providers and other potential referral sources; state and local laws and regulations that require drug manufacturers to file reports relating to drug pricing and marketing information, which requires tracking gifts and other remuneration and items of value provided to healthcare professionals and entities; state and local laws that require the registration of pharmaceutical sales representatives; and state laws governing the privacy and security of health information in certain circumstances, many of which differ from each other in significant ways and often are not preempted by HIPAA, thus complicating compliance efforts.

In addition, our activities are also subject to certain federal and state consumer protection and unfair competition laws, which broadly regulate marketplace activities and activities that potentially harm consumers.

Ensuring that our internal operations and future business arrangements with third parties comply with applicable healthcare laws and regulations will involve substantial costs. It is possible that governmental authorities will conclude that our business practices do not comply with current or future statutes, regulations, agency guidance 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 the laws described above or any other governmental laws and regulations that may apply to us, we may be subject to significant penalties, including civil, criminal and administrative penalties, damages, fines, exclusion from government-funded healthcare programs, such as Medicare and Medicaid or similar programs in other countries or jurisdictions, integrity oversight and reporting obligations to resolve allegations of non-compliance, disgorgement, imprisonment, contractual damages, reputational harm, diminished profits and the curtailment or restructuring of our operations. If any of the physicians or other providers or entities with whom we expect to do business are found to not be in compliance with applicable laws, they may be subject to significant criminal, civil or administrative sanctions, including exclusions from government funded healthcare programs and imprisonment, which could affect our ability to operate our business. Further, defending against any such actions can be costly, time-consuming and may require significant personnel resources. Therefore, even if we are successful in defending against any such actions that may be brought against us, our business may be impaired.

If the market opportunities for our product candidates are smaller than we believe they are, even assuming approval of a product candidate, our business may suffer.

Our projections of both the number of people who are affected by disease within our potential target indications, as well as the subset of these people who have the potential to benefit from treatment with our product candidates, are based on our beliefs and estimates. These estimates have been derived from a variety of sources, including the scientific literature, healthcare utilization databases and market research, and may prove to be incorrect. Further, new studies may change the estimated incidence or prevalence of these diseases. The number of patients may turn out to be lower than expected. Likewise, the potentially addressable patient population for each of our product candidates may be limited or may not be amenable to treatment with our product candidates, and new patients may become increasingly difficult to identify or gain access to, which would adversely affect our business, financial condition and results of operations.

Any product candidates we develop may become subject to unfavorable third-party coverage and reimbursement practices, as well as pricing regulations.

The availability and extent of coverage and adequate reimbursement by third-party payors, including government health administration authorities, private health coverage insurers, managed care organizations and other third-party payors is essential for most patients to be able to afford expensive treatments. Sales of any of our product candidates that receive marketing approval will depend substantially, both in the United States and internationally, on the extent to which the costs of our product candidates will be covered and reimbursed by 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 an adequate return on our investment. Coverage and reimbursement may impact the demand for, or the price of, any product candidate for which we obtain marketing approval. If coverage and reimbursement are not available or reimbursement is available only to limited levels, we may not successfully commercialize any product candidate for which we obtain marketing approval.

There is significant uncertainty related to third-party payor coverage and reimbursement of newly approved products. In the United States, for example, principal decisions about reimbursement for new products are typically made by the CMS. CMS decides whether and to what extent a new product will be covered and reimbursed under Medicare, and private third-party payors often follow CMS's decisions regarding coverage and reimbursement to a substantial degree. However, one third-party payor's determination to provide coverage for a product candidate does not assure that other payors will also provide coverage for the product candidate. As a result, the coverage determination process is often time-consuming and costly. This process will require us to provide scientific and clinical support for the use of our products to each third-party payor separately, with no assurance that coverage and adequate reimbursement will be applied consistently or obtained in the first instance.

Increasingly, third-party payors are requiring that drug companies provide them with predetermined discounts from list prices and are challenging the prices charged for medical products. Further, such payors are increasingly challenging the price, examining the medical necessity and reviewing the cost effectiveness of medical product candidates. There may be

especially significant delays in obtaining coverage and reimbursement for newly approved drugs. Third-party payors may limit coverage to specific product candidates on an approved list, known as a formulary, which might not include all FDA-approved drugs for a particular indication. We may need to conduct expensive pharmaco-economic studies to demonstrate the medical necessity and cost effectiveness of our products. Nonetheless, our product candidates may not be considered medically necessary or cost effective. We cannot be sure that coverage and reimbursement will be available for any product that we commercialize and, if reimbursement is available, what the level of reimbursement will be.

Furthermore, obtaining coverage and adequate reimbursement for products administered under the supervision of a physician may be particularly difficult because of the higher prices often associated with such drugs. Additionally, separate reimbursement for the product itself or the treatment or procedure in which the product is used may not be available, which may impact physician utilization. In addition, companion diagnostic tests require coverage and reimbursement separate and apart from the coverage and reimbursement for their companion pharmaceutical or biological products. Similar challenges to obtaining coverage and reimbursement, applicable to pharmaceutical or biological products, will apply to companion diagnostics.

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 therapeutics such as our product candidates. In many countries, particularly the countries of the European Union, medical product prices are subject to varying price control mechanisms as part of national health systems. In these countries, pricing negotiations with governmental authorities can take considerable time after a product receives marketing approval. 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. In general, product prices under such systems are substantially lower than in the United States. Other countries allow companies to fix their own prices for products, 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 revenue and profits.

If we are unable to establish or sustain coverage and adequate reimbursement for any future product candidates from third-party payors, the adoption of those products and sales revenue will be adversely affected, which, in turn, could adversely affect the ability to market or sell those product candidates, if approved. Coverage policies and third-party payor reimbursement rates may change at any time. Even if favorable coverage and reimbursement status is attained for one or more products for which we receive regulatory approval, less favorable coverage policies and reimbursement rates may be implemented in the future.

Risks Related to Our Intellectual Property

Our success depends in part on our ability to protect our intellectual property. It is difficult and costly to protect our proprietary rights and technology, and we may not be able to ensure their protection.

Our commercial success will depend in large part on obtaining and maintaining patent, trademark and trade secret protection of our proprietary technologies and our product candidates, their respective components, formulations, combination therapies, methods used to manufacture them and methods of treatment, as well as successfully defending these patents against third-party challenges. Our ability to stop unauthorized third parties from making, using, selling, offering to sell or importing our product candidates is dependent upon the extent to which we have rights under valid and enforceable patents that cover these activities. If we are unable to secure and maintain patent protection for any product or technology we develop, or if the scope of the patent protection secured is not sufficiently broad, our competitors could develop and commercialize products and technology similar or identical to ours, and our ability to commercialize any product candidates we may develop may be adversely affected.

The patenting process is expensive and time-consuming, and we may not be able to file, prosecute and maintain all necessary or desirable patent applications at a reasonable cost or in a timely manner. In addition, we may not pursue, obtain or maintain patent protection in all relevant markets. It is also possible that we will fail to identify patentable aspects of our research and development output before it is too late to obtain patent protection. Moreover, in some circumstances, we may not have the right to control the preparation, filing and prosecution of patent applications, or to maintain the patents, covering technology that we license from or license to third parties and are reliant on our licensors or licensees. Therefore, these patents and applications may not be prosecuted and enforced in a manner consistent with the best interests of our business.

The strength of patents in the biotechnology and pharmaceutical field involves complex legal and scientific questions and can be uncertain. The patent applications that we own or in-license may fail to result in issued patents with claims that cover our product candidates or uses thereof in the United States or in other foreign countries. Even if the patents do successfully issue, third parties may challenge the validity, enforceability or scope thereof, which may result in such patents being narrowed, invalidated or held unenforceable. Furthermore, even if they are unchallenged, our patents and patent applications may not adequately protect our intellectual property or prevent others from designing around our claims. If the breadth or strength of protection provided by the patent applications we hold with respect to our product candidates is threatened, it could dissuade companies from collaborating with us to develop, and threaten our ability to commercialize, our product

candidates. Further, if we encounter delays in our clinical trials, the period of time during which we could market our product candidates under patent protection would be reduced.

Since patent applications in the United States and most other countries are confidential for a period of time after filing, we cannot be certain that we were the first to file any patent application related to our product candidates. Furthermore, for United States applications in which all claims are entitled to a priority date before March 16, 2013, an interference proceeding can be provoked by a third party or instituted by the United States Patent and Trademark Office, or USPTO, to determine who was the first to invent any of the subject matter covered by the patent claims of our applications.

We cannot be certain that we are the first to invent the inventions covered by pending patent applications and, if we are not, we may be subject to priority disputes. We may be required to disclaim part or all of the term of certain patents or all of the term of certain patent applications. There may be prior art of which we are not aware that may affect the validity or enforceability of a patent claim, and we may be subject to a third-party preissuance submission of prior art to the USPTO. There also may be prior art of which we are aware, but which we do not believe affects the validity or enforceability of a claim, which may, nonetheless, ultimately be found to affect the validity or enforceability of a claim. No assurance can be given that if challenged, our patents would be declared by a court to be valid or enforceable or that even if found valid and enforceable, a competitor's technology or product would be found by a court to infringe our patents. We may analyze patents or patent applications of our competitors that we believe are relevant to our activities, and consider that we are free to operate in relation to our product candidates, but our competitors may achieve issued claims, including in patents we consider to be unrelated, which block our efforts or may potentially result in our product candidates or our activities infringing such claims. The possibility exists that others will develop products which have the same effect as our products on an independent basis which do not infringe our patents or other intellectual property rights, or will design around the claims of patents that we have had issued that cover our products.

Recent or future 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. Under the enacted Leahy-Smith America Invents Act, or America Invents Act, enacted in 2013, the United States moved from a "first to invent" to a "first-to-file" system. Under a "first-to-file" system, assuming the other requirements for patentability are met, the first inventor to file a patent application generally will be entitled to a patent on the invention regardless of whether another inventor had made the invention earlier. The America Invents Act includes a number of other significant changes to U.S. patent law, including provisions that affect the way patent applications are prosecuted, redefine prior art and establish a new post-grant review system. The effects of these changes are currently unclear as the USPTO only recently developed new regulations and procedures in connection with the America Invents Act and many of the substantive changes to patent law, including the "first-to-file" provisions, only became effective in March 2013. In addition, the courts have yet to address many of these provisions and the applicability of the act and new regulations on specific patents discussed herein have not been determined and would need to be reviewed. However, the America Invents 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.

The degree of future protection for our proprietary rights is uncertain because legal means afford only limited protection and may not adequately protect our rights or permit us to gain or keep our competitive advantage. For example:

- others may be able to make or use compounds or cells that are similar to the biological compositions of our product candidates but that are not covered by the claims of our patents;
- the active biological ingredients in our current product candidates will eventually become commercially available in biosimilar drug products, and no patent protection may be available with regard to formulation or method of use;
- we or our licensors, as the case may be, may fail to meet our obligations to the U.S. government in regards to any in-licensed patents and patent applications funded by U.S. government grants, leading to the loss of patent rights;
- we or our licensors, as the case may be, might not have been the first to file patent applications for these inventions;
- others may independently develop similar or alternative technologies or duplicate any of our technologies;
- it is possible that our pending patent applications will not result in issued patents;
- it is possible that there are prior public disclosures that could invalidate our or our licensors' patents, as the case may be, or parts of our or their patents;
- it is possible that others may circumvent our owned or in-licensed patents;
- it is possible that there are unpublished applications or patent applications maintained in secrecy that may later issue with claims covering our products or technology similar to ours;
- the laws of foreign countries may not protect our or our licensors', as the case may be, proprietary rights to the same extent as the laws of the United States;
- the claims of our owned or in-licensed issued patents or patent applications, if and when issued, may not cover our product candidates;
- our owned or in-licensed issued patents may not provide us with any competitive advantages, may be narrowed in scope, or be held invalid or unenforceable as a result of legal challenges by third parties;
- the inventors of our owned or in-licensed patents or patent applications may become involved with competitors, develop products or processes which design around our patents, or become hostile to us or the patents or patent applications on which they are named as inventors;

- it is possible that our owned or in-licensed patents or patent applications omit individual(s) that should be listed as inventor(s) or include individual(s) that should not be listed as inventor(s), which may cause these patents or patents issuing from these patent applications to be held invalid or unenforceable;
- we have engaged in scientific collaborations in the past, and will continue to do so in the future. Such collaborators may develop adjacent or competing products to ours that are outside the scope of our patents;
- we may not develop additional proprietary technologies for which we can obtain patent protection;
- it is possible that product candidates or diagnostic tests we develop may be covered by third parties' patents or other exclusive rights; or
- the patents of others may have an adverse effect on our business.

We depend on intellectual property licensed from third parties and termination of any of these licenses could result in the loss of significant rights, which would harm our business.

We are dependent on patents, know-how and proprietary technology, both our own and licensed from others. Any termination of these licenses could result in the loss of significant rights and could harm our ability to commercialize our product candidates. See the section titled "Business—Collaborations and License Agreement" set forth in Part I, Item 1 of this Annual Report on Form 10-K for additional information regarding our license agreements.

Disputes may also arise between us and our licensors regarding intellectual property subject to a license agreement, including:

- the scope of rights granted under the license agreement and other interpretation-related issues; whether and the extent to which our technology and processes infringe on intellectual property of the licensor that is not subject to the licensing agreement;
- our right to sublicense patent and other rights to third parties under collaborative development relationships;
- our diligence obligations with respect to the use of the licensed technology in relation to our development and commercialization of our product candidates, and what activities satisfy those diligence obligations; and
- the inventorship or ownership of inventions and know-how resulting from the joint creation or use of intellectual property by our licensors and us and our partners.

In addition, intellectual property license agreements are complex, and certain provisions in such agreements may be susceptible to multiple interpretations. The resolution of any contract interpretation disagreement that may arise could narrow what we believe to be the scope of our rights to the relevant intellectual property or technology, or increase what we believe to be our financial or other obligations under the relevant agreement, either of which could have a material adverse effect on our business, financial condition, results of operations and prospects. If disputes over intellectual property that we have licensed prevent or impair our ability to maintain our current licensing arrangements on acceptable terms, we may be unable to successfully develop and commercialize the affected product candidates.

We are generally also subject to all of the same risks with respect to protection of intellectual property that we license, as we are for intellectual property that we own, which are described below. If we or our licensors fail to adequately protect this intellectual property, our ability to commercialize products could suffer.

If we fail to comply with our obligations under our patent license with a third party, we could lose license rights that are important to our business.

We are a party to a license agreement pursuant to which we in-license key patent and patent applications for our product candidates. These existing licenses impose various diligence, milestone payment, royalty, insurance and other obligations on us. If we fail to comply with these obligations, our licensor may have the right to terminate the license, in which event we would not be able to develop or market the products covered by such licensed intellectual property. Termination of these agreements or reduction or elimination of our rights under these agreements, or restrictions on our ability to freely assign or sublicense our rights under such agreements when it is in the interest of our business to do so, may impede, delay or prohibit the further development or commercialization of one or more product candidates that rely on such agreements.

We may have limited control over the maintenance and prosecution of these in-licensed patents and patent applications, activities or any other intellectual property that may be related to our in-licensed intellectual property. For example, we cannot be certain that such activities by our licensor have been or will be conducted in compliance with applicable laws and regulations or will result in valid and enforceable patents and other intellectual property rights.

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

In addition to patent protection, we rely heavily upon know-how and to some extent trade secret protection, as well as non-disclosure agreements and invention assignment agreements with our employees, consultants and third-parties, to protect our confidential and proprietary information, especially where we do not believe patent protection is appropriate or obtainable. In addition to contractual measures, we try to protect the confidential nature of our proprietary information using physical and technological security measures. Such measures may not, for example, in the case of misappropriation of a trade secret by an employee or third party with authorized access, provide adequate protection for our proprietary information. Our security

measures may not prevent an employee or consultant from misappropriating our trade secrets and providing them to a competitor, and recourse we take against such misconduct may not provide an adequate remedy to protect our interests fully. Enforcing a claim that a party illegally disclosed or misappropriated a trade secret can be difficult, expensive, and time-consuming, and the outcome is unpredictable. In addition, trade secrets may be independently developed by others in a manner that could prevent legal recourse by us. If any of our confidential or proprietary information, such as our trade secrets, were to be disclosed or misappropriated, or if any such information was independently developed by a competitor, our competitive position could be harmed.

In addition, courts outside the United States are sometimes less willing to protect trade secrets. If we choose to go to court to stop a third party from using any of our trade secrets, we may incur substantial costs. These lawsuits may consume our time and other resources even if we are successful. Although we take steps to protect our proprietary information and trade secrets, including through contractual means with our employees and consultants, third parties may independently develop substantially equivalent proprietary information and techniques or otherwise gain access to our trade secrets or disclose our technology.

Thus, we may not be able to meaningfully protect our trade secrets. It is our policy to require our employees, consultants, outside scientific collaborators, sponsored researchers and other advisors to execute confidentiality agreements upon the commencement of employment or consulting relationships with us. These agreements provide that all confidential information concerning our business or financial affairs developed or made known to the individual or entity during the course of the party's relationship with us is to be kept confidential and not disclosed to third parties except in specific circumstances. In the case of employees, the agreements provide that all inventions conceived by the individual, and which are related to our current or planned business or research and development or made during normal working hours, on our premises or using our equipment or proprietary information, are our exclusive property. In addition, we take other appropriate precautions, such as physical and technological security measures, to guard against misappropriation of our proprietary technology by third parties. We have also adopted policies and conduct training that provides guidance on our expectations, and our advice for best practices, in protecting our trade secrets.

Third-party claims of intellectual property infringement may prevent or delay our product discovery and development efforts.

Our commercial success depends in part on our ability to develop, manufacture, market and sell our product candidates and use our proprietary technologies without infringing the proprietary rights of third parties. There is a substantial amount of litigation involving patents and other intellectual property rights in the biotechnology and pharmaceutical industries, as well as administrative proceedings for challenging patents, including interference, derivation, inter partes review, post grant review, and reexamination proceedings before the USPTO or oppositions and other comparable proceedings in foreign jurisdictions. We may be exposed to, or threatened with, future litigation by third parties having patent or other intellectual property rights alleging that our product candidates and/or proprietary technologies infringe their intellectual property rights. Numerous U.S. and foreign issued patents and pending patent applications, which are owned by third parties, exist in the fields in which we are developing our product candidates. There may be third-party patents or patent applications with claims to materials, formulations, methods of manufacture or methods for treatment related to our product candidates and programs. As the biotechnology and pharmaceutical industries expand and more patents are issued, the risk increases that our product candidates may give rise to claims of infringement of the patent rights of others. Moreover, it is not always clear to industry participants, including us, which patents cover various types of drugs, products or their methods of use or manufacture. Thus, because of the large number of patents issued and patent applications filed in our fields, there may be a risk that third parties may allege they have patent rights encompassing our product candidates, technologies or methods.

If a third-party claims that we infringe its intellectual property rights, we may face a number of issues, including, but not limited to:

- infringement and other intellectual property claims which, regardless of merit, may be expensive and time-consuming to litigate and may divert our management's attention from our core business;
- substantial damages for infringement, which we may have to pay if a court decides that the product candidate or technology at issue infringes on or violates the third party's rights, and, if the court finds that the infringement was willful, we could be ordered to pay treble damages and the patent owner's attorneys' fees;
- a court prohibiting us from developing, manufacturing, marketing or selling our product candidates, or from using our proprietary technologies, unless the third party licenses its product rights to us, which it is not required to do;
- if a license is available from a third party, we may have to pay substantial royalties, upfront fees and other amounts, and/or grant cross-licenses to intellectual property rights for our products; and
- redesigning our product candidates or processes so they do not infringe, which may not be possible or may require substantial monetary expenditures and time.

Some of our competitors may be able to sustain the costs of complex patent litigation more effectively than we can because they have substantially greater resources. In addition, any uncertainties resulting from the initiation and continuation of any litigation could have a material adverse effect on our ability to raise the funds necessary to continue our operations or could otherwise have a material adverse effect on our business, results of operations, financial condition and prospects.

Third parties may assert that we are employing their proprietary technology without authorization. Generally, conducting clinical trials and other development activities in the United States is protected under the Safe Harbor exemption as set forth in 35 U.S.C. § 271. If and when KER-050, KER-047, KER-012 or another one of our product candidates is approved by the FDA, that certain third party may then seek to enforce its patent by filing a patent infringement lawsuit against us. While we do not believe that any claims of such patent that could otherwise materially adversely affect commercialization of our product candidates, if approved, are valid and enforceable, we may be incorrect in this belief, or we may not be able to prove it in a litigation. In this regard, patents issued in the United States by law enjoy a presumption of validity that can be rebutted only with evidence that is "clear and convincing," a heightened standard of proof. There may be third-party patents of which we are currently unaware with claims to materials, formulations, methods of manufacture or methods for treatment related to the use or manufacture of our product candidates. Because patent applications can take many years to issue, there may be currently pending patent applications which may later result in issued patents that our product candidates may infringe. In addition, third parties may obtain patents in the future and claim that use of our technologies infringes upon these patents. If any third-party patents were held by a court of competent jurisdiction to cover the manufacturing process of our product candidates, constructs or molecules used in or formed during the manufacturing process, or any final product itself, the holders of any such patents may be able to block our ability to commercialize the product candidate unless we obtained a license under the applicable patents, or until such patents expire or they are finally determined to be held invalid or unenforceable. Similarly, if any third-party patent were held by a court of competent jurisdiction to cover aspects of our formulations, processes for manufacture or methods of use, the holders of any such patent may be able to block our ability to develop and commercialize the product candidate unless we obtained a license or until such patent expires or is finally determined to be held invalid or unenforceable. In either case, such a license may not be available on commercially reasonable terms or at all. If we are unable to obtain a necessary license to a third-party patent on commercially reasonable terms, or at all, our ability to commercialize our product candidates may be impaired or delayed, which could in turn significantly harm our business. Even if we obtain a license, it may be non-exclusive, thereby giving our competitors access to the same technologies licensed to us. 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.

Parties making claims against us may seek and obtain injunctive or other equitable relief, which could effectively block our ability to further develop and commercialize our product candidates. Defense of these claims, regardless of their merit, would involve substantial litigation expense and would be a substantial diversion of employee resources from our business. In the event of a successful claim of infringement against us, we may have to pay substantial damages, including treble damages and attorneys' fees for willful infringement, obtain one or more licenses from third parties, pay royalties or redesign our infringing products, which may be impossible or require substantial time and monetary expenditure. We cannot predict whether any such license would be available at all or whether it would be available on commercially reasonable terms. Even if such a license is available, it may be non-exclusive, which could result in our competitors gaining access to the same intellectual property. Furthermore, even in the absence of litigation, we may need to obtain licenses from third parties to advance our research or allow commercialization of our product candidates. We may fail to obtain any of these licenses at a reasonable cost or on reasonable terms, if at all. In that event, we would be unable to further develop and commercialize our product candidates, which could harm our business significantly.

Lastly, we may need to indemnify our customers and distributors against claims relating to the infringement of intellectual property rights of third parties related to our product candidates, including KER-050, KER-047 and KER-012. Third parties may assert infringement claims against our customers or distributors. These claims may require us to initiate or defend protracted and costly litigation on behalf of our customers or distributors, regardless of the merits of these claims. If any of these claims succeed, we may be forced to pay damages on behalf of our customers, suppliers or distributors, or may be required to obtain licenses for the product candidates or services they use. If we cannot obtain all necessary licenses on commercially reasonable terms, our customers may be forced to stop using our products or services.

Third parties may assert that our employees or consultants have wrongfully used or disclosed confidential information or misappropriated trade secrets.

As is common in the biotechnology and pharmaceutical industries, we employ individuals who were previously employed at universities or other biopharmaceutical or pharmaceutical companies, including our competitors or potential competitors. Although no claims against us are currently pending, and although we try to ensure that our employees and consultants do not use the proprietary information or know-how of others in their work for us, we may be subject to claims that we or our employees, consultants or independent contractors have inadvertently or otherwise used or disclosed intellectual property, including trade secrets or other proprietary information, of a former employer or other third parties. Litigation may be necessary to defend against these claims. If we fail in defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights or personnel. Even if we are successful in defending against such claims, litigation or other legal proceedings relating to intellectual property claims may cause us to incur significant expenses, and could distract our technical and management personnel from their normal responsibilities. In addition, there could be public announcements of the results of hearings, motions or other interim proceedings or developments, and, if securities analysts or investors perceive these results to be negative, it could have a substantial adverse effect on the price of our common stock. This type of litigation or proceeding could substantially increase our operating losses and reduce our resources available for development activities. We may not have sufficient financial or other resources to adequately conduct such

litigation or proceedings. Some of our competitors may be able to sustain the costs of such litigation or proceedings more effectively than we can because of their substantially greater financial resources. Uncertainties resulting from the initiation and continuation of patent litigation or other intellectual property related proceedings could adversely affect our ability to compete in the marketplace.

We may not be successful in obtaining or maintaining necessary rights to develop any future product candidates on acceptable terms.

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.

Our product candidates may also require specific formulations to work effectively and efficiently and these rights may be held by others. We may develop products containing our compounds and pre-existing pharmaceutical compounds. We may be required by the FDA or comparable foreign regulatory authorities to provide a companion diagnostic test or tests with our product candidates. These diagnostic test or tests may be covered by intellectual property rights held by others. We may be unable to acquire or in-license any compositions, methods of use, processes or other third-party intellectual property rights from third parties that we identify as necessary or important to our business operations. We may fail to obtain any of these licenses at a reasonable cost or on reasonable terms, if at all, which would harm our business. We may need to cease use of the compositions or methods covered by such third-party intellectual property rights, and may need to seek to develop alternative approaches that do not infringe on such intellectual property rights which may entail additional costs and development delays, even if we were able to develop such alternatives, which may not be feasible. Even if we are able to obtain a license, it may be non-exclusive, thereby giving our competitors access to the same technologies licensed to us. In that event, we may be required to expend significant time and resources to develop or license replacement technology.

Additionally, we sometimes collaborate with academic institutions to accelerate our preclinical research or development under written agreements with these institutions. In certain cases, 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 option, we may be unable to negotiate a license within the specified timeframe or under terms that are acceptable to us. If we are unable to do so, the institution may offer the intellectual property rights to others, potentially blocking our ability to pursue our program. If we are unable to successfully obtain rights to required third-party intellectual property or to maintain the existing intellectual property rights we have, we may have to abandon development of such program and our business and financial condition could suffer.

The licensing and acquisition of third-party intellectual property rights is a competitive area, and companies, which may be more established, or have greater resources than we do, may also be pursuing strategies to license or acquire third-party intellectual property rights that we may consider necessary or attractive in order to commercialize our product candidates. More established companies may have a competitive advantage over us due to their size, cash resources and greater clinical development and commercialization capabilities. There can be no assurance that we will be able to successfully complete such negotiations and ultimately acquire the rights to the intellectual property surrounding the additional product candidates that we may seek to acquire.

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

Competitors may infringe our patents or the patents of our licensors. To counter infringement or unauthorized use, we may be required to file infringement claims, which can be expensive and time-consuming. In addition, in an infringement proceeding, a court may decide that one or more of our patents is not valid or is unenforceable, or may refuse to stop the other party from using the technology at issue on the grounds that our patents do not cover the technology in question. An adverse result in any litigation or defense proceedings could put one or more of our patents at risk of being invalidated, held unenforceable, or interpreted narrowly and could put our patent applications at risk of not issuing. Defense of these claims, regardless of their merit, would involve substantial litigation expense and would be a substantial diversion of employee resources from our business.

We may choose to challenge the patentability of claims in a third party's U.S. patent by requesting that the USPTO review the patent claims in an ex-parte re-exam, inter partes review or post-grant review proceedings. These proceedings are expensive and may consume our time or other resources. We may choose to challenge a third party's patent in patent opposition proceedings in the foreign patent offices. The costs of these opposition proceedings could be substantial, and may consume our time or other resources. If we fail to obtain a favorable result at the USPTO or other patent office then we may be exposed to litigation by a third party alleging that the patent may be infringed by our product candidates or proprietary technologies.

In addition, because some patent applications in the United States may be maintained in secrecy until the patents are issued, patent applications in the United States and many foreign jurisdictions are typically not published until 18 months after filing, and publications in the scientific literature often lag behind actual discoveries, we cannot be certain that others have not filed patent applications for technology covered by our owned and in-licensed issued patents or our pending applications, or that we or, if applicable, a licensor were the first to invent the technology. Our competitors may have filed, and may in the future file, patent applications covering our products or technology similar to ours. Any such patent application may have priority

over our owned and in-licensed patent applications or patents, which could require us to obtain rights to issued patents covering such technologies. If another party has filed a U.S. patent application on inventions similar to those owned by or in-licensed to us, we or, in the case of in-licensed technology, the licensor may have to participate in an interference proceeding declared by the USPTO to determine priority of invention in the United States. If we or one of our licensors is a party to an interference proceeding involving a U.S. patent application on inventions owned by or in-licensed to us, we may incur substantial costs, divert management's time and expend other resources, even if we are successful.

Interference proceedings provoked by third parties or brought by the USPTO may be necessary to determine the priority of inventions with respect to our patents or patent applications or those of our licensors. An unfavorable outcome could result in a loss of our current patent rights and could require us to cease using the related technology or to attempt to license rights to it from the prevailing party. Our business could be harmed if the prevailing party does not offer us a license on commercially reasonable terms or at all. Litigation or interference proceedings may result in a decision adverse to our interests and, even if we are successful, may result in substantial costs and distract our management and other employees. We may not be able to prevent, alone or with our licensors, misappropriation of our trade secrets or confidential information, particularly in countries where the laws may not protect those rights as fully as in the United States.

Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation, there is a risk that some of our confidential information could be compromised by disclosure during this type of litigation. In addition, there could be public announcements of the results of hearings, motions or other interim proceedings or developments. If securities analysts or investors perceive these results to be negative, it could have a substantial adverse effect on the price of our common stock.

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 on any issued patent are due to be paid to the USPTO and foreign patent agencies in several stages over the lifetime of the patent. The USPTO and various foreign governmental patent agencies require compliance with a number of procedural, documentary, fee payment and other provisions during the patent application process and following the issuance of a patent. While an inadvertent lapse, including due to the effect of the COVID-19 pandemic on us or our licensors' patent maintenance vendors, can in many cases be cured by payment of a late fee or by other means in accordance with the applicable rules, there are situations in which noncompliance can result in abandonment or lapse of the patent or patent application, resulting in partial or complete loss of patent rights in the relevant jurisdiction. Noncompliance events that could result in abandonment or lapse of a patent or patent application include, but are not limited to, failure to respond to official actions within prescribed time limits, non-payment of fees and failure to properly legalize and submit formal documents. In such an event, our competitors might be able to enter the market, which would have a material adverse effect on our business.

Issued patents covering our product candidates could be found invalid or unenforceable if challenged in court or the USPTO.

