Filed Pursuant to Rule 424(b)(4)
Registration No. 333-228566

PROSPECTUS

6,250,000 Shares of Common Stock

Warrants to Purchase up to 6,250,000 Shares of Common Stock

Biocept, Inc. is offering 6,250,000 shares of common stock and warrants to purchase up to 6,250,000 shares of our common stock, at a combined offering price of $1.20 per share of common stock and accompanying warrant. Each share of our common stock is being sold together with a warrant to purchase one share of our common stock. Each warrant will have an exercise price per share of $1.20, will be immediately exercisable and will expire on the fifth anniversary of the original issuance date. The shares of our common stock and warrants are immediately separable and will be issued separately, but will be purchased together in this offering.

Our common stock is listed on The Nasdaq Capital Market under the symbol "BIOC." On February 7, 2019, the last reported sale price of our common stock on The Nasdaq Capital Market was $2.03 per share. There is no established trading market for the warrants and we do not expect a market to develop. In addition, we do not intend to apply for the listing of the warrants on any national securities exchange or other trading market. Without an active trading market, the liquidity of the warrants will be limited.

We are an "emerging growth company" as that term is used in the Jumpstart Our Business Startups Act of 2012, and, as such, we have elected to take advantage of certain reduced public company reporting requirements for this prospectus and future filings.

You should read this prospectus, together with additional information described under the heading "Where You Can Find More Information," carefully before you invest in any of our securities.

Investing in our securities involves a high degree of risk. See "Risk Factors" beginning on page 5 of this prospectus for a discussion of information that should be considered in connection with an investment in our securities.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or determined if this prospectus is truthful or complete. Any representation to the contrary is a criminal offense.

	Per Share and Warrant	Total (No Exercise) (2)	Total (Full Exercise) (2)
Public offering price(1)	$ 1.200	$ 7,500,000	$ 8,625,000
Underwriting discounts and commissions(2)	$ 0.084	$ 525,000	$ 603,750
Proceeds, before expenses, to us	$ 1.116	$ 6,975,000	$ 8,021,250

(1) The public offering price and underwriting discount corresponds to a public offering price per share of common stock of $1.19999892 (or $1.115999 after deducting the underwriting discount) and a public offering price per warrant of $0.00000108 (or $0.000001 after deducting the underwriting discount).

(2) See “Underwriting” on page 113 for additional disclosure regarding underwriting discounts and commissions and reimbursement of expenses.

We have granted the underwriters an option for a period of 45 days from the date of this prospectus to purchase up to an additional 937,500 shares of common stock and/or warrants to purchase 937,500 shares of common stock at the public offering price, less the underwriting discount.

We anticipate that delivery of the shares and warrants against payment will be made on or about February 12, 2019.

Book-Running Manager

Maxim Group LLC

Co-Manager

Dawson James Securities, Inc.

The date of this prospectus is February 8, 2019.

Biocept

The CEE Solution

Personalized Medicine from a Liquid Biopsy

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We have not, and the underwriters have not, authorized anyone to provide you with information that is different from that contained in this prospectus or in any free writing prospectus we may authorize to be delivered or made available to you. When you make a decision about whether to invest in our securities, you should not rely upon any information other than the information in this prospectus or in any free writing prospectus that we may authorize to be delivered or made available to you. Neither the delivery of this prospectus nor the sale of our securities means that the information contained in this prospectus or any free writing prospectus is correct after the date of this prospectus or such free writing prospectus. This prospectus is not an offer to sell or the solicitation of an offer to buy our securities in any circumstances under which the offer or solicitation is unlawful.

For investors outside the United States: We have not, and the underwriters have not, taken any action that would permit this offering or possession or distribution of this prospectus in any jurisdiction where action for that purpose is required, other than in the United States. Persons outside the United States who come into possession of this prospectus must inform themselves about, and observe any restrictions relating to, the offering of the securities covered hereby and the distribution of this prospectus outside the United States.

Unless otherwise indicated, information contained in this prospectus concerning our industry and the markets in which we operate, including our general expectations and market position, market opportunity and market share, is based on information from our own management estimates and research, as well as from industry and general publications and research, surveys and studies conducted by third parties. Management estimates are derived from publicly available information, our knowledge of our industry and assumptions based on such information and knowledge, which we believe to be reasonable. Our management estimates have not been verified by any independent source, and we have not independently verified any third-party information. In addition, assumptions and estimates of our and our industry's future performance are necessarily subject to a high degree of uncertainty and risk due to a variety of factors, including those described in "Risk Factors." These and other factors could cause our future performance to differ materially from our assumptions and estimates. See "Special Note Regarding Forward-Looking Statements."

We further note that the representations, warranties and covenants made by us in any agreement that is filed as an exhibit to the registration statement of which this prospectus is a part were made solely for the benefit of the parties to such agreement, including, in some cases, for the purpose of allocating risk among the parties to such agreements, and should not be deemed to be a representation, warranty or covenant to you. Moreover, such representations, warranties or covenants were accurate only as of the date when made. Accordingly, such representations, warranties and covenants should not be relied on as accurately representing the current state of our affairs.

We use in this prospectus our BIOCEPT logo, for which a United States trademark application has been filed. This prospectus also includes trademarks, tradenames and service marks that are the property of other organizations. Solely for convenience, trademarks and tradenames referred to in this prospectus appear (after the first usage) without the ® and ™ symbols, but those references are not intended to indicate, in any way, that we will not assert, to the fullest extent under applicable law, our rights or that the applicable owner will not assert its rights, to these trademarks and tradenames.

SUMMARY

This summary highlights information contained elsewhere in this prospectus. This summary does not contain all of the information you should consider before investing in our common stock. You should read this entire prospectus carefully, especially the "Risk Factors" section of this prospectus before making an investment decision.

Our Company

We are an early stage molecular oncology diagnostics company that develops and commercializes proprietary circulating tumor cell, or CTC, and circulating tumor DNA, or ctDNA, assays utilizing a standard blood sample, or "liquid biopsy." Our current and planned assays are intended to provide information to aid healthcare providers to identify specific oncogenic alterations that may qualify a subset of cancer patients for targeted therapy at diagnosis, progression or used for monitoring in order to identify specific resistance mechanisms. Sometimes traditional procedures, such as surgical tissue biopsies, result in tumor tissue that is insufficient and/or unable to provide the molecular subtype information necessary for clinical decisions. Our assays, performed on blood, have the potential to provide more contemporaneous information on the characteristics of a patient's disease when compared with tissue biopsy and radiographic imaging.

Our current assays and our planned future assays focus on key solid tumor indications utilizing our Target-Selector™ liquid biopsy technology platform for the biomarker analysis of CTCs and ctDNA from a standard blood sample. Our patented Target-Selector CTC offering is based on an internally developed microfluidics-based cell capture and analysis platform, with enabling features that change how information provided by CTC testing is used by clinicians. Our CTC technology could also be validated on cerebral spinal fluid in order to provide information for patients with central nervous system (CNS) tumors both primary and metastatic. Our patented Target-Selector ctDNA technology enables detection of mutations and genome alterations with enhanced sensitivity and specificity, and is applicable to nucleic acid from ctDNA, and could potentially be validated for other sample types such as bone marrow, pleural effusions, ascitic fluid, tissue (surgical resections and/or biopsies) or cerebrospinal fluid. Our Target-Selector CTC and ctDNA platforms provide both biomarker detection as well as monitoring capabilities and require only a patient blood sample. We believe that our Target-Selector platform technology has the potential to be developed and commercialized as in vitro diagnostic (IVD) test kits, and we are currently pursuing this strategy.

At our corporate headquarters facility located in San Diego, California, we operate a clinical laboratory that is certified under the Clinical Laboratory Improvement Amendments of 1988, or CLIA, and accredited by the College of American Pathologists, or CAP. We also performed research and development that led to our current assays, and continue to perform research and development for our planned assays, at this same facility. In addition, we manufacture our microfluidic channels, related equipment and certain reagents. The assays we offer and intend to offer are classified as laboratory developed tests, or LDTs, under CLIA regulations. CLIA certification is required before any clinical laboratory, including ours, may perform testing on human specimens for the purpose of obtaining information for the diagnosis, prevention, or treatment of disease or the assessment of health. In addition, we participate in and have received CAP accreditation, which includes rigorous biennial laboratory inspections and adherence to specific quality standards.

Our primary sales strategy is to engage medical oncologists and other physicians in the United States at private and group practices, hospitals, laboratories and cancer centers. In addition, we market our clinical trial and research services to pharmaceutical and biopharmaceutical companies and clinical research organizations. Additionally, commencing in October 2017, our pathology partnership program, branded as Empower TC™, provides the unique ability for pathologists to participate in the interpretation of liquid biopsy results and is available to pathology practices and hospital systems throughout the United States. Further, sales to laboratory supply distributors of our proprietary blood collection tubes, or BCTs, commenced during the three months ending June 30, 2018, which allow for the intact transport of liquid biopsy samples for research use only, or RUO, from regions around the world. We also plan to develop and market kits containing our patented and proprietary Target Selector testing to laboratories and researchers worldwide.

Our revenue generating efforts are focused in three areas:

- medical oncologists, surgical oncologists, pulmonologists, pathologists and other physicians who use the biomarker information we provide in order to determine the best treatment plan for their patients;
- laboratory services utilizing both our CTC and ctDNA testing in order to help pharmaceutical and biopharmaceutical companies developing drug candidate therapies to treat cancer; and
- licensing and/or selling our proprietary testing and/or technologies, including our BCTs, to partners in the United States and abroad.

Risks That We Face

An investment in our common stock involves a high degree of risk. You should carefully consider the risks summarized below. The risks are discussed more fully in the "Risk Factors" section of this prospectus immediately following this prospectus summary. These risks include, but are not limited to, the following:

- we are an early stage company with a history of substantial net losses. We have never been profitable and we have an accumulated deficit of approximately $214.4 million (as of September 30, 2018);
- we expect to incur net losses in the future, and we may never achieve sustained profitability;
- we need to raise additional capital to continue as a going concern;
- our failure to meet the continued listing requirements of The Nasdaq Capital Market could result in a de-listing of our common stock;
- our financial condition may be materially adversely affected in an event of default under our credit facility;
- our sale of our common stock may cause substantial dilution to our existing stockholders and could cause the price of our common stock to decline;
- our business depends upon our ability to increase sales of our current products and assays and to develop and commercialize other products and assays;
- our business depends on executing on our sales and marketing strategy for our products and diagnostic assays and gaining acceptance of our current products and assays and future products and assays in the market, for which we expect to continue to incur significant expenses;
- our business depends on our ability to continually develop new products and diagnostic assays and enhance our current products assays and future products and assays, for which we expect to continue to incur significant expenses;
- our business depends on our ability to effectively compete with other products and diagnostic assays, methods and services that now exist or may hereafter be developed;
- our business depends on our senior management;
- our business depends on our ability to attract and retain scientists, clinicians and sales personnel with extensive experience in oncology, who are in short supply;
- our business depends on our ability to enter into agreements with commercialization partners, who may not perform adequately or be locatable, for the sales, marketing and commercialization of our current products and assays and our planned future products and assays;
- we expect to expand our business internationally, which would increase our exposure to business, regulatory, political, operational, financial and economic risks associated with doing business outside of the United States;
- our financial condition may be materially adversely affected by healthcare policy changes, including legislation reforming the United States health care system;
- our business depends on being able to obtain coverage and adequate reimbursement from governmental and other third-party payers for assays and services;
- our business depends on satisfying any applicable United States (including Food and Drug Administration) and international regulatory requirements with respect to products, assays and services, and many of these requirements are new and still evolving; and
- we need to obtain or maintain patents or other appropriate protection for the intellectual property utilized in our current and planned products, assays and services, and we must avoid infringement of third-party intellectual property.

Recent Developments

On January 18, 2019, we entered into a Securities Purchase Agreement with certain purchasers pursuant to which we sold to such purchasers, in a registered direct offering, an aggregate of 990,000 shares of common stock at a negotiated purchase price of $2.25 per share for aggregate net proceeds to us of approximately $2.0 million.

Implications of Being an Emerging Growth Company

As a company with less than $1.07 billion in gross revenues during our last fiscal year, we qualify as an "emerging growth company" as defined in the Jumpstart Our Business Startups Act, or JOBS Act, enacted in April 2012. An "emerging growth company" may take advantage of reduced reporting requirements that are otherwise applicable to public companies. These provisions include, but are not limited to:

- not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act;
- reduced disclosure obligations regarding executive compensation in our periodic reports, proxy statements and registration statements; and
- exemptions from the requirements of holding a nonbinding advisory vote on executive compensation and stockholder approval of any golden parachute payments not previously approved.

We may take advantage of these provisions until December 31, 2019. However, if certain events occur prior to December 31, 2019, including if we become a "large accelerated filer," our annual gross revenues exceed $1.07 billion or we issue more than $1.0 billion of non-convertible debt in any three-year period, we will cease to be an emerging growth company before such date.

We have elected to take advantage of certain of the reduced disclosure obligations and may elect to take advantage of other reduced reporting requirements in future filings. As a result, the information that we provide to our stockholders may be different than the information you might receive from other public reporting companies in which you hold equity interests.

The Offering

Common stock offered by us	6,250,000 shares.
Warrants offered by us	Warrants to purchase up to 6,250,000 shares of our common stock. Each share of our common stock is being sold together with a warrant to purchase one share of our common stock. Each warrant will have an exercise price per share of $1.20, will be immediately exercisable and will expire on the fifth anniversary of the original issuance date. This prospectus also relates to the offering of the shares of common stock issuable upon exercise of such warrants.
Option to purchase additional shares and/or warrants	We have granted the underwriters an option for a period of 45 days from the date of this prospectus to purchase up to an additional 937,500 shares of common stock and/or warrants to purchase 937,500 shares of common stock at the public offering price, less the underwriting discount.
Common stock outstanding after this offering	12,058,692 shares (or 18,308,692 shares if the warrants sold in this offering are exercised in full).
Use of proceeds	The net proceeds from our sale of shares of our common stock and warrants in this offering will be approximately $6.8 million, after deducting underwriting discounts and commissions and estimated offering expenses payable by us. If the underwriters exercise their option to purchase additional shares and warrants in full, our net proceeds from this offering will be approximately $7.8 million, excluding the proceeds, if any, from the exercise of the warrants. We currently expect to use the net proceeds from this offering for general corporate purposes and to fund ongoing operations and expansion of our business. For additional information please refer to the section entitled “Use of Proceeds” on page 34 of this prospectus.
Risk Factors	Investing in our securities involves a high degree of risk. You should carefully review and consider the “Risk Factors” section of this prospectus for a discussion of factors to consider before deciding to invest in shares of our common stock.
Market Symbol and trading	Our common stock is listed on The Nasdaq Capital Market under the symbol “BIOC.” There is no established trading market for the warrants and we do not expect a market to develop. In addition, we do not intend to apply for the listing of the warrants on any national securities exchange or other trading market. Without an active trading market, the liquidity of the warrants will be limited.

The number of shares of our common stock to be outstanding after this offering is based on 5,808,692 shares of our common stock outstanding as of the date hereof and excludes the following as of September 30, 2018:

- up to 1,548,105 shares of common stock issuable upon the conversion of Series A Convertible Preferred Stock outstanding as of September 30, 2018;
- 114,641 shares of our common stock issuable upon the exercise of stock options, with a weighted-average exercise price of $72.02 per share;
- 360 shares of our common stock issuable upon the settlement of outstanding restricted stock units;
- 4,814,927 shares of our common stock issuable upon the exercise of outstanding warrants, with a weighted-average exercise price of $5.44 per share; and
- 194,649 other shares of our common stock reserved for future issuance under our 2013 Amended and Restated Equity Incentive Plan.

RISK FACTORS

A purchase of shares of our common stock is an investment in our securities and involves a high degree of risk. You should carefully consider the following risk factors, as well as the other information contained elsewhere in this prospectus before deciding whether to purchase, hold or sell shares of our common stock. The occurrence of any of the following risks could harm our business, financial condition, results of operations and/or growth prospects or cause our actual results to differ materially from those contained in forward-looking statements we have made in this prospectus and those we may make from time to time. You should consider all of the risk factors described when evaluating our business.

Risks Relating to Our Financial Condition and Capital Requirements

We are an early commercial stage molecular oncology diagnostics company with a history of net losses; we expect to incur net losses in the future, and we may never achieve sustained profitability.

We have historically incurred substantial net losses, including net losses of $21.6 million for the year ended December 31, 2017 and $18.6 million for the nine month period ended September 30, 2018, and we have never been profitable. At September 30, 2018, our accumulated deficit was $214.4 million. Before 2008, we were pursuing a business plan relating to fetal genetic disorders and other fields, all of which were unrelated to cancer diagnostics. The portion of our accumulated deficit that relates to the period from inception through December 31, 2007 is $66.5 million.

We expect our losses to continue as a result of costs relating to our lab operations as well as increased sales and marketing costs and ongoing research and development expenses. These losses have had, and will continue to have, an adverse effect on our working capital, total assets and stockholders' equity. Because of the numerous risks and uncertainties associated with our commercialization efforts, we are unable to predict when we will become profitable, and we may never become profitable. Even if we do achieve profitability, we may not be able to sustain or increase profitability on a quarterly or annual basis. Our inability to achieve and then maintain profitability would negatively affect our business, financial condition, results of operations and cash flows.

We need to raise additional capital to continue as a going concern.

We expect to continue to incur losses for the foreseeable future and will have to raise additional capital to fund our planned operations and to meet our long-term business objectives. As a result, there is substantial doubt about our ability to continue as a going concern unless we are able to successfully raise additional capital. Until we can generate significant cash from operations, including product and assay revenues, we expect to continue to fund our operations with the proceeds from offerings of our equity securities or debt, or transactions involving product development, technology licensing or collaboration. We can provide no assurances that any sources of a sufficient amount of financing will be available to us on favorable terms, if at all. Failure to raise additional capital in sufficient amounts would significantly impact our ability to continue as a going concern. The actual amount of funds that we will need and the timing of any such investment will be determined by many factors, some of which are beyond our control.

Risks Relating to Our Business and Strategy

If we are unable to increase sales of our current products, assays and services or successfully develop and commercialize other products, assays and services, our revenues will be insufficient for us to achieve profitability.

We currently derive substantially all of our revenues from sales of diagnostic assays. We began offering our assays through our Clinical Laboratory Improvement Amendments of 1988, or CLIA, certified, CAP accredited, and state-licensed laboratory in 2014. Additionally, sales to laboratory supply distributors of our proprietary blood collection tubes, or BCTs, commenced during the three months ending June 30, 2018, which allow for the intact transport of liquid biopsy samples for RUO from regions around the world. We are in varying stages of research and development for other products and diagnostic assays that we may offer. If we are unable to increase sales of our existing products and diagnostic assays or successfully develop and commercialize other products and diagnostic assays, we will not produce sufficient revenues to become profitable.

If we are unable to execute our sales and marketing strategy for our products and diagnostic assays and are unable to gain acceptance in the market, we may be unable to generate sufficient revenue to sustain our business.

We are an early commercialization stage molecular oncology diagnostics company and have engaged in only limited sales and marketing activities for the diagnostic assays we currently offer through our CLIA-certified, CAP accredited, and state-licensed laboratory. To date, our revenue has been insufficient to fund operations.

Although we believe that our current assays and our planned future assays, as well as our BCT product and future kits, represent a promising commercial opportunity, our products or assays may never gain significant acceptance in the marketplace and therefore may never generate substantial revenue or profits for us. We will need to establish a market for our products and diagnostic assays and build that market through physician education, awareness programs and the publication of clinical trial results. Gaining acceptance in medical communities requires, among other things, publications in leading peer-reviewed journals of results from studies using our current products, assays and services and/or our planned future products, assays and services. The process of publication in leading medical journals is subject to a peer review process and peer reviewers may not consider the results of our studies sufficiently novel or worthy of publication. Failure to have our studies published in peer-reviewed journals would limit the adoption of our current products, assays and services and our planned future products, assays and services.

Our ability to successfully market the products and diagnostic assays that we have developed, and may develop in the future, will depend on numerous factors, including:

- conducting clinical utility studies of such assays in collaboration with key thought leaders to demonstrate their use and value in important medical decisions such as treatment selection;
- whether our current or future partners, vigorously support our offerings;
- the success of our sales force;
- whether healthcare providers believe such diagnostic assays provide clinical utility;
- whether the medical community accepts that such diagnostic assays are sufficiently sensitive and specific to be meaningful in-patient care and treatment decisions;
- our ability to continually source raw materials, BCTs, shipping kits and other products that we sell or consume in our manufacturing process that are of sufficient quality and supply;
- our ability to provide high quality testing within the turn-around time stated;
- our ability to maintain and gain certifications with regulatory agencies;
- our ability to continue to fund planned sales and marketing activities; and
- whether private health insurers, government health programs and other third-party payers will adopt liquid biopsy-based assays in their guidelines, or cover such diagnostic assays and, if so, whether they will adequately reimburse us.

Failure to achieve widespread market acceptance of our current products, assays and services, as well as our planned future products, assays and services, would materially harm our business, financial condition and results of operations.

If we cannot develop products, assays and services to keep pace with rapid advances in technology, medicine and science, our operating results and competitive position could be harmed.

In recent years, there have been numerous advances in technologies relating to the diagnosis and treatment of cancer. Several new cancer drugs have been approved, and a number of new drugs in clinical development may increase patient survival time. There have also been advances in methods used to identify patients likely to benefit from these drugs based on analysis of biomarkers. We must continuously develop new products and diagnostic assays and enhance any existing products, assays and services to keep pace with evolving standards of care. Our current products, assays and services and our planned future products, assays and services could become obsolete unless we continually innovate and expand them to demonstrate benefit in the diagnosis, monitoring or prognosis of patients with cancer. New cancer therapies typically have only a few years of clinical data associated with them, which limits our ability to develop products and diagnostic assays based on, for example, biomarker analysis related to the appearance or development of resistance to those therapies. If we cannot adequately demonstrate the applicability of our current products, assays and services and our planned future products, assays and services to new treatments, by incorporating important biomarker analysis, sales of our products, assays and services could decline, which would have a material adverse effect on our business, financial condition and results of operations.

If our current products, assays and services and our planned future products, assays and services do not continue to perform as expected, our operating results, reputation and business will suffer.

Our success depends on the market’s confidence that we can continue to provide reliable, high-quality products and assay results. We believe that our customers are likely to be particularly sensitive to product or assay defects and errors. As a result, the failure of our current or planned future products or assays to perform as expected, including with respect to our ability to maintain the sensitivity, specificity, concordance or reproducibility of such assays, would significantly impair our reputation and the public image of our products and cancer assays, and we may be subject to legal claims arising from any defects or errors.

If our sole laboratory facility becomes damaged or inoperable, or we are required to vacate the facility, our ability to sell and provide our products and diagnostic assays and pursue our research and development efforts may be jeopardized.

We currently derive our revenues from our diagnostic assays conducted in our CLIA-certified, CAP accredited, and state-licensed laboratory. We do not have any clinical reference laboratory facilities other than our facility in San Diego, California. Our facilities and equipment could be harmed or rendered inoperable by natural or man-made disasters, including fire, earthquake, flooding and power outages, which may render it difficult or impossible for us to sell our products or perform our diagnostic assays for some period of time. The inability to sell our current or planned future products, or to perform our current assays and our planned future assays, or the backlog of assays that could develop if our facility is inoperable for even a short period of time, may result in the loss of customers or harm to our reputation or relationships with scientific or clinical collaborators, and we may be unable to regain those customers or repair our reputation in the future. Furthermore, our facilities and the equipment we use to perform our research and development work could be costly and time-consuming to repair or replace.

The San Diego area has recently experienced serious fires and power outages and is considered to lie in an area with earthquake risk.

Additionally, a key component of our research and development process involves using biological samples as the basis for our diagnostic assay development. In some cases, these samples are difficult to obtain. If the parts of our laboratory facility where we store these biological samples were damaged or compromised, our ability to pursue our research and development projects, as well as our reputation, could be jeopardized. We carry insurance for damage to our property and the disruption of our business, but this insurance may not be sufficient to cover all of our potential losses and may not continue to be available to us on acceptable terms, if at all.

Further, if our CLIA-certified, CAP accredited, and state-licensed laboratory became inoperable we may not be able to license or transfer our technology to another facility with the necessary qualifications, including state licensure and CLIA certification, under the scope of which our current assays and our planned future assays could be performed. Even if we find a facility with such qualifications to perform our assays, it may not be available to us on commercially reasonable terms.

If we cannot compete successfully with our competitors, we may be unable to increase or sustain our revenues or achieve and sustain profitability.

Our principal competition comes from mainstream diagnostic methods, used by medical oncologists, surgical oncologists, pulmonologists, pathologists and other physicians for many years, which focus on tumor tissue analysis. The methods or behavior of medical oncologists, surgical oncologists, pulmonologists, pathologists and other physicians may be difficult to change regarding the use of our CTC and ctDNA assays, including molecular diagnostic assays, in their practices in conjunction with or instead of tissue biopsies and analysis. In addition, companies offering capital equipment, BCTs, and kits or reagents to local pathology laboratories or laboratory supply distributors represent another source of potential competition. These kits are used directly by the pathologist, which can facilitate adoption. Historically, we have focused our marketing and sales efforts on medical oncologists rather than pathologists, although commencing in October 2017, our Empower TC offering provides the unique ability for pathologists to participate in the interpretation of liquid biopsy results and is available to pathology practices and hospital systems throughout the United States.