If we or one of our licensing partners initiate legal proceedings against a third party to enforce a patent covering one of our product candidates, the defendant could counterclaim that the patent covering our product candidate, as applicable, is invalid and/or unenforceable. In patent litigation in the United States, defendant counterclaims alleging invalidity and/or unenforceability are commonplace, and there are numerous grounds upon which a third-party can assert invalidity or unenforceability of a patent. Third parties may also raise similar claims before administrative bodies in the United States or abroad, even outside the context of litigation. Such mechanisms include re-examination, post grant review, and equivalent proceedings in foreign jurisdictions (e.g., opposition proceedings). Such proceedings could result in revocation or amendment to our patents in such a way that they no longer cover our product candidates. The outcome following legal assertions of invalidity and unenforceability is unpredictable. With respect to the validity question, for example, we cannot be certain that there is no invalidating prior art, of which we, our patent counsel and the patent examiner were unaware during prosecution. If a defendant were to prevail on a legal assertion of invalidity and/or unenforceability, or if we are otherwise unable to adequately protect our rights, we would lose at least part, and perhaps all, of the patent protection on our product candidates. Such a loss of patent protection could have a material adverse impact on our business and our ability to commercialize or license our technology and product candidates.

Moreover, the patents included in our patent portfolio may expire before, or soon after, our first product achieves marketing approval in the United States or foreign jurisdictions. For example, the patents related to novel ALK2 inhibitors in the patent family that we license from The General Hospital Corporation are expected to expire in April 2038, without taking into account any possible patent term adjustments or extensions. Upon the expiration of our current or future owned or licensed patents, we may lose the right to exclude others from practicing these inventions. The expiration of these patents could also have a similar material adverse effect on our business, results of operations, financial condition and prospects. We own pending patent applications covering our proprietary technologies or our product candidates that if issued as patents are expected to expire from 2037 through 2042, without taking into account any possible patent term adjustments or extensions. However, we cannot be assured that the USPTO or relevant foreign patent offices will grant any of these patent applications.

Changes in patent law in the U.S. and in ex-U.S. jurisdictions could diminish the value of patents in general, thereby impairing our ability to protect our products.

As is the case with other biopharmaceutical companies, our success is heavily dependent on intellectual property, particularly patents. Obtaining and enforcing patents in the biopharmaceutical industry involve both technological and legal complexity, and is therefore costly, time-consuming and inherently uncertain. Changes in either the patent laws or interpretation of the patent laws in the United States or in ex-U.S. jurisdictions could increase the uncertainties and costs surrounding the prosecution of patent applications and the enforcement or defense of issued patents. In addition, the United States has recently enacted and is currently implementing wide-ranging patent reform legislation. Recent U.S. Supreme Court rulings have narrowed the scope of patent protection available in certain circumstances and weakened the rights of patent owners in certain situations. In addition to increasing uncertainty with regard to our ability to obtain patents in the future, this combination of events has created uncertainty with respect to the value of patents, once obtained. Depending on decisions by the U.S. Congress, the federal courts, and the USPTO, the laws and regulations governing patents could change in unpredictable ways that would weaken our ability to obtain new patents or to enforce our existing patents and patents that we might obtain in the future. For example, in the case *Amgen Inc. v. Sanofi*, the Federal Circuit held that a well-characterized antigen is insufficient to satisfy the written description requirement of certain claims directed to a genus of antibodies that are solely defined by function; and in the case of *Assoc. for Molecular Pathology v. Myriad Genetics, Inc.*, the U.S. Supreme Court held that certain claims to DNA molecules are not patentable. We cannot predict how these decisions or any future decisions by the courts, the U.S. Congress or the USPTO may impact the value of our patents. Similarly, any adverse changes in the patent laws of other jurisdictions could have a material adverse effect on our business and financial condition.

Some of our in-licensed intellectual property that was discovered through government-funded programs may be subject to federal regulation such as “march-in” rights, certain reporting requirements and a preference for U.S. industry. Compliance with such regulations may limit our exclusive rights, subject us to expenditure of resources with respect to reporting requirements and limit our ability to contract with foreign manufacturers.

At least one of our in-licensed patent cases related to our KER-047 product candidate has been funded in part by the U.S. government and, therefore, is subject to certain federal regulations pursuant to the Bayh-Dole Act of 1980, or the Bayh-Dole Act, and it is possible that additional patent filings we may choose to in-license in the future may also be subject to similar regulations. In particular, the federal government retains a “nonexclusive, nontransferable, irrevocable, paid-up license” for its own benefit to inventions produced with its financial assistance. The Bayh-Dole Act also provides federal agencies with “march-in rights.” March-in rights allow the government, in specified circumstances, to require the contractor or successors in title to the patent to grant a “nonexclusive, partially exclusive, or exclusive license” to a “responsible applicant or applicants.” If the patent owner refuses to do so, the government may grant the license itself. Intellectual property discovered under government-funded programs are also subject to certain reporting requirements, compliance with which may require us or our licensors to expend substantial resources. Such intellectual property is also subject to a preference for U.S. industry, which may limit our ability to contract with foreign product manufacturers for products covered by such intellectual property. Moreover, we sometimes collaborate with academic institutions to accelerate our preclinical research or development. While it is our policy to avoid engaging our university partners in projects in which there is a risk that federal funds may be commingled, we cannot be sure that any co-developed intellectual property will be free from government rights pursuant to the Bayh-Dole Act. Further, we may choose to license intellectual property in the future that may be subject to government rights pursuant to the Bayh-Dole Act. If, in the future, we co-own or license in technology which is critical to our business that is developed in whole or in part with federal funds subject to the Bayh-Dole Act, our ability to enforce or otherwise exploit patents covering such technology may be adversely affected.

We have limited foreign intellectual property rights and may not be able to protect our intellectual property rights throughout the world.

We have limited intellectual property rights outside the United States. Filing, prosecuting and defending patents on product candidates in all countries throughout the world would be prohibitively expensive, and our intellectual property rights in some countries outside the United States can be less extensive than those in the United States. In addition, the laws of some foreign countries do not protect intellectual property rights to the same extent as do federal and state laws in the United States. Consequently, we may not be able to prevent third parties from practicing our inventions in all countries outside the United States, or from selling or importing products made using our inventions in and into the United States or other jurisdictions. Many countries have compulsory licensing laws under which a patent owner may be compelled to grant licenses to third parties. In addition, many countries limit the enforceability of patents against government agencies or government contractors. In these countries, the patent owner may have limited remedies, which could materially diminish the value of such patent. If we or any of our licensors are forced to grant a license to third parties with respect to any patents relevant to our business, our competitive position may be impaired, and our business, financial condition, results of operations and prospects may be adversely affected. Also, competitors may use our technologies in jurisdictions where we have not obtained patent protection to develop their own products and, further, may export otherwise infringing products to territories where we have patent protection but where enforcement is not as strong as that in the United States. These products may compete with our products in jurisdictions where we do not have any issued patents and our patent claims or other intellectual property rights may not be effective or sufficient to prevent them from competing.

Many companies have encountered significant problems in protecting and defending intellectual property rights in foreign jurisdictions. The legal systems of certain countries, particularly certain developing countries, do not favor the enforcement of

patents, trade secrets and other intellectual property protection, particularly those relating to biopharmaceutical products, which could make it difficult for us to stop the infringement of our patents or marketing of competing products against third parties in violation of our proprietary rights generally. The initiation of proceedings by third parties to challenge the scope or validity of our patent rights in foreign jurisdictions could result in substantial cost and divert our efforts and attention from other aspects of our business. Proceedings to enforce our patent rights in foreign jurisdictions could result in substantial costs and divert our efforts and attention from other aspects of our business, could put our patents at risk of being invalidated or interpreted narrowly and our patent applications at risk of not issuing and could provoke third parties to assert claims against us. We may not prevail in any lawsuits that we initiate and the damages or other remedies awarded, if any, may not be commercially meaningful. Accordingly, our efforts to enforce our intellectual property rights around the world may be inadequate to obtain a significant commercial advantage from the intellectual property that we develop or license.

We may incur substantial costs as a result of litigation or other proceedings relating to patents, and we may be unable to protect our rights to our products and technology.

If we or our licensors choose to go to court to stop a third party from using the inventions claimed in our owned or in-licensed patents, that third party may ask the court to rule that the patents are invalid and/or should not be enforced against that third party. These lawsuits are expensive and would consume time and other resources even if we or they, as the case may be, were successful in stopping the infringement of these patents. In addition, there is a risk that the court will decide that these patents are not valid and that we or they, as the case may be, do not have the right to stop others from using the inventions.

There is also the risk that, even if the validity of these patents is upheld, the court will refuse to stop the third party on the ground that such third party's activities do not infringe our owned or in-licensed patents. In addition, the U.S. Supreme Court has recently changed some legal principles that affect patent applications, granted patents and assessment of the eligibility or validity of these patents. As a consequence, issued patents may be found to contain invalid claims according to the newly revised eligibility and validity standards. Some of our owned or in-licensed patents may be subject to challenge and subsequent invalidation or significant narrowing of claim scope in proceedings before the USPTO, or during litigation, under the revised criteria which could also make it more difficult to obtain patents.

We, or our licensors, may not be able to detect infringement against our owned or in-licensed patents, as the case may be, which may be especially difficult for manufacturing processes or formulation patents. Even if we or our licensors detect infringement by a third party of our owned or in-licensed patents, we or our licensors, as the case may be, may choose not to pursue litigation against or settlement with the third party. If we, or our licensors, later sue such third party for patent infringement, the third party may have certain legal defenses available to it, which otherwise would not be available except for the delay between when the infringement was first detected and when the suit was brought. Such legal defenses may make it impossible for us or our licensors to enforce our owned or in-licensed patents, as the case may be, against such third party.

If another party questions the patentability of any of our claims in our owned or in-licensed U.S. patents, the third-party can request that the USPTO review the patent claims such as in an *inter partes* review, *ex parte* re-exam or post-grant review proceedings. These proceedings are expensive and may result in a loss of scope of some claims or a loss of the entire patent. In addition to potential USPTO review proceedings, we may become a party to patent opposition proceedings in foreign patent offices, where either our owned or in-licensed foreign patents are challenged.

In the future, we may be involved in similar proceedings challenging the patent rights of others, and the outcome of such proceedings is highly uncertain. An adverse determination in any such proceeding could reduce the scope of, or invalidate, our patent rights, allow third parties to commercialize our technology or products and compete directly with us, without payment to us, or result in our inability to manufacture or commercialize products without infringing third-party patent rights. The costs of these opposition or similar proceedings could be substantial, and may result in a loss of scope of some claims or a loss of the entire patent. An unfavorable result at the USPTO or other patent office may result in the loss of our right to exclude others from practicing one or more of our inventions in the relevant country or jurisdiction, which could have a material adverse effect on our business.

Patent terms may be inadequate to protect our competitive position on our product candidates for an adequate amount of time.

Patents have a limited lifespan. In the United States, if all maintenance fees are timely paid, the natural expiration of a patent is generally 20 years from its earliest U.S. non-provisional filing date. Various extensions such as patent term adjustments and/or extensions, may be available, but the life of a patent, and the protection it affords, is limited. Even if patents covering our product candidates are obtained, once the patent life has expired, we may be open to competition from competitive products, including biosimilars. 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.

If we do not obtain patent term extension and data exclusivity for any product candidates we may develop, our business may be materially harmed.

Depending upon the timing, duration and specifics of any FDA marketing approval of any product candidates we may develop, one or more of our U.S. patents may be eligible for limited patent term extension under the Drug Price Competition and Patent Term Restoration Act of 1984 Hatch-Waxman Amendments. The Hatch-Waxman Amendments permit a patent extension term of up to five years as compensation for patent term lost during the FDA regulatory review process. A patent term extension cannot extend the remaining term of a patent beyond a total of 14 years from the date of product approval, only one patent may be extended and only those claims covering the approved drug, a method for using it, or a method for manufacturing it may be extended. However, we may not be granted an extension because of, for example, failing to exercise due diligence during the testing phase or regulatory review process, failing to apply within applicable deadlines, failing to apply prior to expiration of relevant patents, or otherwise failing to satisfy applicable requirements. Moreover, the applicable time period or the scope of patent protection afforded could be less than we request. If we are unable to obtain patent term extension or term of any such extension is less than we request, our competitors may obtain approval of competing products following our patent expiration, and our business, financial condition, results of operations, and prospects could be materially harmed. Further, for our licensed patents, we may not have the right to control prosecution, including filing with the USPTO, of a petition for patent term extension under the Hatch-Waxman Act. Thus, if one of our licensed patents is eligible for patent term extension under the Hatch-Waxman Act, we may not be able to control whether a petition to obtain a patent term extension is filed, or obtained, from the USPTO.

If our trademarks and trade names are not adequately protected, then we may not be able to build name recognition in our markets of interest and our business may be adversely affected.

Our trademarks or trade names may be challenged, infringed, circumvented or declared generic or determined to be infringing on other marks. We may not be able to protect our rights to these trademarks and trade names or may be forced to stop using these names, which we need for name recognition by potential partners or customers in our markets of interest. At times, competitors may adopt trade names or trademarks similar to ours, thereby impeding our ability to build brand identity and possibly leading to market confusion. In addition, there could be potential trade name or trademark infringement claims brought by owners of other registered trade names or trademarks that incorporate variations of our unregistered trade names or trademarks. If we are unable to establish name recognition based on our trademarks and trade names, we may not be able to compete effectively and our business may be adversely affected.

Risks Related to Our Reliance on Third Parties

We rely, and expect to continue to rely, on third parties, including independent clinical investigators, contracted laboratories and CROs, to conduct our preclinical studies and clinical trials. If these third parties do not successfully carry out their contractual duties or meet expected deadlines, we may not be able to obtain regulatory approval for or commercialize our product candidates and our business could be substantially harmed.

We have relied upon and plan to continue to rely upon third parties, including independent clinical investigators, contracted laboratories and third-party CROs, to conduct our preclinical studies and clinical trials in accordance with applicable regulatory requirements and to monitor and manage data for our ongoing preclinical and clinical programs. We rely on these parties for execution of our preclinical studies and clinical trials, and control only certain aspects of their activities. Nevertheless, we are responsible for ensuring that each of our studies and trials is conducted in accordance with the applicable protocol, legal and regulatory requirements and scientific standards, and our reliance on these third parties does not relieve us of our regulatory responsibilities. We and our third-party contractors and CROs are required to comply with good laboratory practices, or GLPs, as applicable, and GCP requirements, which are regulations and guidelines enforced by the FDA and comparable foreign regulatory authorities for conducting, recording and reporting the results of clinical trials to assure that data and reported results are credible, reproducible and accurate and that the rights, integrity, and confidentiality of trial participants are protected. Regulatory authorities enforce these GLPs and GCPs through periodic inspections of laboratories conducting GLP studies, trial sponsors, principal investigators and trial sites. If we, our investigators or any of our CROs or contracted laboratories fail to comply with applicable GLPs and GCPs, the clinical data generated in our clinical trials may be deemed unreliable and the FDA or comparable foreign regulatory authorities may require us to perform additional preclinical studies or clinical trials before approving our marketing applications. We cannot assure you that upon inspection by a given regulatory authority, such regulatory authority will determine that any of our preclinical studies or clinical trials comply with applicable GLP or GCP regulations. In addition, our clinical trials must be conducted with product, including biologic product, produced in compliance with applicable cGMP regulations. Our failure to comply with these regulations may require us to repeat preclinical studies or clinical trials, which would delay the regulatory approval process.

Further, these laboratories, investigators and CROs are not our employees and we will not be able to control, other than by contract, the amount of resources, including time, which they devote to our product candidates and clinical trials. If independent laboratories, investigators or CROs fail to devote sufficient resources to the development of our product candidates, or if their performance is substandard, it may delay or compromise the prospects for approval and commercialization of any product candidates that we develop. In addition, the use of third-party service providers requires us to disclose our proprietary information to these parties, which could increase the risk that this information will be misappropriated.

Our CROs have the right to terminate their agreements with us in the event of an uncured material breach. In addition, some of our CROs have an ability to terminate their respective agreements with us if it can be reasonably demonstrated that the safety of the subjects participating in our clinical trials warrants such termination, if we make a general assignment for the benefit of our creditors or if we are liquidated.

The COVID-19 pandemic and government measures taken in response have also had a significant impact on our CROs, and we expect that they will face further disruption which may affect our ability to initiate and complete our preclinical studies and clinical trials.

There is a limited number of third-party service providers that specialize or have the expertise required to achieve our business objectives. If any of our relationships with these third-party laboratories, CROs or clinical investigators terminate, we may not be able to enter into arrangements with alternative laboratories, CROs or investigators or to do so in a timely manner or on commercially reasonable terms. If laboratories, CROs or clinical investigators do not successfully carry out their contractual duties or obligations or meet expected deadlines, if they need to be replaced or if the quality or accuracy of the clinical data they obtain is compromised due to the failure to adhere to our preclinical or clinical protocols, regulatory requirements or for other reasons, our preclinical or clinical trials may be extended, delayed or terminated and we may not be able to obtain regulatory approval for or successfully commercialize our product candidates. As a result, our results of operations and the commercial prospects for our product candidates would be harmed, our costs could increase and our ability to generate revenues could be delayed.

Switching or adding additional laboratories or CROs (or investigators) involves additional cost and requires management time and focus. In addition, there is a natural transition period when a new laboratory or CRO commences work. As a result, delays occur, which can materially impact our ability to meet our desired clinical development timelines. Though we carefully manage our relationships with our contracted laboratories and CROs, there can be no assurance that we will not encounter similar challenges or delays in the future or that these delays or challenges will not have a material adverse impact on our business, financial condition and results of operations.

In addition, clinical investigators may serve as scientific advisors or consultants to us from time to time and may receive cash or equity compensation in connection with such services. If these relationships and any related compensation result in perceived or actual conflicts of interest, or the FDA concludes that the financial relationship may have affected the interpretation of the preclinical study or clinical trial, the integrity of the data generated at the applicable preclinical study or clinical trial site may be questioned and the utility of the preclinical study or clinical trial itself may be jeopardized, which could result in the delay or rejection by the FDA. Any such delay or rejection could prevent us from commercializing our clinical-stage product candidate or any future product candidates.

We rely on third parties to supply and manufacture our product candidates, and we expect to continue to rely on third parties to manufacture our products, if approved. The development of such product candidates and the commercialization of any products, if approved, could be stopped, delayed or made less profitable if any such third party fails to provide us with sufficient quantities of product candidates or products or fails to do so at acceptable quality levels or prices or fails to maintain or achieve satisfactory regulatory compliance.

We do not currently have the infrastructure or capability internally to manufacture our product candidates for use in the conduct of our preclinical studies and clinical trials or for commercial supply, if our products are approved. We rely on, and expect to continue to rely on, contract manufacturing organizations, or CMOs. Any replacement of our CMOs could require significant effort and expertise because there may be a limited number of qualified CMOs. This could be particularly problematic where we rely on a single-source supplier, as is currently the case for the manufacture of each of KER-050, KER-047 and KER-012.

Reliance on third-party providers may expose us to more risk than if we were to manufacture our product candidates ourselves. We are dependent on our CMOs for the production of our product candidates in accordance with relevant regulations, such as cGMP, which includes, among other things, quality control, quality assurance and the maintenance of records and documentation. Moreover, many of the third parties with whom we contract may also have relationships with other commercial entities, including our competitors, for whom they may also be conducting product development activities that could harm our competitive position.

If we were to experience an unexpected loss of supply of or if any supplier were unable to meet our demand for any of our product candidates, we could experience delays in our research or planned clinical trials or commercialization. For example, the extent to which the COVID-19 pandemic impacts our ability to procure sufficient supplies for the development of our product candidates will depend on the severity and duration of the spread of the virus, and the actions undertaken to contain COVID-19 or treat its effects. We could be unable to find alternative suppliers of acceptable quality, in the appropriate volumes and at an acceptable cost. Moreover, our suppliers are often subject to strict manufacturing requirements and rigorous testing requirements, which could limit or delay production. Any changes in regulatory requirements, policy and guidelines, including the imposition of additional regulatory oversight around manufacturing and testing requirements generally or with respect to our technology in particular, could also limit or delay production. The long transition periods necessary to switch manufacturers and suppliers, if necessary, could significantly delay our clinical studies and the

commercialization of our products, if approved, which could materially adversely affect our business, financial condition and results of operation.

In complying with the applicable manufacturing regulations of the FDA and comparable foreign regulatory authorities, we and our third-party suppliers must spend significant time, money and effort in the areas of design and development, testing, production, record-keeping and quality control to assure that the products meet applicable specifications and other regulatory requirements. The facilities used by our contract manufacturers to manufacture our product candidates are subject to review by the FDA pursuant to inspections that will be conducted after we submit our NDA or BLA to the FDA. We do not control the manufacturing process of, and are completely dependent on, our contract manufacturing partners for compliance with cGMP requirements for manufacture of drug and biologic products. If our contract manufacturers cannot successfully manufacture material that conforms to our specifications and the strict regulatory requirements of the FDA or others, we will not be able to secure or maintain regulatory approval for our product candidates manufactured at these manufacturing facilities. In addition, we have no control over the ability of our contract manufacturers to maintain adequate quality control, quality assurance and qualified personnel. If the FDA or a comparable foreign regulatory agency does not approve these facilities for the manufacture of our product candidates or if any agency withdraws its approval in the future, we and they may need to find alternative manufacturing facilities, which would negatively impact the ability to develop, obtain regulatory approval for or market our product candidates, if approved. The failure of our manufacturers to comply with regulatory requirements could also result in an enforcement action against us, including the seizure of products and shutting down of production. If any of our third-party suppliers fails to comply with cGMP or other applicable manufacturing regulations, our ability to develop and commercialize the products could suffer significant interruptions. We face risks inherent in relying on a single CMO, as any disruption, such as a fire, natural hazards or vandalism at the CMO could significantly interrupt our manufacturing capability. All of our CMOs currently do not have alternative production plans in place or disaster-recovery facilities available. In case of a disruption, we will have to establish alternative manufacturing sources. This would require substantial capital on our part, which we may not be able to obtain on commercially acceptable terms or at all. Additionally, we would likely experience months of manufacturing delays as the CMO builds or locates replacement facilities and seeks and obtains necessary regulatory approvals. If this occurs, we will be unable to satisfy manufacturing needs on a timely basis, if at all.

We are dependent on our existing third-party collaboration with Hansoh to commercialize KER-050 within the territories of mainland China, Hong Kong and Macau, and if Hansoh is not successful in commercializing KER-050 in these areas, we will lose a significant source of potential revenue.

We currently have a license agreement with Hansoh who will pay us milestone payments upon the achievement of specified development and commercial milestones. In addition, if KER-050, or a licensed product containing KER-050, is approved for marketing within the territories of mainland China, Hong Kong and Macau, which we refer to collectively as the Territory, we will be entitled to receive royalty payments based on a tiered percentage of annual net sales in each region within the Territory, with such percentage ranging from the low double digit to high teens, subject to specified potential royalty reductions. We are relying on Hansoh to commercialize KER-050 in the Territory, and if Hansoh is not able to commercialize KER-050 in those countries, or determines not to pursue development or commercialization of KER-050 in those countries, we will not receive any milestone or royalty payments under the agreement.

Our future collaborations will be important to our business. If we are unable to enter into new collaborations, or if these collaborations are not successful, our business could be adversely affected.

A part of our strategy is to strategically evaluate and, as deemed appropriate, enter into additional strategic collaborations in the future when strategically attractive, including potentially with major biotechnology or pharmaceutical companies. We have limited capabilities for product development and do not yet have any capability for commercialization. Accordingly, we may enter into collaborations with other companies to provide us with important technologies and funding for our programs and technology. If we fail to enter into or maintain collaborations on reasonable terms or at all, our ability to develop our existing or future research programs and product candidates could be delayed, the commercial potential of our product could change and our costs of development and commercialization could increase. Furthermore, we may find that our programs require the use of intellectual property rights held by third parties, and the growth of our business may depend in part on our ability to acquire or in-license these intellectual property rights.

Any future collaborations we enter into may pose a number of risks, including, but not limited to, the following:

- collaborators have significant discretion in determining the efforts and resources that they will apply;
- collaborators may not perform their obligations as expected;
- collaborators may not pursue development and commercialization of any product candidates that achieve regulatory approval or may elect not to continue or renew development or commercialization programs or license arrangements based on clinical trial results, changes in the collaborators' strategic focus or available funding, or external factors, such as a strategic transaction that may divert resources or create competing priorities;
- collaborators may delay clinical trials, provide insufficient funding for a clinical trial program, stop a clinical trial or abandon a product candidate, repeat or conduct new clinical trials or require a new formulation of a product candidate for clinical testing;
- collaborators could independently develop, or develop with third parties, products that compete directly or indirectly with our products and product candidates if the collaborators believe that the competitive products are more likely to be successfully developed or can be commercialized under terms that are more economically attractive than ours;

- product candidates discovered in collaboration with us may be viewed by our collaborators as competitive with their own product candidates or products, which may cause collaborators to cease to devote resources to the commercialization of our product candidates;
- collaborators may fail to comply with applicable regulatory requirements regarding the development, manufacture, distribution or marketing of a product candidate or product;
- collaborators with marketing and distribution rights to one or more of our product candidates that achieve regulatory approval may not commit sufficient resources to the marketing and distribution of such product or products;
- disagreements with collaborators, including disagreements over proprietary rights, contract interpretation or the preferred course of development, might cause delays or terminations of the research, development or commercialization of product candidates, might lead to additional responsibilities for us with respect to product candidates, or might result in litigation or arbitration, any of which would be time-consuming and expensive;
- collaborators may not properly maintain or defend our intellectual property rights or may use our proprietary information in such a way as to invite litigation that could jeopardize or invalidate our intellectual property or proprietary information or expose us to potential litigation;
- collaborators may infringe the intellectual property rights of third parties, which may expose us to litigation and potential liability;
- if a collaborator of ours is involved in a business combination, the collaborator might de-emphasize or terminate the development or commercialization of any product candidate licensed to it by us; and
- collaborations may be terminated by the collaborator, and, if terminated, we could be required to raise additional capital to pursue further development or commercialization of the applicable product candidates.

If our collaborations do not result in the successful discovery, development and commercialization of product candidates or if one of our collaborators terminates its agreement with us, we may not receive any future research funding or milestone or royalty payments under such collaboration. All of the risks relating to product development, regulatory approval and commercialization described in this Annual Report on Form 10-K also apply to the activities of our therapeutic collaborators.

Additionally, if one of our collaborators terminates its agreement with us, we may find it more difficult to attract new collaborators and our perception in the business and financial communities could be adversely affected.

We face significant competition in seeking appropriate collaborative partners. Our ability to reach a definitive agreement for a collaboration will depend, among other things, upon an assessment of the collaborator's resources and expertise, the terms and conditions of the proposed collaboration and the proposed collaborator's evaluation of a number of factors. These factors may include the design or results of preclinical studies or clinical trials, the likelihood of regulatory approval, the potential market for the subject product candidate, the costs and complexities of manufacturing and delivering such product candidate to patients, the potential of competing products, the existence of any uncertainty with respect to our ownership of technology (which can exist if there is a challenge to such ownership regardless of the merits of the challenge) and industry and market conditions generally. The collaborator may also consider alternative product candidates or technologies for similar indications that may be available to collaborate on and whether such a collaboration could be more attractive than the one with us.

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

If we engage in future acquisitions or strategic collaborations, this may increase our capital requirements, dilute our stockholders, cause us to incur debt or assume contingent liabilities and subject us to other risks.

From time to time, we may evaluate various acquisition opportunities and strategic collaborations, including licensing or acquiring complementary products, intellectual property rights, technologies or businesses. Any potential acquisition or strategic collaboration may entail numerous risks, including:

- increased operating expenses and cash requirements;
- the assumption of additional indebtedness or contingent liabilities;
- the issuance of our equity securities;
- assimilation of operations, intellectual property and products of an acquired company, including difficulties associated with integrating new personnel;
- the diversion of our management's attention from our existing programs and initiatives in pursuing such a strategic merger or acquisition;
- retention of key employees, the loss of key personnel and uncertainties in our ability to maintain key business relationships;

- risks and uncertainties associated with the other party to such a transaction, including the prospects of that party and their existing products or product candidates and marketing approvals; and
- our inability to generate revenue from acquired technology and/or products sufficient to meet our objectives in undertaking the acquisition or even to offset the associated acquisition and maintenance costs.

In addition, if we undertake acquisitions or pursue collaborations in the future, we may issue dilutive securities, assume or incur debt obligations, incur large one-time expenses and acquire intangible assets that could result in significant future amortization expense. Moreover, we may not be able to locate suitable acquisition opportunities, and this inability could impair our ability to grow or obtain access to technology or products that may be important to the development of our business.

Risks Related to Our Employee Matters, Managing Our Growth and Other Risks Relating to Our Operations

The COVID-19 pandemic could adversely impact our business, including the timing or results of our preclinical studies and clinical trials.

Since December 2019, a novel strain of coronavirus, COVID-19, has spread worldwide, including the United States, Australia and New Zealand, where we have planned or ongoing preclinical studies and clinical trials. On March 11, 2020, the World Health Organization declared the outbreak of COVID-19 as a global pandemic. On March 23, 2020, the governor of Massachusetts ordered the closure of all non-essential businesses effective March 24, 2020, through April 7, 2020, which was subsequently extended through May 18, 2020. On May 29, 2021, the Commonwealth of Massachusetts permitted all industries to fully re-open and on June 15, 2021, the governor of Massachusetts signed an executive order that terminated the Commonwealth's State of Emergency. Because of the nature of our operations, we are considered to be an essential business so, to date, our operations have only been partially affected by these orders. The outbreak and government measures taken in response have also had a significant impact, both direct and indirect, on businesses and commerce, as worker shortages have occurred; supply chains have been disrupted; facilities and production have been suspended; and demand for certain goods and services, such as medical services and supplies, has spiked, while demand for other goods and services, such as travel, has fallen. In response to the spread of COVID-19, we have closed our principal executive office in March 2020, with our administrative employees continuing their work outside of our office, and limited the number of staff in any given research and development laboratory. In July 2021, we implemented a plan to reopen our office to allow employees to return to the office, which is based on a phased approach that is principles-based and local in design, with a focus on continuity of preclinical studies and clinical trial activities, employee safety and optimal work environment. If COVID-19 continues to spread in the United States, Australia, New Zealand and other countries, particularly in light of variant strains of the COVID-19 virus, we may experience disruptions that could severely impact our business, preclinical studies and clinical trials, including:

- delays in receiving approval from local regulatory authorities to initiate our planned clinical trials;
- delays or difficulties in enrolling patients in our clinical trials;
- delays or difficulties in clinical site initiation, including difficulties in recruiting clinical site investigators and clinical site staff;
- delays in clinical sites receiving the supplies and materials needed to conduct our clinical trials, including interruption in global shipping that may affect the transport of clinical trial materials;
- changes in local regulations as part of a response to COVID-19 which may require us to change the ways in which our clinical trials are conducted, which may result in unexpected costs, or to discontinue the clinical trials altogether;
- diversion of healthcare resources away from the conduct of clinical trials, including the diversion of hospitals serving as our clinical trial sites and hospital staff supporting the conduct of our clinical trials;
- interruption of key clinical trial activities, such as clinical trial site monitoring, due to limitations on travel imposed or recommended by federal or state governments, employers and others, or interruption of clinical trial subject visits and study procedures, the occurrence of which could affect the integrity of clinical trial data;
- risk that participants enrolled in our clinical trials will acquire COVID-19 while the clinical trial is ongoing, which could impact the results of the clinical trial, including by increasing the number of observed adverse events;
- interruptions in preclinical studies due to restricted or limited operations at our research and development laboratory facility or delays in receiving the supplies and materials needed to conduct our preclinical studies;
- delays in necessary interactions with local regulators, ethics committees and other important agencies and contractors due to limitations in employee resources or forced furlough of government employees;
- limitations in employee resources that would otherwise be focused on the conduct of our clinical trials, including because of sickness of employees or their families or the desire of employees to avoid contact with large groups of people;
- refusal of the FDA to accept data from clinical trials in these affected geographies; and
- interruption or delays to our sourced discovery and clinical activities.