We also face competition from companies that offer products or are conducting research to develop products for CTC or ctDNA assays in various cancers. CTC and ctDNA products, assays and services represent a new area of science and we cannot predict what products or assays others will develop that may compete with or provide results similar or superior to the results we are able to achieve with the products or assays we develop. Competitors include but are not limited to companies such as Atossa, Qiagen, Roche, Guardant Health, Cancer Genetics, Agena Bioscience, Alere (Adnagen), Illumina, Grail, Apocell, EPIC Sciences, Clearbridge Biomedics, Biodesix, Thermo Fisher Scientific, Foundation Medicine, Neogenomics, Cynvenio Biosystems, Genomic Health, Fluxion Biosciences, RareCells, ScreenCell, Menarini Silicon Biosystems, Sysmex, Natera, Inc, Circulogen, Angle PLC, Caris Life Sciences, Archer DX, and Tempus. Some of these groups, in addition to operating research and development laboratories, are establishing CLIA-certified testing laboratories while others are focused on selling equipment and reagents.

There are a number of companies which are focused on the oncology diagnostic market, such as Agendia and Genoptix, who while not currently offering CTC or ctDNA assays are selling to the medical oncologists and pathologists and could develop or offer CTC or ctDNA assays. Large laboratory services companies such as Quest and LabCorp provide more generalized cancer diagnostic assays and testing but could also offer a CTC or ctDNA assay service. Companies like Abbott and Danaher and others could develop equipment or reagents in the future as well. Currently, companies like Streck, Qiagen, Roche and Exact Sciences offer BCTs, and in the future, companies like Covidien, Beckton Dickinson, Thermo Fisher, and other large medical device companies may develop BCTs as well.

There are a number of companies that are focused on the oncology diagnostic market such as Illumina, Biorad, Sysmex, Precipio, Qiagen and Thermo Fisher Scientific that are selling equipment and reagents kits for ctDNA assays and assay panels to laboratories that are developing tests that are marketed to medical oncologists and pathologists.

Some of our present and potential competitors have widespread brand recognition and substantially greater financial and technical resources and development, production and marketing capabilities than we do. Others may develop lower-priced, less complex assays that payers, medical oncologists, surgical oncologists, pulmonologists, pathologists and other physicians could view as functionally equivalent to our current or planned future assays, which could force us to lower the list price of our assays and impact our operating margins and our ability to achieve and maintain profitability. In addition, technological innovations that result in the creation of enhanced products or diagnostic tools that are more sensitive or specific than ours may enable other clinical laboratories, hospitals, physicians or medical providers to provide specialized products or diagnostic assays similar to ours in a more patient-friendly, efficient or cost-effective manner than is currently possible. If we cannot compete successfully against current or future competitors, we may be unable to increase or create market acceptance and sales of our current or planned future products or assays, which could prevent us from increasing or sustaining our revenues or achieving or sustaining profitability.

We expect that biopharmaceutical companies will increasingly focus attention and resources on the personalized cancer diagnostic sector as the potential and prevalence of molecularly targeted oncology therapies approved by the FDA along with companion diagnostics increases. For example, the FDA has approved three such agents: Xalkori® from Pfizer Inc. along with its companion anaplastic lymphoma kinase FISH test from Abbott Laboratories, Inc., Zelboraf® from Daiichi-Sankyo/Genentech/Roche along with its companion BRAF kinase V600 mutation test from Roche Molecular Systems, Inc. and Tafinlar® from GlaxoSmithKline along with its companion BRAF kinase V600 mutation test from bioMerieux. Since companion diagnostic tests are part of FDA labeling, non-FDA cleared tests such as ours would be considered an off-label use and this may limit our access to this market segment.

Additionally, projects related to cancer diagnostics and particularly genomics have received increased government funding, both in the United States and internationally. As more information regarding cancer genomics becomes available to the public, we anticipate that more products aimed at identifying targeted treatment options will be developed and that these products may compete with ours. In addition, competitors may develop their own versions of our current or planned future products or assays in countries where we did not apply for patents or where our patents have not issued and compete with us in those countries, including encouraging the use of their product or assay by physicians or patients in other countries.

We expect to continue to incur significant expenses to develop and market products and diagnostic assays, which could make it difficult for us to achieve and sustain profitability.

In recent years, we have incurred significant costs in connection with the development of our products and diagnostic assays. Our research and development expenses were $3.4 million for the year ended December 31, 2017 and $3.2 million for the nine month period ended September 30, 2018, and our sales and marketing expenses were $6.3 million and $4.5 million, respectively. We expect our expenses to continue to increase for the foreseeable future as we conduct studies of our current products, assays and services and our planned future products, assays and services, continue to establish our sales and marketing organization, drive adoption of and reimbursement for our products and diagnostic assays and develop new products, assays and services. As a result, we need to generate significant revenues in order to achieve sustained profitability.

If medical oncologists, surgical oncologists, pulmonologists, urologists, pathologists and other physicians or health care practitioners decide not to order our current or planned future assays, or if laboratory supply distributors or their customers decide not to order our current or planned future products, we may be unable to generate sufficient revenue to sustain our business.

To generate demand for our current products, assays and services and our planned future products, assays and services, we will need to educate medical oncologists, surgical oncologists, pulmonologists, pathologists, and other physicians and other health care professionals, as well as laboratory and medical equipment suppliers, on the clinical utility, benefits and value of the products, assays and services we provide through published papers, presentations at scientific conferences, educational programs and one-on-one education sessions by members of our sales force. In addition, we need to demonstrate to medical oncologists, surgical oncologists, pulmonologists, pathologists and other physicians of our ability to obtain and maintain coverage and adequate from third-party payers. Unless an adequate number of medical practitioners order our current assays and our planned future assays, or unless an adequate number of laboratory supply distributors order our current and planned future products, we will likely be unable to create demand in sufficient volume for us to achieve sustained profitability.

Clinical utility studies are important in demonstrating to both customers and payers an assay's clinical relevance and value. If we are unable to identify collaborators willing to work with us to conduct clinical utility studies, or the results of those studies do not demonstrate that an assay provides clinically meaningful information and value, commercial adoption of such assay may be slow, which would negatively impact our business.

Clinical utility studies show when and how to use a clinical test or assay and describe the particular clinical situations or settings in which it can be applied and the expected results. Clinical utility studies also show the impact of the test or assay results on patient care and management. Clinical utility studies are typically performed with collaborating oncologists or other physicians at medical centers and hospitals, analogous to a clinical trial, and generally result in peer-reviewed publications. Sales and marketing representatives use these publications to demonstrate to customers how to use a clinical test or assay, as well as why they should use it. These publications are also used with payers to obtain coverage for a test or assay, helping to assure there is appropriate reimbursement.

We need to conduct additional studies for our assays, increase assay adoption in the marketplace and obtain coverage and adequate reimbursement. Should we not be able to perform these studies, or should their results not provide clinically meaningful data and value for medical oncologists, surgical oncologists, pulmonologists, pathologists and other physicians, adoption of our assays could be impaired, and we may not be able to obtain coverage and adequate reimbursement for them.

The loss of key members of our executive management team could adversely affect our business.

Our success in implementing our business strategy depends largely on the skills, experience and performance of key members of our executive management team and others in key management positions, including Michael W. Nall, our Chief Executive Officer and President, Lyle J. Arnold, Ph.D., our Senior Vice-President of Research & Development and Chief Scientific Officer, Michael Terry, our Senior Vice President Corporate Development, Edwin Hendrick, Senior Vice President Chief Commercial Officer, and Timothy C. Kennedy, our Chief Financial Officer, Senior Vice President of Operations and Secretary. The collective efforts of each of these persons and others working with them as a team are critical to us as we continue to develop our technologies, products, services, assays and research and development and sales programs. As a result of the difficulty in locating qualified new management, the loss or incapacity of existing members of our executive management team could adversely affect our operations. If we were to lose one or more of these key employees, we could experience difficulties in finding qualified successors, competing effectively, developing our technologies and implementing our business strategy. Our executive management team each have employment agreements, however, the existence of an employment agreement does not guarantee retention of members of our executive management team and we may not be able to retain those individuals for the duration of or beyond the end of their respective terms. We do not maintain "key person" life insurance on any of our employees.

In addition, we rely on collaborators, consultants and advisors, including scientific and clinical advisors, to assist us in formulating our research and development and commercialization strategy. Our collaborators, consultants and advisors are generally employed by employers other than us and may have commitments under agreements with other entities that may limit their availability to us.

The loss of a key employee, the failure of a key employee to perform in his or her current position or our inability to attract and retain skilled employees could result in our inability to continue to grow our business or to implement our business strategy.

There is a scarcity of experienced professionals in our industry. If we are not able to retain and recruit personnel with the requisite technical skills, we may be unable to successfully execute our business strategy.

The specialized nature of our industry results in an inherent scarcity of experienced personnel in the field. Our future success depends upon our ability to attract and retain highly skilled personnel, including scientific, technical, commercial, business, regulatory and administrative personnel, necessary to support our anticipated growth, develop our business and perform certain contractual obligations. Given the scarcity of professionals with the scientific knowledge that we require and the competition for qualified personnel among life science businesses, we may not succeed in attracting or retaining the personnel we require to continue and grow our operations.

Our failure to continue to attract, hire and retain a sufficient number of qualified sales professionals would hamper our ability to increase demand for our products and diagnostic assays, to expand geographically and to successfully commercialize any other products or assays we may develop.

To succeed in selling our products and diagnostic assays and any other products or assays that we are able to develop, we must expand our sales force in the United States and/or internationally by recruiting additional sales representatives with extensive experience in oncology and established relationships with medical oncologists, surgical oncologists, pulmonologists, pathologists, oncology nurses, and other physicians and hospital personnel, as well as laboratory supply distributors. To achieve our marketing and sales goals, we will need to continue to build our sales and commercial infrastructure. Sales professionals with the necessary technical and business qualifications are in high demand, and there is a risk that we may be unable to attract, hire and retain the number of sales professionals with the right qualifications, scientific backgrounds and relationships with decision-makers at potential customers needed to achieve our sales goals. We expect to face competition from other companies in our industry, some of whom are much larger than us and who can pay greater compensation and benefits than we can, in seeking to attract and retain qualified sales and marketing employees. If we are unable to hire and retain qualified sales and marketing personnel, our business will suffer.

Our dependence on commercialization partners for sales of products, assays and services could limit our success in realizing revenue growth.

We intend to grow our business through the use of commercialization partners for the sales, marketing and commercialization of our current products, assays and services, as well as our planned future products, assays and services, and to do so we must enter into agreements with these partners to sell, market or commercialize our products, assays and services. These agreements may contain exclusivity provisions and generally cannot be terminated without cause during the term of the agreement. We may need to attract additional partners to expand the markets in which we sell products or assays. These partners may not commit the necessary resources to market and sell our products and diagnostics assays to the level of our expectations, and we may be unable to locate suitable alternatives should we terminate our agreement with such partners or if such partners terminate their agreement with us.

If current or future commercialization partners do not perform adequately, or we are unable to locate commercialization partners, we may not realize revenue growth.

We depend on third parties for the supply of blood samples and other biological materials that we use in our research and development efforts. If the costs of such samples and materials increase or our third-party suppliers terminate their relationship with us, our business may be materially harmed.

We have relationships with suppliers and institutions that provide us with blood samples and other biological materials that we use in developing and validating our current assays and our planned future assays. If one or more suppliers terminate their relationship with us or are unable to meet our requirements for samples, we will need to identify other third parties to provide us with blood samples and biological materials, which could result in a delay in our research and development activities and negatively affect our business. In addition, as we grow, our research and academic institution collaborators may seek additional financial contributions from us, which may negatively affect our results of operations.

We currently rely on third-party suppliers for our BCTs, shipping kits, and critical materials needed to perform our current assays, as well as our planned future products, assays and services, and any problems experienced by them could result in a delay or interruption of their supply to us.

We currently purchase our BCTs and raw materials for our microfluidic channels and assay reagents under purchase orders and do not have long-term contracts with most of the suppliers of these materials. If suppliers were to delay or stop producing our BCTs, shipping kits, materials or reagents, or if the prices they charge us were to increase significantly, or if they elected not to sell to us, we would need to identify other suppliers. We could experience delays in obtaining BCTs and shipping kits, manufacturing the microfluidic channels, or performing assays while finding another acceptable supplier, which could impact our results of operations. The changes could also result in increased costs associated with qualifying the new BCTs, shipping kits, materials or reagents and in increased operating costs. Further, any prolonged disruption in a supplier’s operations could have a significant negative impact on our ability to perform diagnostic assays in a timely manner and sell our products.

Some of the components used in our current or planned future products are currently sourced from a supplier for which alternative suppliers exist but we have not validated the products of such alternative suppliers, and substitutes for these components might not be able to be obtained easily or may require substantial design or manufacturing modifications. Any significant problem experienced by any one of our suppliers may result in a delay or interruption in the supply of components to us until that supplier cures the problem or an alternative source of the component is located and qualified. Any delay or interruption would likely lead to a delay or interruption in our manufacturing operations or product sales. The inclusion of substitute components must meet our product specifications and could require us to qualify the new supplier with the appropriate government regulatory authorities.

If we were sued for product liability or professional liability, we could face substantial liabilities that exceed our resources.

The marketing, sale and use of our products and current assays, as well our planned future products, assays and services, could lead to the filing of product liability claims against us if someone alleges that our products or assays failed to perform as designed. We may also be subject to liability for errors in the assay results we provide to physicians or for a misunderstanding of, or inappropriate reliance upon, the information we provide. A product liability or professional liability claim could result in substantial damages and be costly and time-consuming for us to defend.

Although we believe that our existing product and professional liability insurance is adequate, our insurance may not fully protect us from the financial impact of defending against product liability or professional liability claims. Any product liability or professional liability claim brought against us, with or without merit, could increase our insurance rates or prevent us from securing insurance coverage in the future. Additionally, any product liability lawsuit could damage our reputation, result in the recall of products or assays, or cause current partners to terminate existing agreements and potential partners to seek other partners, any of which could impact our results of operations.

If we use biological and hazardous materials in a manner that causes injury, we could be liable for damages.

Our activities currently require the controlled use of potentially harmful biological materials and chemicals. We cannot eliminate the risk of accidental contamination or injury to employees or third parties from the use, storage, handling or disposal of these materials. In the event of contamination or injury, we could be held liable for any resulting damages, and any liability could exceed our resources or any applicable insurance coverage we may have. Additionally, we are subject to, on an ongoing basis, federal, state and local laws and regulations governing the use, storage, handling and disposal of these materials and specified waste products. The cost of compliance with these laws and regulations may become significant and could have a material adverse effect on our financial condition, results of operations and cash flows. In the event of an accident or if we otherwise fail to comply with applicable regulations, we could lose our permits or approvals or be held liable for damages or penalized with fines.

We may acquire other businesses or form joint ventures or make investments in other companies or technologies that could harm our operating results, dilute our stockholders' ownership, increase our debt or cause us to incur significant expense.

As part of our business strategy, we may pursue acquisitions of businesses and assets. We also may pursue strategic alliances and joint ventures that leverage our core technology and industry experience to expand our offerings or distribution. We have no experience with acquiring other companies and limited experience with forming strategic alliances and joint ventures. We may not be able to find suitable partners or acquisition candidates, and we may not be able to complete such transactions on favorable terms, if at all. If we make any acquisitions, we may not be able to integrate these acquisitions successfully into our existing business, and we could assume unknown or contingent liabilities. Any future acquisitions also could result in significant write-offs or the incurrence of debt and contingent liabilities, any of which could have a material adverse effect on our financial condition, results of operations and cash flows. Integration of an acquired company also may disrupt ongoing operations and require management resources that would otherwise focus on developing our existing business. We may experience losses related to investments in other companies, which could have a material negative effect on our results of operations. We may not identify or complete these transactions in a timely manner, on a cost-effective basis, or at all, and we may not realize the anticipated benefits of any acquisition, technology license, strategic alliance or joint venture.

To finance any acquisitions or joint ventures, we may choose to issue shares of our common stock as consideration, which would dilute the ownership of our stockholders. If the price of our common stock is low or volatile, we may not be able to acquire other companies or fund a joint venture project using our stock as consideration. Alternatively, it may be necessary for us to raise additional funds for acquisitions through public or private financings. Additional funds may not be available on terms that are favorable to us, or at all.

If we cannot support demand for our current products, assays and services, as well as our planned future products, assays and services, including successfully managing the evolution of our laboratory service, our business could suffer.

As our product and assay volume grows, we will need to increase our assay capacity, implement automation, increase our scale and related processing, customer service, billing, collection and systems process improvements and expand our internal quality assurance program and technology to support assays on a larger scale. Examples of challenges we may face include, but are not limited to, maintaining the same validated sensitivity in our assays for both CTC and ctDNA analysis as our assay volume increases. We will also need additional clinical laboratory scientists and other scientific and technical personnel to process these additional assays. Any increases in scale, related improvements and quality assurance may not be successfully implemented and appropriate personnel may not be available. As additional products, assays and services are commercialized, we may need to bring new equipment on line, implement new systems, technology, controls and procedures and hire personnel with different qualifications. Failure to

implement or maintain necessary procedures or to hire the necessary personnel could result in a higher cost of processing or an inability to meet market demand. We cannot assure you that we will be able to perform assays on a timely basis, or procure BCTs, shipping kits or other materials we sell, at a level consistent with demand, that our efforts to scale our commercial operations will not negatively affect the quality of our assay results, or that we will respond successfully to the growing complexity of our operations. If we encounter difficulty meeting market demand or quality standards for our current products, assays and services and our planned future products, assays and services, including with respect to our assays our ability to maintain the sensitivity, specificity, concordance and reproducibility of such assays, our reputation could be harmed, and our future prospects and business could suffer, which may have a material adverse effect on our financial condition, results of operations and cash flows.

Billing for our diagnostic assays is complex, and we must dedicate substantial time and resources to the billing process to be paid.

Billing for clinical laboratory assay services is complex, time-consuming and expensive. Depending on the billing arrangement and applicable law, we bill various payers, including Medicare, insurance companies and patients, all of which have different billing requirements. We generally bill third-party payers for our diagnostic assays and pursue reimbursement on a case-by-case basis where pricing contracts are not in place. To the extent laws or contracts require us to bill patient co-payments or co-insurance, we must also comply with these requirements. We may also face increased risk in our collection efforts, including potential write-offs of doubtful accounts and long collection cycles, which could adversely affect our business, results of operations and financial condition.

Several factors make the billing process complex, including:

- differences between the list price for our assays and the reimbursement rates of payers;
- compliance with complex federal and state regulations related to billing Medicare;
- risk of government audits related to billing Medicare;
- disputes among payers as to which party is responsible for payment;
- differences in coverage and in information and billing requirements among payers, including the need for prior authorization and/or advanced notification;
- the effect of patient co-payments or co-insurance;
- changes to billing codes and/or coverage policies that apply to our assays;
- incorrect or missing billing information; and
- the resources required to manage the billing and claims appeals process.

We use standard industry billing codes, known as CPT codes, to bill for our diagnostic assays. These codes can change over time. When codes change, there is a risk of an error being made in the claim adjudication process. These errors can occur with claims submission, third-party transmission or in the processing of the claim by the payer. Claim adjudication errors may result in a delay in payment processing or a reduction in the amount of the payment received. Coding changes, therefore, may have an adverse effect on our revenues. There can be no assurance that payers will recognize these codes in a timely manner or that the process of transitioning to such a code and updating their billing systems and ours will not result in errors, delays in payments and a related increase in accounts receivable balances.

As we introduce new assays, we will need to add new codes to our billing process as well as our financial reporting systems. Failure or delays in effecting these changes in external billing and internal systems and processes could negatively affect our collection rates, revenue and cost of collecting.

Additionally, our billing activities require us to implement compliance procedures and oversight, train and monitor our employees, challenge coverage and payment denials, assist patients in appealing claims, and undertake internal audits to evaluate compliance with applicable laws and regulations as well as internal compliance policies and procedures. Payers also conduct external audits to evaluate payments, which add further complexity to the billing process. If the payer makes an overpayment determination, there is a risk that we may be required to return some portion of prior payments we have received. These billing complexities, and the related uncertainty in obtaining payment for our assays, could negatively affect our revenue and cash flow, our ability to achieve profitability, and the consistency and comparability of our results of operations.

We rely on third-party billing provider software, and an in-house billing function, to transmit claims to payers, and any delay in transmitting claims could have an adverse effect on our revenue.

While we manage the overall processing of claims, we rely on third-party billing provider software to transmit the actual claims to payers based on the specific payer billing format. We have previously experienced delays in claims processing when our third-party provider made changes to its invoicing system. Additionally, coding for diagnostic assays may change, and such changes may cause short-term billing errors that may take significant time to resolve. If claims are not submitted to payers on a timely basis or are erroneously submitted, or if we are required to switch to a different software provider to handle claim submissions, we may experience delays in our ability to process these claims and receipt of payments from payers, or possibly denial of claims for lack of timely submission, which would have an adverse effect on our revenue and our business.

We may encounter manufacturing problems or delays that could result in lost revenue.

We currently manufacture our proprietary microfluidic channels at our San Diego facility and are in the process of evaluating the option of an outsourced manufactured channel. We believe we currently have adequate manufacturing capacity for our microfluidic channels, however, we believe outsourcing could lead to lower costs. If demand for our current products, assays and services and our planned future products, assays and services increases significantly, we will need to either expand our manufacturing capabilities or outsource to other manufacturers. If we or third-party manufacturers engaged by us fail to manufacture and deliver our microfluidic channels or certain reagents in a timely manner, our relationships with our customers could be seriously harmed. We cannot assure you that manufacturing, or quality control problems will not arise as we attempt to increase the production of our microfluidic channels or reagents or that we can increase our manufacturing capabilities and maintain quality control in a timely manner or at commercially reasonable costs. If we cannot manufacture our microfluidic channels consistently on a timely basis because of these or other factors, it could have a significant negative impact on our ability to perform assays and generate revenues.

International expansion of our business would expose us to business, regulatory, political, operational, financial and economic risks associated with doing business outside of the United States.

Our business strategy is to pursue increased international expansion, including partnering with academic and commercial testing laboratories, and introducing our technology outside the United States as part of IVD test kits and/or testing systems utilizing our technologies. Doing business internationally involves a number of risks, including:

- multiple, conflicting and changing laws and regulations such as tax laws, export and import restrictions, employment laws, regulatory requirements and other governmental approvals, permits and licenses;
- failure by us or our distributors to obtain regulatory approvals for the sale or use of our current products or assays and our planned future products or assays in various countries;
- difficulties in managing foreign operations;
- complexities associated with managing government payer systems, multiple payer-reimbursement regimes or self-pay systems;
- logistics and regulations associated with shipping blood samples, including infrastructure conditions and transportation delays;
- limits on our ability to penetrate international markets if our current products or assays and our planned future products or assays cannot be processed by an appropriately qualified local laboratory;
- financial risks, such as longer payment cycles, difficulty enforcing contracts and collecting accounts receivable and exposure to foreign currency exchange rate fluctuations;
- reduced protection for intellectual property rights, or lack of them in certain jurisdictions, forcing more reliance on our trade secrets, if available;
- natural disasters, political and economic instability, including wars, terrorism and political unrest, outbreak of disease, boycotts, curtailment of trade and other business restrictions; and
- failure to comply with the Foreign Corrupt Practices Act, including its books and records provisions and its anti-bribery provisions, by maintaining accurate information and control over sales activities and distributors' activities.

Any of these risks, if encountered, could significantly harm our future international expansion and operations and consequently, have a material adverse effect on our financial condition, results of operations and cash flows.

General economic or business conditions may have a negative impact on our business.

Continuing concerns over United States health care reform legislation and energy costs, geopolitical issues, the availability and cost of credit and government stimulus programs in the United States and other countries have contributed to increased volatility and diminished expectations for the global economy. These factors, combined with low business and consumer confidence and high unemployment, precipitated an economic slowdown and recession. If the economic climate deteriorates, our business, including our access to patient samples and the addressable market for products or diagnostic assays that we may successfully develop, as well as the financial condition of our suppliers and our third-party payers, could be adversely affected, resulting in a negative impact on our business, financial condition and results of operations.

Intrusions into our computer systems could result in compromise of confidential information.

Despite the implementation of security measures, our technology or systems that we interface with, including the Internet and related systems, may be vulnerable to physical break-ins, hackers, improper employee or contractor access, computer viruses, programming errors, or similar problems. Any of these might result in confidential medical, business or other information of other persons or of ourselves being revealed to unauthorized persons.

There are a number of state, federal and international laws protecting the privacy and security of health information and personal data. As part of the American Recovery and Reinvestment Act of 2009, or ARRA, Congress amended the privacy and security provisions of the Health Insurance Portability and Accountability Act, or HIPAA. HIPAA imposes limitations on the use and disclosure of an individual's healthcare information by healthcare providers, healthcare clearinghouses, and health insurance plans, collectively referred to as covered entities, and also grants individuals rights with respect to their health information. HIPAA also imposes compliance obligations and corresponding penalties for non-compliance on individuals and entities that provide services to healthcare providers and other covered entities, collectively referred to as business associates. ARRA also made significant increases in the penalties for improper use or disclosure of an individual's health information under HIPAA and extended enforcement authority to state attorneys general. As amended by ARRA and subsequently by the final omnibus rule adopted in 2013, or Final Omnibus Rule, HIPAA also imposes notification requirements on covered entities in the event that certain health information has been inappropriately accessed or disclosed: notification requirements to individuals, federal regulators, and in some cases, notification to local and national media. Notification is not required under HIPAA if the health information that is improperly used or disclosed is deemed secured in accordance with encryption or other standards developed by the U.S. Department of Health and Human Services, or HHS. Most states have laws requiring notification of affected individuals and/or state regulators in the event of a breach of personal information, which is a broader class of information than the health information protected by HIPAA. Many state laws impose significant data security requirements, such as encryption or mandatory contractual terms to ensure ongoing protection of personal information. Activities outside of the United States implicate local and national data protection standards, impose additional compliance requirements and generate additional risks of enforcement for non-compliance. We may be required to expend significant capital and other resources to ensure ongoing compliance with applicable privacy and data security laws, to protect against security breaches and hackers or to alleviate problems caused by such breaches.