The COVID-19 pandemic continues to rapidly evolve. The extent to which the outbreak impacts our business, preclinical studies and clinical trials will depend on future developments which are highly uncertain and cannot be predicted with confidence, such as the ultimate geographic spread of the disease, particularly in light of variant strains of the COVID-19 virus, the duration of the pandemic, travel restrictions and social distancing in the United States, Australia, New Zealand and

other countries, business closures or business disruptions and the effectiveness of actions taken in the United States, Australia, New Zealand and other countries to contain and treat the disease. In addition, while the potential impact and duration of the COVID-19 pandemic on the global economy and our business in particular may be difficult to assess or predict, the pandemic has resulted in, and may continue to result in, significant disruption of global financial markets, reducing our ability to access capital, which could negatively affect our liquidity in the future. Moreover, to the extent the COVID-19 pandemic adversely affects our business, financial condition and results of operations, it may also have the effect of heightening many of the other risks described in this “Risk Factors” section.

We are highly dependent on our key personnel, including our Chief Executive Officer, Chief Scientific Officer, Chief Medical Officer and Chief Operating Officer. If we are not successful in attracting, motivating and retaining highly qualified personnel, we may not be able to successfully implement our business strategy.

Our ability to compete in the highly competitive biotechnology and pharmaceutical industries depends upon our ability to attract, motivate and retain highly qualified managerial, scientific and medical personnel. We are highly dependent on our management and particularly on the services of our scientific personnel including Jasbir Sehra, Ph.D., our Chief Executive Officer, Jennifer Lachey, Ph.D., our Chief Scientific Officer, Simon Cooper, M.B.B.S., our Chief Medical Officer, and Christopher Rovaldi, our Chief Operating Officer. We believe that their drug discovery and development experience and overall biopharmaceutical company management experience would be difficult to replace. Any of our executive officers could leave our employment at any time, as all of our employees are “at-will” employees. The loss of the services of our key personnel and any of our other executive officers, key employees, and scientific and medical advisors, and our inability to find suitable replacements, could result in delays in our research and development objectives and harm our business.

Recruiting and retaining qualified employees, consultants and advisors for our business, including scientific and technical personnel, also will be critical to our success. Competition for skilled personnel is intense and the turnover rate can be high. We may not be able to attract and retain personnel on acceptable terms given the competition among numerous pharmaceutical and biotechnology companies and academic institutions for skilled individuals. In addition, failure to succeed in preclinical studies, clinical trials or applications for marketing approval may make it more challenging to recruit and retain qualified personnel. The inability to recruit, or the loss of services of certain executives, key employees, consultants or advisors, may impede the progress of our research, development and commercialization objectives and have a material adverse effect on our business, financial condition, results of operations and prospects.

We will need to grow the size of our organization, and we may experience difficulties in managing this growth.

As of December 31, 2021, we had 60 full-time employees, including 45 employees engaged in research and development and 15 employees engaged in management or general and administrative activities. As our clinical development and commercialization plans and strategies develop, we expect we will need additional managerial, operational, sales, marketing, financial, legal and other personnel. Future growth would impose significant added responsibilities on members of management, including:

- identifying, recruiting, integrating, maintaining and motivating additional employees;
- managing our development efforts effectively, including the clinical and FDA review process for KER-050, KER-047, KER-012 and any future product candidates, while complying with our contractual obligations to contractors and other third parties; and
- improving our operational, financial and management controls, reporting systems and procedures.

Our future financial performance and our ability to commercialize KER-050, KER-047, KER-012 and any other product candidates we develop will depend, in part, on our ability to effectively manage any future growth, and our management may also have to divert a disproportionate amount of its attention away from day-to-day activities in order to devote a substantial amount of time to managing these growth activities.

We currently rely, and for the foreseeable future will continue to rely, in substantial part on certain independent organizations, advisors and consultants to provide certain services. The services include substantially all aspects of clinical trial management and manufacturing. We cannot assure you that the services of independent organizations, advisors and consultants will continue to be available to us on a timely basis when needed, or that we can find qualified replacements. In addition, if we are unable to effectively manage our outsourced activities or if the quality or accuracy of the services provided by consultants is compromised for any reason, our clinical trials may be extended, delayed or terminated, and we may not be able to obtain marketing approval of KER-050, KER-047, KER-012 and our other product candidates or otherwise advance our business. We cannot assure you that we will be able to manage our existing consultants or find other competent outside contractors and consultants on economically reasonable terms, or at all.

If we are not able to effectively expand our organization by hiring qualified new employees and expanding our groups of consultants and contractors, we may not be able to successfully implement the tasks necessary to further develop and commercialize KER-050, KER-047, KER-012 and our other product candidates and, accordingly, may not achieve our research, development and commercialization goals.

Our internal computer systems, or those used by our contract research organizations, or other contractors or consultants, may fail or suffer security breaches, which could adversely affect our business.

We are increasingly dependent upon information technology systems, infrastructure and data to operate our business, particularly during the COVID-19 pandemic. Despite the implementation of security measures, our internal computer systems and those of our future CROs and other contractors and consultants are vulnerable to damage or unauthorized access or use resulting from computer viruses, malware, cyber-attacks or cyber-intrusions over the Internet, denial or degradation of service attacks, ransomware, hacking, phishing and other social engineering attacks, attachments to emails, actions of persons inside our organization or persons with access to the systems upon which we depend. The techniques used to sabotage or to obtain unauthorized access to information systems, and networks in which data is stored or through which data is transmitted change frequently, and we may be unable to implement adequate preventative measures. In addition to traditional computer “hackers”, malicious code (such as viruses and worms), employee theft or misuse, denial-of-service attacks and sophisticated nation-state and nation-state supported actors now engage in attacks (including advanced persistent threat intrusions). We anticipate that these threats will continue to grow in scope and complexity over time. Despite significant efforts to create security barriers to such threats, it is virtually impossible for us to entirely mitigate these risks. Our ability to monitor future CROs and other contractors and consultants' data security is further limited. While we have not experienced any such material system failure or security breach to date, if such an event were to occur and cause interruptions in our operations, it could result in a material disruption of our development programs, our business operations, and the privacy or confidentiality of the information that we maintain. For example, the loss of preclinical or clinical data could result in delays in our regulatory approval efforts and significantly increase our costs to recover or reproduce the data. Our reputation could be damaged, our business may be harmed and we could incur significant liability, in particular if such security incident would lead to the exposure of personal data, sensitive data and confidential information to unauthorized persons. In addition, as a result of the COVID-19 pandemic, we may face increased cybersecurity risks due to our reliance on internet technology and the number of our employees that are working remotely, which may create additional opportunities for cybercriminals to exploit vulnerabilities.

The costs to respond to a security breach and/or to mitigate any security vulnerabilities that may be identified could be significant, our efforts to address these problems may not be successful, and these problems could result in unexpected interruptions, delays, cessation of service, negative publicity, and other harm to our business and our competitive position. Any security breach affecting us, our CROs, contractors, consultants or other partners or our industry, whether real or perceived, could harm our reputation, erode confidence in the effectiveness of our security measures and lead to regulatory scrutiny. Likewise, we may rely on third parties for the manufacture of our product candidates and to conduct clinical trials, and similar events relating to their computer systems could also have a material adverse effect on our business. To the extent that any disruption or security breach were to result in a loss of, or damage to, our data or applications, or inappropriate disclosure of confidential or proprietary information, we could face governmental reporting obligations, fines, incur liability and the further development and commercialization of our product candidates could be delayed.

We may have contractual and legal obligations to notify relevant stakeholders of security breaches. Most jurisdictions have enacted laws requiring companies to notify individuals, regulatory authorities, and others of security breaches involving certain types of data. In addition, our agreements with collaborators may require us to notify them in the event of a security breach. Such mandatory disclosures are costly, could lead to negative publicity, may cause our collaborators to lose confidence in the effectiveness of our security measures and require us to expend significant capital and other resources to respond to and/or alleviate problems caused by the actual or perceived security breach.

In addition, any actual or perceived security breach could result in legal claims or proceedings, regulatory investigations or actions, and other types of liability under laws that protect the privacy and security of personal information, including federal, state and foreign data protection and privacy regulations, violations of which could result in significant penalties and fines in the EU and United States. In addition, although we seek to detect and investigate all data security incidents, security breaches and other incidents of unauthorized access to our information technology systems and data can be difficult to detect and any delay in identifying such breaches or incidents may lead to increased harm and legal exposure of the type described above.

We may not have adequate insurance coverage for security incidents or breaches or information system failures. The successful assertion of one or more large claims against us that exceeds our available insurance coverage, or results in changes to our insurance policies (including premium increases or the imposition of large deductible or co-insurance requirements), could have an adverse effect on our business. In addition, we cannot be sure that our existing insurance coverage and coverage for errors and omissions will continue to be available on acceptable terms or that our insurers will not deny coverage as to any future claim.

Failure to comply with existing and future data protection laws and regulations could lead to government enforcement actions, including administrative, civil or criminal fines or penalties, private litigation, other liabilities and adverse publicity and could negatively affect our operating results and business. Compliance or the failure to

comply with such laws and regulations could increase the costs of our products, could limit their use or adoption, and could otherwise negatively affect our operating results and business.

We, our service providers and any potential collaborators are subject to or affected by federal, state, local and foreign data protection laws and regulations, such as laws and regulations that address privacy and data security. In the United States, numerous federal and state laws and regulations, including federal and state health information privacy laws, state data breach notification laws, and federal and state consumer protection laws, including Section 5 of the Federal Trade Commission Act, that govern the collection, use, disclosure and protection of health information and other personal information could apply to our operations or the operations of our collaborators. In addition, we may obtain health information from third parties, including research institutions from which we obtain clinical trial data, that are subject to privacy and security requirements under HIPAA, as amended by HITECH. Depending on the facts and circumstances, we could be subject to civil, criminal and administrative penalties and fines if we violate HIPAA.

In addition, certain state and foreign laws govern the privacy and security of health information in certain circumstances, some of which are more stringent than U.S. federal law and many of which differ from each other in significant ways and may not have the same effect, thus complicating compliance efforts. For instance, the California Consumer Privacy Act of 2018, or CCPA, which became effective on January 1, 2020, gives California residents expanded rights to access and require deletion of their personal information, opt out of the sale of personal information, and receive detailed information about how their personal information is used. The CCPA authorizes private lawsuits to recover statutory damages for certain data breaches. Although the CCPA exempts some data regulated by HIPAA and certain data regarding clinical trials, the CCPA, to the extent applicable to our business and operations, may increase our compliance costs and potential liability with respect to other personal information we maintain about California residents. Other privacy legislation has been proposed at the federal and state levels, which, if enacted, could adversely affect our business.

Our operations may also be subject to increased scrutiny or attention from foreign data protection authorities. Our clinical trial programs and research collaborations outside the United States may implicate foreign data protection laws, including in Europe, Australia, and New Zealand. Many countries have established, or are in the process of establishing, privacy and data security legal frameworks with which we, our collaborators, service providers, including our CROs, and contractors must comply. For example, European data protection laws, including, without limitation, the European Union's General Data Protection Regulation, or GDPR, which went into effect in May 2018, and the UK Data Protection Act introduced strict requirements regarding the processing of personal data, including clinical trial data, which may apply to the company to the extent it processes the personal data of data subjects within the European Economic Area, or EEA, and/or the United Kingdom.

Laws such as these give rise to an increasingly complex set of compliance obligations on us. These data protection rules continue to evolve and may result in ever-increasing regulatory and public scrutiny and escalating levels of enforcement and sanctions and increased costs of compliance. We strive to comply with these rules and obligations to the extent possible. Such compliance is a rigorous and time-consuming process.

The GDPR and UK Data Protection Act set out extensive compliance requirements, including providing detailed disclosures about how personal data is collected and processed, demonstrating that an appropriate legal basis is in place or otherwise exists to justify data processing activities; granting new rights for data subjects in regard to their personal data, as well as enhancing pre-existing rights (e.g., data subject access requests); introducing the obligation to notify data protection regulators or supervisory authorities (and in certain cases, affected individuals) of significant data breaches; imposing limitations on retention of personal data; maintaining a record of data processing; and complying with the principle of accountability and the obligation to demonstrate compliance through policies, procedures, training and audit. The processing of sensitive personal data, such as health information, impose heightened compliance burdens under the GDPR and the UK Data Protection Act and is a topic of active interest among foreign regulators. Moreover, the GDPR and the UK Data Protection Act increase our obligations with respect to clinical trials conducted in the EU by expanding the definition of personal data to include coded data and requiring changes to informed consent practices and more detailed notices for clinical trial participants and investigators.

Recent legal developments in Europe have created complexity and uncertainty regarding transfers of personal data from the European Economic Area, or EEA, to the United States. On July 16, 2020, in a case known as Schrems II, the Court of Justice of the European Union, or CJEU, invalidated the EU-US Privacy Shield Framework under which personal data could be transferred from the EEA to U.S. entities who had self-certified under the Privacy Shield scheme. While the CJEU upheld the adequacy of the Standard Contractual Clauses (a standard form of contract approved by the European Commission as an adequate personal data transfer mechanism, and potential alternative to the Privacy Shield), it made clear that reliance on them alone may not necessarily be sufficient in all circumstances. Use of the standard contractual clauses must now be assessed on a case-by-case basis taking into account the legal regime applicable in the destination country, in particular applicable surveillance laws and rights of individuals and additional measures and/or contractual provisions may need to be put in place. Additionally, new Standard Contractual Clauses that repealed the Standard Contractual Clauses adopted under the Data Protection Directive have recently been adopted. We will thus need to update all of our contracts entailing the transfer of personal data outside of the European Economic Area with this new Standard Contractual Clauses. As supervisory authorities issue further guidance on personal data export mechanisms, including on the new Standard Contractual Clauses,

and/or start taking enforcement action, we could suffer additional costs, complaints and/or regulatory investigations or fines, and/or if we are otherwise unable to transfer personal data between and among countries and regions in which we conduct clinical trials, it could affect our business.

Relatedly, following the United Kingdom's withdrawal from the EEA and the EU, we also have to comply with the UK-specific requirements related to data protection, including with respect to transfer of personal data outside of the UK, which increases our regulatory compliance burden. The UK also recently updated its transfer mechanism and we will need to update all of our contracts entailing the transfer of personal data outside of the United Kingdom with this new UK-specific Transfer Tools.

We maintain privacy policies and other documentation regarding our collection, processing, use and disclosure of personal information and/or other confidential information. Although we endeavor to comply with our policies and other documentation, we may at times fail to do so or may be perceived to have failed to do so.

Certain of our current or future data processing activities could be found by a government or regulatory authority to be noncompliant or become noncompliant in the future with one or more applicable data protection laws, even if we have implemented and maintained a strategy that we believe to be compliant

Moreover, despite our efforts, we may not be successful in achieving compliance if our employees or vendors fail to comply with our policies and documentation. Such failures can subject us to potential foreign, local, state and federal action if they are found to be deceptive, unfair, or misrepresentative of our actual practices. Moreover, subjects about whom we or our collaborators obtain information, as well as the providers who share this information with us, may contractually limit our ability to use and disclose the information.

Any failure or perceived failure by us to comply with our legal obligations concerning privacy, data protection or information security could result in claims by data subjects, governmental investigations and enforcement action against us, including fines, enforcement orders, imprisonment of company officials and public censure, (individual and collective) claims for damages by affected individuals and damage to our reputation, any of which could have a material adverse effect on our business, financial condition, and operating results. Companies that must comply with the GDPR and UK Data Protection Act face increased compliance obligations and risk, including more robust regulatory enforcement of data protection requirements and potential fines for noncompliance of up to €20 million or 4% of the annual global revenues of the noncompliant company, whichever is greater, litigation, regulatory investigations, enforcement actions that require us to change the way we use personal data, and/or prohibitions on the use of personal data. Such penalties may be in addition to any civil litigation claims by data subjects. We may not be successful in avoiding potential liability or disruption of business resulting from the failure to comply with these laws and, even if we comply with laws, we may be subject to liability because of a security incident. Further, complying with the applicable notification requirements in the event of a security breach could result in significant costs. Furthermore, future interpretations of existing data protection laws or regulations could be inconsistent with our current interpretations, increase our compliance burden, make it more difficult to comply, and/or increase our risk of regulatory investigations and fines.

Additionally, if third parties we work with, such as CROs and other contractors and consultants, violate data privacy or data protection applicable laws or regulations or our policies, or are subject to security incidents, such violations or security incidents may also put our clinical trial data at risk and could in turn materially and adversely affect our business, financial condition, results of operations and prospects.

Compliance with U.S. and foreign data protection laws and regulations could require us to take on more onerous obligations in our contracts, increase our costs of legal compliance, restrict our ability to collect, use and disclose data, or in some cases, impact our or our partners' or suppliers' ability to operate in certain jurisdictions. Failure to comply with these laws and regulations could result in government investigations and/or enforcement actions (which could include civil, criminal and administrative penalties), private litigation and/or adverse publicity and could negatively affect our operating results and business. Moreover, clinical trial subjects, employees and other individuals about whom we or our potential collaborators obtain personal information, as well as the providers who share this information with us, may limit our ability to collect, use and disclose the information. Claims that we have violated individuals' privacy rights, failed to comply with data protection laws, or breached our contractual obligations, even if we are not found liable, could be expensive and time-consuming to defend and could result in adverse publicity that could harm our business.

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

We are exposed to the risk that our employees, independent contractors, vendors, principal investigators, CROs and consultants may engage in fraudulent conduct or other illegal activity. Misconduct by these parties could include intentional, reckless and/or negligent conduct or disclosure of unauthorized activities to us that violate the regulations of the FDA and comparable foreign regulatory authorities, including those laws requiring the reporting of true, complete and accurate information to such authorities; healthcare fraud and abuse laws and regulations in the United States and abroad; or laws that require the reporting of financial information or data accurately. In particular, sales, marketing and business arrangements in the healthcare industry are subject to extensive laws and regulations intended to prevent fraud, misconduct, kickbacks, self-

dealing and other abusive practices. These laws and regulations may restrict or prohibit a wide range of pricing, discounting, marketing and promotion, sales commission, customer incentive programs and other business arrangements. Activities subject to these laws also involve the improper use of information obtained in the course of clinical trials or creating fraudulent data in our preclinical studies or clinical trials, which could result in regulatory sanctions and cause serious harm to our reputation. It is not always possible to identify and deter misconduct by employees and other third parties, and the precautions we take to detect and prevent this activity may not be effective in controlling unknown or unmanaged risks or losses or in protecting us from governmental investigations or other actions or lawsuits stemming from a failure to comply with these laws or regulations. Additionally, we are subject to the risk that a person could allege such fraud or other misconduct, even if none occurred. If any such actions are instituted against us, and we are not successful in defending ourselves or asserting our rights, those actions could have a significant impact on our business, including the imposition of significant civil, criminal and administrative penalties, damages, monetary fines, imprisonment, possible exclusion from participation in Medicare, Medicaid and other federal 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, contractual damages, reputational harm, diminished profits and future earnings, and curtailment of our operations, any of which could adversely affect our ability to operate our business, financial condition and results of operations.

A variety of risks are associated with operating our business internationally which could materially adversely affect our business.

We conduct certain research and development operations in Australia and New Zealand and may conduct certain future clinical trials outside of the United States. Additionally, while we have not taken any steps to enter into any non-U.S. markets, we may do so in the future. Accordingly, we are subject to risks related to operating in foreign countries, including:

- different standards of care in various countries that could complicate the evaluation of our product candidates;
- different United States and foreign drug import and export rules;
- reduced protection for intellectual property rights in certain countries;
- unexpected changes in tariffs, trade barriers and regulatory requirements;
- economic weakness, including inflation, or political instability in particular foreign economies and markets;
- compliance with tax, employment, immigration, and labor laws for employees living or traveling abroad;
- compliance with the FCPA and other anti-corruption and anti-bribery laws;
- foreign taxes, including withholding of payroll taxes;
- foreign currency fluctuations, which could result in increased operating expenses and reduced revenue, and other obligations incident to doing business in another country;
- workforce uncertainty in countries where labor unrest is more common than in the United States;
- production shortages resulting from any events affecting raw material supply or manufacturing capabilities abroad;
- different payor reimbursement regimes, governmental payors or patient self-pay systems and price controls;
- potential liability resulting from development work conducted by foreign partners;
- business interruptions resulting from natural disasters, outbreaks of contagious diseases, such as COVID-19, or geopolitical actions, including war and terrorism, or systems failure including cybersecurity breaches; and
- compliance with evolving and expansive foreign regulatory requirements, including data privacy laws (such as the GDPR).

Additionally, in connection with the ongoing conflict between Russia and Ukraine, the U.S. government and European Union countries have imposed enhanced export controls on certain products and sanctions on certain industry sectors and parties in Russia. The U.S. government has also indicated it will consider imposing additional sanctions and other similar measures in the near future. Although we do not currently conduct any clinical trials in Russia or Ukraine, further escalation of geopolitical tensions could have a broader impact that expands into other markets where we do business or conduct certain research and development operations, which could adversely affect our business, our supply chain for our product candidates, our collaborators or our ability to carry out our clinical trials.

We are subject to certain U.S. and foreign anti-corruption, anti-money laundering, export control, sanctions and other trade laws and regulations. We can face serious consequences for violations.

We are presently conducting clinical development solely in Australia and New Zealand and may choose to conduct additional international clinical trials in the future. The U.S. Foreign Corrupt Practices Act, or FCPA, prohibits companies and their employees and third-party intermediaries from paying, offering, promising or authorizing others to pay or offer anything of value, directly or indirectly, to any foreign official, political party or candidate for the purpose of influencing any act or decision of the foreign entity in order to assist the individual or business in obtaining or retaining business. The FCPA also obligates companies whose securities are listed in the United States to comply with certain accounting provisions requiring the company to maintain books and records that accurately and fairly reflect all transactions of the corporation, including international subsidiaries, and to devise and maintain an adequate system of internal accounting controls. The FCPA presents particular challenges in the pharmaceutical industry, because, in many countries, hospitals are owned and operated by the government, and doctors and other hospital employees are considered foreign officials. We can be held liable for the corrupt or other illegal activities of our employees, representatives, contractors, business partners and agents, even if we do not explicitly authorize or have actual knowledge of such activities. Noncompliance with the FCPA and anti-corruption laws could subject us to whistleblower complaints, investigations, sanctions, settlements, prosecution, other enforcement actions,

disgorgement of profits, significant fines, damages, other civil and criminal penalties or injunctions, suspension and/or debarment from contracting with certain persons, the loss of export privileges, reputational harm, adverse media coverage and other collateral consequences. If any subpoenas or investigations are launched, or governmental or other sanctions are imposed, or if we do not prevail in any possible civil or criminal litigation, our business, results of operations and financial condition could be materially harmed.

In addition, our products may be subject to export controls, trade sanctions laws and regulations. Governmental regulation of the import or export of our products, or our failure to obtain any required import or export authorization for our products, when applicable, could harm our international sales and adversely affect our revenue. Compliance with applicable regulatory requirements regarding the export of our products may create delays in the introduction of our products in international markets or, in some cases, prevent the export of our products to some countries altogether. Furthermore, U.S. export control laws and economic sanctions prohibit the shipment of certain products and services to countries, governments, and persons targeted by U.S. sanctions. If we fail to comply with export and import regulations and such economic sanctions, penalties could be imposed, including fines and/or denial of certain export privileges. Moreover, any new export or import restrictions, new legislation or shifting approaches in the enforcement or scope of existing regulations, or in the countries, persons, or products targeted by such regulations, could result in decreased use of our products by, or in our decreased ability to export our products to, existing or potential customers with international operations. Any decreased use of our products or limitation on our ability to export or sell our products would likely adversely affect our business.

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

We are subject to numerous environmental, health and safety laws and regulations, including those governing laboratory procedures and the handling, use, storage, treatment and disposal of hazardous materials and wastes. Our research and development activities involve the use of biological and hazardous materials and 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, which could cause an interruption of our commercialization efforts, research and development efforts and business operations, environmental damage resulting in costly clean-up and liabilities under applicable laws and regulations governing the use, storage, handling and disposal of these materials and specified waste products. Although we believe that the safety procedures utilized by our third-party manufacturers for handling and disposing of these materials generally comply with the standards prescribed by these laws and regulations, we cannot guarantee that this is the case or eliminate the risk of accidental contamination or injury from these materials. In such an event, we may be held liable for any resulting damages and such liability could exceed our resources and state or federal or other applicable authorities may curtail our use of certain materials and/or interrupt our business operations. Furthermore, environmental laws and regulations are complex, change frequently and have tended to become more stringent. We cannot predict the impact of such changes and cannot be certain of our future compliance. 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 research, development or production efforts. Failure to comply with these laws and regulations also may result in substantial fines, penalties or other sanctions.

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 or other work-related injuries, this insurance may not provide adequate coverage against potential liabilities. We do not carry specific biological waste or hazardous waste insurance coverage, workers compensation or property and casualty and general liability insurance policies that include coverage for damages and fines arising from biological or hazardous waste exposure or contamination.

Changes in tax laws or regulations that are applied adversely to us may have a material adverse effect on our business, cash flow, financial condition or results of operations.

The Tax Act enacted many significant changes to the U.S. tax laws. Future guidance from the Internal Revenue Service and other tax authorities with respect to the Tax Act may affect us, and certain aspects of the Tax Act could be repealed or modified in future legislation. In addition, in response to the COVID-19 pandemic, the Coronavirus Aid, Relief, and Economic Security, or CARES, Act was signed into law in March 2020. The CARES Act modifies certain of the changes made by the Tax Act. Changes in corporate tax rates, the realization of net deferred tax assets relating to our U.S. operations, and the deductibility of expenses under the Tax Act, as amended by the CARES Act, or future tax reform legislation could have a material impact on the value of our deferred tax assets, could result in significant one-time charges in the current or future taxable years, and could increase our future U.S. tax expense. The foregoing items, as well as any other future changes in tax laws, could have a material adverse effect on our business, cash flow, financial condition or results of operations. For example, proposals have recently been made in Congress (which have not yet been enacted) to make certain tax law changes that could have a material adverse impact on us. In addition, it is uncertain if and to what extent various states will conform to the Tax Act, as amended by the CARES Act, or any newly enacted federal tax legislation.

Our ability to use our net operating loss carryforwards and certain tax credit carryforwards may be subject to limitation.

As of December 31, 2021, we had \$85.8 million of U.S. federal, \$90.3 million of state and \$16.4 million of foreign NOL carryforwards. Under the Tax Act, as modified by the CARES Act, federal NOLs incurred in taxable years beginning after December 31, 2017 can be carried forward indefinitely, but the deductibility of federal NOLs in taxable years beginning after December 31, 2020, is limited. The CARES Act also provides for the ability for companies to carry back net operating losses arising in tax years beginning after 2017 and before 2021 for up to 5 years. We evaluated the provisions of the CARES Act and, as a result, we received approximately \$0.2 million as of December 31, 2020, related to the carry back of our 2019 net operating loss to claim a refund for prior federal tax liabilities and, as a result, our net operating loss carryforwards will be reduced.

Our NOL carryforwards are subject to review and possible adjustment by the U.S. and state tax authorities. In addition, under Sections 382 and 383 of the Code and corresponding provisions of state law, if a corporation undergoes an “ownership change,” which is generally defined as a greater than 50% change (by value) in its equity ownership over a three-year period, the corporation’s ability to use its pre-change NOL carryforwards and R&D credits to offset its post-change income may be limited. This could limit the amount of NOLs or R&D credit carryforwards that we can utilize annually to offset future taxable income or tax liabilities. Subsequent ownership changes and changes to the U.S. tax rules in respect of the utilization of NOLs and R&D credits carried forward may further affect the limitation in future years. In addition, at the state level, there may be periods during which the use of NOLs is suspended or otherwise limited, which could accelerate or permanently increase state taxes owed.

In February 2021, we completed a study to assess whether an ownership change has occurred or whether there have been multiple ownership changes since our formation. The results of this study indicated that we experienced ownership changes as defined by Section 382 of the Code in 2016 and 2020. These ownership changes have subjected and will continue to subject our net operating loss carryforwards to an annual limitation, which will significantly restrict our ability to use them to offset our taxable income in periods following an ownership change. Based on the results of the study, management has determined that these limitations may have a material impact on our ability to utilize our net operating losses and research and development credit carryforwards to offset future tax liabilities.

Risks Related to Our Common Stock

An active, liquid and orderly trading market may not develop for our common stock and as a result it may be difficult for you to sell your shares of our common stock.

Prior to our IPO in April 2020, there was no public market for shares of our common stock. Although our common stock is currently listed on the Nasdaq Global Market, we cannot assure you that an active trading market for our shares will develop or be sustained. In the absence of an active trading market for our common stock, investors may not be able to sell their shares of common stock without depressing the market price for the common stock, or may not be able to sell the shares at all. An inactive trading market may also impair our ability to raise capital to continue to fund operations by selling shares and may impair our ability to enter into collaborations or acquire other companies or technologies using our shares as consideration.

Our quarterly operating results may fluctuate significantly or may fall below the expectations of investors or securities analysts, each of which may cause our stock price to fluctuate or decline.

We expect our operating results to be subject to quarterly fluctuations. Our net loss and other operating results will be affected by numerous factors, including:

- variations in the level of expense related to the ongoing development of our product candidates and preclinical development programs;
- results of preclinical studies and future clinical trials, or the addition or termination of future clinical trials or funding support by us, or current or future collaborators or licensing partners;
- our execution of any collaboration, licensing or similar arrangements, and the timing of payments we may make or receive under existing or future arrangements or the termination or modification of any such existing or future arrangements;
- any intellectual property infringement lawsuit or opposition, interference or cancellation proceeding in which we may become involved;
- additions and departures of key personnel;
- strategic decisions by us, such as acquisitions, divestitures, spin-offs, joint ventures, strategic investments or changes in business strategy;
- if any of our product candidates receives regulatory approval, the terms of such approval and market acceptance and demand for such product candidates;
- regulatory developments affecting our product candidates; and
- general economic conditions, as well as economic conditions specifically affecting the biopharmaceutical industry, including those related to the ongoing COVID-19 pandemic.

If our quarterly operating results fall below the expectations of investors or securities analysts, the price of our common stock could decline substantially. Furthermore, any quarterly fluctuations in our operating results may, in turn, cause the price of our common stock to fluctuate substantially. We believe that quarterly comparisons of our financial results are not necessarily meaningful and should not be relied upon as an indication of our future performance.

The market price of our common stock has been and is likely to continue to be volatile and fluctuate substantially.