We depend on our information technology and telecommunications systems, and any failure of these systems could harm our business.

We depend on information technology and telecommunications systems for significant aspects of our operations. In addition, our third-party billing software provider depends upon telecommunications and data systems provided by outside vendors and information we provide on a regular basis. These information technology and telecommunications systems support a variety of functions, including assay processing, sample tracking, quality control, customer service and support, billing and reimbursement, research and development activities and our general and administrative activities. Information technology and telecommunications systems are vulnerable to damage from a variety of sources, including telecommunications or network failures, malicious human acts and natural disasters. Moreover, despite network security and back-up measures, some of our servers are potentially vulnerable to physical or electronic break-ins, computer viruses and similar disruptive problems. Despite the precautionary measures we have taken to prevent unanticipated problems that could affect our information technology and telecommunications systems, failures or significant downtime of our information technology or telecommunications systems or those used by our third-party service providers could prevent us from processing assays, providing assay results to medical oncologists, surgical oncologists, pulmonologists, pathologists, other physicians, billing payers, processing reimbursement appeals, handling patient or physician inquiries, conducting research and development activities and managing the administrative aspects of our business. Any disruption or loss of information technology or telecommunications systems on which critical aspects of our operations depend could have an adverse effect on our business.

Regulatory Risks Relating to Our Business

Healthcare policy changes, including recently enacted legislation reforming the U.S. health care system, may have a material adverse effect on our financial condition, results of operations and cash flows.

The Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act, or collectively the ACA, enacted in March 2010, makes a number of substantial changes in the way health care is financed by both governmental and private insurers. Among other things, the ACA requires each medical device manufacturer to pay an excise tax equal to 2.3% of the price for which such manufacturer sells its medical devices that are listed with the FDA. We believe that at this time this tax does not apply to our current diagnostic assays or to our products that are currently sold or in development; nevertheless, this could change in the future if either the FDA or the Internal Revenue Service, which regulates the payment of this excise tax, changes its position.

Although some of these provisions may negatively impact payment rates for clinical laboratory tests, the ACA also extends coverage to over 30 million previously uninsured people, which may result in an increase in the demand for our current assays and our planned future assays. The mandatory purchase of insurance has been strenuously opposed by a number of state governors, resulting in lawsuits challenging the constitutionality of certain provisions of the ACA. In 2012, the Supreme Court upheld the constitutionality of the ACA, with the exception of certain provisions dealing with the expansion of Medicaid coverage under the law. Since January 2017, the President of the United States has signed two executive orders and other directives designed to delay, circumvent, or loosen certain requirements mandated by the ACA. Concurrently, Congress has considered legislation that would repeal or repeal and replace all or part of the ACA. While Congress has not passed repeal legislation, the Tax Cuts and Jobs Act of 2017 includes a provision repealing, effective January 1, 2019, the tax-based shared responsibility payment imposed by the ACA on certain individuals who fail to maintain qualifying health coverage for all or part of a year that is commonly referred to as the "individual mandate." Additionally, on January 22, 2018, the president signed a continuing resolution on appropriations for fiscal year 2018 that delayed the implementation of certain ACA-mandated fees, including the so-called "Cadillac" tax on certain high cost employer-sponsored insurance plans, the annual fee imposed on certain health insurance providers based on market share, and the medical device excise tax on non-exempt medical devices. Congress may consider other legislation to repeal or replace elements of the ACA.

In addition, other legislative changes have been proposed and adopted since the ACA was enacted. The Protecting Access to Medicare Act of 2014, or PAMA, was signed to law, which, among other things, significantly alters the current payment methodology under the CLFS. Under the new law, issued in 2016 and the reporting period beginning in 2017 and every three years thereafter (or annually in the case of advanced diagnostic lab tests), clinical laboratories must report laboratory test payment data for each Medicare-covered clinical diagnostic lab test that it furnishes during a time period. The reported data must include the payment rate (reflecting all discounts, rebates, coupons and other price concessions) and the volume of each test that was paid by each private payer (including health insurance issuers, group health plans, Medicare Advantage plans and Medicaid managed care organizations). Beginning in 2018, the Medicare payment rate for each clinical diagnostic lab test is equal to the weighted median amount for the test from the most recent data collection period. The payment rate will apply to laboratory tests furnished by a hospital laboratory if the test is separately paid under the hospital outpatient prospective payment system. The PAMA rate changes to our tests that were impacted did not materially affect our payments beginning in 2018; however, we cannot predict how this may change future payment in coming years. Also, under PAMA, the Centers for Medicare & Medicaid Services, or CMS, is required to adopt temporary billing codes to identify new tests and new advanced diagnostic laboratory tests that have been cleared or approved by the FDA. For an existing test that is cleared or approved by the FDA and for which Medicare payment is made as of April 1, 2014, CMS is required to assign a unique billing code if one has not already been assigned by the agency. In addition to assigning the code, CMS was required to publicly report payment for the tests no later than January 1, 2016. Further, under PAMA, CMS is required to adopt temporary billing codes to identify new tests and new advanced diagnostic laboratory tests that have been cleared or approved by the FDA. We cannot determine at this time the full impact of PAMA on our business, financial condition and results of operations.

Additionally, the Budget Control Act of 2011, among other things, created the Joint Select Committee on Deficit Reduction to recommend proposals in spending reductions to Congress. The Joint Select Committee did not achieve its targeted deficit reduction of at least $1.2 trillion for the years 2013 through 2021, triggering the legislation's automatic reduction to several government programs. This includes aggregate reductions to Medicare payments to providers and suppliers of up to 2% per fiscal year, starting in 2013, and will remain in effect through 2024 unless additional congressional action is taken. The full impact on our business the sequester law is uncertain. In addition, the Middle-Class Tax Relief and Job Creation Act of 2012, or MCTRJCA, mandated an additional change in Medicare reimbursement for clinical laboratory tests.

Some of our laboratory assay business is subject to the Medicare Physician Fee Schedule and, under the current statutory formula, the rates for these services are updated annually. For the past several years, the application of the statutory formula would have resulted in substantial payment reductions if Congress failed to intervene. In the past, Congress passed interim legislation to prevent the decreases. If Congress fails to intervene to prevent the negative update factor in future years, the resulting decrease in

payment may adversely affect our revenue and results of operations. If in future years Congress does not adopt interim legislation to block or offset, and/or CMS does not moderate, any substantial CMS-proposed reimbursement reductions, the resulting decrease in payments from Medicare could adversely impact our revenues and results of operations.

We cannot predict whether future health care initiatives will be implemented at the federal or state level, or how any future legislation or regulation may affect us. The expansion of government's role in the U.S. health care industry, and changes to the reimbursement amounts paid by Medicare and other payers for our current assays and our planned future assays, may reduce our profits, if any, and have a materially adverse effect on our business, financial condition, results of operations and cash flows. Moreover, Congress has proposed on several occasions to impose a 20% coinsurance payment requirement on patients for clinical laboratory tests reimbursed under the Medicare Clinical Laboratory Fee Schedule, which would require us to bill patients for these amounts. In the event that Congress were to ever enact such legislation, the cost of billing and collecting for our assays could often exceed the amount actually received from the patient.

Our commercial success could be compromised if hospitals or other clients do not pay our invoices or if third-party payers, including managed care organizations and Medicare, do not provide coverage and reimbursement, breach, rescind or modify their contracts or reimbursement policies or delay payments for our current assays and our planned future assays.

Medical oncologists, surgical oncologists, pulmonologists, pathologists and other physicians may not order our current assays and our planned future assays unless third-party payers, such as managed care organizations and government payers (e.g., Medicare and Medicaid), pay a substantial portion of the assay price. Coverage and reimbursement by a third-party payer may depend on a number of factors, including a payer's determination that assays using our technologies are:

- not experimental or investigational;
- medically necessary;
- appropriate for the specific patient;
- cost-effective;
- supported by peer-reviewed publications; and
- included in clinical practice guidelines.

Uncertainty surrounds third-party payer coverage and adequate reimbursement of any test incorporating new technology, including tests developed using our technologies. Technology assessments of new medical tests conducted by research centers and other entities may be disseminated to interested parties for informational purposes. Third-party payers and health care providers may use such technology assessments as grounds to deny coverage for a test or procedure. Technology assessments can include evaluation of clinical utility studies, which define how a test is used in a particular clinical setting or situation.

Because each payer generally determines for its own enrollees or insured patients whether to cover or otherwise establish a policy to reimburse our diagnostic assays, seeking payer approvals is a time-consuming and costly process. We cannot be certain that coverage for our current assays and our planned future assays will be provided in the future by additional third-party payers or that existing agreements, policy decisions or reimbursement levels will remain in place or be fulfilled under existing terms and provisions. If we cannot obtain coverage and adequate reimbursement from private and governmental payers such as Medicare and Medicaid for our current assays, or new assays or assay enhancements that we may develop in the future, our ability to generate revenues could be limited, which may have a material adverse effect on our financial condition, results of operations and cash flow. Further, we may experience delays and interruptions in the receipt of payments from third-party payers due to missing documentation and/or other issues, which could cause delay in collecting our revenue.

In addition, to the extent that our assays are ordered for Medicare inpatients and outpatients, only the hospital may receive payment from the Medicare program for the technical component of pathology services and any clinical laboratory services that we perform, unless the testing is ordered at least 14 days after discharge and certain other requirements are met. We therefore must look to the hospital for payment for these services under these circumstances. If hospitals refuse to pay for the services or fail to pay in a timely manner, our ability to generate revenues could be limited, which may have a material adverse effect on our financial condition, results of operations and cash flow.

We expect to depend on Medicare and a limited number of private payers for a significant portion of our revenues and if these or other payers stop providing reimbursement or decrease the amount of reimbursement for our current assays and our planned future assays, our revenues could decline.

Approximately 39% and 39% of total net revenues during the year ended December 31, 2017 and the nine month period ended September 30, 2018, respectively, were associated with Medicare reimbursement. Approximately 19% and 14% of total net revenues during the year ended December 31, 2017 and the nine month period ended September 30, 2018, respectively, were associated with Blue Cross Blue Shield reimbursement, and approximately 12% and 15% of total net revenues during the year ended December 31, 2017 and the nine month period ended September 30, 2018, respectively, were associated with United Healthcare reimbursement. We cannot assure you that, even if our current assays and our planned future assays are otherwise successful, reimbursement for the currently Medicare, Blue Cross Blue Shield, and United Healthcare covered-portions of our current assays and our planned future assays would, without such contracted payer reimbursement for the capture/enumeration portion, produce sufficient revenues to enable us to reach profitability and achieve our other commercial objectives.

Medicare and other third-party payers may change their coverage policies or cancel future contracts with us at any time, review and adjust the rate of reimbursement or stop paying for our assays altogether, which would reduce our total revenues. Payers have increased their efforts to control the cost, utilization and delivery of health care services. In the past, measures have been undertaken to reduce payment rates for and decrease utilization of the clinical laboratory testing generally. Because of the cost-trimming trends, third-party payers that currently cover and provide reimbursement for our current assays and our planned future assays may suspend, revoke or discontinue coverage at any time, or may reduce the reimbursement rates payable to us. Any such action could have a negative impact on our revenues, which may have a material adverse effect on our financial condition, results of operations and cash flows.

In addition, we are currently considered a “non-contracted provider” by many private payers because we have not entered into a specific contract to provide diagnostic assays to their insured patients at specified rates of reimbursement. Additionally, a significant amount of our non-Medicare business (private payers) has historically not been contracted, and reimbursement for this business has historically not been at “in network” rates and has therefore been inconsistent. We first began to contract private payer networks in 2015, and since then our number of accessions treated as “in network” has increased as we continue to execute additional contracts, and reimbursement is improving. We are currently contracted with nine preferred provider organization networks, three large health plans, and five regional independent physician associations, and expect to continue to gain contracts in order to be considered as an “in-network” provider with additional plans. If we were to become a contracted provider with additional payers in the future, the amount of overall reimbursement we receive would likely decrease because we could be reimbursed less money per assay performed at a contracted rate than at a non-contracted rate, which could have a negative impact on our revenues. Further, we typically are unable to collect payments from patients beyond that which is paid by their insurance and will continue to experience lost revenue as a result.

Because of certain Medicare billing policies, we may not receive complete reimbursement for assays provided to Medicare patients. Medicare reimbursement revenues are an important component of our business model, and private payers sometimes look to Medicare determinations when making their own payment determinations; therefore, incomplete or inadequate reimbursement from Medicare would negatively affect our business.

Medicare has coverage policies that can be national or regional in scope. Coverage means that assay is approved as a benefit for Medicare beneficiaries. If there is no coverage, neither the supplier nor any other party, such as a reference laboratory, may receive reimbursement from Medicare for the service. There is currently no national coverage policy regarding the CTC enumeration portion of our assays. Because our laboratory is in California, the regional MAC for California is the relevant MAC for all our assays. The previous MAC for California, Palmetto, which is contracted with CMS to administer the MolDx program that sets guidelines for coding, coverage and reimbursement of molecular diagnostic assays, adopted a negative coverage policy for CTC enumeration. The current MAC for California, Noridian Healthcare Solutions, LLC, is adopting the coverage policies from Palmetto. Therefore, the enumeration portion of our assays is not currently covered, and we will receive no payment from Medicare for this portion of the service unless and until the coverage policy is changed. Although approximately 76% and 75.7% of all billable cases received during the year-ended December 31, 2017 and the nine month period ended September 30, 2018, respectively, relate to our Target-Selector biomarker assays, we continue to receive orders for traditional enumeration testing, which counts disease burden, and therefore the enumeration testing receives no payment from Medicare based upon the existing coverage decision. The CTC enumeration counts disease burden and is a prognostic assay, and although valuable, it does not meet many of the medical necessity requirements of Medicare and the payers. We intend to pursue payment for the capture portion of our CTC technology that allows us to run our diagnostic testing for some of our Target-Selector assays.

We cannot assure you that, even if our current assays and our planned future assays are otherwise successful, reimbursement for the currently Medicare, Blue Cross Blue Shield, and United Healthcare-covered portions of our current assays and our planned future assays would, without such contracted payer reimbursement for the capture/enumeration portion, produce sufficient revenues to enable us to reach profitability and achieve our other commercial objectives.

The processing of Medicare claims is subject to change at CMS' discretion at any time. Cost containment initiatives may be a threat to Medicare reimbursement levels (including for the covered components of our current assays and our planned future assays, including FISH analysis and molecular assays) for the foreseeable future.

Long payment cycles of Medicare, Medicaid and/or other third-party payers, or other payment delays, could hurt our cash flows and increase our need for working capital.

Medicare and Medicaid have complex billing and documentation requirements that we must satisfy in order to receive payment, and the programs can be expected to carefully audit and monitor our compliance with these requirements. We must also comply with numerous other laws applicable to billing and payment for healthcare services, including, for example, privacy laws. Failure to comply with these requirements may result in, among other things, non-payment, refunds, exclusion from government healthcare programs, and civil or criminal liabilities, any of which may have a material adverse effect on our revenues and earnings. In addition, failure by third-party payers to properly process our payment claims in a timely manner could delay our receipt of payment for our products and services, which may have a material adverse effect on our cash flows.

Complying with numerous regulations pertaining to our business is an expensive and time-consuming process, and any failure to comply could result in substantial penalties.

We are subject to CLIA, a federal law regulating clinical laboratories that perform testing on specimens derived from humans for the purpose of providing information for the diagnosis, prevention or treatment of disease. Our clinical laboratory must be certified under CLIA in order for us to perform testing on human specimens. CLIA is intended to ensure the quality and reliability of clinical laboratories in the United States by mandating specific standards in the areas of personnel qualifications, administration, and participation in proficiency testing, patient test management, quality control, quality assurance and inspections. We have a current certificate of accreditation under CLIA to perform high complexity testing, and our laboratory is accredited by CAP, one of six CLIA-approved accreditation organizations. To renew this certificate, we are subject to survey and inspection every two years. Moreover, CLIA and CAP inspectors may make periodic inspections of our clinical laboratory outside of the renewal process. The failure to comply with CLIA or CAP requirements can result in enforcement actions, including the revocation, suspension, or limitation of our CLIA and/or CAP certificate of accreditation, as well as a directed plan of correction, state on-site monitoring, civil money penalties, civil injunctive suit and/or criminal penalties. We must maintain CLIA compliance and certification to be eligible to bill for assays provided to Medicare beneficiaries. If we were to be found out of compliance with CLIA program requirements and subjected to sanctions, our business and reputation could be harmed. Even if it were possible for us to bring our laboratory back into compliance, we could incur significant expenses and potentially lose revenue in doing so.

In addition, our laboratory is located in California and is required by state law to have a California state license; as we expand our geographic focus, we may need to obtain laboratory licenses from additional states. California laws establish standards for operation of our clinical laboratory, including the training and skills required of personnel and quality control. In addition, we hold licenses from the states of Pennsylvania, Florida, Maryland and Rhode Island to test specimens from patients in those states or received from ordering physicians in those states. In addition, our clinical reference laboratory is required to be licensed on a product-specific basis by New York as an out of state laboratory and our products, as LDTs, must be approved by the New York State Department of Health before they are offered in New York. As part of this process, the State of New York requires validation of our assays. We currently do not have the necessary New York license, but we are in the process of addressing the requirements for licensure in New York. Other states may have similar requirements or may adopt similar requirements in the future. Finally, we may be subject to regulation in foreign jurisdictions if we seek to expand international distribution of our assays outside the United States.

If we were to lose our CLIA certification or California laboratory license, whether as a result of a revocation, suspension or limitation, we would no longer be able to offer our assays, which would limit our revenues and harm our business. If we were to lose, or fail to obtain, a license in any other state where we are required to hold a license, we would not be able to test specimens from those states. If we were to lose our CAP accreditation, our reputation for quality, as well as our business, financial condition and results of operations, could be significantly and adversely affected.

If the FDA were to begin requiring approval or clearance of our current products or assays and our planned future products or assays, we could incur substantial costs and time delays associated with meeting requirements for pre-market clearance or approval or we could experience decreased demand for, or reimbursement of, our assays.

We provide our assays as LDTs. Historically; the FDA has exercised enforcement discretion with respect to most LDTs and has not required laboratories that offer LDTs to comply with the agency's requirements for medical devices (e.g., establishment registration, device listing, quality systems regulations, premarket clearance or premarket approval, and post-market controls). In recent years, however, the FDA has stated it intends to end its policy of enforcement discretion and regulate certain LDTs as medical devices. To this end, on October 3, 2014, the FDA issued two draft guidance documents, entitled "Framework for Regulatory Oversight of Laboratory Developed Tests (LDTs)" and "FDA Notification and Medical Device Reporting for Laboratory Developed Tests (LDTs)", respectively, that set forth a proposed risk-based regulatory framework that would apply varying levels of FDA oversight to LDTs. The FDA has indicated that it does not intend to modify its policy of enforcement discretion until the draft guidance documents are finalized. In January 2017, the FDA announced that final guidance on the oversight of LDTs would allow for further public discussion. On January 13, 2017 the FDA issued a "Discussion Paper on Laboratory Developed Tests (LDTs)," which states that the material in the document does not represent a final version of the LDT draft guidance documents that were published in 2014 or position of the FDA; rather, the document is a method to encourage additional dialogue. The timing of when, if at all, the draft guidance documents will be finalized is unclear, and even then, the new regulatory requirements are proposed to be phased-in consistent with the schedule set forth in the guidance. Nevertheless, the FDA may decide to regulate certain LDTs on a case-by-case basis at any time. LDTs with the same intended use as a cleared or approved companion diagnostic are defined in FDA's draft guidance as "high-risk LDTs (Class III medical devices)" for which premarket review would be first to occur.

FDA review, if required and successfully accomplished, would be expected to have some advantages. Certain health insurance payers have paid higher amounts over LDT prices for FDA approved or cleared tests, recognizing the additional costs of bringing a test through regulatory review. Some payers also accept FDA approval or clearance as a presumptive evidence of an assay's analytic validity and clinical validity, which can reduce the barriers to coverage since the payer can focus its review on clinical utility.

The container we provide for collection and transport of blood samples from a health care provider to our clinical laboratory, as well as our BCTs, may be medical devices subject to the FDA regulation but are currently exempt from pre-market review by the FDA. While we believe that we are currently in material compliance with applicable laws and regulations, we cannot assure you that the FDA or other regulatory agencies would agree with our determination, and a determination that we have violated these laws, or a public announcement that we are being investigated for possible violations of these laws, could adversely affect our business, prospects, results of operations or financial condition.

Some of the materials we use for our current products, assays and services and may use in our planned future products, assays and services are labeled for RUO. In November 2013, the FDA finalized guidance regarding the sale and use of products labeled for research or investigational use only. Among other things, the guidance advises that the FDA continues to be concerned about distribution of research or investigational use only products intended for clinical diagnostic use and that the manufacturer's objective intent for the product's intended use will be determined by examining the totality of circumstances, including advertising, instructions for clinical interpretation, presentations that describe clinical use, and specialized technical support, surrounding the distribution of the product in question. The FDA has advised that if evidence demonstrates that a product is inappropriately labeled for research or investigational use only, the device would be misbranded and adulterated within the meaning of the Federal Food, Drug and Cosmetic Act. Some of the materials and reagents obtained by us from suppliers for use in our current products, assays and services and our planned future products, assays and services are currently labeled as research or investigational use only products. If the FDA were to undertake enforcement actions, some of our suppliers might cease selling research or investigational use products to us, and any failure to obtain an acceptable substitute could significantly and adversely affect our business, financial condition and results of operations, including increasing the cost of materials or reagents used in our current products, assays and services or planned future products, assays and services or delaying, limiting or prohibiting the purchase of materials or reagents necessary to sell our current products or planned future products or to perform our current assays or our planned future assays.

Our BCTs will be marketed for RUO and distributed and sold to end users, some of which will be researchers and institutions while other end users could be labs performing clinical testing that will create their own LDTs utilizing our tubes. Some end users of the BCTs may assert that our BCT caused their assays to perform inadequately or give erroneous results. If that was the case, we could potentially incur additional liabilities.

Further, HHS requested that its Advisory Committee on Genetics, Health and Society make recommendations about the oversight of genetic testing. A final report was published in April 2008. If the report's recommendations for increased oversight of genetic testing were to result in further regulatory burdens, they could negatively affect our business and delay the commercialization of assays in development.

Additionally, on March 16, 2018, CMS issued a final determination decision memo for NGS for Medicare Beneficiaries with Advanced Cancer (CAG-00450N). Under this final determination, NGS tests that gain FDA approval or clearance as a companion diagnostic will receive coverage, and the final determination of coverage for NGS tests that are LDTs will be left up to the local MAC. Currently, only one of our 15 CLIA validated assays is NGS-based; however, we plan to offer additional NGS assays in the future. To gain coverage for those assays, we will need to apply to Palmetto, which is the MAC that evaluates and recommends payment coverage or denial for molecular testing in our jurisdiction. Historically, Palmetto has offered a path to reimbursement by providing coverage while data is being gathered known as Coverage with Data Development, or CDD. Going forward, the extent to which CDD will be continued, if at all, or to the extent that a process will be available in its place, if any, are unclear.

The requirement of pre-market review could negatively affect our business until such review is completed and clearance to market or approval is obtained. The FDA could require that we stop selling our products or diagnostic assays pending pre-market clearance or approval. If the FDA allows our products or assays to remain on the market but there is uncertainty about our products or assays, if they are labeled investigational by the FDA or if labeling claims the FDA allows us to make are very limited, orders from laboratory supply distributors and physicians, or reimbursement from third-party payers, may decline. The regulatory approval process may involve, among other things, successfully completing additional clinical trials and making a 510(k) submission or filing a pre-market approval application with the FDA. If the FDA requires pre-market review, our products or assays may not be cleared or approved on a timely basis, if at all. We may also decide voluntarily to pursue FDA pre-market review of our products or assays if we determine that doing so would be appropriate.

If we were required to conduct additional clinical studies or trials before continuing to offer assays that we have developed or may develop as LDTs, those studies or trials could lead to delays or failure to obtain necessary regulatory approval, which could cause significant delays in commercializing any future products and harm our ability to achieve sustained profitability.

If the FDA decides to require that we obtain clearance or approvals to commercialize our current assays or our planned future assays, we may be required to conduct additional pre-market clinical testing before submitting a regulatory notification or application for commercial sales. In addition, as part of our long-term strategy we may plan to seek FDA clearance or approval, so we can sell our assays outside our CLIA laboratory; however, we would need to conduct additional clinical validation activities on our assays before we can submit an application for FDA approval or clearance. Clinical trials must be conducted in compliance with FDA regulations or the FDA may take enforcement action or reject the data. The data collected from these clinical trials may ultimately be used to support market clearance or approval for our assays. It may take two years or more to conduct the clinical studies and trials necessary to obtain approval from the FDA to commercially launch our current assays and our planned future assays outside of our clinical laboratory. Even if our clinical trials are completed as planned, we cannot be certain that their results will support our assay claims or that the FDA or foreign authorities will agree with our conclusions regarding our assay results. Success in early clinical trials does not ensure that later clinical trials will be successful, and we cannot be sure that the later trials will replicate the results of prior clinical trials and studies. If we are required to conduct pre-market clinical trials, whether using prospectively acquired samples or archival samples, delays in the commencement or completion of clinical testing could significantly increase our assay development costs and delay commercialization. Many of the factors that may cause or lead to a delay in the commencement or completion of clinical trials may also ultimately lead to delay or denial of regulatory clearance or approval. The commencement of clinical trials may be delayed due to insufficient patient enrollment, which is a function of many factors, including the size of the patient population, the nature of the protocol, the proximity of patients to clinical sites and the eligibility criteria for the clinical trial. Moreover, the clinical trial process may fail to demonstrate that our current assays and our planned future assays are effective for the proposed indicated uses, which could cause us to abandon an assay candidate and may delay development of other assays.