The market price of our common stock has been and is likely to continue to be highly volatile and may fluctuate substantially as a result of a variety of factors, some of which are related in complex ways. The market price for our common stock may fluctuate significantly in response to numerous factors, many of which are beyond our control, including the factors listed below and other factors described in this “Risk Factors” section:

- results of preclinical studies and clinical trials of KER-050, KER-047, KER-012 and any other product candidate we may develop or those of our competitors;
- actual or anticipated changes in estimates as to financial results, development timelines or recommendations by securities analysts;
- commencement or termination of collaboration, licensing or similar arrangements for our development programs;
- announcements by our competitors of significant acquisitions, strategic partnerships, joint ventures, collaborations or capital commitments;
- failure or discontinuation of any of our development programs;
- results of clinical trials of product candidates of our competitors;
- regulatory or legal developments in the United States and other countries;
- developments or disputes concerning patent applications, issued patents or other proprietary rights;
- the recruitment or departure of key personnel;
- the level of expenses related to the development of KER-050, KER-047, KER-012 and any other product candidate we may develop;
- variations in our financial results or those of companies that are perceived to be similar to us;
- announcements or expectations of additional financing efforts by us;
- sales of our common stock by us, our insiders or other stockholders;
- recommendations and changes in estimates or recommendations by securities analysts, if any, that cover our stock;
- changes in the structure of healthcare payment systems;
- market conditions in the pharmaceutical and biotechnology sectors;
- general economic, political, and market conditions and overall fluctuations in the financial markets in the United States and abroad; and
- investors’ general perception of us and our business.

The stock market in general, and the markets for pharmaceutical, biopharmaceutical and biotechnology stocks in particular, have experienced extreme price and volume fluctuations that have been often unrelated or disproportionate to the operating performance of the issuer. In addition, the trading prices for common stock of other pharmaceutical, biopharmaceutical and biotechnology companies have been highly volatile as a result of the COVID-19 pandemic. The COVID-19 outbreak continues to rapidly evolve. The extent to which the outbreak may impact our business, preclinical studies and clinical trials will depend on future developments, which are highly uncertain and cannot be predicted with confidence.

These and other market and industry factors may cause the market price and demand for our common stock to fluctuate substantially, regardless of our actual operating performance, which may negatively affect the liquidity of our common stock.

We could be subject to securities class action litigation.

In the past, securities class action litigation has often been brought against public companies following declines in the market prices of their securities. This risk is especially relevant for biopharmaceutical companies, which have experienced significant stock price volatility in recent years. If we face such litigation, it could result in substantial costs and a diversion of management’s attention and our resources, which could harm our business, operating results, financial condition and cash flows.

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

Additional capital will be needed in the future to continue our planned operations. To the extent we raise additional capital by issuing equity securities, our stockholders may experience substantial dilution. 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 may be materially diluted by subsequent sales. These sales may also result in material dilution to our existing stockholders, and new investors could gain rights superior to our existing stockholders.

Pursuant to our 2020 Equity Incentive Plan, or 2020 Plan, our management is authorized to grant stock options and other equity-based awards to our employees, directors and consultants. The number of shares of our common stock reserved for

issuance under our 2020 Plan will automatically increase on January 1 of each year, for a period of ten years, from January 1, 2021 continuing through January 1, 2030, by 4.0% of the total number of shares of our common stock outstanding on December 31 of the preceding calendar year, or a lesser number of shares as may be determined by our board of directors. If our board of directors elects to increase the number of shares available for future grant by the maximum amount each year, our stockholders may experience additional dilution, which could cause our stock price to fall.

We do not intend to pay dividends on our common stock so any returns will be limited to the value of our stock.

You should not rely on an investment in our common stock to provide dividend income. We currently anticipate that we will retain future earnings for the development, operation and expansion of our business and do not anticipate declaring or paying any cash dividends for the foreseeable future. Any return to stockholders will therefore be limited to the appreciation of their stock, which may never occur, as the only way to realize any return on their investment.

Our executive officers, directors, and stockholders and their affiliates who beneficially own more than 5% of our common stock have the ability to exercise significant influence over our company, which will limit your ability to influence corporate matters and could delay or prevent a change in corporate control.

As of December 31, 2021, our executive officers, directors and stockholders and their affiliates who beneficially own more than 5% of our common stock beneficially held a significant percentage of our outstanding common stock. As a result, these stockholders, if they act together, will be able to exercise significant influence over our management and affairs and the outcome of matters submitted to our stockholders for approval, including the election of directors and any sale, merger, consolidation, or sale of all or substantially all of our assets. In addition, this concentration of ownership might adversely affect the market price of our common stock by:

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

Conflicts of interest may arise because some members of our board of directors are representatives of our principal stockholders.

Certain of our principal stockholders or their affiliates are venture capital funds or other investment vehicles that could invest in entities that directly or indirectly compete with us. As a result of these relationships, conflicts may arise between the interests of the principal stockholders or their affiliates and the interests of other stockholders, and members of our board of directors that are representatives of such principal stockholders may not be disinterested in such conflicts. Neither the principal stockholders nor the representatives of the principal stockholders on our board of directors, by the terms of our amended and restated certificate of incorporation, are required to offer us any transaction opportunity of which they become aware and could take any such opportunity for themselves or offer it their other affiliates, unless such opportunity is expressly offered to them solely in their capacity as members of our board of directors.

Sales of a substantial number of shares of our common stock in the public market could cause our stock price to fall.

If our existing stockholders sell, or indicate an intention to sell, substantial amounts of our common stock in the public market, the market price of our common stock could decline. We are unable to predict the effect that such sales, particularly by our directors, executive officers and significant stockholders, may have on the prevailing market price of our common stock.

In May 2021, we filed a registration statement on Form S-3, which was automatically effective upon filing. Pursuant to this registration statement, we may issue up to \$150.0 million in common stock in sales deemed to be an “at the market offering,” as defined by the Securities Act, and, so long as we qualify as a “well-known seasoned issuer” as defined in Rule 405 of the Securities Act, an unspecified amount of shares of our common stock, preferred stock, debt securities and warrants.

In addition, we have filed registration statements on Form S-8 registering the issuance of shares of common stock subject to options or other equity awards issued or reserved for future issuance under our equity incentive plans. Shares registered under these registration statements on Form S-8 are available for sale in the public market subject to vesting arrangements and exercise of options and the restrictions of Rule 144 under the Securities Act in the case of our affiliates. In addition, certain holders of shares of our common stock have rights, subject to some conditions, to require us to file registration statements covering their shares or to include their shares in registration statements that we may file for ourselves or other stockholders. If we were to register the resale of these shares, they could be freely sold in the public market. If these additional shares are sold, or if it is perceived that they will be sold, in the public market, the trading price of our common stock could decline.

If securities or industry analysts publish inaccurate or unfavorable research about our business, our stock price and trading volume could decline.

The trading market for our common stock will rely, in part, on the research and reports that industry or financial analysts publish about us or our business. We do not have any control over these analysts. If one or more of the analysts covering our business downgrade their evaluations of our stock or publish inaccurate or unfavorable research about our business, the

price of our stock would likely decline. If one or more of these analysts cease to cover our stock or fail to publish reports on us regularly, we could lose visibility in the market for our stock, which, in turn, could cause our stock price and trading volume to decline.

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

As a public company, and particularly after we are no longer an emerging growth company, we will incur significant legal, accounting and other expenses that we did not incur as a private company. The Sarbanes-Oxley Act of 2002, as amended, or the Sarbanes-Oxley Act, the Dodd-Frank Wall Street Reform and Consumer Protection Act, the listing requirements of the Nasdaq Stock Market and other applicable securities rules and regulations impose various requirements on public companies, including establishment and maintenance of effective disclosure and financial controls and corporate governance practices. Our management and other personnel will need to devote a substantial amount of time to these compliance initiatives. Moreover, we expect these rules and regulations to substantially increase our legal and financial compliance costs and to make some activities more time consuming and costly. For example, we expect that these rules and regulations may make it more difficult and more expensive for us to obtain director and officer liability insurance and we may be required to incur substantial costs to maintain sufficient coverage. We are evaluating these rules and regulations, and cannot predict or estimate the amount or timing of additional costs we may incur or the timing of such costs. The impact of these requirements could also make it more difficult for us to attract and retain qualified persons to serve on our board of directors, our board committees or as executive officers. The increased costs may require us to reduce costs in other areas of our business or increase the prices of our services. Moreover, these rules and regulations are often subject to varying interpretations, in many cases due to their lack of specificity, and, as a result, their application in practice may evolve over time as new guidance is provided by regulatory and governing bodies. This could result in continuing uncertainty regarding compliance matters and higher costs necessitated by ongoing revisions to disclosure and governance practices.

We are an “emerging growth company” and, as a result of the reduced disclosure and governance requirements applicable to emerging growth companies, our common stock may be less attractive to investors.

We are an “emerging growth company” as defined in the Jumpstart Our Business Startups Act of 2012, or the JOBS Act. For as long as we continue to be an emerging growth company, we may take advantage of exemptions from various reporting requirements that are applicable to other public companies that are not emerging growth companies, including (i) not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act, (ii) reduced disclosure obligations regarding executive compensation in our periodic reports and proxy statements and (iii) exemptions from the requirements of holding nonbinding advisory stockholder votes on executive compensation and stockholder approval of any golden parachute payments not approved previously. Under the JOBS Act, emerging growth companies can also delay adopting new or revised accounting standards until such time as those standards apply to private companies. We have elected to take advantage of the benefits of this extended transition period. Our financial statements may therefore not be comparable to those of companies that comply with such new or revised accounting standards. Until the date that we are no longer an “emerging growth company” or affirmatively and irrevocably opt out of the exemption provided by Section 7(a)(2)(B) of the Securities Act, upon issuance of a new or revised accounting standard that applies to our financial statements and that has a different effective date for public and private companies, we will disclose the date on which adoption is required for non-emerging growth companies and the date on which we will adopt the recently issued accounting standard.

We could be an emerging growth company until December 31, 2025, although circumstances could cause us to lose that status earlier, including if we are deemed to be a “large accelerated filer,” which occurs when the market value of our common stock that is held by non-affiliates equals or exceeds \$700.0 million as of the prior June 30, or if we have total annual gross revenue of \$1.07 billion or more during any fiscal year before that time, in which cases we would no longer be an emerging growth company as of the following December 31, or if we issue more than \$1.0 billion in non-convertible debt during any three-year period before that time, in which case we would no longer be an emerging growth company immediately.

We cannot predict if investors will find our common stock less attractive because we may rely on the exemptions and reduced disclosure obligations applicable to emerging growth companies. If some investors find our common stock less attractive as a result, there may be a less active trading market for our common stock and our share price may be more volatile.

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

Pursuant to Section 404 of the Sarbanes-Oxley Act, our management will be required to report upon the effectiveness of our internal control over financial reporting beginning with the annual report for our fiscal year ending December 31, 2021. When we lose our status as an “emerging growth company,” our independent registered public accounting firm will be required to attest to the effectiveness of our internal control over financial reporting. The rules governing the standards that must be met for management to assess our internal control over financial reporting are complex and require significant documentation, testing and possible remediation. To comply with the requirements of being a reporting company under the Securities Exchange Act of 1934, as amended, or the Exchange Act, we will need to implement additional financial and management controls, reporting systems and procedures and hire additional accounting and finance staff.

We cannot assure you that there will not be material weaknesses or significant deficiencies in our internal control over financial reporting in the future. Any failure to maintain internal control over financial reporting could severely inhibit our ability to accurately report our financial condition, results of operations or cash flows. If we are unable to conclude that our internal control over financial reporting is effective, or if our independent registered public accounting firm determines we have a material weakness or significant deficiency in our internal control over financial reporting, investors may lose confidence in the accuracy and completeness of our financial reports, the market price of our common stock could decline, and we could be subject to sanctions or investigations by the Nasdaq Stock Market, the SEC or other regulatory authorities. Failure to remedy any material weakness in our internal control over financial reporting, or to implement or maintain other effective control systems required of public companies, could also restrict our future access to the capital markets.

Our disclosure controls and procedures may not prevent or detect all errors or acts of fraud.

We are subject to the periodic reporting requirements of the Exchange Act. We designed our disclosure controls and procedures to reasonably assure that information we must disclose in reports we file or submit under the Exchange Act is accumulated and communicated to management, and recorded, processed, summarized and reported within the time periods specified in the rules and forms of the SEC. We believe that any disclosure controls and procedures or internal controls and procedures, no matter how well-conceived and operated, can provide only reasonable, not absolute, assurance that the objectives of the control system are met. These inherent limitations include the realities that judgments in decision-making can be faulty, and that breakdowns can occur because of simple error or mistake. For example, our directors or executive officers could inadvertently fail to disclose a new relationship or arrangement causing us to fail to make a required related party transaction disclosure. Additionally, controls can be circumvented by the individual acts of some persons, by collusion of two or more people or by an unauthorized override of the controls. Accordingly, because of the inherent limitations in our control system, misstatements due to error or fraud may occur and not be detected.

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

Provisions in our amended and restated certificate of incorporation and our amended and restated bylaws may discourage, delay or prevent a merger, acquisition or other change in control of us that stockholders may consider favorable, including transactions in which you might otherwise receive a premium for your shares. These provisions also could limit the price that investors might be willing to pay in the future for shares of our common stock, thereby depressing the market price of our common stock. In addition, because our board of directors is responsible for appointing the members of our management team, these provisions may frustrate or prevent any attempts by our stockholders to replace or remove our current management by making it more difficult for stockholders to replace members of our board of directors. Among other things, these provisions:

- establish a classified board of directors such that not all members of the board are elected at one time;
- allow the authorized number of our directors to be changed only by resolution of our board of directors;
- limit the manner in which stockholders can remove directors from the board;
- establish advance notice requirements for stockholder proposals that can be acted on at stockholder meetings and nominations to our board of directors;
- require that stockholder actions must be effected at a duly called stockholder meeting and prohibit actions by our stockholders by written consent;
- prohibit our stockholders from calling a special meeting of our stockholders;
- authorize our board of directors to issue preferred stock without stockholder approval, which could be used to institute a stockholder rights plan, or so-called “poison pill,” that would work to dilute the stock ownership of a potential hostile acquirer, effectively preventing acquisitions that have not been approved by our board of directors; and
- require the approval of the holders of at least 66 2/3% of the votes that all our stockholders would be entitled to cast to amend or repeal certain provisions of our charter or bylaws.

Moreover, because we are incorporated in Delaware, we are governed by the provisions of Section 203 of the Delaware General Corporation Law, which prohibits a person who owns 15% or more of our outstanding voting stock from merging or combining with us for a period of three years after the date of the transaction in which the person acquired 15% or more of our outstanding voting stock, unless the merger or combination is approved in a prescribed manner. These provisions could discourage potential acquisition proposals and could delay or prevent a change in control transaction. They could also have the effect of discouraging others from making tender offers for our common stock, including transactions that may be in your best interests. These provisions may also prevent changes in our management or limit the price that investors are willing to pay for our stock.

Our amended and restated certificate of incorporation designates the Court of Chancery of the State of Delaware as the exclusive forum for substantially all disputes between us and our stockholders, which could limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or our directors, officers or employees.

Our amended and restated certificate of incorporation provides that the Court of Chancery of the State of Delaware (or, if and only if the Court of Chancery of the State of Delaware lacks subject matter jurisdiction, any state court located within the

State of Delaware or, if and only if all such state courts lack subject matter jurisdiction, the federal district court for the District of Delaware) will be the exclusive forum for the following types of actions or proceedings under Delaware statutory or common law:

- any derivative action or proceeding brought on our behalf;
- any action or proceeding asserting a claim of breach of a fiduciary duty owed by any of our current or former directors, officers or other employees to us or our stockholders;
- any action or proceeding asserting a claim against us or any of our current or former directors, officers or other employees, arising out of or pursuant to any provision of the Delaware General Corporation Law, our certificate of incorporation or our bylaws;
- any action or proceeding to interpret, apply, enforce or determine the validity of our certificate of incorporation or our bylaws; and
- any action asserting a claim against us or any of our directors, officers or other employees governed by the internal affairs doctrine.

This provision would not apply to suits brought to enforce a duty or liability created by the Exchange Act or any other claim for which the U.S. federal courts have exclusive jurisdiction.

In addition, our amended and restated certificate of incorporation provides that the federal district courts of the United States will be the exclusive forum for resolving any complaint asserting a cause of action arising under the Securities Act, unless we consent in writing to the selection of an alternative forum.

These exclusive-forum provisions may limit a stockholder's ability to bring a claim in a judicial forum that it finds favorable for disputes with us or our directors, officers or other employees, which may discourage these types of lawsuits. Furthermore, the enforceability of similar choice of forum provisions in other companies' certificates of incorporation has been challenged in legal proceedings, and it is possible that a court could find these types of provisions to be inapplicable or unenforceable. For example, the Court of Chancery of the State of Delaware recently determined that a provision stating that U.S. federal district courts are the exclusive forum for resolving any complaint asserting a cause of action arising under the Securities Act is not enforceable. However, on March 18, 2020, this decision was ultimately overturned by the Delaware Supreme Court. If a court were to find the exclusive-forum provision contained in our amended and restated certificate of incorporation to be inapplicable or unenforceable in an action, we may incur additional costs associated with resolving such action in other jurisdictions, which could harm our business.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None.

ITEM 2. PROPERTIES

Our principal office is located at 99 Hayden Avenue, Suite 120, Building E, Lexington, Massachusetts 02421, where we lease approximately 15,622 square feet of office and laboratory space under a lease that terminates in March 2023. We previously amended our lease to expand our square footage as we continued to grow. We believe that these facilities will be adequate for our near-term needs. If required, we believe that suitable additional or substitute space will be available in the future on commercially reasonable terms to accommodate any such expansion of our operations.

In September 2021, we entered into an indenture of lease, or Lease, with Revolution Labs Owner, LLC, a Delaware limited liability company, or the Landlord, pursuant to which we will lease approximately 35,662 square feet of office and laboratory space located at 1050 Waltham Street, Lexington, Massachusetts, or the Premises, for our new principal executive office. The term of the Lease will commence on the date the Landlord delivers the Premises to us after the substantial completion of agreed upon improvements to be performed by the Landlord, or the Commencement Date, which we expect to be on or prior to October 21, 2022. Our obligation for the payment of base rent for the Premises begins four months after the Commencement Date.

ITEM 3. LEGAL PROCEEDINGS

From time to time, we may become subject to arbitration, litigation or claims arising in the ordinary course of business. We are not currently a party to any material arbitration or legal proceedings. The results of any future claims or proceedings cannot be predicted with certainty, and regardless of the outcome, litigation can have an adverse impact on us because of defense and litigation costs, diversion of management resources, and other factors.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

PART II

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

Market Information

Our common stock commenced trading on the Nasdaq Global Market on April 8, 2020 and trades under the symbol “KROS.” Prior to April 8, 2020, there was no public market for our common stock.

Holders

As of March 2, 2022, there were 43 stockholders of record of our common stock, one of which is Cede & Co., a nominee for Depository Trust Company, or DTC. All of the shares of common stock held by brokerage firms, banks and other financial institutions as nominees for beneficial owners are deposited into participant accounts at DTC, and are considered to be held of record by Cede & Co. as one stockholder.

Dividends

We have never declared or paid any dividends on our capital stock. We currently intend to retain all available funds and any future earnings for the operation and expansion of our business and, therefore, we do not anticipate declaring or paying cash dividends in the foreseeable future. The payment of dividends will be at the discretion of our board of directors and will depend on our results of operations, capital requirements, financial condition, prospects, contractual arrangements, any limitations on payment of dividends present in any future debt agreements and other factors that our board of directors may deem relevant.

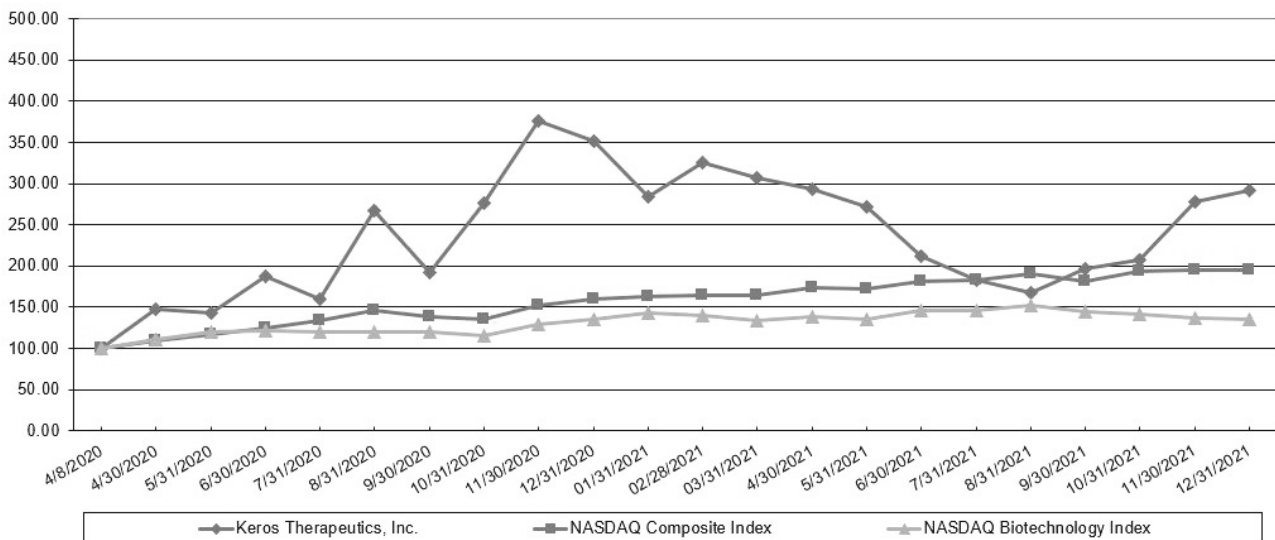
Stock Performance Graph

This performance graph below shall not be deemed "soliciting material" or to be "filed" with the SEC for purposes of Section 18 of the Exchange Act, or otherwise subject to the liabilities under that Section, and shall not be deemed to be incorporated by reference into this Annual Report on Form 10-K or any other filing of Keros Therapeutics, Inc. under the Exchange Act or the Securities Act, whether made before or after the date hereof and irrespective of any general incorporation language in any such filing, except to the extent that we specifically incorporate this information by reference therein.

The graph set forth below compares the cumulative total stockholder return on our common stock between April 8, 2020 (the date our common stock commenced trading on the Nasdaq Global Market) and December 31, 2021, with the cumulative total return of (a) the Nasdaq Composite Index and (b) the Nasdaq Biotechnology Index, over the same period. This graph assumes the investment of \$100 on April 8, 2020 in our common stock, the Nasdaq Composite Index, and the Nasdaq Biotechnology Index and assumes the reinvestment of dividends, if any. The graph assumes our closing sales price on April 8, 2020 of \$20.08 per share as the initial value of our common stock and not the initial offering price to the public of \$16.00 per share.

The comparisons shown in the graph below are based upon historical data. We caution that the stock price performance shown in the graph below is not necessarily indicative of, nor is it intended to forecast, the potential future performance of our common stock.

COMPARISON OF 21 MONTH CUMULATIVE TOTAL RETURN
Among Keros Therapeutics, Inc., the NASDAQ Composite Index and the NASDAQ Biotechnology Index



Recent Sales of Unregistered Securities

None.

Use of Proceeds

Initial Public Offering

On April 13, 2020, we closed our initial public offering, or IPO, in which we issued and sold an aggregate of 6,900,000 shares of common stock at a public offering price of \$16.00 per share. All of the shares of common stock issued and sold in our IPO were registered under the Securities Act pursuant to a registration statement on Form S-1 (Registration No. 333-237212), which was declared effective by the SEC on April 7, 2020. The offering commenced on April 7, 2020, and, following the sale of the shares upon the closing of the IPO, the offer terminated.

The aggregate net proceeds to us from the public offering were approximately \$100.1 million, after deducting underwriting discounts and commissions and offering expenses payable by us of approximately \$2.5 million. No offering expenses were paid directly or indirectly to any of our directors or officers (or their associates) or persons owning 10% or more of any class of our equity securities or to any other affiliates.

There has been no material change in the use of proceeds from our IPO from those disclosed in the Annual Report on Form 10-K for the year ended December 31, 2020, filed with the SEC on March 25, 2021.

November 2020 Public Offering of Common Stock

On November 17, 2020, we closed a public offering in which we issued and sold an aggregate of 2,990,000 shares of common stock at a public offering price of \$50.00 per share. All of the shares of common stock issued and sold in this public offering were registered under the Securities Act pursuant to a registration statement on Form S-1 (Registration No. 333-250010), which was declared effective by the SEC on November 12, 2020. Jefferies LLC, SVB Leerink LLC and Piper Sandler & Co. acted as joint book-running managers for the offering. H.C. Wainwright & Co., LLC acted as co-manager for the offering. The offering commenced on November 12, 2020, and, following the sale of the shares upon the closing of the offering, the offer terminated.

The aggregate net proceeds to us from the public offering were approximately \$140.1 million, after deducting underwriting discounts and commissions and offering expenses payable by us of approximately \$9.4 million. No offering expenses were paid directly or indirectly to any of our directors or officers (or their associates) or persons owning 10% or more of any class of our equity securities or to any other affiliates.

There has been no material change in the use of proceeds from our public offering from those disclosed in the final prospectus for our public offering dated November 12, 2020 and filed with the SEC pursuant to Rule 424(b)(4) of the Securities Act on November 13, 2020.

Purchase of Equity Securities by the Issuer and Affiliated Purchasers

None.

ITEM 6. [Reserved]

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

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

Overview

We are a clinical-stage biopharmaceutical company focused on the discovery, development and commercialization of novel treatments for patients suffering from hematological and musculoskeletal disorders with high unmet medical need. We are a leader in understanding the role of the transforming growth factor-beta, or TGF- β , family of proteins, which are master regulators of red blood cell and platelet production as well as of the growth, repair and maintenance of muscle and bone. We have leveraged this understanding and developed a discovery approach to generate large and small molecules to address diseases of these tissues. Targeting TGF- β signaling pathways has been clinically proven to elicit robust changes in blood cells, muscle and bone, which we believe provides a precedent and strong rationale for our strategy. Our lead protein

therapeutic product candidate, KER-050, is being developed for the treatment of low blood cell counts, or cytopenias, including anemia and thrombocytopenia, in patients with myelodysplastic syndromes, or MDS, and in patients with myelofibrosis. We have initiated a Phase 2 clinical trial in patients with MDS and reported preliminary data from Part 1 of this trial most recently in December 2021. We expect to report additional data from this ongoing trial in mid-2022. We have also commenced a Phase 2 clinical trial in patients with myelofibrosis and expect to report initial data from this trial by the end of 2022. Our lead small molecule product candidate, KER-047, is being developed for the treatment of anemia resulting from iron imbalance. We have completed our Phase 1 clinical trial of KER-047 and expect to commence two open-label Phase 2 clinical trials in the first half of 2022, one in patients with iron deficiency anemia and one in patients with iron-refractory iron deficiency anemia. Our third product candidate, KER-012, is being developed for the treatment of pulmonary arterial hypertension and for the treatment of disorders associated with bone loss, such as osteoporosis and osteogenesis imperfecta. We have commenced a Phase 1 clinical trial of KER-012 in healthy volunteers and expect to report initial data from Part 1 of this trial in the second quarter of 2022. We believe KER-047 and KER-012 offer substantial opportunities for us to continue to apply our understanding of TGF- β signaling pathways and expand our development programs in related hematological and musculoskeletal disorders with high unmet medical need.

Since our inception in 2015, we have devoted the majority of our efforts into business planning, research and development of our product candidates, including by conducting clinical trials and preclinical studies, raising capital and recruiting management and technical staff to support these operations. To date, we have not generated any revenue from product sales as none of our product candidates have been approved for commercialization. We have historically financed our operations primarily through the sale of convertible preferred stock and cash received from licensing agreements.

Initial Public Offering

On April 13, 2020, we completed an initial public offering, or IPO, of our common stock, in which we issued and sold 6,900,000 shares of common stock, which includes 900,000 shares issued and sold pursuant to the full exercise of the underwriters' option to purchase additional shares, at a public offering price of \$16.00 per share. The aggregate net proceeds to us from the IPO were approximately \$100.1 million after deducting underwriting discounts and commissions and offering expenses. The shares began trading on the Nasdaq Global Market on April 8, 2020. Upon completion of the IPO, all of our outstanding shares of convertible preferred stock converted into 10,725,129 shares of our common stock.

November 2020 Public Offering of Common Stock

On November 17, 2020, we closed a public offering in which we issued and sold 2,990,000 shares of common stock at a public offering price of \$50.00 per share, which included 390,000 shares of common stock issued pursuant to the exercise in full of the underwriters' option to purchase additional shares. The aggregate net proceeds to us from the public offering were approximately \$140.1 million, after deducting underwriting discounts and commissions and offering expenses.

2021 ATM Sales Agreement

In May 2021, we entered into a Sales Agreement with SVB Leerink LLC, or SVB Leerink, as sales agent, which we refer to as the ATM Sale Agreement, under which we may offer and sell, from time to time, shares of our common stock having an aggregate offering price of up to \$150.0 million, or the ATM Shares, through SVB Leerink, which we refer to as the ATM Offering. Under the ATM Sales Agreement, SVB Leerink may sell the ATM Shares by methods deemed to be an "at the market offering" as defined in Rule 415(a)(4) promulgated under the Securities Exchange Act of 1934, as amended. We may sell the ATM Shares in amounts and at times to be determined by us from time to time subject to the terms and conditions of the ATM Sales Agreement, but we have no obligation to sell any of the ATM Shares in the ATM Offering.

For the year ended December 31, 2021, we raised gross proceeds of \$28.6 million pursuant to the ATM Offering through the sale of 520,000 shares of common stock at a weighted average price of \$55.00 per share. The net proceeds from the ATM Offering were approximately \$28.1 million after deducting sales agent commissions of \$0.4 million and offering expenses of \$0.1 million. As of December 31, 2021, we may offer and sell ATM shares at an aggregate offering price of up to the remaining \$121.4 million available under the ATM Offering.

We have incurred recurring operating losses since inception in 2015. Our ability to generate product revenue sufficient to achieve profitability will depend on the successful development and commercialization of one or more of our product candidates. Our net loss was \$58.7 million and \$45.4 million for the years ended December 31, 2021 and 2020, respectively. As of December 31, 2021, we had an accumulated deficit of \$123.8 million. We expect to continue to generate operating losses and negative operating cash flows for the foreseeable future in connection with our ongoing activities.

We will not generate any revenue from product sales unless and until we successfully complete clinical development and obtain regulatory approval for one or more of our product candidates. If we obtain regulatory approval for any of our product candidates, we expect to incur significant expenses related to developing our internal commercialization capability to support product sales, marketing and distribution.

As a result, we will need substantial additional funding to support our operating activities as we advance our product candidates through clinical development, seek regulatory approval and prepare for and, if any of our product candidates are approved, proceed to commercialization. Until such time as we can generate significant revenue from product sales, if ever,

we expect to finance our operating activities through a combination of equity offerings, debt financings, and license and development agreements in connection with any future collaborations. Adequate funding may not be available to us on acceptable terms, or at all.

If we are unable to obtain funding, we will be forced to delay, reduce or eliminate some or all of our research and development programs, product portfolio expansion or commercialization efforts, which could adversely affect our business prospects, or we may be unable to continue operations. Although we continue to pursue these plans, there is no assurance that we will be successful in obtaining sufficient funding on terms acceptable to us to fund continuing operations, if at all.

As of December 31, 2021, we had cash and cash equivalents of \$230.0 million. We expect that our existing cash and cash equivalents as of December 31, 2021, along with the net \$18.0 million upfront payment pursuant to our license agreement with Hansoh (Shanghai) Healthtech Co., Ltd., which we received in January 2022, will enable us to fund our operating expenses and capital expenditure requirements into the first quarter of 2024. See “—Liquidity and Capital Resources.”