We may find it necessary to engage contract research organizations to perform data collection and analysis and other aspects of our clinical trials, which might increase the cost and complexity of our trials. We may also depend on clinical investigators, medical institutions and contract research organizations to perform the trials properly. If these parties do not successfully carry out their contractual duties or obligations or meet expected deadlines, or if the quality, completeness or accuracy of the clinical data they obtain is compromised due to the failure to adhere to our clinical protocols or for other reasons, our clinical trials may have to be extended, delayed or terminated. Many of these factors would be beyond our control. We may not be able to enter into replacement arrangements without undue delays or considerable expenditures. If there are delays in testing or approvals as a result of the failure to perform by third parties, our research and development costs would increase, and we may not be able to obtain regulatory clearance or approval for our current assays and our planned future assays. In addition, we may not be able to establish or maintain relationships with these parties on favorable terms, if at all. Each of these outcomes would harm our ability to market our assays or to achieve sustained profitability.

We are subject to federal and state healthcare fraud and abuse laws and regulations and could face substantial penalties if we are unable to fully comply with such laws.

We are subject to health care fraud and abuse regulation and enforcement by both the federal government and the states in which we conduct our business. These health care laws and regulations include, for example:

- the federal Anti-Kickback Statute, which prohibits, among other things, persons or entities from soliciting, receiving, offering or providing remuneration, directly or indirectly, overtly or covertly, in cash or in kind, in return for or to induce either the referral of an individual for, or the purchase, lease, order or recommendation of, any good, facility, item or services for which payment may be made under a federal health care program such as the Medicare and Medicaid programs;
- the federal physician self-referral prohibition, commonly known as the Stark Law, which prohibits physicians from referring Medicare or Medicaid patients to providers of "designated health services" with whom the physician or a member of the physician's immediate family has an ownership interest or compensation arrangement, unless a statutory or regulatory exception applies;
- HIPAA, which established federal crimes for, among other things, knowingly and willfully executing a scheme to defraud any health care benefit program or making false statements in connection with the delivery of or payment for health care benefits, items or services;
- HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act of 2009, or HITECH, and its implementing regulations, which imposes certain requirements relating to the privacy, security and transmission of individually identifiable health information;
- federal false claims and civil monetary penalties laws, which, prohibit, among other things, individuals or entities from knowingly presenting, or causing to be presented, false or fraudulent claims for payment to the federal government;
- the federal Physician Payments Sunshine Act requirements under the ACA, which require certain manufacturers of drugs, devices, biologics and medical supplies to report to the U.S. Department of Health and Human Services information related to payments and other transfers of value made to or at the request of covered recipients, such as physicians and teaching hospitals, and certain physician ownership and investment interests in such manufacturers; and
- state law equivalents of each of the above federal laws, such as anti-kickback and false claims laws, which may apply to items or services reimbursed by any third-party payer, including commercial insurers.

Further, the ACA, among other things, amends the intent requirement of the federal Anti-Kickback Statute and certain criminal health care fraud statutes. Where the intent requirement has been lowered, a person or entity no longer needs to have actual knowledge of this statute or specific intent to violate it. In addition, the government may now assert that a claim including items or services resulting from a violation of the federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the false claims statutes. Any action brought against us for violation of these laws or regulations, even if we successfully defend against it, could cause us to incur significant legal expenses and divert our management's attention from the operation of our business. If our operations are found to be in violation of any of these laws and regulations, we may be subject to any applicable penalty associated with the violation, including, among others, administrative, civil and criminal penalties, damages and fines, and/or exclusion from participation in Medicare, Medicaid programs, including the California Medical Assistance Program (Medi-Cal-the California Medicaid program) or other state or federal health care programs. Additionally, we could be required to refund payments received by us, and we could be required to curtail or cease our operations. Any of the foregoing consequences could seriously harm our business and our financial results.

We may be required to comply with laws governing the transmission, security and privacy of health information that require significant compliance costs, and any failure to comply with these laws could result in material criminal and civil penalties.

Under the administrative simplification provisions of HIPAA, HHS has issued regulations which establish uniform standards governing the conduct of certain electronic health care transactions and protecting the privacy and security of Protected Health Information used or disclosed by health care providers and other covered entities.

The privacy regulations regulate the use and disclosure of Protected Health Information by covered entities engaging in certain electronic transactions or "standard transactions." They also set forth certain rights that an individual has with respect to his or her Protected Health Information maintained by a covered entity, including the right to access or amend certain records containing Protected Health Information or to request restrictions on the use or disclosure of Protected Health Information. The HIPAA security regulations establish administrative, physical and technical standards for maintaining the confidentiality, integrity and availability of Protected Health Information in electronic form. These standards apply to covered entities and also to "business associates" or third parties providing services to covered entities involving the use or disclosure of Protected Health Information. The HIPAA privacy and security regulations establish a uniform federal "floor" and do not supersede state laws that are more stringent or provide individuals

with greater rights with respect to the privacy or security of, and access to, their records containing Protected Health Information. As a result, we may be required to comply with both HIPAA privacy regulations and varying state privacy and security laws.

Moreover, HITECH, enacted as part of ARRA, among other things, established certain health information security breach notification requirements, which were later further modified by the Final Omnibus Rule. In the event of a breach of unsecured Protected Health Information, a covered entity must notify each individual whose Protected Health Information is breached, federal regulators and in some cases, must publicize the breach in local or national media. Breaches affecting 500 individuals or more may be publicized by federal regulators who publicly identify the breaching entity, the circumstances of the breach and the number of individuals affected.

These laws contain significant fines and other penalties for wrongful use or disclosure of Protected Health Information. Given the complexity of HIPAA and HITECH and their overlap with state privacy and security laws, and the fact that these laws are rapidly evolving and are subject to changing and potentially conflicting interpretation, our ability to comply with the HIPAA, HITECH and state privacy requirements is uncertain and the costs of compliance are significant. Adding to the complexity is that our operations are evolving, and the requirements of these laws will apply differently depending on such things as whether or not we bill electronically for our services. The costs of complying with any changes to the HIPAA, HITECH and state privacy restrictions may have a negative impact on our operations. Noncompliance could subject us to criminal penalties, civil sanctions and significant monetary penalties as well as reputational damage.

Clinical research is heavily regulated and failure to comply with human subject protection regulations may disrupt our research program leading to significant expense, regulatory enforcement, private lawsuits and reputational damage.

Clinical research is subject to federal, state and, for studies conducted outside of the United States, international regulation. At the federal level, the FDA imposes regulations for the protection of human subjects and requirements such as initial and ongoing institutional review board review; informed consent requirements, adverse event reporting and other protections to minimize the risk and maximize the benefit to research participants. Many states impose human subject protection laws that mirror or in some cases exceed federal requirements. HIPAA also regulates the use and disclosure of Protected Health Information in connection with research activities. Research conducted overseas is subject to a variety of national protections such as mandatory ethics committee review, as well as laws regulating the use, disclosure and cross-border transfer of personal data. The costs of compliance with these laws may be significant and compliance with regulatory requirements may result in delay. Noncompliance may disrupt our research and result in data that is unacceptable to regulatory authorities, data lock or other sanctions that may significantly disrupt our operations.

Violation of a state's prohibition on the corporate practice of medicine could result in a material adverse effect on our business.

A number of states, including California, do not allow business corporations to employ physicians to provide professional services. This prohibition against the "corporate practice of medicine" is aimed at preventing corporations such as us from exercising control over the medical judgments or decisions of physicians. The state licensure statutes and regulations and agency and court decisions that enumerate the specific corporate practice rules vary considerably from state to state and are enforced by both the courts and regulatory authorities, each with broad discretion. If regulatory authorities or other parties in any jurisdiction successfully assert that we are engaged in the unauthorized corporate practice of medicine, we could be required to restructure our contractual and other arrangements. In addition, violation of these laws may result in sanctions imposed against us and/or the professional through licensure proceedings, and we could be subject to civil and criminal penalties that could result in exclusion from state and federal health care programs.

Intellectual Property Risks Related to Our Business

If we are unable to obtain and maintain effective patent rights for our products or services, we may not be able to compete effectively in our markets.

We rely upon a combination of patents, trade secret protection, and confidentiality agreements to protect the intellectual property related to our technologies, products and services. Our success depends in large part on our ability to obtain and maintain patent and other intellectual property protection in the United States and in other countries with respect to our proprietary technology and products.

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

The patent position of diagnostic companies generally is highly uncertain and involves complex legal and factual questions for which legal principles remain unsolved. The patent applications that we own, or in-license, may fail to result in issued patents with claims that cover our products or services in the United States or in other foreign countries. There is no assurance that all potentially relevant prior art relating to our patents and patent applications has been found, which can invalidate a patent or prevent a patent from issuing from a pending patent application. Even if patents do successfully issue, and even if such patents cover our products and services, third parties may challenge their validity, enforceability, or scope, which may result in such patents being narrowed, found unenforceable or invalidated. Furthermore, even if they are unchallenged, our patents and patent applications may not adequately protect our intellectual property, provide exclusivity for our products and services, or prevent others from designing around our claims. Any of these outcomes could impair our ability to prevent competition from third parties, which may have an adverse impact on our business.

We, independently or together with our licensors, have filed several patent applications covering various aspects of our products and services. We cannot offer any assurances about which, if any, patents will issue, the breadth of any such patent or whether any issued patents will be found invalid and unenforceable or will be threatened by third parties. Any successful opposition to these patents or any other patents owned by or licensed to us after patent issuance could deprive us of rights necessary for the successful commercialization of any products and services that we may offer. Further, if we encounter delays in regulatory approvals, the period of time during which we could market a product or service under patent protection could be reduced.

Patent policy and rule changes could increase the uncertainties and costs surrounding the prosecution of our patent applications and the enforcement or defense of our issued patents.

Changes in either the patent laws or interpretation of the patent laws in the United States and other countries may diminish the value of our patents or narrow the scope of our patent protection. The laws of foreign countries may not protect our rights to the same extent as the laws of the United States. Publications of discoveries in the scientific literature often lag behind the actual discoveries, and patent applications in the United States and other jurisdictions are typically not published until 18 months after filing, or in some cases not at all. We therefore cannot be certain that we or our licensors were the first to make the invention claimed in our owned and licensed patents or pending applications, or that we or our licensor were the first to file for patent protection of such inventions. Assuming the other requirements for patentability are met, in the United States prior to March 15, 2013, the first to make the claimed invention is entitled to the patent, while outside the United States, the first to file a patent application is entitled to the patent. After March 15, 2013, under the Leahy-Smith America Invents Act, or the Leahy-Smith Act, enacted on September 16, 2011, the United States has moved to a first to file system. The Leahy-Smith Act also includes a number of significant changes that affect the way patent applications will be prosecuted and may also affect patent litigation. The effects of these changes are currently unclear as the United States Patent and Trademark Office, or USPTO, must still implement various regulations, the courts have yet to address any 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. In general, the Leahy-Smith Act and its implementation could increase the uncertainties and costs surrounding the prosecution of our patent applications and the enforcement or defense of our issued patents, all of which could have a material adverse effect on our business and financial condition.

If we are unable to maintain effective proprietary rights for our products or services, we may not be able to compete effectively in our markets.

In addition to the protection afforded by patents, we rely on trade secret protection and confidentiality agreements to protect proprietary know-how that is not patentable or that we elect not to patent, processes for which patents are difficult to enforce and any other elements of our products and services that involve proprietary know-how, information or technology that is not covered by patents. However, trade secrets can be difficult to protect. We seek to protect our proprietary technology and processes, in part, by entering into confidentiality agreements with our employees, consultants, scientific advisors, and contractors. We also seek to preserve the integrity and confidentiality of our data and trade secrets by maintaining physical security of our premises and physical and electronic security of our information technology systems. While we have confidence in these individuals, organizations and systems, agreements or security measures 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.

Although we expect all of our employees and consultants to assign their inventions to us, and all of our employees, consultants, advisors, and any third parties who have access to our proprietary know-how, information, or technology to enter into confidentiality agreements, we cannot provide any assurances that all such agreements have been duly executed or that our trade secrets and other confidential proprietary information will not be disclosed or that competitors will not otherwise gain access to our trade secrets or independently develop substantially equivalent information and techniques. Misappropriation or unauthorized disclosure of our trade secrets could impair our competitive position and may have a material adverse effect on our business. Additionally, if the steps taken to maintain our trade secrets are deemed inadequate, we may have insufficient recourse against third parties for misappropriating the trade secret.