COVID-19 Business Update

As a result of the continuing global COVID-19 pandemic, we have implemented business continuity plans designed to address and mitigate the impact of the COVID-19 pandemic on our employees, and our business operations, including our preclinical studies and clinical trials, supply chains and third-party providers. We are closely monitoring the COVID-19 situation as we evolve our business, continuity plans and response strategy. On March 23, 2020, the governor of Massachusetts ordered the closure of all non-essential businesses effective March 24, 2020, through April 7, 2020, which was subsequently extended through May 18, 2020. On May 18, 2020, the governor of Massachusetts issued a new order implementing a phased re-opening of workplaces, effective May 18, 2020. On May 29, 2021, the Commonwealth of Massachusetts permitted all industries to fully re-open and on June 15, 2021, the governor of Massachusetts signed an executive order that terminated the Commonwealth's State of Emergency. Because of the nature of our operations, we were considered to be an essential business so our operations were only partially affected by these orders. The outbreak and government measures taken in response have also had a significant impact, both direct and indirect, on third-party businesses and commerce, as worker shortages have occurred; supply chains have been disrupted; facilities and production have been suspended; and demand for certain goods and services, such as medical services and supplies, has spiked, while demand for other goods and services, such as travel, has fallen. In response to the spread of COVID-19, we closed our principal executive office in March 2020, with our administrative employees continuing their work outside of our office, and limited the number of staff in any given research laboratory. In July 2021, we implemented a plan to reopen our office to allow employees to return to the office, which is based on a phased approach that is principles-based and local in design, with a focus on continuity of preclinical studies and clinical trial activities, employee safety and optimal work environment. While we are experiencing limited financial impacts at this time, given the global economic slowdown, the overall disruption of global healthcare systems and the other risks and uncertainties associated with the pandemic, particularly in light of variant strains of the COVID-19 virus, our business, financial condition, results of operations and growth prospects could be materially adversely affected.

Preclinical and Clinical Developments

With respect to preclinical and clinical development, we have taken measures to implement remote and virtual approaches, including remote participant monitoring where possible, to maintain participant safety and trial continuity and to preserve study integrity. For several of our clinical development programs, we are experiencing, and expect to continue to experience, a disruption or delay in our ability to initiate trial sites and enroll and assess participants. As the COVID-19 pandemic continues, we have experienced and expect to continue to experience an impact on our ability to enroll participants in our clinical trials. We have experienced and expect to continue to experience an impact on the ability to supply study drug, report trial results or interact with clinicians, investigators, regulators, ethics committees or other important agencies due to limitations in regulatory authority employee resources or otherwise. In addition, we rely on contract research organizations, or CROs, or other third parties to assist us with clinical trials, and we cannot guarantee that they will continue to perform their contractual duties in a timely and satisfactory manner as a result of the COVID-19 pandemic. If the COVID-19 pandemic continues and persists for an extended period of time, we could experience significant disruptions to our preclinical and clinical development timelines, which would adversely affect our business, financial condition, results of operations and growth prospects.

Supply Chain

As for our third-party manufacturers, distributors, and other partners, we are working closely with them to manage our supply chain activities and mitigate potential disruptions to our clinical supply as a result of the COVID-19 pandemic. We expect to have adequate supply for the development of our product candidates. However, if the COVID-19 pandemic continues to persist and impact essential distribution systems such as FedEx and postal delivery, we could experience disruptions to our supply chain and operations, and associated delays in the manufacturing and supply of our product candidates, which would adversely impact our ability to carry out our clinical trials.

Financial Impact

The COVID-19 pandemic continues to rapidly evolve and has already resulted in a significant disruption of global financial markets. If the disruption persists and deepens, we could experience an inability to access additional capital, which could in the future negatively affect our operations. While we expect the COVID-19 pandemic to adversely affect our business operations, our clinical development and regulatory efforts, our corporate development objectives and the value of and market for our common stock will depend on future developments that are highly uncertain and cannot be predicted with confidence at this time, as a result of uncertainty regarding ultimate duration of the pandemic, particularly in light of variant strains of the COVID-19 virus, travel restrictions, quarantines, social distancing and business closure requirements in the United States, Australia and New Zealand and the effectiveness of actions taken globally to contain and treat the disease.

Licensing Agreements

2016 Exclusive Patent License Agreement with The General Hospital Corporation

In April 2016, we entered into an exclusive patent license agreement with The General Hospital Corporation, or MGH, which was subsequently amended in May 2017 and February 2018. Under the license agreement with MGH, or the MGH Agreement, we obtained an exclusive, worldwide license, with the right to sublicense, under certain patents and technical information of MGH, to make, have made, use, have used, sell, have sold, lease, have leased, import, have imported or otherwise transfer licensed products and processes for use in the treatment, diagnosis, palliation and prevention of diseases and disorders in humans and animals. We are required to use commercially reasonable efforts to develop and commercialize licensed products and processes, and must achieve certain required diligence milestones.

Under the terms of the MGH Agreement, we made an initial license payment of \$0.1 million in 2016 and reimbursed MGH approximately \$0.3 million of prior patent prosecution expenses related to the licensed patents in 2017. We also issued MGH an aggregate of 358,674 shares of our common stock. Additionally, we are required to pay a nominal annual maintenance fee prior to the first commercial sale of our first product or process, a mid-five digit annual maintenance fee after the first commercial sale of our first product or process that is creditable against royalties, certain clinical and regulatory milestone payments for the first three products or indications to achieve such milestones, which milestone payments are \$8.6 million in the aggregate, and certain commercial milestone payments for the first three products or indications to achieve such milestones, which milestone payments are \$18.0 million in the aggregate. We made payments of \$50,000 and \$300,000 in 2020 and 2021, respectively, for the achievement of the clinical and regulatory milestones of (i) filing of an IND in the first country and (ii) the completion of a Phase 1 clinical trial, respectively. We are also obligated to pay tiered royalties on net sales of licensed products ranging in the low-single digits to mid-single digits. The royalty rates are subject to up to a maximum 50% reduction for lack of a valid claim, in the event that it is necessary for us to obtain a license to any third-party intellectual property related to the licensed products, and generic competition. The obligation to pay royalties under the MGH Agreement expires on a licensed product-by-licensed product and country-by-country basis upon the later of expiry of the last valid claim of the licensed patents that cover such licensed product in such country and ten years from the first commercial sale of such product in such country. We are also obligated to pay a percentage of non-royalty-related payments received by us from sublicensees ranging in the sub-teen double digits and a change of control fee equal to a low-single digit percentage of the payments received as part of any completed transaction up to a low-seven digit amount.

Neurona Therapeutics Inc., License Agreement

On June 22, 2021, we entered into a license agreement, or the Neurona Agreement, with Neurona Therapeutics, Inc., or Neurona. Under the Neurona Agreement, we granted Neurona a non-exclusive license to use LDN-193189, an early-stage research compound, which we license from a third party, solely as a reagent in connection with the manufacturing of diagnostic and/or therapeutic products to make, have made, use, import, offer for sale and sell products and services arising therefrom, and to make, have made, acquire, transfer, import and export the compound for such use. The license excludes Neurona from any rights to use, sell or distribute the compound for any therapeutic or diagnostic purpose. Unless terminated by either party for breach of contract or insolvency, the Neurona Agreement will continue in perpetuity until the last patent expires. Under the Neurona Agreement, we received a one-time, upfront license fee of \$0.1 million from Neurona in July 2021.

2021 License Agreement with Hansoh (Shanghai) Healthtech Co., Ltd.

In December 2021, we entered into a license agreement with Hansoh (Shanghai) Healthtech Co., Ltd., or Hansoh. Under the terms of the license agreement with Hansoh, or the Hansoh Agreement, we granted to Hansoh the exclusive right to develop, manufacture and commercialize KER-050 and licensed products containing KER-050 within the territories of mainland China, Hong Kong and Macau, which we refer to collectively as the Territory.

In connection with the Hansoh Agreement, Hansoh will purchase clinical trial supply of KER-050 from us, and the parties will also negotiate in good faith to enter into an agreement for commercial supply prior to any anticipated commercialization in the Territory. In addition, Hansoh will use commercially reasonable efforts to develop, obtain regulatory approval for, and commercialize licensed products in any region in the Territory.

Pursuant to the terms of the Hansoh Agreement, we received a net \$18.0 million upfront payment in January 2022. In addition to the upfront payment, we are entitled to receive up to an aggregate of (i) \$26.5 million upon the achievement of

specified development milestones and (ii) \$144.0 million upon the achievement of specified net sales thresholds for all licensed products in the Territory. If a licensed product is approved for marketing in the Territory, we will be entitled to receive royalty payments based on a tiered percentage of annual net sales in each region within the Territory, with such percentage ranging from the low double digit to high teens, subject to specified potential royalty reductions.

Hansoh's obligation to pay royalties for a given licensed product in a given region in the Territory will begin on the date of the first commercial sale for such licensed product in such region and continue until the latest of (i) ten years from the date of the first commercial sale for such licensed product in such region, (ii) the expiration of the last valid claim of certain licensed patents or joint patents, and (iii) expiration of regulatory exclusivity in such region. During the royalty term, neither party will directly or indirectly commercialize a competing product in the Territory.

Components of Our Results of Operations

Revenue

To date, we have not generated any revenue, and do not expect to generate any revenue in the foreseeable future, from product sales. We have generated revenue solely from research collaborations or licensing of intellectual property. We may in the future generate revenue from other strategic collaborations.

Operating Expenses

Research and Development Expenses

Research and development expenses consist primarily of costs incurred for our research activities, including our discovery efforts and the preclinical and clinical development of our current and potential future product candidates, and include:

- salaries, benefits and other related costs, including stock-based compensation expense, for personnel engaged in research and development functions;
- expenses incurred under agreements with third parties, including CROs that conduct research, preclinical and clinical activities on our behalf, as well as contract manufacturing organizations, or CMOs, that manufacture drug product for use in our preclinical studies and clinical trials;
- license fees incurred in connection with license agreements;
- research and development supplies and services expenses;
- facility-related expenses, which include direct depreciation costs and allocated expenses for rent and maintenance of facilities and other operating costs;
- cost of outside consultants, including their fees and related travel expenses, engaged in research and development functions;
- expenses related to regulatory affairs; and
- fees related to our scientific advisory board.

We expense research and development costs as incurred. Costs for external development activities are recognized based on an evaluation of the progress to completion of specific tasks using information provided to us by our vendors. Payments for these activities are based on the terms of the individual agreements, which may differ from the pattern of costs incurred, and are reflected in our consolidated financial statements as prepaid or accrued research and development expenses.

Nonrefundable advance payments for goods or services to be received in the future for use in research and development activities are recorded as prepaid expenses and expensed as the related goods are delivered or the services are performed.

Research and development activities are central to our business model. We expect that our research and development expenses will continue to increase for the foreseeable future as we continue ongoing and initiate new clinical trials for our product candidates and continue to discover and develop additional product candidates. We expect research and development expenses to fluctuate from quarter to quarter depending on the timing of clinical trial activities, clinical manufacturing and other development activities. If any of our product candidates enter into later stages of clinical development, they will generally have higher development costs than those in earlier stages of clinical development, primarily due to the increased size and duration of later-stage clinical trials. There are numerous factors associated with the successful commercialization of any product candidates we may develop in the future, including future trial design and various regulatory requirements, many of which cannot be determined with accuracy at this time based on our stage of development. Additionally, future commercial and regulatory factors beyond our control will impact our clinical development program and plans.

General and Administrative Expenses

General and administrative expenses consist primarily of salaries and other related costs, including stock-based compensation, for personnel in our executive, finance, corporate and business development and administrative functions. General and administrative expenses also include professional fees for legal, patent, accounting, information technology, auditing, tax and consulting services, and travel expenses and facility-related expenses, which include direct depreciation costs and allocated expenses for rent and maintenance of facilities and other operating costs.

We expect that our general and administrative expenses will increase in the future as we increase our headcount to support our continued research and development and potential commercialization of our product candidates. As a result of our IPO, we have incurred and expect to continue to incur increased expenses associated with being a public company, including costs of accounting, audit, legal, regulatory and tax compliance services, director and officer insurance costs, and investor and public relations costs.

Other Income (Expense), Net

Interest Expense, Net

Interest expense, net primarily consists of interest earned on money market accounts and interest expense related to leasehold improvement debt amortization. Our interest expense, net has not been significant to date.

Research and Development Incentive Income

Research and development incentive income includes payments under the Research and Development Incentive Program, or the R&D Incentive, from the Australian government. The R&D Incentive is one of the key elements of the Australian government's support for Australia's innovation system and was developed to assist businesses recover some of the costs of undertaking research and development. The R&D Incentive provides tax offsets to eligible companies that engage in research and development activities and has two core components:

- 43.5% refundable tax offset for certain eligible research and development entities with an aggregated turnover of less than \$20.0 million per annum; and
- 38.5% non-refundable tax offset for all other eligible research and development entities. Unused offset amounts may be able to be carried forward for use in future income years.

We have assessed our research and development activities and expenditures to determine which activities and expenditures are likely to be eligible under the R&D Incentive. We recognize the amount we expect to be reimbursed for qualified expenses as income at each period end. We estimate the refundable tax offset available to us based on available information at the time. This estimate is also reviewed by our external tax advisors on an annual basis.

Other Income (Expense), Net

Other income (expense), net primarily consists of unrealized gains on foreign currency and dividend income earned on money market fund accounts.

Change in Fair Value of Preferred Stock Tranche Obligation

The change in fair value of our preferred stock tranche obligation fluctuated based on remeasurement at each reporting period. Our preferred stock tranche obligation stemmed from our obligation to issue additional shares to investors upon the closing of additional tranches of preferred stock. Upon the waiver of the Series B-2 preferred stock milestone by our board of directors in March 2020, this liability was fully settled. Until settlement, fluctuations in the fair value of our preferred stock tranche obligation were based on the remeasurement at each reporting period.

Other Income (Expense), Net

Income Tax (Provision) Benefit

We recognize deferred tax assets and liabilities for the expected future tax consequences of events that have been included in our consolidated financial statements and tax returns. Deferred tax assets and liabilities are determined based upon the differences between the financial statement carrying amounts and the tax bases of existing assets and liabilities and for loss and credit carryforwards, using enacted tax rates expected to be in effect in the year in which the differences are expected to reverse. Deferred tax assets are reduced by a valuation allowance if it is more likely than not that these assets may not be realized. We determine whether it is more likely than not that a tax position will be sustained upon examination. If it is not more likely than not that a position will be sustained, none of the benefit attributable to the position is recognized. The tax benefit to be recognized for any tax position that meets the more-likely-than-not recognition threshold is calculated as the largest amount that is more than 50% likely of being realized upon resolution of the contingency. We account for interest and penalties related to uncertain tax positions as part of its provision for income taxes.

Results of Operations

Comparison for the years ended December 31, 2021 and 2020

The following table summarizes our results of operations for the years ended December 31, 2021 and 2020 (in thousands):

	YEAR ENDED DECEMBER 31,	
	2021	2020
REVENUE:		
Research collaboration revenue	\$ 20,100	\$ —
Total revenue	20,100	—
OPERATING EXPENSES:		
Research and development	(55,143)	(33,860)
General and administrative	(21,330)	(12,797)
Total operating expenses	(76,473)	(46,657)
LOSS FROM OPERATIONS	(56,373)	(46,657)
OTHER INCOME (EXPENSE), NET:		
Interest expense, net	(4)	(6)
Research and development incentive income	—	2,460
Change in fair value of preferred stock tranche obligation	—	(1,490)
Other income (expense), net	(356)	160
Total other income (expense), net	(360)	1,124
Loss before income taxes	(56,733)	(45,533)
Income tax (provision) benefit	(2,011)	172
Net loss	\$ (58,744)	\$ (45,361)

Revenue

Our revenue for the year ended December 31, 2021 consisted of (i) a one-time license fee of \$0.1 million under the Neurona Agreement and (ii) upfront fee of \$20.0 million under the Hansoh Agreement, whereby we granted Hansoh the exclusive right to develop, manufacture and commercialize KER-050 and licensed products containing KER-050 within the Territory. We satisfied the performance obligation under the Hansoh Agreement upon delivery of the licenses and initial know-how transfers and consequently, we recognized the upfront payment of \$20.0 million in revenue for the year ended December 31, 2021.

Research and Development Expenses

The following table summarizes our research and development expenses for the years ended December 31, 2021 and 2020 (in thousands):

	YEAR ENDED DECEMBER 31,		INCREASE/ (DECREASE)
	2021	2020	
KER-050	\$ 16,515	\$ 13,461	\$ 3,054
KER-047	3,135	6,703	(3,568)
KER-012	13,072	2,954	10,118
Preclinical and development fees	5,360	2,168	3,192
Personnel expenses (including stock-based compensation)	13,275	5,936	7,339
Professional fees	2,671	1,929	742
Facilities and supplies	741	421	320
Other expenses	374	288	86
	\$ 55,143	\$ 33,860	\$ 21,283

Research and development expenses were \$55.1 million for the year ended December 31, 2021, compared to \$33.9 million for the year ended December 31, 2020. The increase of \$21.3 million was primarily due to an increase in program-related costs including (i) a net increase of \$3.1 million of KER-050-related expenses, primarily driven by a \$4.8 million increase in clinical and preclinical program activities due to the progression of our Phase 2 clinical trial of KER-050 in MDS, partially offset by a decrease of \$1.7 million in manufacturing activities; (ii) a net decrease of \$3.6 million of KER-047-related expenses, primarily driven by a \$1.5 million decrease in clinical expenses due to the completion of our Phase 1 clinical trial and a \$2.0 million decrease in manufacturing and preclinical expenses; (iii) a net increase of \$10.1 million of KER-012-related

expenses, which was driven by a \$6.0 million increase in manufacturing costs, a \$1.8 million increase in preclinical activities and a \$2.3 million increase in clinical activities due to the commencement of our Phase 1 clinical trial of KER-012; (iv) a \$3.2 million increase in preclinical pipeline and development activities; (v) a \$7.3 million increase in personnel costs, including additional stock-based compensation costs driven by the increase in headcount to support the advancement of our pipeline; (vi) a \$0.7 million increase in professional fees to support our organizational growth and the continued advancements in our pipeline; and (vii) a \$0.4 million increase in facilities and other expense due to the growth of our organization. We expect research and development expenses to fluctuate from quarter to quarter depending on the timing of clinical trial activities, clinical manufacturing and other development activities.

General and Administrative Expenses

General and administrative expenses were \$21.3 million for the year ended December 31, 2021, compared to \$12.8 million for the year ended December 31, 2020. The increase of \$8.5 million was primarily due to (i) a \$6.3 million increase in personnel expenses, which includes additional stock-based compensation costs, to support our organizational growth and achievement of our corporate goals; (ii) a \$1.0 million increase in director and officer insurance premiums; (iii) a \$0.7 million increase in professional fees primarily attributable to legal expenses related to data privacy law compliance and the maintenance and expansion of our intellectual property portfolio; and (iv) a \$0.5 million increase in facilities and other office expense due to growth of our organization.

Other Income (Expense), Net

Other income (expense), net was \$(0.4) million for the year ended December 31, 2021, compared to \$1.1 million for the year ended December 31, 2020. The decrease of \$1.5 million is related to (i) a decrease of \$2.5 million in R&D Incentive income in Australia in 2020, and (ii) a decrease of \$0.5 million primarily related to foreign currency unrealized gains and losses and dividend income, which was partially offset by an increase of \$1.5 million related to the change in fair value of the preferred stock tranche obligation upon remeasurement in March 2020, prior to settlement.

Income Tax (Provision) Benefit

Income tax provision was \$2.0 million for the year ended December 31, 2021, compared to \$0.2 million tax benefit for the year ended December 31, 2020. The increase in income tax provision consists primarily of withholding taxes related to the taxable income generated from the Hansoh Agreement.

Liquidity and Capital Resources

Since our inception, we have incurred significant operating losses. Our net losses were \$58.7 million and \$45.4 million for the years ended December 31, 2021 and 2020, respectively. As of December 31, 2021 and December 31, 2020, we had an accumulated deficit of \$123.8 million and \$65.0 million, respectively. To date, we have devoted the majority of our efforts into business planning, research and development of our product candidates, including conducting clinical trials and preclinical studies, raising capital and recruiting management and technical staff to support these operations. Our primary uses of cash are to fund operating expenses, primarily research and development expenditures. We expect our expenses to increase substantially in connection with our ongoing activities, particularly as we advance the preclinical activities and clinical trials of our product candidates. Furthermore, we expect to incur additional costs associated with operating as a public company, including significant legal, accounting, investor relations, director and officer insurance premiums and other expenses that we did not incur as a private company.

We do not have any products approved for sale. We do not expect to generate any revenue from product sales unless and until we successfully complete development and obtain regulatory approval for one or more of our product candidates, which we expect will take a number of years. Since our inception, we have funded our operations primarily through equity financings and through research collaborations or licensing of intellectual property. In March 2020, we sold 4,169,822 shares of Series C Preferred Stock for aggregate net proceeds of approximately \$55.8 million. In April 2020, we completed our IPO whereby we sold an aggregate of 6,900,000 shares of our common stock for aggregate net proceeds of approximately \$100.1 million after deducting underwriting discounts and commissions and offering expenses. In November 2020, we completed a public offering of our common stock, whereby we sold an aggregate of 2,990,000 shares of our common stock for aggregate net proceeds of approximately \$140.1 million after deducting underwriting discounts and commissions and offering expenses.

On May 3, 2021, we filed a shelf registration statement on Form S-3, or Shelf, with the Securities and Exchange Commission, or SEC, which was automatically effective upon filing. The Shelf permits us to offer, from time to time, an unspecified amount of common stock, preferred stock, debt securities and warrants. We simultaneously entered into a sales agreement with SVB Leerink, as agent, to provide for the issuance and sale by us of the ATM Shares from time to time in “at the market” offerings under the Shelf. As of December 31, 2021, we sold a total of 520,000 shares of our common stock pursuant to the ATM Offering for aggregate net proceeds of approximately \$28.1 million after deducting sales agent commissions and estimated offering expenses.

As of December 31, 2021, we had cash and cash equivalents of \$230.0 million. We expect that our existing cash and cash equivalents as of December 31, 2021, along with the net \$18.0 million upfront payment pursuant to our license agreement with Hansoh (Shanghai) Healthtech Co., Ltd., or Hansoh, which we received in January 2022, will enable us to fund our operating expenses and capital expenditure requirements into the first quarter of 2024. We have based this estimate on

assumptions that may prove to be wrong, and we could use our capital resources sooner than we currently expect. Due to the numerous risks and uncertainties associated with the development of our product candidates and programs, and because the extent to which we may enter into collaborations with third parties for development of our product candidates is unknown, we are unable to estimate the timing and amounts of increased capital outlays and operating expenses associated with completing the research and development of our product candidates. Our future funding requirements, both near and long-term, will depend on many factors, including:

- the progress, timing and completion of preclinical studies and clinical trials for our current or any future product candidates, as well as the associated costs, including any unforeseen costs we may incur as a result of preclinical study or clinical trial delays due to the COVID-19 pandemic or other causes;
- the timing and amount of milestone and royalty payments we are required to make or are eligible to receive under our license agreements with each of The General Hospital Corporation and Hansoh;
- the number of potential new product candidates we identify and decide to develop;
- the need for additional or expanded preclinical studies and clinical trials beyond those that we plan to conduct with respect to our current and future product candidates;
- the costs involved in growing our organization to the size needed to allow for the research, development and potential commercialization of our current or any future product candidates;
- the costs involved in filing patent applications, maintaining and enforcing patents or defending against infringement or other claims raised by third parties;
- the maintenance of our existing license and collaboration agreements and the entry into new license and collaboration agreements;
- the time and costs involved in obtaining regulatory approval for our product candidates and any delays we may encounter as a result of evolving regulatory requirements or adverse results with respect to any of our product candidates;
- the effect of competing technological and market developments;
- the costs of operating as a public company;
- the cost of manufacturing KER-050, KER-047, KER-012 and future product candidates for clinical trials in preparation for marketing approval and in preparation for commercialization;
- the cost of establishing sales, marketing and distribution capabilities for any product candidates for which we may receive regulatory approval in regions where we choose to commercialize our products on our own;
- the amount of revenues, if any, we may derive either directly or in the form of royalty payments from future sales of our product candidates, if approved; and
- market acceptance of any approved product candidates.

In addition, the COVID-19 pandemic continues to rapidly evolve and has already resulted in a significant disruption of global financial markets. If the disruption persists and deepens, we could experience an inability to access additional capital when and if needed. If we are unable to obtain funding, we could be forced to delay, reduce or eliminate some or all of our research and development programs and clinical development efforts, which would adversely affect our business prospects, or we may be unable to continue operations. We do not have any committed external source of funds or other support for our development efforts and we cannot be certain that additional funding will be available on acceptable terms, or at all. Until we can generate sufficient product or royalty revenue to finance our cash requirements, which we may never do, we expect to finance our future cash needs through a combination of public or private equity offerings, debt financings, collaborations, strategic alliances, licensing arrangements and other marketing or distribution arrangements. Adequate additional funding may not be available to us on acceptable terms, or at all. Any failure to raise capital as and when needed could have a negative impact on our financial condition and on our ability to pursue our business plans and strategies.

Cash Flows

The following table summarizes our cash flows for each of the periods presented (in thousands):

	YEAR ENDED DECEMBER 31,	
	2021	2020
Net cash used in operating activities	\$ (62,148)	\$ (36,894)
Net cash used in investing activities	(1,024)	(294)
Net cash provided by financing activities	28,550	296,044
Net (decrease) increase in cash and cash equivalents, and restricted cash	<u>\$ (34,622)</u>	<u>\$ 258,856</u>

Operating Activities

Net cash used in operating activities was \$62.1 million for the year ended December 31, 2021, which was driven by a net loss of \$58.7 million and \$16.1 million in cash used in operating assets and liabilities, partially offset by non-cash charges, including \$11.7 million of stock-based compensation expense and \$0.4 million in depreciation. The \$16.1 million of cash used in operating assets and liabilities was primarily comprised of (i) an \$18.0 million increase in accounts receivable from the

\$20.0 million upfront payment pursuant to the Hansoh Agreement, net of \$2.0 million in withholding tax; and (ii) a \$1.5 million increase in prepaid expenses and other assets due to timing of expense recognition for our research and development costs, which was partially offset by a \$4.1 million increase in accounts payable and accrued expenses to support the advancement of our programs.

During the year ended December 31, 2020, net cash used in operating activities was \$36.9 million, which was driven by a net loss of \$45.4 million, offset by non-cash charges, including \$4.1 million of stock-based compensation expense and \$1.5 million related to the change in the fair value of our preferred stock tranche liability prior to settlement. Cash used in operating activities was partially offset by \$2.3 million in changes in operating assets and liabilities, including (i) an increase in accrued expenses of \$2.6 million to support the advancement of our programs, (ii) a \$0.9 million decrease in our R&D Incentive receivable and (iii) a \$0.6 million decrease in deferred IPO costs in connection with the recognition of these IPO costs, partially offset by a \$1.5 million increase in prepaid expenses and other assets due to the timing of expense recognition for our research and development costs.

Investing Activities

Net cash used in investing activities was \$1.0 million and \$0.3 million for the years ended December 31, 2021 and 2020, respectively. The cash used in investing activities in both periods was due to purchases of property and equipment.

Financing Activities

Net cash provided by financing activities was \$28.6 million for the year ended December 31, 2021, which was primarily related to (i) net proceeds of \$28.2 million received from sales of our common stock under the ATM Sales Agreement, after deducting sales agent commissions and before deducting offering expenses; and (ii) proceeds of \$0.4 million related to exercises of options to purchase common stock.

Net cash provided by financing activities was \$296.0 million for the year ended December 31, 2020, which was primarily related to (i) the net proceeds of \$55.8 million from our March 2020 issuance and sale of Series C Preferred Stock; (ii) the net proceeds of \$100.1 million from our April 2020 IPO, net of underwriters' discounts and commissions and offering expenses payable by us; and (iii) the net proceeds of \$140.1 million from our November 2020 public offering, net of underwriters' discounts and commissions and offering expenses payable by us.

Contractual Obligations and Commitments

The following table summarizes our contractual obligations as of December 31, 2021 and the effects of such obligations are expected to have on our liquidity and cash flow in future periods (in thousands):

	PAYMENTS DUE BY PERIOD				
	TOTAL	LESS THAN 1 YEAR	1 TO 3 YEARS	4 TO 5 YEARS	MORE THAN 5 YEARS
Operating lease commitments	\$ 1,147	\$ 913	\$ 234	\$ —	\$ —
Loan for leasehold improvements	65	65	—	—	—
Total	\$ 1,212	\$ 978	\$ 234	\$ —	\$ —

In March 2017, we entered into a lease agreement for our current headquarters located in Lexington, Massachusetts. In July and August 2019, we executed the first and second amendments to our lease, respectively, to expand the rental space to 10,417 square feet. In August 2021, we entered into a third amendment to our lease to extend the lease term through March 31, 2023 and to expand the rental space to 15,622 square feet. The table above includes future minimum lease payments under the non-cancelable lease arrangement.

A portion of the contractual obligations and commitments is related to the loan we received from the landlord of \$0.2 million for leasehold improvements. This will be repaid in full by December 2022, but principal payments became due in monthly installments beginning 18 months after the commencement of the lease, which was March 2017.

We have entered into a new lease for rental space in Lexington, Massachusetts, which will serve as our new principal executive office and includes laboratory space, which has not yet commenced. We expect to pay \$21.6 million over the lease term of eight years and four months, which we expect to begin in the fourth quarter of 2022.

We may incur contingent payments upon our achievement of clinical, regulatory and commercial milestones, as applicable, or royalty payments that we are required to make under the MGH Agreement pursuant to which we have in-licensed certain intellectual property. Due to the uncertainty of the achievement and timing of the events requiring payment under these agreements, the amounts to be paid by us are not fixed or determinable at this time and are excluded from the table above. Under the terms of the MGH Agreement, we are obligated to pay MGH designated amounts when any licensed product achieves certain developmental milestones. Following the commencement of commercial sales of the licensed products, we will pay designated amounts when certain milestone events occur. The development milestones and commercial milestones

range from \$50,000 to \$10.0 million depending upon the significance of the particular milestone. We are also required to pay MGH royalties on all sales of licensed products, with such royalties ranging from the low-single digits to mid-single digits of sales, as well as royalties ranging in the low-double digits of sublicense income depending on the stage of development of the relevant product or process when the sublicense is granted. In conjunction with the execution of the MGH Agreement, we issued MGH five percent of our outstanding fully diluted capital on April 15, 2016, or 358,674 shares of common stock, for proceeds of less than \$0.1 million.

Critical Accounting and Estimates

This management's discussion and analysis of financial condition and results of operations is based on our consolidated financial statements, which have been prepared in accordance with generally accepted accounting principles in the United States. The preparation of our consolidated financial statements and related disclosures requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities, costs and expenses and the disclosure of contingent assets and liabilities in our financial statements. We base our estimates on historical experience, known trends and events and various other factors that we believe are 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. We evaluate our estimates and assumptions on an ongoing basis. Our actual results may differ from these estimates under different assumptions or conditions.

While our significant accounting policies are described in greater detail in Note 2 to our consolidated financial statements appearing elsewhere in this Annual Report on Form 10-K, we believe that the following accounting policies are those most critical to the judgments and estimates used in the preparation of our consolidated financial statements.

Revenue Recognition

To date, our revenues have consisted solely of payments received related to research collaborations or licensing of intellectual property. We apply the revenue recognition guidance in accordance with Financial Accounting Standards Board, Accounting Standards Codification, or ASC, Subtopic 606, Revenue from Contracts with Customers, or ASC 606, which was adopted January 1, 2018 using the full retrospective method. Under ASC 606, we recognize revenue when our customers obtain control of promised goods or services, in an amount that reflects the consideration which we expect to receive in exchange for those goods or services.

To determine the appropriate amount of revenue to be recognized for arrangements determined to be within the scope of ASC 606, we perform the following five steps: (i) identification of the promised goods or services in the contract; (ii) determination of whether the promised goods or services are performance obligations including whether they are distinct in the context of the contract; (iii) measurement of the transaction price, including the constraint on variable consideration; (iv) allocation of the transaction price to the performance obligations; and (v) recognition of revenue when (or as) we satisfy each performance obligation. We only apply the five-step model to contracts when it is probable that we will collect consideration we are entitled to in exchange for the goods or services we transfer to our customer. All variable consideration, including milestones and royalties, is constrained until the cumulative revenue related to the consideration is no longer probable of reversal.

The consideration allocated to each performance obligation is recognized as revenue when control is transferred for the related goods or services. For performance obligations which consist of licenses and other promises, we utilize judgment to assess the nature of the combined performance obligation to determine whether the combined performance obligation is satisfied over time or at a point in time and, if over time, the appropriate method of measuring progress. We evaluate the measure of progress each reporting period and, if necessary, adjust the measure of performance and related revenue recognition. We currently measure progress according to the expenditure of research and development efforts, based on costs incurred, as this is the best indicator of performance.

We receive payments from our customers based on billing schedules established in each contract. Upfront payments and fees are recorded as deferred revenue upon receipt or when due until we satisfy our obligations under these arrangements. Amounts are recorded as accounts receivable when our right to consideration is unconditional.

Accrued Research and Development Expenses

As part of the process of preparing our consolidated financial statements, we are required to estimate our accrued research and development expenses. We make estimates of our accrued expenses as of each balance sheet date in the consolidated financial statements based on facts and circumstances known to us at that time. There may be instances in which payments made to our vendors will exceed the level of services provided and result in a prepayment of the expense. In accruing service fees, we estimate the time period over which services will be performed and the level of effort to be expended in each period. If the actual timing of the performance of services or the level of effort varies from the estimate, we adjust the accrual or the amount of prepaid expenses accordingly. Although we do not expect our estimates to be materially different from amounts actually incurred, our understanding of the status and timing of services performed relative to the actual status and timing of services performed may vary and may result in reporting amounts that are too high or too low in any particular period. To date, there have not been any material adjustments to our prior estimates of accrued research and development expenses.

Stock-Based Compensation

We account for all stock-based compensation awards granted to employees and non-employees as stock-based compensation expense at fair value. Our stock-based payments include stock options and grants of common stock, including common stock subject to vesting. The measurement date for awards is the date of grant, and stock-based compensation costs are recognized as expense over the requisite service period, which is generally the vesting period, on a straight-line basis. Our Black-Scholes option-pricing model requires the input of subjective assumptions, including the expected volatility of the price of our common stock and the expected term of the award. These estimates involve inherent uncertainties and the application of management's judgment. If factors change and these assumptions either increase or decrease, our stock-based compensation expense could materially differ in the future. Stock-based compensation expense is classified in the accompanying statements of operations based on the function to which the related services are provided. We recognize stock-based compensation expense for the portion of awards that have vested. Forfeitures are recorded as they occur. The fair value of each stock option grant is estimated on the date of grant using the Black-Scholes option-pricing model.

Recently Issued Accounting Pronouncements

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

Emerging Growth Company Status

In April 2012, the Jumpstart Our Business Startups Act of 2012, or the JOBS Act, was enacted. Section 107 of the JOBS Act provides that an "emerging growth company" may take advantage of the extended transition period provided in Section 7(a)(2)(B) of the Securities Act for complying with new or revised accounting standards. Therefore, an emerging growth company can delay the adoption of certain accounting standards until those standards would otherwise apply to private companies. We have irrevocably elected to avail ourselves of this extended transition period and, as a result, we will not adopt new or revised accounting standards on the relevant dates on which adoption of such standards is required for other public companies.

In addition, as an emerging growth company, we may take advantage of specified reduced disclosure and other requirements that are otherwise applicable generally to public companies. These provisions include:

- reduced disclosure about the compensation paid to our executive officers;
- not being required to submit to our stockholders' advisory votes on executive compensation or golden parachute arrangements;
- an exemption from the auditor attestation requirement in the assessment of our internal control over financial reporting pursuant to the Sarbanes-Oxley Act of 2002; and
- an exemption from new or revised financial accounting standards until they would apply to private companies and from compliance with any new requirements adopted by the Public Company Accounting Oversight Board requiring mandatory audit firm rotation.

We may take advantage of these exemptions until December 31, 2025 or such earlier time that we are no longer an emerging growth company. We would cease to be an emerging growth company on the date that is the earliest of (1) the last day of the fiscal year in which we have total annual gross revenues of \$1.07 billion or more; (2) December 31, 2025; (3) the date on which we have issued more than \$1.0 billion in nonconvertible debt during the previous three years; or (4) the date on which we are deemed to be a large accelerated filer under the rules of the Securities and Exchange Commission. We may choose to take advantage of some but not all of these exemptions.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

We are exposed to market risks in the ordinary course of our business. Market risk represents the risk of loss that may impact our financial position due to adverse changes in financial market prices and rates. Our market risk exposure is primarily the result of interest rate sensitivities.

Interest Rate Sensitivity

As of December 31, 2021 and December 31, 2020, we had cash and cash equivalents of \$230.0 million and \$265.9 million, respectively. Our exposure to interest rate sensitivity is impacted by changes in the underlying U.S. bank interest rates. Our surplus cash has been invested in money market fund accounts as well as interest-bearing savings accounts from time to time. We have not entered into investments for trading or speculative purposes. Due to the conservative nature of our investment portfolio, which is predicated on capital preservation of investments with short-term maturities, we do not believe an immediate one percentage point change in interest rates would have a material effect on the fair market value of our portfolio, and therefore we do not expect our operating results or cash flows to be significantly affected by changes in market interest rates.

As of December 31, 2021 and 2020, we had no debt outstanding that is subject to interest rate variability, as our only debt is related to our lease incentive allowance. Therefore, we are not subject to interest rate risk related to debt.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

The information required by this Item 8 is contained on pages F-1 through F-25 of this Annual Report on Form 10-K and is incorporated herein by reference.

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

None.

ITEM 9A. CONTROLS AND PROCEDURES

Evaluation of Disclosure Controls and Procedures

We maintain "disclosure controls and procedures," as defined in Rule 13a-15(e) and Rule 15d-15(e) under the Exchange Act that are designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the SEC's rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is accumulated and communicated to our management, including our principal executive and principal financial officers, as appropriate to allow timely decisions regarding required disclosure.

Our management, with the participation of our Chief Executive Officer and our Chief Financial Officer, evaluated the effectiveness of our disclosure controls and procedures as of December 31, 2021. Based on the evaluation of our disclosure controls and procedures as of December 31, 2021, our Chief Executive Officer and Chief Financial Officer concluded that, as of such date, our disclosure controls and procedures were effective at the reasonable assurance level.

Management's Annual Report on Internal Control Over Financial Reporting

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

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

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

Our management assessed the effectiveness of our internal control over financial reporting as of December 31, 2021. In making this assessment, management used the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission in *Internal Control—Integrated Framework* (2013 framework) (COSO). Based on its assessment, management concludes that, as of December 31, 2021, our internal control over financial reporting is effective based on those criteria.

This Annual Report on Form 10-K does not include an attestation report of our independent registered accounting firm regarding internal control over financial reporting due to a transition period established by rules of the SEC for an "emerging growth company" as defined in the Jumpstart Our Business Startups Act of 2012.

Changes in Internal Control over Financial Reporting

There were no changes in our internal control over financial reporting, as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act, that occurred during the fiscal quarter ended December 31, 2021 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting. We have not experienced any material impact to our internal controls over financial reporting despite the fact that certain of our employees are continuing their work outside of our office due to the COVID-19 pandemic. We are continually monitoring and assessing the impact of the COVID-19 pandemic on our internal controls to minimize any potential impact on the design and operating effectiveness of such controls.

Inherent Limitations on Effectiveness of Controls

Our disclosure controls and procedures and internal control over financial reporting are designed to provide reasonable assurance of achieving the desired control objectives. Our management recognizes that any control system, no matter how well designed and operated, is based upon certain judgments and assumptions and cannot provide absolute assurance that its objectives will be met. Similarly, an evaluation of controls cannot provide absolute assurance that misstatements due to error or fraud will not occur or that all control issues and instances of fraud, if any, have been detected.

ITEM 9B. OTHER INFORMATION

None.

ITEM 9C. DISCLOSURE REGARDING FOREIGN JURISDICTIONS THAT PREVENT INSPECTIONS

Not applicable.

PART III

We will file a definitive Proxy Statement for our 2022 Annual Meeting of Stockholders, or our 2022 Proxy Statement, with the SEC, pursuant to Regulation 14A, not later than 120 days after the end of our fiscal year. Accordingly, certain information required by Part III has been omitted under General Instruction G(3) to Form 10-K. Only those sections of the 2022 Proxy Statement that specifically address the items set forth herein are incorporated by reference.

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS, AND CORPORATE GOVERNANCE

The information required by this Item 10 will be included in our 2022 Proxy Statement and is incorporated herein by reference.

We have adopted a written Code of Business Conduct and Ethics, or the Code of Conduct, applicable to all of our employees, executive officers and directors, including our principal executive officer, principal financial officer and principal accounting officer. A current copy of the Code of Conduct is available on the Investors section of our website, www.kerostx.com, under "Corporate Governance." We intend to disclose on our website any amendments to, or waivers from, our Code of Conduct that are required to be disclosed pursuant to SEC rules.

ITEM 11. EXECUTIVE COMPENSATION

The information required by this Item 11 will be included in our 2022 Proxy Statement and is incorporated herein by reference.

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

The information required by this Item 12 will be included in our 2022 Proxy Statement and is incorporated herein by reference.

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS AND DIRECTOR INDEPENDENCE

The information required by this Item 13 will be included in our 2022 Proxy Statement and is incorporated herein by reference.

ITEM 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES

The information required by this Item 14 will be included in our 2022 Proxy Statement and is incorporated herein by reference.

PART IV

ITEM 15. EXHIBITS, FINANCIAL STATEMENT SCHEDULES

(a) The following documents are filed as part of this Annual Report on Form 10-K:

(1) The Consolidated Financial Statements required to be filed by Item 8 of this Annual Report on Form 10-K, and filed in this Item 15, are as follows:

	PAGE
Report of Independent Registered Public Accounting Firm (PCAOB ID 34)	F-2
Consolidated Balance Sheets	F-2
Consolidated Statements of Operations	F-3
Consolidated Statements of Convertible Preferred Stock and Stockholders' Equity (Deficit)	F-4
Consolidated Statements of Cash Flows	F-5
Notes to Consolidated Financial Statements	F-7

(2) The Consolidated Financial Statement Schedule have been omitted because they are either not applicable or the required information is included in the Consolidated Financial Statements or notes thereto listed in (a)(1) above.

(3) Exhibits are incorporated herein by reference or are filed with this Annual Report on Form 10-K as indicated below

(b) Exhibits

EXHIBIT NO.	DESCRIPTION	FORM	FILE NO.	EXHIBIT	FILING DATE
3.1	<u>Amended and Restated Certificate of Incorporation of the Registrant.</u>	8-K	001-39264	3.1	April 13, 2020
3.2	<u>Amended and Restated Bylaws of the Registrant.</u>	8-K	001-39264	3.2	April 13, 2020
4.1	<u>Amended and Restated Investors' Rights Agreement by and among the registrant and certain of its stockholders, dated as of March 2, 2020.</u>	S-1	333-237212	4.1	March 16, 2020
4.2	<u>Form of Common Stock Certificate.</u>	S-1/A	333-237212	4.2	April 1, 2020
4.3*	<u>Description of the Registrant's Securities.</u>				
10.1	<u>Form of Indemnity Agreement between the registrant and its directors and officers.</u>	S-1/A	333-237212	10.1	April 1, 2020
10.2+	<u>2017 Stock Incentive Plan, as amended.</u>	S-1	333-237212	10.2	March 16, 2020
10.3+	<u>Form of Stock Option Grant Notice and Option Agreement for the 2017 Stock Incentive Plan, as amended.</u>	S-1	333-237212	10.3	March 16, 2020
10.4+	<u>2020 Equity Incentive Plan.</u>	S-1/A	333-237212	10.4	April 1, 2020
10.5+	<u>Forms of Stock Option Grant Notice, Option Agreement, Notice of Exercise, Restricted Stock Unit Grant Notice and Restricted Stock Unit Award Agreement for the 2020 Equity Incentive Plan.</u>	S-1/A	333-237212	10.5	April 1, 2020
10.6+	<u>2020 Employee Stock Purchase Plan.</u>	S-1/A	333-237212	10.6	April 1, 2020
10.7+	<u>Offer Letter Agreement by and between the registrant and Jasbir Sehra, dated as of December 14, 2015.</u>	S-1	333-237212	10.7	March 16, 2020
10.8+	<u>Offer Letter Agreement by and between the registrant and Jenn Lachey, dated as of April 20, 2016.</u>	S-1	333-237212	10.8	March 16, 2020

10.9#	<u>Exclusive Patent License Agreement by and between the registrant and The General Hospital Corporation, d/b/a Massachusetts General Hospital, or MGH, dated as of April 5, 2016, as amended by Amendment #1 by and between the registrant and The Brigham and Women's Hospital, Inc. on May 12, 2017 and by Amendment #2 by and between the registrant and MGH on February 23, 2018.</u>	S-1	333-237212	10.10	March 16, 2020
10.10*#	<u>License Agreement by and between the registrant and Hansoh (Shanghai) Healthtech Co., Ltd., dated as of December 12, 2021, as amended by Amendment No. 1 by and between the registrant and Hansoh (Shanghai) Healthtech Co., Ltd., dated as of February 10, 2022.</u>				
10.11	<u>Lease Agreement by and between the registrant and 128 Spring Street Lexington, LLC, dated March 20, 2017, as amended by the First Amendment to Lease Agreement by and between the registrant and 128 Spring Street Lexington, LLC, dated July 1, 2019 and by the Second Amendment to Lease Agreement by and between the registrant and 128 Spring Street Lexington, LLC, dated August 8, 2019.</u>	S-1	333-237212	10.12	March 16, 2020
10.12	<u>Third Amendment to Lease Agreement by and between the registrant and 99 Hayden LLC, dated August 4, 2021.</u>	10-Q	001-39264	10.3	August 5, 2021
10.13+	<u>Offer Letter Agreement by and between the registrant and Keith Regnante, dated as of February 7, 2020.</u>	S-1	333-237212	10.13	March 16, 2020
10.14+	<u>Employment Agreement by and between the registrant and Jasbir Seehra, dated as of March 31, 2020, effective as of April 13, 2020.</u>	S-1/A	333-237212	10.14	April 1, 2020
10.15+	<u>Employment Agreement by and between the registrant and Jenn Lachey, dated as of March 31, 2020, effective as of April 13, 2020.</u>	S-1/A	333-237212	10.15	April 1, 2020
10.16+	<u>Employment Agreement by and between the registrant and Keith Regnante, dated as of March 31, 2020, effective as of April 13, 2020.</u>	S-1/A	333-237212	10.17	April 1, 2020
10.17+	<u>Separation and Release Agreement by and between the registrant and Claudia Ordonez, dated and effective as of July 30, 2021.</u>	8-K	001-39264	10.1	August 2, 2021
10.18+	<u>Employment Agreement by and between the registrant and Simon Cooper, dated as of July 30, 2021 effective as of August 2, 2021.</u>	8-K	001-39264	10.2	August 2, 2021
10.19+	<u>Employment Agreement by and between the registrant and Christopher Rovaldi, dated as of January 28, 2022 effective as of February 1, 2022.</u>	8-K	001-39264	10.1	January 31, 2022
10.20*+	<u>First Amendment to the Employment Agreement by and between the registrant and Jenn Lachey, dated as of January 1, 2022.</u>				
10.21*+	<u>First Amendment to the Employment Agreement by and between the registrant and Keith Regnante, dated as of January 1, 2022.</u>				
10.22*+	<u>First Amendment to the Employment Agreement by and between the registrant and Simon Cooper, dated as of January 1, 2022.</u>				
10.23	<u>Indenture of Lease by and between the registrant and Revolution Labs Owner, LLC, dated September 7, 2021.</u>	10-Q	001-39264	10.1	November 4, 2021
21.1*	<u>Subsidiaries of Keros Therapeutics, Inc.</u>				
23.1*	<u>Consent of Independent Registered Public Accounting Firm.</u>				

- 31.1* Certification of Principal Executive Officer Pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of 1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
- 31.2* Certification of Principal Financial Officer Pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of 1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
- 32.1** Certification of Principal Executive Officer and Principal Financial Officer Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
- 101.INS Inline XBRL Instance Document - the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document
- 101.SCH* Inline XBRL Taxonomy Extension Schema Document
- 101.CAL* Inline XBRL Taxonomy Extension Calculation Linkbase Document
- 101.DEF* Inline XBRL Taxonomy Extension Definition Linkbase Document
- 101.LAB* Inline XBRL Taxonomy Extension Label Linkbase Document
- 101.PRE* Inline XBRL Taxonomy Extension Presentation Linkbase Document
- 104* Cover Page Interactive Data File - the cover page interactive data is embedded within the Inline XBRL document or included within the Exhibit 101 attachments

* Filed herewith

** Furnished herewith

+ Indicates management contract or compensatory plan.

Certain portions of this exhibit (indicated by asterisks) have been omitted because they are not material and would likely cause competitive harm to Keros Therapeutics, Inc. if publicly disclosed.

ITEM 16. FORM 10-K SUMMARY

Not applicable.

SIGNATURES

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

Keros Therapeutics, Inc.

Date: March 9, 2022

By: /s/ Jasbir Seehra
Jasbir Seehra, Ph.D.
Chief Executive Officer
(Principal Executive Officer)

POWER OF ATTORNEY AND SIGNATURES

KNOW ALL BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints Jasbir Seehra, Ph.D. and Keith Regnante, and each of them, as his or her true and lawful attorneys-in-fact and agents, with full power of substitution for him or her, and in his or her name in any and all capacities, to sign any and all amendments to this Annual Report on Form 10-K, and to file the same, with exhibits thereto and other documents in connection therewith, with the U.S. Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done therewith, as fully to all intents and purposes as he or she might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents, and either of them, his or her substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

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

<u>NAME</u>	<u>TITLE</u>	<u>DATE</u>
<u>/s/ Jasbir Seehra</u> Jasbir Seehra, Ph.D.	Chief Executive Officer and Director (Principal Executive Officer)	March 9, 2022
<u>/s/ Keith Regnante</u> Keith Regnante	Chief Financial Officer (Principal Financial Officer and Principal Accounting Officer)	March 9, 2022
<u>/s/ Nima Farzan</u> Nima Farzan	Director	March 9, 2022
<u>/s/ Carl Gordon</u> Carl Gordon, Ph.D., C.F.A.	Director	March 9, 2022
<u>/s/ Mary Ann Gray</u> Mary Ann Gray, Ph.D.	Director	March 9, 2022
<u>/s/ Tomer Kariv</u> Tomer Kariv	Director	March 9, 2022
<u>/s/ Julius Knowles</u> Julius Knowles	Director	March 9, 2022
<u>/s/ Ran Nussbaum</u> Ran Nussbaum	Director	March 9, 2022

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the stockholders and the Board of Directors of Keros Therapeutics, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Keros Therapeutics, Inc. and subsidiaries (the "Company") as of December 31, 2021 and 2020, the related consolidated statements of operations, convertible preferred stock and stockholders' equity (deficit), and cash flows, for each of the two years in the period ended December 31, 2021, and the related notes (collectively referred to as the "financial statements"). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2021 and 2020, and the results of its operations and its cash flows for each of the two years in the period ended December 31, 2021, in conformity with accounting principles generally accepted in the United States of America.

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/ Deloitte & Touche LLP

Boston, Massachusetts

March 9, 2022

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

KEROS THERAPEUTICS, INC.

Consolidated Balance Sheets
(In thousands, except share and per share data)

	DECEMBER 31,	
	2021	2020
ASSETS		
CURRENT ASSETS:		
Cash and cash equivalents	\$ 230,042	\$ 265,876
Accounts receivable	18,000	—
Prepaid expenses and other current assets	3,398	1,850
Total current assets	251,440	267,726
Operating lease right-of-use assets	1,067	878
Property and equipment, net	1,335	724
Restricted cash	1,327	115
Other long term assets	82	—
TOTAL ASSETS	\$ 255,251	\$ 269,443
LIABILITIES AND STOCKHOLDERS' EQUITY		
CURRENT LIABILITIES:		
Accounts payable	\$ 3,645	\$ 2,149
Current portion of operating lease liabilities	862	423
Accrued expenses and other current liabilities	7,339	4,612
Total current liabilities	11,846	7,184
Operating lease liabilities, net of current portion	231	476
Other liabilities	—	62
Total liabilities	12,077	7,722
COMMITMENTS AND CONTINGENCIES (Note 12)		
STOCKHOLDERS' EQUITY:		
Common stock, par value of \$0.0001 per share; 200,000,000 and 200,000,000 shares authorized as of December 31, 2021 and December 31, 2020, respectively; 23,974,834 and 23,192,866 shares issued and outstanding as of December 31, 2021 and December 31, 2020, respectively	2	2
Additional paid-in capital	366,927	326,730
Accumulated deficit	(123,755)	(65,011)
Total stockholders' equity	243,174	261,721
TOTAL LIABILITIES AND STOCKHOLDERS' EQUITY	\$ 255,251	\$ 269,443

See notes to consolidated financial statements.

KEROS THERAPEUTICS, INC.

Consolidated Statements of Operations
(In thousands, except share and per share data)

	YEAR ENDED DECEMBER 31,	
	2021	2020
REVENUE:		
Research collaboration revenue	\$ 20,100	\$ —
Total revenue	20,100	—
OPERATING EXPENSES:		
Research and development	(55,143)	(33,860)
General and administrative	(21,330)	(12,797)
Total operating expenses	(76,473)	(46,657)
LOSS FROM OPERATIONS	(56,373)	(46,657)
OTHER INCOME (EXPENSE), NET:		
Interest expense, net	(4)	(6)
Research and development incentive income	—	2,460
Change in fair value of preferred stock tranche obligation	—	(1,490)
Other income (expense), net	(356)	160
Total other income (expense), net	(360)	1,124
Loss before income taxes	(56,733)	(45,533)
Income tax (provision) benefit	(2,011)	172
Net loss	\$ (58,744)	\$ (45,361)
Net loss attributable to common stockholders—basic and diluted	\$ (58,744)	\$ (45,361)
Net loss per share attributable to common stockholders—basic and diluted	\$ (2.52)	\$ (2.93)
Weighted-average common stock outstanding—basic and diluted	23,333,914	15,506,397

See notes to consolidated financial statements.

KEROS THERAPEUTICS, INC.

Consolidated Statements of Convertible Preferred Stock and Stockholders' Equity (Deficit)
(In thousands, except share and per share data)

	CONVERTIBLE PREFERRED STOCK										COMMON STOCK \$0.0001 PAR VALUE	ADDITIONAL PAID-IN CAPITAL	ACCUMULATED DEFICIT	TOTAL STOCKHOLDERS' EQUITY (DEFICIT)
	\$0.0001 PAR VALUE SERIES A		\$0.0001 PAR VALUE SERIES A-1		\$0.0001 PAR VALUE SERIES B-1		\$0.0001 PAR VALUE SERIES C		SHARES	AMOUNT				
	SHARES	AMOUNT	SHARES	AMOUNT	SHARES	AMOUNT	SHARES	AMOUNT						
BALANCE, January 1, 2020	4,607,652	\$ 9,891	368,612	\$ 944	1,579,043	\$ 9,106	—	—	2,429,705	\$ 1	\$ 203	\$ (19,650)	\$ (19,446)	
Issuance of Series C convertible preferred stock, net of issuance costs of \$227	—	—	—	—	—	—	4,169,822	55,781	—	—	(8)	—	(8)	
Settlement of preferred stock tranche liability	—	—	—	—	—	—	—	—	—	—	6,446	—	6,446	
Conversion of convertible preferred stock upon initial public offering	(4,607,652)	(9,891)	(368,612)	(944)	(1,579,043)	(9,106)	(4,169,822)	(55,781)	10,725,129	1	75,721	—	75,722	
Initial public offering, net of underwriting commissions and offering costs	—	—	—	—	—	—	—	—	6,900,000	—	100,123	—	100,123	
Issuance of common stock, net of underwriting discounts, commissions and offering costs of \$9,390	—	—	—	—	—	—	—	—	2,990,000	—	140,110	—	140,110	
Exercise of common stock options	—	—	—	—	—	—	—	—	113,475	—	38	—	38	
Vesting of restricted stock	—	—	—	—	—	—	—	—	34,557	—	—	—	—	
Stock-based compensation	—	—	—	—	—	—	—	—	—	—	4,097	—	4,097	
Net loss	—	—	—	—	—	—	—	—	—	—	—	(45,361)	(45,361)	
BALANCE, December 31, 2020	—	\$ —	—	\$ —	—	\$ —	—	\$ —	23,192,866	2	\$ 326,730	\$ (65,011)	\$ 261,721	
Issuance of common stock under the ATM agreement, net of commissions and offering cost of \$475	—	—	—	—	—	—	—	—	520,000	—	28,096	—	28,096	
Exercise of common stock options	—	—	—	—	—	—	—	—	261,968	—	379	—	379	
Stock-based compensation	—	—	—	—	—	—	—	—	—	—	11,722	—	11,722	
Net loss	—	—	—	—	—	—	—	—	—	—	—	(58,744)	(58,744)	
BALANCE, December 31, 2021	—	\$ —	—	\$ —	—	\$ —	—	\$ —	23,974,834	2	\$ 366,927	\$ (123,755)	\$ 243,174	

See notes to consolidated financial statements.

KEROS THERAPEUTICS, INC.

Consolidated Statements of Cash Flows
(In thousands)

	YEAR ENDED DECEMBER	
	31,	
	2021	2020
CASH FLOWS FROM OPERATING ACTIVITIES:		
Net loss	\$ (58,744)	\$ (45,361)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation expense	378	278
Loss on disposal of fixed asset	46	—
Stock-based compensation expense	11,722	4,097
Non-cash lease expense	520	327
Changes in fair value of preferred stock tranche obligation	—	1,490
Changes in operating assets and liabilities:		
Accounts receivable	(18,000)	—
Research and development incentive receivable	—	922
Prepaid expenses and other current assets	(1,548)	(1,469)
Deferred IPO costs	—	604
Accounts payable	1,485	61
Right-of-use assets and operating lease liabilities	(597)	(376)
Accrued expenses and other current liabilities	2,652	2,590
Other liabilities	(62)	(57)
Net cash used in operating activities	<u>(62,148)</u>	<u>(36,894)</u>
CASH FLOWS FROM INVESTING ACTIVITIES:		
Purchase of property and equipment	(1,024)	(294)
Net cash used in investing activities	<u>(1,024)</u>	<u>(294)</u>
CASH FLOWS FROM FINANCING ACTIVITIES:		
Proceeds from issuance of common stock, net of offering cost	28,171	—
Proceeds from issuance of Series C preferred stock	—	56,000
Payment of Series C preferred stock issuance costs	—	(227)
Proceeds from issuance of common stock, from the initial public offering, net of underwriting discounts of \$7,728	—	102,672
Payment of initial public offering costs	—	(2,549)
Proceeds from issuance of common stock, from follow-on financing, net of underwriting discounts of \$8,970	—	140,530
Payment of follow-on financing offering costs	—	(420)
Proceeds from exercise of stock options	379	38
Net cash provided by financing activities	<u>28,550</u>	<u>296,044</u>
NET (DECREASE) INCREASE IN CASH, CASH EQUIVALENTS AND RESTRICTED CASH	(34,622)	258,856
Cash, cash equivalents and restricted cash at beginning of year	265,991	7,135
Cash, cash equivalents and restricted cash at end of year	<u>\$ 231,369</u>	<u>\$ 265,991</u>
SUPPLEMENTAL DISCLOSURE OF CASH FLOW INFORMATION:		
Settlement of preferred stock tranche obligation	\$ —	\$ 6,446
Property and equipment purchases still in accounts payable	\$ 11	\$ —
Issuance cost still in accrued and accounts payable	\$ 75	\$ —
Conversion of preferred stock into common stock upon closing of initial public offering	\$ —	\$ 75,714

The following table provides a reconciliation of the cash and cash equivalents and restricted cash as of each of the periods shown above:

	YEAR ENDED DECEMBER 31,	
	2021	2020
Cash and cash equivalents	\$ 230,042	\$ 265,876
Restricted cash	1,327	115
Total cash, cash equivalents and restricted cash	<u>\$ 231,369</u>	<u>\$ 265,991</u>

See notes to consolidated financial statements.

KEROS THERAPEUTICS, INC.

Notes to Consolidated Financial Statements

1. NATURE OF BUSINESS AND BASIS OF PRESENTATION

Keros Therapeutics, Inc. (“Keros” or the “Company”) was incorporated in 2015 as a Delaware corporation. Its principal offices are in Lexington, Massachusetts. The Company is a clinical-stage biopharmaceutical company focused on the discovery, development and commercialization of novel treatments for patients suffering from hematological and musculoskeletal disorders with high unmet medical need.

The Company’s lead protein therapeutic product candidate, KER-050, is an engineered ligand trap comprised of a modified ligand-binding domain of the transforming growth factor-beta (“TGF-β”) receptor known as activin receptor type IIA that is fused to the portion of the human antibody known as the Fc domain. KER-050 is being developed for the treatment of low blood cell counts (“cytopenias”), including anemia and thrombocytopenia, in patients with myelodysplastic syndromes (“MDS”) and in patients with myelofibrosis. The Company has initiated a Phase 2 clinical trial in patients with MDS and reported preliminary data from Part 1 of this trial most recently in December 2021.

The Company’s lead small molecule product candidate, KER-047, is designed to selectively and potently inhibit activin receptor-like kinase-2 (“ALK2”), a TGF-β receptor. KER-047 is being developed for the treatment of anemia resulting from iron imbalance as a direct consequence of elevated ALK2 signaling, including the Company’s initial target, iron-refractory iron deficiency anemia (“IRIDA”). In December 2020, the Company reported topline data from its completed Phase 1 clinical trial of KER-047 in healthy volunteers.

The Company’s third product candidate, KER-012, is designed to bind to and inhibit the signaling of TGF-β ligands that suppress bone growth, including activin A and activin B, to potentially promote bone growth. KER-012 is being developed for the treatment of pulmonary arterial hypertension (“PAH”) and for the treatment of disorders associated with bone loss, such as osteoporosis and osteogenesis imperfecta. In September 2021, the Company commenced a Phase 1 clinical trial of KER-012 in healthy volunteers.

Since its inception in 2015, the Company has devoted the majority of its resources to business planning, research and development of its product candidates, including conducting clinical trials and preclinical studies, raising capital and recruiting management and technical staff to support these operations. To date, the Company has not generated any revenue from product sales as none of its product candidates have been approved for commercialization.

In May 2021, the Company filed a registration statement on Form S-3, which was automatically effective upon filing. Pursuant to this registration statement, the Company may issue up to \$150.0 million in common stock in sales deemed to be an “at the market offering,” as defined by the Securities Act, and, so long as the Company qualifies as a “well-known seasoned issuer” as defined in Rule 405 of the Securities Act, an unspecified amount of shares of the Company common stock, preferred stock, debt securities and warrants.

Liquidity and Capital Resources

The Company’s consolidated financial statements have been prepared on the basis of the Company continuing as a going concern for the next 12 months. Management believes that the Company’s existing \$230.0 million in cash and cash equivalents, will allow the Company to continue its operations for at least the next 12 months. In the absence of a significant source of recurring revenue, the continued viability of the Company beyond that point is dependent on its ability to continue to raise additional capital to finance its operations. If the Company is unable to obtain additional funding, the Company may be forced to delay, reduce or eliminate some or all of its research and development programs, product portfolio expansion or commercialization efforts, which could adversely affect its business prospects, or the Company may be unable to continue operations.

The accompanying consolidated financial statements are prepared in conformity with accounting principles generally accepted in the United States of America (“U.S. GAAP”) and include the accounts of the Company and its wholly owned subsidiaries, Keros Therapeutics Australia Pty Ltd (“Keros Australia”) and Keros Security Corporation, a Massachusetts securities corporation.

2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Principles of Consolidation

The accompanying consolidated financial statements include the accounts of the Company, Keros Australia and Keros Security Corporation. All intercompany accounts and transactions have been eliminated in consolidation.

Use of Estimates

The preparation of financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenue, and expenses, and the disclosure of contingent

assets and liabilities as of and during the reporting period. The Company bases its estimates and assumptions on historical experience when available and on various factors that it believes to be reasonable under the circumstances. This process may result in actual results differing materially from those estimated amounts used in the preparation of the financial statements if these results differ from historical experience, or other assumptions do not turn out to be substantially accurate, even if such assumptions are reasonable when made. Significant estimates and assumptions reflected in these consolidated financial statements include, but are not limited to, useful lives assigned to property and equipment, the fair values of common and preferred stock and the fair value of the preferred stock tranche obligation. The Company assesses estimates on an ongoing basis; however, actual results could materially differ from those estimates.

Fair Value Measurements

Certain assets and liabilities are reported on a recurring basis at fair value. Fair value is defined as the exchange price that would be received for an asset or paid to transfer a liability (an exit price) in the principal or most advantageous market for the asset or liability in an orderly transaction between market participants on the measurement date. Valuation techniques used to measure fair value must maximize the use of observable inputs and minimize the use of unobservable inputs. Financial assets and liabilities carried at fair value are to be classified and disclosed in one of the following three levels of the fair value hierarchy, of which the first two are considered observable and the last is considered unobservable:

Level 1—Quoted prices in active markets for identical assets or liabilities.

Level 2—Observable inputs (other than Level 1 quoted prices), such as quoted prices in active markets for similar assets or liabilities, quoted prices in markets that are not active for identical or similar assets or liabilities, or other inputs that are observable or can be corroborated by observable market data.

Level 3—Unobservable inputs that are supported by little or no market activity and that are significant to determining the fair value of the assets or liabilities, including pricing models, discounted cash flow methodologies and similar techniques.

To the extent that the valuation is based on models or inputs that are less observable or unobservable in the market, the determination of fair value requires more judgment. Accordingly, the degree of judgment exercised by the Company in determining fair value is greatest for instruments categorized in Level 3. A financial instrument's level within the fair value hierarchy is based on the lowest level of any input that is significant to the fair value measurement.

An entity may choose to measure many financial instruments and certain other items at fair value at specified election dates. Subsequent unrealized gains and losses on items for which the fair value option has been elected will be reported in earnings. The Company had no financial instruments measured at level 3 as of December 31, 2021.

Cash, Cash Equivalents, and Restricted Cash

Cash and cash equivalents consist of standard checking accounts and money market funds. The Company considers all highly liquid investments with an original maturity of 90 days or less at the date of purchase to be cash equivalents.

The Company's cash equivalents, which are funds held in a money market account, are measured at fair value on a recurring basis. The carrying amount of cash equivalents was \$230.0 million and \$262.0 million as of December 31, 2021 and 2020, respectively, which approximates fair value and was determined based upon Level 1 inputs. The money market account is valued using quoted market prices with no valuation adjustments applied and is categorized as Level 1.

The Company had restricted cash of \$1.3 million and \$0.1 million in the form of a certificate of deposit related to its operating leases in Lexington, Massachusetts as of December 31, 2021 and 2020, respectively.

Concentrations of Credit Risk

Financial instruments that potentially subject us to significant concentration of credit risk consist primarily of cash and cash equivalents. The Company may maintain deposits in financial institutions in excess of government insured limits. The Company believes that it is not exposed to significant credit risk as its deposits are held at financial institutions that management believes to be of high credit quality and the Company has not experienced any losses on these deposits. As of December 31, 2021 and 2020, the Company's cash and cash equivalents were held with three financial institutions. The Company believes that the market risk arising from its holdings of these financial instruments is mitigated based on the fact that many of these securities are either government-backed or of high credit rating.

Property and Equipment

Property and equipment are recorded at cost. Expenditures for repairs and maintenance are expensed as incurred. When assets are retired or disposed of, the assets and related accumulated depreciation are derecognized from the accounts, and

any resulting gain or loss is included in the determination of net loss. Depreciation is calculated using the straight-line method over the estimated useful lives of the related assets as follows:

	ESTIMATED USEFUL LIFE
Computer equipment and software	3 years
Laboratory equipment	5 years
Office furniture	5 years
Leasehold improvements	lesser of useful life or remaining lease term

Impairment of Long-Lived Assets

The Company evaluates its long-lived assets for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. Recoverability of assets to be held and used is measured by a comparison of the carrying amount of an asset to future undiscounted net cash flows expected to be generated by the asset. If such assets are considered to be impaired, the impairment to be recognized is measured by the amount by which the carrying amount of the assets exceed the fair value of the assets. Assets to be disposed of are reported at the lower of the carrying amount or fair value less costs to sell. To date, no impairments have been recognized for these assets.

Leases

The Company accounts for its leases under Accounting Standards Codification (“ASC”) Topic 842, *Leases* (“ASC 842”). At the inception of an arrangement, the Company determines whether the arrangement is or contains a lease based on the unique facts and circumstances present in the arrangement. Leases with a term greater than 12 months are recognized on the balance sheet as ROU assets and current and non-current lease liabilities, as applicable. The Company has elected not to recognize on the balance sheet leases with terms of 12 months or less. The Company typically only includes an initial lease term in its assessment of a lease arrangement. Options to renew a lease are not included in the Company’s assessment unless there is reasonable certainty that the Company will renew. The Company monitors its material leases on a quarterly basis.

Operating lease liabilities and their corresponding ROU assets are recorded based on the present value of future lease payments over the expected remaining lease term. Lease cost for operating leases is recognized on a straight-line basis over the lease term as an operating expense. Certain adjustments to the ROU asset may be required for items such as lease prepayments or incentives received. The interest rate implicit in lease contracts is typically not readily determinable. As a result, the Company utilizes its incremental borrowing rate, which reflects the fixed rate at which the Company could borrow on a collateralized basis the amount of the lease payments in the same currency, for a similar term, in a similar economic environment. In transition to ASC 842, the Company utilized the remaining lease term of its lease in determining the appropriate incremental borrowing rate.

For all asset classes of its leases, the Company has elected to account for the lease and non-lease components together for existing classes of underlying assets.

Guarantees and Indemnifications

As permitted under Delaware law, the Company indemnifies its officers, directors, consultants and employees for certain events or occurrences that happen by reason of the relationship with, or position held at, the Company. Through December 31, 2021, the Company had not experienced any losses related to these indemnification obligations, and no claims were outstanding. The Company does not expect significant claims related to these indemnification obligations and, consequently, concluded that the fair value of these obligations is negligible, and no related liabilities have been established.

Research and Development Costs

Research and development costs are charged to expense as incurred. Research and development costs consist of expenses incurred in performing research and development activities, including salaries and benefits, materials and supplies, preclinical expenses, stock-based compensation expense, depreciation of equipment, contract services, facilities, and other outside expenses. Costs for external development activities are recognized based on an evaluation of the progress to completion of specific tasks using information provided to the Company by its vendors. Payments for these activities are based on the terms of the individual arrangements, which may differ from the pattern of costs incurred, and are reflected in the consolidated financial statements as prepaid expense or accrued research and development expense.

Nonrefundable advance payments for goods or services to be received in the future for use in research and development activities are recorded as prepaid expenses and expensed as the related goods are delivered or the services are performed.

Research and Development Incentive

The Australian research and development tax incentive program provides tax offsets to eligible companies that engage in research and development activities and has two core components:

- 43.5% refundable tax offset for certain eligible research and development entities with an aggregated turnover of less than \$20.0 million per annum; and
- 38.5% non-refundable tax offset for all other eligible research and development entities. Unused offset amounts may be able to be carried forward for use in future income years.

The Company is eligible to participate in an Australian research and development tax incentive program under which the Company is eligible to receive a cash refund from the Australian Taxation Office for a percentage of the research and development costs expended by the Company in Australia.

The Company's estimate of the cash refund it expects to receive related to the Australian research and development tax incentive program is included in other assets in the accompanying consolidated balance sheet and such amounts are recorded as research and development incentive income in the statement of operations. The Company recognizes research and development incentive income when there is reasonable assurance that the income will be received, the relevant expenditure has been incurred, and the consideration can be reliably measured. The Company has no research and development incentive receivable and other income from Australian research and development incentives of \$0.0 million and \$2.5 million for the years ended December 31, 2021 and 2020, respectively, related to refundable research and development incentive income payments in Australia.

Revenue Recognition

To date, the Company has earned revenue under the license agreement with Novo Nordisk A/S, which was terminated in October 2020, the license agreement with Neurona Therapeutics, Inc. ("Neurona") (see Note 13) and the license agreement with Hansoh (Shanghai) Healthtech Co., Ltd. ("Hansoh") (see Note 13).

The Company recognizes revenue in accordance with ASC Topic 606, *Revenue from Contracts with Customers* ("ASC 606"). The Company enters into certain agreements that are within the scope of ASC 606, under which the Company licenses, may license or grants an option to license rights to certain of the Company's product candidates and performs research and development services in connection with such arrangements. The terms of these arrangements typically include payment of one or more of the following: non-refundable, upfront fees; reimbursement of research and development costs; development, clinical, regulatory and commercial sales milestone payments, and royalties on net sales of licensed products.

Under ASC 606, an entity recognizes revenue when its customer obtains control of promised goods or services, in an amount that reflects the consideration which the entity expects to receive in exchange for those goods or services. To determine the appropriate amount of revenue to be recognized for arrangements determined to be within the scope of ASC 606, the Company performs the following five steps: (i) identification of the promised goods or services in the contract; (ii) determination of whether the promised goods or services are performance obligations including whether they are distinct; (iii) measurement of the transaction price, including the constraint on variable consideration; (iv) allocation of the transaction price to the performance obligations; and (v) recognition of revenue when (or as) the Company satisfies each performance obligation. The Company only applies the five-step model to contracts when it is probable that the entity will collect consideration it is entitled to in exchange for the goods or services it transfers to the customer.

The promised goods or services in the Company's arrangements typically consist of a license, or option to license, rights to the Company's intellectual property or research and development services. The Company provides options to additional items in such arrangements, which are accounted for as separate contracts when the customer elects to exercise such options, unless the option provides a material right to the customer. Performance obligations are promised goods or services in a contract to transfer a distinct good or service to the customer and are considered distinct when (i) the customer can benefit from the good or service on its own or together with other readily available resources and (ii) the promised good or service is separately identifiable from other promises in the contract. In assessing whether promised goods or services are distinct, the Company considers factors such as the stage of development of the underlying intellectual property, the capabilities of the customer to develop the intellectual property on its own or whether the required expertise is readily available and whether the goods or services are integral or dependent to other goods or services in the contract.

The Company estimates the transaction price based on the amount expected to be received for transferring the promised goods or services in the contract. The consideration may include fixed consideration and variable consideration. At the inception of each arrangement that includes variable consideration, the Company evaluates the amount of potential payment and the likelihood that the payments will be received. The Company utilizes either the most likely amount method or expected value method to estimate the amount expected to be received based on which method best predicts the amount expected to be received. The amount of variable consideration that is included in the transaction price may be constrained and is included in the transaction price only to the extent that it is probable that a significant reversal in the amount of the cumulative revenue recognized will not occur in a future period.

The Company's contracts often include development and regulatory milestone payments that are assessed under the most likely amount method and constrained if it is probable that a significant revenue reversal would occur. Milestone payments that are not within the Company's control or the licensee's control, such as regulatory approvals, are not considered probable of being achieved until those approvals are received. At the end of each reporting period, the Company re-evaluates the probability of achievement of such development and clinical milestones and any related constraint, and if necessary, adjusts its estimate of the overall transaction price. Any such adjustments are recorded on a cumulative catch-up basis, which would affect collaboration and other research and development revenue in the period of adjustment.

For arrangements that include sales-based royalties, including milestone payments based on the level of sales, and the license is deemed to be the predominant item to which the royalties relate, the Company recognizes revenue at the later of (i) when the related sales occur, or (ii) when the performance obligation to which some or all of the royalty has been allocated has been satisfied (or partially satisfied). To date, the Company has not recognized any royalty revenue resulting from any of the Company's collaboration or strategic alliance arrangements.

The Company allocates the transaction price based on the estimated standalone selling price. The Company must develop assumptions that require judgment to determine the stand-alone selling price for each performance obligation identified in the contract. The Company utilizes key assumptions to determine the stand-alone selling price, which may include other comparable transactions, pricing considered in negotiating the transaction and the estimated costs. Variable consideration is allocated specifically to one or more performance obligations in a contract when the terms of the variable consideration relate to the satisfaction of the performance obligation and the resulting amounts allocated are consistent with the amounts the Company would expect to receive for the satisfaction of each performance obligation.

The consideration allocated to each performance obligation is recognized as revenue when control is transferred for the related goods or services. For performance obligations which consist of licenses and other promises, the Company utilizes judgment to assess the nature of the combined performance obligation to determine whether the combined performance obligation is satisfied over time or at a point in time and, if over time, the appropriate method of measuring progress. The Company evaluates the measure of progress each reporting period and, if necessary, adjusts the measure of performance and related revenue recognition.

The Company receives payments from its customers based on billing schedules established in each contract. Upfront payments and fees are recorded as deferred revenue upon receipt or when due until the Company performs its obligations under these arrangements. Amounts are recorded as accounts receivable when the Company's right to consideration is unconditional.

Foreign Currency Transactions

The functional currency for the Company's wholly owned foreign subsidiary, Keros Australia, is the United States dollar. All foreign currency transaction gains and losses are recognized in the consolidated statement of operations.

Segment Information

Operating segments are identified as components of an enterprise about which separate discrete financial information is made available for evaluation by the chief operating decision maker ("CODM") in making decisions regarding resource allocation and assessing performance. The CODM is the Company's chief executive officer. The Company manages its operations as a single segment for the purposes of assessing performance and making operating decisions. The Company's singular concentration is focused on the discovery and development of breakthrough therapeutics for hematological and musculoskeletal disorders with high unmet medical need.

Common Stock Valuation

Prior to the Company's initial public offering ("IPO") in April 2020, due to the absence of an active market for the Company's common stock, the Company utilized methodologies in accordance with the framework of the American Institute of Certified Public Accountants Technical Practice Aid (*Valuation of Privately-Held Company Equity Securities Issued as Compensation*) to estimate the fair value of its common stock. Prior to the IPO, the fair value of the shares of common stock underlying the stock-based awards were determined by the Company's board of directors (the "Board") with input from management. Since there was no public market for the common stock prior to April 8, 2020, the Board had determined the fair value of the common stock at the time of grant of the stock-based award by considering a number of objective and subjective factors, including having valuations of the common stock performed by a third-party valuation specialist. Following the closing of the initial public offering, the fair value of the Company's common stock is determined based on the quoted market price of the common stock.

Convertible Preferred Stock

The Company has classified convertible preferred stock, referred to as preferred stock, as temporary equity in the accompanying consolidated balance sheet due to terms that allow for redemption of the shares in cash upon certain change in control events that are outside of the Company's control, including sale or transfer of control of the Company as holders of the preferred stock could cause redemption of the shares in these situations. Subsequent adjustments of the carrying values to the ultimate redemption values will be made only when it becomes probable that such a liquidation event will occur.

On April 13, 2020, upon the closing of the Company's IPO, all outstanding shares of Preferred Stock converted into 10,725,129 shares of the Company's common stock. Additionally, effective April 13, 2020, the Company's amended and restated certificate of incorporation authorized the issuance of 10,000,000 shares of preferred stock. There were no outstanding shares of convertible preferred stock as of December 31, 2021.

Stock-Based Compensation

The Company accounts for all stock-based payment awards granted to employees and non-employees as stock-based compensation expense at fair value. The Company's stock-based payments include stock options and grants of common stock, including common stock subject to vesting. The measurement date for employee awards is the date of grant, and stock-based compensation costs are recognized as expense over the employees' requisite service period, which is the vesting period, on a straight-line basis. Stock-based compensation costs for non-employees are recognized as expense over the vesting period on a straight-line basis. Stock-based compensation expense is classified in the accompanying consolidated statement of operations based on the function to which the related services are provided. The Company recognizes stock-based compensation expense for the portion of awards that have vested. Forfeitures are recorded as they occur.

The fair value of each stock option grant is estimated on the date of grant using the Black-Scholes option-pricing model. The Company lacks company-specific historical and implied volatility information. Therefore, it estimates its expected stock volatility based on the historical volatility of a publicly traded set of peer companies and expects to continue to do so until such time as it has adequate historical data regarding the volatility of its own traded stock price. The expected term of the Company's stock options has been determined utilizing the "simplified" method for awards that qualify as "plain-vanilla" options. The risk-free interest rate is determined by reference to the U.S. Treasury yield curve in effect at the time of grant of the award for time periods approximately equal to the expected term of the award. Expected dividend yield is based on the fact that the Company has never paid cash dividends on common stock and does not expect to pay any cash dividends in the foreseeable future.

Income Taxes

The Company recognizes deferred tax assets and liabilities for the expected future tax consequences of events that have been included in the Company's consolidated financial statements and tax returns. Deferred tax assets and liabilities are determined based upon the differences between the financial statement carrying amounts and the tax bases of existing assets and liabilities and for loss and credit carryforwards, using enacted tax rates expected to be in effect in the year in which the differences are expected to reverse. Deferred tax assets are reduced by a valuation allowance if it is more likely than not that these assets may not be realized. The Company determines whether it is more likely than not that a tax position will be sustained upon examination. If it is not more likely than not that a position will be sustained, none of the benefit attributable to the position is recognized. The tax benefit to be recognized for any tax position that meets the more-likely-than-not recognition threshold is calculated as the largest amount that is more than 50% likely of being realized upon resolution of the contingency. The Company accounts for interest and penalties related to uncertain tax positions as part of its provision for income taxes.

Comprehensive Loss

Comprehensive loss is defined as the change in equity of a business enterprise during a period from transactions and other events and circumstances from non-owner sources. Comprehensive loss is equal to net loss for all periods presented.

Net Loss Per Share

Basic net loss per share and diluted net loss per share are computed using the weighted-average number of shares of common stock outstanding for the period. Net loss per share attributable to common stockholders is calculated using the two-class method, which is an earnings allocation formula that determines net loss per share for the holders of shares of the Company's common stock and participating securities. The Company's preferred stock contains participation rights in any dividend paid by the Company and is deemed to be a participating security. The participating securities do not include a contractual obligation to share in losses of the Company and are not included in the calculation of net loss per share in the periods in which a net loss is recorded.

Diluted net loss per share is computed using the more dilutive of (a) the two-class method or (b) the if-converted method. The Company allocates earnings first to preferred stockholders based on dividend rights and then to common and preferred stockholders based on ownership interests. The weighted-average number of shares of common stock included in the computation of diluted net loss gives effect to all potentially dilutive common stock equivalent shares, including outstanding stock options and preferred stock.

The Company's potentially dilutive securities, which include stock options, have been excluded from the computation of diluted net loss per share as the effect would be to reduce the net loss per share. Therefore, the weighted-average number of common shares outstanding used to calculate both basic and diluted net loss per share attributable to common stockholders

is the same. The Company excluded the following from the computation of diluted net loss per share attributable to common stockholders as of December 31, 2021 and 2020, because including them would have had an anti-dilutive effect:

	DECEMBER 31,	
	2021	2020
Options to purchase common stock	2,810,684	2,499,603
	2,810,684	2,499,603

Recently Adopted Accounting Pronouncements

On January 1, 2021, the Company adopted Financial Accounting Standards Board Accounting Standards Update No. 2019-12, Income Taxes Simplifying the Accounting for Income Taxes ("ASU No. 2019-12"). ASU No. 2019-12 eliminates certain exceptions related to the approach for intraperiod tax allocation, the methodology for calculating income taxes in an interim period and the recognition of deferred tax liabilities for outside basis differences. ASU No. 2019-12 also simplifies aspects of the accounting for franchise taxes, enacted changes in tax laws or rates and clarifies the accounting for transactions that result in a step-up in the tax basis of goodwill. The adoption of this standard did not have an impact on the Company's consolidated financial statements and related disclosures.

Risks and Uncertainties

As a result of the continuing global COVID-19 pandemic, the Company has implemented business continuity plans designed to address and mitigate the impact of the COVID-19 pandemic on its employees and its business operations, including its preclinical studies and clinical trials, supply chains and third-party providers. Additionally, in response to ongoing COVID-19 pandemic, the Company closed its principal executive office in March 2020. Currently, the Company's administrative employees continue to work outside of the principal executive office, and the Company maintains a limited the number of staff in any given research laboratory. The Company anticipates that the COVID-19 pandemic will continue to have an impact on the development timelines for several of its preclinical and clinical programs. The extent to which the COVID-19 pandemic impacts the Company's business, its clinical development, its regulatory efforts, its corporate development objectives and the value of and market for its common stock will depend on future developments which are highly uncertain and cannot be predicted with confidence at this time, including, without limitation: the ultimate duration of the pandemic; travel restrictions; home quarantine orders; social distancing and business closure requirements in the United States, Australia, New Zealand and other countries; and the effectiveness of actions taken globally to mitigate the spread of the COVID-19 virus. The overall disruption of global healthcare systems and the other risks and uncertainties associated with the pandemic could have a material adverse effect on the Company's business, financial condition, results of operations and growth prospects. As of the date of issuance of these financial statements, the Company is not aware of any specific event or circumstance that would require the Company to update its estimates, assumptions and judgments or revise the carrying value of its assets or liabilities. Actual results could differ from those estimates, and any such differences may be material to the Company's financial statements.

In addition, the Company is subject to other challenges and risks specific to its business and its ability to execute on its business plan and strategy, as well as risks and uncertainties common to companies in the biopharmaceutical industry with research and development operations, including, without limitation, risks and uncertainties associated with: obtaining regulatory approval of its product candidates; delays or problems in obtaining clinical supply, loss of single source suppliers or failure to comply with manufacturing regulations; product development and the inherent uncertainty of clinical success; the challenges of protecting and enhancing its intellectual property rights; the challenges of complying with applicable regulatory requirements; and identifying, acquiring or in-licensing additional products or product candidates. In addition, to the extent the ongoing COVID-19 pandemic adversely affects the Company's business and results of operations, it may also have the effect of heightening many of the other risks and uncertainties discussed above.

3. FAIR VALUE MEASUREMENTS

The following table presents information about the Company's financial assets and liabilities measured at fair value on a recurring basis and indicates the level of the fair value hierarchy utilized to determine such fair values (in thousands):

DESCRIPTION	DECEMBER 31, 2021	QUOTED PRICES ACTIVE MARKETS FOR IDENTICAL ASSETS (LEVEL 1)	SIGNIFICANT OTHER OBSERVABLE INPUTS (LEVEL 2)	SIGNIFICANT OTHER OBSERVABLE INPUTS (LEVEL 3)
<i>Asset</i>				
Money market funds	\$ 230,042	\$ 230,042	\$ —	\$ —
Total financial assets	\$ 230,042	\$ 230,042	\$ —	\$ —

DESCRIPTION	DECEMBER 31, 2020	QUOTED PRICES ACTIVE MARKETS FOR IDENTICAL ASSETS (LEVEL 1)	SIGNIFICANT OTHER OBSERVABLE INPUTS (LEVEL 2)	SIGNIFICANT OTHER OBSERVABLE INPUTS (LEVEL 3)
<i>Asset</i>				
Money market funds	\$ 262,043	\$ 262,043	\$ —	\$ —
Total financial assets	\$ 262,043	\$ 262,043	\$ —	\$ —

There have been no transfers between fair value levels during the years ended December 31, 2021 and 2020. The carrying values of other current assets, accounts payable and accrued expenses approximate their fair values due to the short-term nature of these assets and liabilities.

Preferred Stock Tranche Obligation

The Company determined that its obligation to issue, and the Company's investors' obligation to purchase additional shares of convertible preferred stock at a fixed price (i.e. the issuance price) in subsequent tranches following the initial closings of the series A, series A-1, and series B-1 convertible preferred stock (respectively, the "Series A Preferred Stock," "Series A-1 Preferred Stock," and "Series B-1 Preferred Stock", which are referred to collectively with the series B-2 convertible preferred stock (the "Series B-2 Preferred Stock") and the series C convertible preferred stock (the "Series C Preferred Stock") as the "Preferred Stock") financings represented a freestanding financial instrument (the "Preferred Stock Tranche Obligation"). The freestanding financial instrument was classified as a liability on the Company's consolidated balance sheets and initially recorded at fair value, with changes in fair value for each reporting period recognized in other expense, net in the consolidated statement of operations.

The Board determined it was probable that the Series B-2 Preferred Stock milestone would be met, and the stockholders and the Board subsequently waived the milestone and the issuance of the Series B-2 Preferred Stock on March 2, 2020. Instead of issuing the Series B-2 Preferred Stock upon this waiver, the Company instead closed its convertible Series C Preferred Stock financing ("Series C financing"). The associated Preferred Stock Tranche Obligation was remeasured prior to settlement, with the associated \$1.5 million increase in fair value recorded in the Company's consolidated statement of operations as other expense, net. As the Series C financing was executed with related parties, the Company recognized the settlement of the Preferred Stock Tranche Obligation of \$6.4 million as a capital contribution in additional paid-in capital in the Company's consolidated balance sheets.

The following reflects the significant quantitative inputs used in the valuation of the Preferred Stock Tranche Obligation:

	MARCH 2, 2020	DECEMBER 31, 2019
Stand-alone Series B-1 Preferred Stock price (spot price)	\$ 7.28	\$ 7.28
Estimated future value of Series B-2 Preferred Stock	\$ 8.14	\$ 8.14
Discount rate	15.50 %	15.50 %
Time to liquidity (years)	0.00	0.16
Probability of tranche closing	100 %	80 %

The purchase price of the Preferred Stock at initial issuance, and all subsequent issuances was higher than the fair value of the Company's common stock.

The following table sets forth a summary of changes in the fair value of the Company's Preferred Stock Tranche Obligation for which fair value was determined by Level 3 inputs (in thousands):

	PREFERRED STOCK TRANCHE OBLIGATION
Balance as of January 1, 2019	\$ 2,392
Issuance	—
Change in fair value	2,564
Balance as of December 31, 2019	4,956
Change in fair value	1,490
Settlement of tranche obligation	(6,446)
Balance as of December 31, 2020	\$ —

Fluctuations in the fair value of the Company's Preferred Stock is the primary cause for the significant changes in fair value of the Preferred Stock Tranche Obligation. In 2020 and 2019, the enterprise value of the Company was determined using the Market Approach, specifically the Subject Company Transaction Method, which considers all share class rights and preferences, as of the date of the most recent financing. As part of the Company's strategy, during 2019, the Company began considering the pursuit of longer-term liquidity options including a potential initial public offering, which caused an increase in the value of the Series B-1 Preferred Stock while reducing the value of the Preferred Stock Tranche Obligation.

Subsequently, in March 2020, the Company determined it was probable that the milestone criteria necessary to close the subsequent tranche would be met; as such, the value of the Preferred Stock Tranche Obligation increased. The Board then waived the milestone in favor of issuing the Series C Preferred Stock in March 2020 (see Note 8), and in doing so, the Preferred Stock Tranche Obligation was fully settled and reduced to \$0 on the Company's consolidated balance sheet.

4. PREPAID EXPENSES AND OTHER CURRENT ASSETS

Prepaid expenses and other current assets as of December 31, 2021 and 2020 consisted of the following (in thousands):

	DECEMBER 31,	
	2021	2020
Prepaid service contracts	1,613	501
Income tax credit receivable	30	172
Prepaid sales tax	255	188
R&D payroll tax credit	167	44
Prepaid Insurance	993	785
Other	340	160
Total prepaid expenses and other current assets	\$ 3,398	\$ 1,850

5. PROPERTY AND EQUIPMENT, NET

Property and equipment, net as of December 31, 2021 and 2020 consisted of the following (in thousands):

	DECEMBER 31,	
	2021	2020
Computer equipment and software	\$ 41	\$ 35
Laboratory equipment	1,821	1,106
Office furniture	55	47
Leasehold improvements	264	257
Total	2,181	1,445
Less: accumulated depreciation	(846)	(721)
Property and equipment, net	\$ 1,335	\$ 724

Depreciation expense was \$0.4 million and \$0.3 million for each of the years ended December 31, 2021 and 2020, respectively.

6. ACCRUED EXPENSES AND OTHER CURRENT LIABILITIES

Accrued expenses and other current liabilities as of December 31, 2021 and 2020 consisted of the following (in thousands):

	DECEMBER 31,	
	2021	2020
Accrued external R&D costs	\$ 861	\$ 169
Accrued external manufacturing costs	3,259	2,265
Accrued compensation and benefits	2,373	1,510
Accrued tax	110	185
Accrued legal and consultants	532	265
Other	204	218
Total accrued expenses and other current liabilities	<u>\$ 7,339</u>	<u>\$ 4,612</u>

7. LICENSE AGREEMENTS

Massachusetts General Hospital

On April 5, 2016, the Company entered into an exclusive patent license agreement with The General Hospital Corporation d/b/a Massachusetts General Hospital (“MGH”). Under the license agreement with MGH (as amended in May 2017 and February 2018, the “MGH Agreement”), the Company obtained an exclusive, worldwide license, with the right to sublicense, under certain patents and technical information of MGH, to make, have made, use, have used, sell, have sold, lease, have leased, import, have imported or otherwise transfer licensed products and processes for use in the treatment, diagnosis, palliation and prevention of diseases and disorders in humans and animals. The Company is required to use commercially reasonable efforts to develop and commercialize licensed products and processes and must achieve certain required diligence milestones.

Under the terms of the MGH Agreement, the Company paid an initial license payment of \$0.1 million in 2016, and reimbursed MGH approximately \$0.3 million of prior patent prosecution expenses related to the licensed patents in 2017. The Company also issued MGH an aggregate of 358,674 shares of its common stock. Additionally, the Company is required to pay a low-five digit to mid-five digit annual maintenance fee prior to the first commercial sale of its first product or process, a mid-five digit annual maintenance fee after the first commercial sale of its first product or process that is creditable against royalties, certain clinical and regulatory milestone payments for the first three products or indications to achieve such milestones, which milestone payments are \$8.6 million in the aggregate, and certain commercial milestone payments for the first three products or indications to achieve such milestones, which milestone payments are \$18.0 million in the aggregate. We made payments of \$50,000 and \$300,000 in 2020 and 2021, respectively, for the achievement of the clinical and regulatory milestones of (i) filing of an IND in the first country and (ii) the completion of a Phase 1 clinical trial, respectively. The Company is also obligated to pay tiered royalties on net sales of licensed products ranging in the low-single digits to mid-single digits. The royalty rates are subject to up to a maximum 50% reduction for lack of a valid claim, in the event that it is necessary for the Company to obtain a license to any third-party intellectual property related to the licensed products, and generic competition. The obligation to pay royalties under the MGH Agreement expires on a licensed product-by-licensed product and country-by-country basis upon the later of expiry of the last valid claim of the licensed patents that cover such licensed product in such country or ten years from the first commercial sale of such product in such country. The Company is also obligated to pay a percentage of non-royalty-related payments received by it from sublicensees ranging in the low-double digits and a change of control fee equal to a low-single digit percentage of the payments received as part of any completed transaction up to a low seven-digit amount.

The MGH Agreement expires upon expiry of the last remaining royalty obligation for a licensed product or process. Under the MGH Agreement, MGH may terminate the agreement upon the Company’s uncured material breach or insolvency, a challenge by the Company of the licensed patents and certain other specified breaches of the MGH Agreement. The Company may terminate the agreement for any reason upon specified prior written notice to MGH.

Neurona Agreement

On June 22, 2021, the Company entered into a license agreement with Neurona. Refer to Note 13, Revenue from Contracts with Customers, for more information regarding this agreement.

Hansoh Agreement

On December 12, 2021, the Company entered into a license agreement with Hansoh. Refer to Note 13, Revenue from Contracts with Customers, for more information regarding this agreement.

8. CONVERTIBLE PREFERRED STOCK

On March 2, 2020, the Company authorized the sale and issuance of up to 9,049,783 shares of Series C Preferred Stock, par value \$0.0001 per share, of which 4,169,822 shares were sold at a purchase price of \$13.43 per share for gross proceeds of

\$56.0 million. Issuance costs were approximately \$0.2 million. As part of the Company's Series C Preferred Stock issuance, 3,078,968 of the shares were issued to affiliates of members of the Board. All issued shares reflect the reverse stock split effected March 31, 2020 while the Board authorized shares reflect the original number of shares authorized pre-split.

On April 13, 2020, upon the closing of the Company's IPO, all outstanding shares of Preferred Stock converted into 10,725,129 shares of the Company's common stock. Additionally, effective April 13, 2020, the Company's amended and restated certificate of incorporation authorized the issuance of 10,000,000 shares of preferred stock. There were no outstanding shares of Preferred Stock as of December 31, 2021 and 2020.

9. COMMON STOCK

As of December 31, 2021, the Company's certificate of incorporation authorized the Company to issue 200,000,000 shares of \$0.0001 par value common stock.

On April 13, 2020, the Company completed its IPO, in which the Company issued and sold 6,900,000 shares of its common stock, which includes 900,000 shares issued and sold pursuant to the full exercise of the underwriters' option to purchase additional shares, at a public offering price of \$16.00 per share, for aggregate gross proceeds of \$110.4 million. The Company received approximately \$100.1 million in net proceeds after deducting underwriting discounts and commissions and offering costs. In connection with the IPO, all outstanding shares of Preferred Stock automatically converted into 10,725,129 shares of common stock at the applicable conversion ratio then in effect.

In connection with the IPO, the Board and stockholders approved an amended and restated certificate of incorporation to, among other things, effect a one-for-2.1703 reverse stock split of its issued and outstanding shares of common stock and convertible preferred stock, as well as to effect a proportional adjustment to the existing conversion ratios for the Company's convertible preferred stock. The reverse stock split was effected on March 31, 2020. Accordingly, all share and per share amounts of common stock for all periods presented in the accompanying audited consolidated financial statements and notes thereto have been retroactively adjusted, where applicable, to reflect this reverse stock split and adjustment of preferred stock conversion ratios.

On November 17, 2020, the Company completed an underwritten public offering in which the Company issued and sold 2,990,000 shares of common stock at a public offering price of \$50.00 per share, which includes 390,000 shares of common stock issued pursuant to the exercise in full of the over-allotment option by the underwriters. The aggregate gross proceeds to the Company from the public offering were approximately \$149.5 million. The Company received approximately \$140.1 million in net proceeds after deducting underwriting discounts and commissions and offering costs.

For the year ended December 31, 2021, the Company raised gross proceeds of \$28.6 million pursuant to the ATM Offering through the sale of 520,000 shares of common stock at a weighted average price of \$55.00 per share. The net proceeds from the ATM Offering were approximately \$28.1 million after deducting sales agent commissions of \$0.4 million and offering expenses of \$0.1 million. As of December 31, 2021, the Company was eligible to offer and sell, from time to time, shares of its common stock for an aggregate offering amount of up to the remaining \$121.4 million available under the ATM Offering.

The following is a summary of the rights and privileges of the holders of common stock as of December 31, 2021:

Liquidation Preference: In the event of liquidation, dissolution or winding up, holders of common stock will be entitled to share ratably in the net assets legally available for distribution to stockholders after the payment of all debts and other liabilities and the satisfaction of any liquidation preference granted to the holders of any then-outstanding shares of preferred stock.

Dividends: Subject to preferences that may be applicable to any then-outstanding preferred stock, holders of common stock are entitled to receive ratably those dividends, if any, as may be declared from time to time by the Board out of legally available funds. As of December 31, 2021, no cash dividends have been declared or paid.

Voting Rights: Each holder of common stock is entitled to one vote for each share on all matters submitted to a vote of the stockholders, including the election of directors. Under the Company's amended and restated certificate of incorporation and amended and restated bylaws, stockholders will not have cumulative voting rights. Because of this, the holders of a majority of the shares of common stock entitled to vote in any election of directors can elect all of the directors standing for election, if they should so choose.

Rights and Preferences: Holders of common stock have no preemptive, conversion or subscription rights and there are no redemption or sinking fund provisions applicable to the common stock. The rights, preferences and privileges of the holders of common stock are subject to, and may be adversely affected by, the rights of the holders of shares of any series of preferred stock that the Company may designate in the future.

As of December 31, 2021 and 2020, the Company has reserved the following shares of common stock for the potential exercise of stock options:

	DECEMBER 31,	
	2021	2020
Options to purchase common stock	2,810,684	2,499,603
Total	<u>2,810,684</u>	<u>2,499,603</u>

10. STOCK-BASED COMPENSATION

2017 Stock Incentive Plan

The Board adopted the 2017 Stock Incentive Plan (the "2017 Plan") in February 2017, and the stockholders approved the 2017 Plan in March 2017. The 2017 Plan was most recently amended in March 2020.

As of December 31, 2021, there were an aggregate of 727,742 shares of common stock issuable upon the exercise of outstanding options under the 2017 Plan. Any options or awards outstanding under the 2017 Plan remain outstanding and effective.

2020 Equity Incentive Plan

In April 2020, the 2020 Equity Incentive Plan (the "2020 Plan") became effective, and, as a result, no further awards will be made under the 2017 Plan. The 2020 Plan provides for the grant of stock options qualifying as incentive stock options ("ISOs"), to employees and for the grant of nonstatutory stock options ("NSOs"), restricted stock awards, restricted stock unit awards, stock appreciation rights, performance stock awards and other forms of stock compensation to employees, consultants and directors. The 2020 Plan also provides for the grant of performance cash awards to employees, consultants and directors. Any previously granted awards under the 2017 Plan will remain outstanding in accordance with their respective terms.

Under the 2020 Plan, there is an annual increase on January 1 of each year from January 1, 2021 continuing through January 1, 2030, by 4.0% of the total number of shares of common stock outstanding on December 31 of the preceding calendar year, or a lesser number of shares as may be determined by the Board. On January 1, 2021, the Company increased the number of shares available for future grant under the 2020 Plan by 927,714 shares. On January 1, 2022, the Company increased the number of shares available for future grant under the 2020 Plan by 958,993 shares. The awards granted under the 2020 Plan typically vest over a four-year period and have a 10-year contractual term.

As of December 31, 2021, there were an aggregate of 2,082,942 shares of common stock issuable upon the exercise of outstanding options under the 2020 Plan. Additionally, there were an aggregate of 894,104 shares reserved for future issuance under the 2020 Plan, including shares forfeited from the 2017 Plan.

Stock Option Valuation

The assumptions that the Company used in the Black-Scholes option-pricing model to determine the grant-date fair value of stock options granted for the years ended December 31, 2021 and 2020 were as follows:

	YEAR ENDED DECEMBER 31,	
	2021	2020
Weighted-average risk-free interest rate	0.88 %	0.53 %
Expected term (in years)	6.05	6.06
Expected volatility	83.00 %	99.10 %
Expected dividend yield	0.00 %	0.00 %

A summary of option activity during the years ended December 31, 2021 and 2020 is as follows (in thousands except share and per share data):

	NUMBER OF OPTIONS	WEIGHTED- AVERAGE EXERCISE PRICE	WEIGHTED- AVERAGE REMAINING CONTRACTUAL TERM (IN YEARS)	AGGREGATE INTRINSIC VALUE
Outstanding as of January 1, 2021	2,499,603	\$ 11.77	8.62	\$ 147,103
Granted	750,408	60.32		
Exercised	(261,968)	1.45		\$ 13,276
Cancelled or forfeited	(175,984)	28.67		
Expired	(1,375)	50.77		
Outstanding as of December 31, 2021	2,810,684	\$ 24.62	8.11	\$ 11,383
Options exercisable as of December 31, 2021	1,223,019	\$ 10.48	7.37	\$ 9,524

The aggregate intrinsic value of stock options is calculated as the difference between the exercise price of the stock options and the fair value of the Company's common stock for those stock options that had exercise prices lower than the fair value of the Company's common stock.

The weighted-average grant date fair value price per share of options granted during each of the years ended December 31, 2021 and 2020 was \$42.29 and \$15.57, respectively. As of December 31, 2021, there was \$35.3 million of unrecognized stock-based compensation expense related to unvested stock options. The unrecognized stock-based compensation expense is estimated to be recognized over a period of 2.60 years.

The total fair value of options vested during the year ended December 31, 2021 was \$10.1 million.

Shares of Restricted Common Stock

The Company has granted shares of restricted common stock with time-based vesting conditions. A summary of restricted stock activity under the 2017 Plan during the years ended December 31, 2021 and 2020 is as follows:

	YEAR ENDED DECEMBER 31,	
	2021	2020
Unvested at the beginning of the year	—	34,557
Vested or released	—	(34,557)
Unvested at the end of the year	—	—

As of December 31, 2021, there was \$0 of unrecognized stock-based compensation expense related to unvested restricted stock.

The total fair value of restricted stock vested during the year ended December 31, 2020 was not material.

Stock-Based Compensation Expense

Total stock-based compensation expense recorded as research and development and general and administrative expenses, respectively, for employees, directors and non-employees during the years ended December 31, 2021 and 2020 is as follows (in thousands):

	YEAR ENDED DECEMBER 31,	
	2021	2020
Research and development	\$ 4,258	\$ 1,322
General and administrative	7,464	2,775
Total stock-based compensation expense	\$ 11,722	\$ 4,097

11. INCOME TAXES

Loss before provision from income taxes for the years ended December 31, 2021 and 2020 consisted of the following (in thousands):

	YEAR ENDED DECEMBER 31,	
	2021	2020
United States	\$ (55,961)	\$ (31,898)
Foreign	(772)	(13,635)
Loss before provision from income taxes	<u>\$ (56,733)</u>	<u>\$ (45,533)</u>

The components of income tax provision (benefit) for the years ended December 31, 2021 and 2020 consisted of the following (in thousands):

	YEAR ENDED DECEMBER 31,	
	2021	2020
Current income tax provision (benefit):		
Federal	\$ —	\$ (172)
State	11	—
Foreign	2,000	—
Total current income tax provision (benefit)	<u>\$ 2,011</u>	<u>\$ (172)</u>
Total deferred income tax benefit	<u>\$ —</u>	<u>\$ —</u>
Total income tax provision (benefit)	<u>\$ 2,011</u>	<u>\$ (172)</u>

A reconciliation of the U.S. federal statutory income tax rate to the Company's effective income tax rate for the years ended December 31, 2021 and 2020 was as follows:

	YEAR ENDED DECEMBER 31,	
	2021	2020
Federal income tax at statutory rate	21.0 %	21.0 %
State income tax, net of federal benefit	6.7	4.7
Stock compensation	(1.5)	(1.1)
Permanent differences	—	(0.3)
Preferred stock tranche obligation remeasurement	—	(0.7)
Research and development credits	4.8	1.5
Impact of foreign operations	(0.6)	2.0
Foreign withholding taxes	(2.8)	—
Other	(0.3)	(0.3)
Change in valuation allowance	<u>(30.9)</u>	<u>(26.4)</u>
Effective tax rate	<u>(3.5)%</u>	<u>0.4 %</u>

Net deferred tax assets as of December 31, 2021 and 2020 consisted of the following (in thousands):

	YEAR ENDED DECEMBER 31,	
	2021	2020
Net operating loss carryforwards	\$ 23,723	\$ 10,324
Research and development credits	6,315	2,766
Accrueds	895	639
Other	4,668	4,319
Intangibles	127	139
Total deferred tax assets	\$ 35,728	\$ 18,187
Valuation allowance	(35,445)	(17,938)
Net deferred tax assets	\$ 283	\$ 249
Deferred tax liability		
Depreciation	(283)	(249)
Net deferred tax assets (liability)	\$ —	\$ —

As of December 31, 2021, the Company had U.S. federal, state and foreign net operating loss carryforwards of \$85.8 million, \$90.3 million and \$16.4 million, respectively. Of the \$85.8 million federal net operating losses, \$0.2 million will expire in 2035 and the remaining \$85.6 million can be carried forward indefinitely. The federal and foreign net operating losses can be carried forward indefinitely. The state net operating loss carryforwards begin to expire in 2039.

As of December 31, 2021, the Company had U.S. federal and state research and development tax credit carryforwards of \$4.3 million and \$2.5 million, respectively. As of December 31, 2020, the Company had U.S. federal and state research and development tax credit carryforwards of \$1.8 million and \$1.2 million, respectively. The tax credits begin to expire in 2038.

Under the provisions of the Internal Revenue Code of 1986, as amended (the "Code"), the net operating loss and tax credit carryforwards are subject to review and potential adjustments by the Internal Revenue Services and state tax authorities. Under Section 382 of the Code ("Section 382"), certain substantial changes in the Company's ownership, including the sale of the Company or significant changes in ownership due to sales of equity, may have limited, or may limit in the future, the amount of net operating loss carryforwards or tax credits which could be used annually to offset future taxable income. The Company completed an analysis under Section 382 through November 17, 2020 and determined that on April 15, 2016 and April 13, 2020, ownership changes had occurred. Based on the Company's analysis, the Company has determined that \$0.3 million and \$0.3 million of its federal and state net operating loss carryforwards, respectively, are limited by Section 382 as of December 31, 2021 and have been written off in the current period. The remaining unused carryforwards remain available for future periods. The Company may also experience ownership changes in the future as a result of subsequent shifts in the Company's stock ownership, some of which may be outside the Company's control. As a result, its ability to use its pre-change NOLs or tax credits to offset U.S. federal taxable income may be subject to limitations, which could potentially result in increased future tax liability. In addition, at the state level, there may be periods during which the use of NOLs is suspended or otherwise limited, which could accelerate or permanently increase state taxes owed.

Management of the Company has evaluated the positive and negative evidence bearing upon the realizability of its deferred tax assets, which are comprised principally of research and development credits and net operating losses. Under the applicable accounting standards, management has considered the Company's history of losses and concluded that it is more likely than not that the Company will not recognize the benefits of federal and state deferred tax assets. Accordingly, a full valuation allowance was maintained as of December 31, 2021 and 2020. A change in the Company's valuation allowance was recorded in 2021 and 2020, in the amount of \$17.5 million and \$12.0 million, respectively, due primarily to the generation of additional net deferred tax assets.

The calculation of the Company's tax liabilities involves dealing with uncertainties in the application of complex tax laws and regulations for both federal taxes and the many states in which it operates or does business in. A tax benefit from an uncertain tax position may be recognized when it is more likely than not that the position will be sustained upon examination, including resolutions of any related appeals or litigation processes, on the basis of the technical merits.

The Company records tax positions as liabilities and adjusts these liabilities when its judgement changes as a result of the evaluation of new information not previously available. Because of the complexity of some of these uncertainties, the ultimate resolution may result in a payment that is materially different from the Company's current estimate of the recognized tax benefit liabilities. These differences will be reflected as increases or decreases to income tax expense in the period in which new information is available. As of December 31, 2021 and 2020, the Company has not recorded any uncertain tax positions in its financial statements.

The Company recognizes interest and penalties related to unrecognized tax benefits on the income tax expense line in the accompanying consolidated statement of operations. As of December 31, 2021 and 2020, no accrued interest or penalties are included on the related tax liability line in the consolidated balance sheet.

The Company files tax returns as prescribed by the tax laws of the jurisdictions in which it operates. In the normal course of business, the Company is subject to examination by federal and state jurisdictions, where applicable. There are currently no pending tax examinations. The Company's tax years are still open under statute from December 31, 2016, to the present. There are currently no pending income tax examinations. To the extent the Company has tax attribute carryforwards, the tax years in which the attribute was generated may still be adjusted upon examination by the Internal Revenue Service and state tax authorities to the extent utilized in a future period.

12. COMMITMENTS AND CONTINGENCIES

Leases

The Company has historically entered into lease arrangements for its facilities and certain equipment. As of December 31, 2021, the Company had one operating lease with required future payments, related to its real estate. In applying the transition guidance under ASU No. 2016-02, *Leases (Topic 842)* ("ASC 842"), early adopted by the Company effective March 1, 2017, the Company determined the classification of its real estate lease to be operating and recorded a ROU asset and lease liability as of the effective date.

Operating Leases

In March 2017, the Company entered into a lease agreement (the "Lexington Lease") for its headquarters located in Lexington, Massachusetts. In July and August 2019, the Company entered into the first and second amendment, respectively, to its Lexington Lease to expand the rental space to 10,417 square feet. In August 2021, the Company entered into a third amendment to its Lexington Lease (the "Third Amendment") to extend the lease term through March 31, 2023 and to further expand the rental space to 15,622 square feet. The lease modification from the Third Amendment resulted in a non-cash increase to the Company's operating lease liabilities and right-of-use assets of \$0.7 million in the quarter ended September 30, 2021. As required under the term of the lease agreement as collateral for the facility lease, the Company had restricted cash of \$0.1 million in the form of a certificate of deposit as of December 31, 2021 and 2020. The Lexington Lease provides for scheduled annual rent increases throughout the lease term and does not include termination or purchase options.

From time to time, leases may include options to renew the lease after the expiration of the initial lease term. A renewal period is included in the lease term only when it is reasonably certain that the Company will exercise such renewal options. As of December 31, 2021, no renewal options existed that the Company believed were reasonably certain of being exercised.

The following table contains a summary of the lease costs recognized under ASC 842 and other information pertaining to the Company's operating lease for the years ended December 31, 2021 and 2020 (in thousands):

	FOR THE YEARS ENDED DECEMBER 31,	
	2021	2020
Lease cost		
Operating lease cost	\$ 587	\$ 468
Total lease cost	\$ 587	\$ 468
Other information		
Operating lease payments	\$ 587	\$ 468
Remaining lease term	1.3 years	1.9 years
Discount rate	7.27 %	8.02 %

The Lexington Lease does not include any variable payments. As the Lexington Lease does not provide an implicit rate, the Company utilized its incremental borrowing rate based on what it would normally pay to borrow on a collateralized basis over a similar term for an amount equal to the lease payments at the commencement date in determining the present value of lease payments. As of December 31, 2021 and 2020, the Company classified its short-term and long-term operating liabilities as short-term and long-term liabilities on the consolidated balance sheet, respectively.

As of December 31, 2021, future discounted lease payments under all lease arrangements accounted for under ASC 842 were as follows (in thousands):

MATURITY OF LEASE LIABILITY	
2022	\$ 913
2023	234
Total lease payments	1,147
Less: imputed interest	(54)
Total operating lease liabilities	<u>\$ 1,093</u>
Included in the consolidated balance sheet:	
Current portion of lease liabilities	\$ 862
Lease liabilities	231
Total operating lease liabilities	<u>\$ 1,093</u>

On September 7, 2021, the Company entered into an indenture of lease (the "1050 Waltham Lease") with Revolution Labs Owner, LLC (the "Landlord"), pursuant to which the Company will lease approximately 35,662 square feet of office and laboratory space located at 1050 Waltham Street, Lexington, Massachusetts for its new principal executive office. The 1050 Waltham Lease has not yet commenced as of December 31, 2021 and is therefore not included in the maturity table above.

The term of the 1050 Waltham Lease is currently expected to commence in the fourth quarter of 2022, on the date that the Landlord delivers the premises to the Company, which shall be after the substantial completion of agreed upon improvements to be performed by the Landlord (such date, the "Commencement Date"). This work is not expected to begin until the second quarter of 2022. The Company's obligation for the payment of base rent for the premises begins four months after the Commencement Date (the "Rent Commencement Date") and will initially be fixed at \$0.2 million per month, which will increase by approximately 3% per annum. The Company will be obligated to reimburse the Landlord for certain variable costs, including its proportional share (approximately 20% of the rentable area of the building) of taxes and operating expenses, as specified in the 1050 Waltham Lease. The 1050 Waltham Lease has a term of eight years and four months, measured from the Commencement Date. The Company has the option to extend the term of the 1050 Waltham Lease for a period of an additional five years.

In connection with its entry into the 1050 Waltham Lease and as a security deposit, the Company has provided the Landlord a letter of credit in the amount of approximately \$1.2 million.

The Landlord has the right to terminate the 1050 Waltham Lease upon customary events of default. The Company has the right to terminate the 1050 Waltham Lease if (i) the Landlord work on the premises has not commenced on or prior to July 1, 2022 or (ii) the premises are not ready for occupancy within a specified time period after October 21, 2022.

Short-term Leases

The Company enters into short-term leasing arrangements related to storage of clinical trial materials. The Company has \$5,089 and \$36,290 related to rent expense for the years ended December 31, 2021 and 2020, respectively. As of December 31, 2021 and 2020, the Company classified its short-term operating lease liabilities within accrued expenses and other current liabilities, as the Company has elected the practical expedient whereby it will not recognize leases with terms of 12 months or less on the balance sheet.

Legal Proceedings

The Company is not a party to any litigation and does not have contingency reserves established for any litigation liabilities.

Other

In connection with the Lexington Lease entered into in March 2017, the Company received a loan from the landlord of \$0.2 million related to its tenant improvement allowance, which is recorded as a non-current liability in the Company's consolidated balance sheets. The Company is required to repay interest only on the loan of 8.0% for the first 18 months of the lease and will then repay the full amount plus interest in installments over the remaining 3.5 year term of the lease, which expires in December 2022. The Company made payments totaling \$65,000 related to the loan in 2021.

Future payments under the Company's loan obligation as of December 31, 2021, are as follows (in thousands):

2022	\$ 65
2023	—
Total payments	<u>\$ 65</u>

Refer to Note 7, License Agreements, for any potential future milestone or royalty payment amounts. These are not currently probable or estimable.

13. REVENUE FROM CONTRACTS WITH CUSTOMERS

Neurona License Agreement

On June 22, 2021, the Company entered into a license agreement (the "Neurona Agreement") with Neurona. Under the Neurona Agreement, the Company granted Neurona a non-exclusive license to use LDN-193189, an early-stage research compound, which the Company licenses from a third party, solely as a reagent in connection with the manufacturing of diagnostic and/or therapeutic products to make, have made, use, import, offer for sale and sell products and services arising therefrom, and to make, have made, acquire, transfer, import and export the compound for such use. The license excludes Neurona from any rights to use, sell or distribute the compound for any therapeutic or diagnostic purpose. Unless terminated by either party for breach of contract or insolvency, the Neurona Agreement, which commenced on the execution date, will continue in perpetuity until the last patent expires. Under the Neurona Agreement, the Company was paid a one-time, upfront license payment of \$0.1 million from Neurona as of December 31, 2021.

In accordance with the Company's ASC 606 assessment, Neurona is considered to be a customer. The Company identified a single performance obligation, the non-exclusive license, that was satisfied on the date of the execution of the Neurona Agreement when control of the license was transferred. The Company determined that the upfront license fee of \$0.1 million constitutes the entire transaction price and does not require further allocation as there was only one performance obligation. The Company determined that the \$0.1 million represented the point at which the licensee was able to use and benefit from the license and recognized revenue from upfront license fees when the license was transferred to Neurona upon execution of the Neurona Agreement. The Company recognized the upfront fee as revenue on its consolidated statement of operations for the year ended December 31, 2021.

Hansoh License Agreement

In December 2021, the Company entered into a license agreement with Hansoh (the "Hansoh Agreement"). Under the Hansoh Agreement, the Company granted to Hansoh the exclusive right to develop, manufacture and commercialize KER-050 and licensed products containing KER-050 within the territories of mainland China, Hong Kong and Macau (the "Territory").

In connection with the Hansoh Agreement, Hansoh will purchase clinical trial supply of KER-050 from the Company, and the parties will also negotiate in good faith to enter into an agreement for commercial supply prior to any anticipated commercialization in the Territory. In addition, Hansoh will use commercially reasonable efforts to develop, obtain regulatory approval for, and commercialize licensed products in any region in the Territory.

Pursuant to the Hansoh Agreement, the Company is due a one-time, \$20.0 million upfront license payment and will also be eligible to receive up to an aggregate of (i) \$26.5 million upon the achievement of specified development milestones and (ii) \$144.0 million upon the achievement of specified net sales thresholds for all licensed products in the Territory. If a licensed product is approved for marketing in the Territory, the Company will be entitled to receive royalty payments based on a tiered percentage of annual net sales in each region within the Territory, with such percentage ranging from the low double digit to high teens, subject to specified potential royalty reductions.

Hansoh's obligation to pay royalties for a given licensed product in a given region in the Territory will begin on the date of the first commercial sale for such licensed product in such region and continue until the latest of (i) 10 years from the date of the first commercial sale for such licensed product in such region, (ii) the expiration of the last valid claim of certain licensed patents or joint patents, and (iii) expiration of regulatory exclusivity in such region. During the royalty term, neither party will directly or indirectly commercialize a competing product in the Territory.

The Hansoh Agreement will continue in force on a region-by-region basis until the expiration of the royalty term. Hansoh may terminate the Agreement in its entirety for convenience, with notice. The Company may terminate the Hansoh Agreement in its entirety for a patent challenge brought by Hansoh or its affiliates or their sublicensees. Either party may terminate the Hansoh Agreement in its entirety (i) if the other party materially breaches the Hansoh Agreement and fails to cure such breach or (ii) upon the bankruptcy of the other party.

The Company evaluated the Hansoh Agreement and concluded that it was subject to ASC 606, as the Company viewed the Hansoh Agreement as a contract with a customer. As such, the Company assessed the terms of the Hansoh Agreement and identified a single performance obligation for the Company to provide Hansoh an exclusive license to develop, manufacture and commercialize KER-050 and licensed products containing KER-050 in the Territory, including the underlying know-how related to such licenses. All other promised goods/services were deemed immaterial in the context of the Hansoh Agreement. The transaction price of the Hansoh Agreement is equal to the full \$20.0 million, which includes the one-time, non-refundable, non-creditable initial payment. All potential milestone payments (development and commercial), and royalty payments are

forms of variable consideration that are fully constrained as of the date of the Hansoh Agreement, and therefore, excluded from the transaction price. The Company allocated 100% of the transaction price to the single performance obligation. The Company recognized the upfront fee of \$20.0 million as revenue and \$2.0 million in withholding tax on its consolidated statement of operations for the year ended December 31, 2021, and a receivable, net of withholding tax on its consolidated balance sheet as of December 31, 2021. The Company received the one-time upfront license payment from Hansoh in January 2022.

The Company will recognize development milestone payments as revenue at the point in time when it is determined that it is probable such milestones will be achieved as all performance obligations will have been satisfied at the point which a milestone might occur (i.e., Hansoh will have assumed all responsibility for the activities under the Hansoh Agreement). The Company will recognize royalty payments and commercial milestone payments as the associated sales of licensed products are recorded by Hansoh, as they predominantly relate to the license granted with the Hansoh Agreement.



BOARD OF DIRECTORS

Jasbir Sehra, Ph.D.

President and Chief Executive Officer
Keros Therapeutics, Inc.

Nima Farzan

Chief Executive Officer
Kinnate Biopharma Inc.

Carl Gordon, Ph.D., C.F.A.

Founding Member, Managing Partner and
Co-Head of Global Private Equity
OrbiMed Advisors LLC

Mary Ann Gray, Ph.D.

President
Gray Strategic Advisors, LLC

Tomer Kariv

Managing Partner and Co-Founder
The Pontifax Group

Julius Knowles

Partner
Partners Innovation Fund

Ran Nussbaum

Managing Partner and Co-Founder
The Pontifax Group

EXECUTIVE OFFICERS

Jasbir Sehra, Ph.D.

President and Chief Executive Officer

Keith Regnante

Chief Financial Officer

Simon Cooper, M.B.B.S.

Chief Medical Officer

Jennifer Lachey, Ph.D.

Chief Scientific Officer

Christopher Rovaldi

Chief Operating Officer

CORPORATE INFORMATION

Corporate Headquarters

Keros Therapeutics, Inc.
99 Hayden Avenue, Suite 120, Building E
Lexington, MA 02421
Phone: +1 617 314 6297

Stock Listing

Keros Therapeutics, Inc. stock is publicly traded on the
Nasdaq Global Market under the ticker symbol: **KROS**

Investor Relations

Our investor relations website is located at
ir.kerostx.com
Contact ir@kerostx.com

Independent Registered Public Accounting Firm

Deloitte & Touche LLP
200 Berkeley Street
Boston, MA 02116

Transfer Agent

Computershare Trust Company, N.A.
250 Royall Street
Canton, MA 02021
www.computershare.com

Annual Meeting of Stockholders

June 1, 2022 at 9:00 a.m. Eastern time

ANNUAL REPORT ON FORM 10-K

A copy of our Annual Report on Form 10-K filed with
the Securities and Exchange Commission (SEC) is
available free of charge on the SEC's website at
www.sec.gov, in the "SEC Filings" tab of the "Investors
and Media" section of our website at
www.kerostx.com, or by sending a written request to:

Keros Therapeutics, Inc.
99 Hayden Avenue, Suite 120, Building E
Lexington, MA 02421
Attention: Secretary