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

Our commercial success depends in part on our avoiding infringement of the patents and proprietary rights of third parties. There have been many lawsuits and other proceedings involving patent and other intellectual property rights in the biotechnology and pharmaceutical industries, including patent infringement lawsuits, interferences, oppositions, and reexamination proceedings before the USPTO and corresponding foreign patent offices. 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 products and services. As the biotechnology and pharmaceutical industries expand and more patents are issued, the risk increases that our products and services may be subject to claims of infringement of the patent rights of third parties.

Third parties may assert that we are employing their proprietary technology without authorization. There may be third-party patents or patent applications with claims to materials, formulations, methods of manufacture, or methods for treatment related to the use or manufacture of our products and services. We have conducted freedom to operate analyses with respect to only certain of our products and services, and therefore we do not know whether there are any third-party patents that would impair our ability to commercialize these products and services. We also cannot guarantee that any of our analyses are complete and thorough, nor can we be sure that we have identified each and every patent and pending application in the United States and abroad that is relevant or necessary to the commercialization of our products and services. Because patent applications can take many years to issue, there may be currently pending patent applications that may later result in issued patents that our products or services may infringe.

For example, in August 2016, we received a letter from MolecularMD Corp. offering a license to two U.S. Patents owned by the Memorial Sloan-Kettering Cancer Center, and licensed to MolecularMD Corp., that are relevant to one of the biomarkers we detect in our Liquid Biopsy Non-Small Cell Lung Cancer Profile Target-Selector assay and our Liquid Biopsy Lung Cancer Resistance Profile Target-Selector™ assay. One of the two patents is expected to expire in 2026. The other patent is expected to expire in 2028. Although we believe that the claims of both patents relevant to our assays would likely be held invalid, we cannot provide any assurances that a court or an administrative agency would agree with our assessment. If the validity of the relevant claims in question is upheld upon a validity challenge, then we may be liable for past damages and would need a license in order to continue commercializing our Liquid Biopsy Non-Small Cell Lung Cancer Profile Target-Selector Assay and our Liquid Biopsy Lung Cancer Resistance Profile Target-Selector Assay in the United States. However, such a license may not be available on commercially reasonable terms or at all, which could materially and adversely affect our business.

In addition, we are aware of a U.S. Patent owned by Amgen, Inc. that is relevant to one of the biomarkers we detect in our Liquid Biopsy Non-Small Cell Lung Cancer Profile Target-Selector assay and our Liquid Biopsy Lung Cancer Resistance Profile Target-Selector assay. The patent is expected to expire in 2028. Although we believe that the claims of the patent relevant to our assays would likely be held invalid, we cannot provide any assurances that a court or an administrative agency would agree with our assessment. If the validity of the relevant claims in question is upheld upon a validity challenge, then we may be liable for past damages and would need a license in order to continue commercializing our Liquid Biopsy Non-Small Cell Lung Cancer Profile Target-Selector assay and our Liquid Biopsy Lung Cancer Resistance Profile Target-Selector assay in the United States. However, such a license may not be available on commercially reasonable terms or at all, which could materially and adversely affect our business.

We are also aware of a U.S. Patent owned by Genentech, Inc. that is relevant to one of the biomarkers we detect in our Liquid Biopsy Lung Cancer Resistance Profile Target-Selector assay and our Liquid Biopsy Colon Cancer Profile Target-Selector assay. The patent is expected to expire in 2025. Although we believe that the claims of the patent relevant to our assays would likely be held invalid, we cannot provide any assurances that a court or an administrative agency would agree with our assessment. If the validity of the relevant claims in question is upheld upon a validity challenge, then we may be liable for past damages and would need a license in order to continue commercializing our Liquid Biopsy Lung Cancer Resistance Profile Target-Selector assay and our Liquid Biopsy Colon Cancer Profile Target-Selector assay in the United States. However, such a license may not be available on commercially reasonable terms or at all, which could materially and adversely affect our business.

In addition, in July 2016, we received a communication from the Mayo Foundation for Medical Education and Research (“Mayo”) offering a license to a U.S. Patent owned by Mayo that is relevant to an antibody that we use in our Liquid Biopsy Immuno-Oncology PD-L1 assay. The patent is expected to expire in 2021. At present, we believe that we will need a license to this patent to continue commercializing our Liquid Biopsy Immuno-Oncology PD-L1 assay. We are currently in discussions with Mayo and believe a license can be obtained on commercially reasonable terms. However, if we are unable to secure such a license, we may be liable for past damages, and our business could be materially and adversely affected.

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 aspects of our products or services, the holders of any such patents may be able to block our ability to commercialize such products or services unless we obtained a license

under the applicable patents, or until such patents expire or are finally determined to be invalid or unenforceable. Such a license may not be available on commercially reasonable terms or at all.

Parties making claims against us may obtain injunctive or other equitable relief, which could effectively block our ability to further develop and commercialize one or more of our products or services. 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, pay royalties, redesign our infringing products or obtain one or more licenses from third parties, which may be impossible or require substantial time and monetary expenditure.

We may not be successful in obtaining or maintaining necessary rights to our products or services through acquisitions and in-licenses.

We currently have rights to the intellectual property, through licenses from third parties and under patents that we own, to develop our products and services. Because our programs may require the use of proprietary rights held by third parties, the growth of our business will likely depend in part on our ability to acquire, in-license, or use these proprietary rights. 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 for our products or services. The licensing and acquisition of third-party intellectual property rights is a competitive area, and a number of more established companies are also pursuing strategies to license or acquire third-party intellectual property rights that we may consider attractive. These established companies may have a competitive advantage over us due to their size, cash resources, and greater clinical development and commercialization capabilities. In addition, companies that perceive us to be a competitor may be unwilling to assign or license rights to us. We also may be unable to license or acquire third-party intellectual property rights on terms that would allow us to make an appropriate return on our investment.

We sometimes collaborate with U.S. and foreign institutions to accelerate our research or development under written agreements with these institutions. Typically, these institutions provide us with an option to negotiate a license to any of the institution's rights in technology resulting from the collaboration. Regardless of such 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 other parties, potentially blocking our ability to pursue our program.

If we are unable to successfully obtain rights to required third-party intellectual property rights or maintain the existing intellectual property rights we have, we may have to abandon development of that program and our business and financial condition could suffer.

Although we are not currently involved in any litigation, 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. Although we are not currently involved in any litigation, if we or one of our licensing partners were to initiate legal proceedings against a third-party to enforce a patent covering one of our products or services, the defendant could counterclaim that the patent covering our product or service is invalid and/or unenforceable. In patent litigation in the United States, defendant counterclaims alleging invalidity and/or unenforceability are commonplace. Grounds for a validity challenge could be an alleged failure to meet any of several statutory requirements, including lack of novelty, obviousness, or non-enablement. Grounds for an unenforceability assertion could be an allegation that someone connected with prosecution of the patent withheld relevant information from the USPTO, or made a misleading statement, during prosecution. The outcome following legal assertions of invalidity and unenforceability is unpredictable.

Interference proceedings provoked by third parties or brought by us or declared 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 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. Our defense of litigation or interference proceedings may fail and, even if successful, may result in substantial costs and distract our management and other employees. In addition, the uncertainties associated with litigation could have a material adverse effect on our ability to raise sufficient capital to continue our research programs, license necessary technology from third parties, or enter into development partnerships that would help commercialize our products or services.

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. There could also 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 material adverse effect on the price of our common stock.

We may be subject to claims that our employees, consultants, or independent contractors have wrongfully used or disclosed confidential information of third parties or that our employees have wrongfully used or disclosed alleged trade secrets of their former employers.

We employ certain individuals who were previously employed at universities or other biotechnology or pharmaceutical companies, including our competitors or potential competitors. Although we try to ensure that our employees, consultants, and independent contractors do not use the proprietary information or know-how of others in their work for us, and we are not currently subject to any claims that our employees, consultants, or independent contractors have wrongfully used or disclosed confidential information of third parties, we may in the future be subject to such claims. 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, which could adversely impact our business. Even if we are successful in defending against such claims, litigation could result in substantial costs and be a distraction to management and other employees.

We may be subject to claims challenging the inventorship of our patents and other intellectual property.

Although we are not currently experiencing any claims challenging the inventorship of our patents or ownership of our intellectual property, we may in the future be subject to claims that former employees, collaborators or other third parties have an interest in our patents or other intellectual property as an inventor or co-inventor. For example, we may have inventorship disputes arise from conflicting obligations of consultants or others who are involved in developing our products or services. Litigation may be necessary to defend against these and other claims challenging inventorship. If we fail in defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights, such as exclusive ownership of, or right to use, valuable intellectual property. Such an outcome could have a material adverse effect on our business. Even if we are successful in defending against such claims, litigation could result in substantial costs and be a distraction to management and other employees.

Changes in U.S. patent law 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 biotechnology industry involves both technological and legal complexity. Therefore, obtaining and enforcing biotechnology patents is costly, time consuming, and inherently uncertain. 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 future actions by the U.S. Congress, the federal courts, and the USPTO, the laws and regulations governing patents could change in unpredictable ways that would weaken our ability to obtain new patents or to enforce our existing patents and patents that we might obtain in the future.

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

Filing, prosecuting, and defending patents on products and services 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 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. Competitors may use our technologies in jurisdictions where we have not obtained patent protection to develop their own products and may also export infringing products to territories where we have patent protection, but enforcement is not as strong as that in the United States. These products may compete with our products and our patents 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 biotechnology products, which could make it difficult for us to stop the infringement of our patents or marketing of competing products in violation of our proprietary rights generally. Proceedings to enforce our patent rights in foreign jurisdictions, whether or not successful, 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.

Our collaborators may assert ownership or commercial rights to inventions we develop from our use of the biological materials which they provide to us, or otherwise arising from the collaboration.

We collaborate with several institutions, physicians and researchers in scientific matters. We do not have written agreements with certain of such collaborators, or the written agreements we have do not cover intellectual property rights. Also, we rely on numerous third parties to provide us with blood samples and biological materials that we use to develop assays. If we cannot successfully negotiate sufficient ownership and commercial rights to any inventions that result from our use of a third-party collaborator's materials, or if disputes arise with respect to the intellectual property developed with the use of a collaborator's samples, or data developed in a collaborator's study, we may be limited in our ability to capitalize on the market potential of these inventions or developments.

Risks Relating to Our Common Stock

The price of our common stock may be volatile.

Before our initial public offering, there was no public market for our common stock. Market prices for securities of early-stage life sciences companies have historically been particularly volatile. The factors that may cause the market price of our common stock to fluctuate include, but are not limited to:

- progress, or lack of progress, in performing, developing and commercializing our current assays and our planned future assays;
- favorable or unfavorable decisions about our assays from government regulators, insurance companies or other third-party payers;
- our ability to recruit and retain qualified research and development personnel;
- changes in investors' and securities analysts' perception of the business risks and conditions of our business;
- changes in our relationship with key collaborators;
- changes in the market valuation or earnings of our competitors or companies viewed as similar to us;
- changes in key personnel;
- depth of the trading market in our common stock;
- changes in our capital structure, such as future issuances of securities or the incurrence of additional debt;
- the granting or exercise of employee stock options or other equity awards;
- realization of any of the risks described herein; and
- general market and economic conditions.

In addition, the equity markets have experienced significant price and volume fluctuations that have affected the market prices for the securities of newly public companies for a number of reasons, including reasons that may be unrelated to our business or operating performance. These broad market fluctuations may result in a material decline in the market price of our common stock and you may not be able to sell your shares at prices you deem acceptable. In the past, following periods of volatility in the equity markets, securities class action lawsuits have been instituted against public companies. Such litigation, if instituted against us, could result in substantial cost and the diversion of management attention.

Our failure to meet the continued listing requirements of The Nasdaq Capital Market could result in a de-listing of our common stock.

If we fail to satisfy the continued listing requirements of The Nasdaq Capital Market, such as the corporate governance requirements, the minimum closing bid price requirement, or the minimum stockholders' equity requirement, Nasdaq may take steps to de-list our common stock. For example, in May 2016, we received a letter from Nasdaq indicating that we are not in compliance with the minimum stockholders' equity requirement of Nasdaq Listing Rule 5550(b)(1), and in each of June 2016, November 2016, and January 2018, we received letters from Nasdaq indicating that we are not in compliance with the minimum bid price requirement of Nasdaq Listing Rule 5550(a)(2), which requires that companies listed on The Nasdaq Capital Market maintain a minimum closing bid price of at least $1.00 per share. If we fail to maintain compliance with these, or any other of the continued listing requirements of The Nasdaq Capital Market, Nasdaq may take steps to de-list our common stock. Such a de-listing would likely have a negative effect on the price of our common stock and would impair your ability to sell or purchase our common stock when you wish to do so. In the event of a de-listing, we would take actions to restore our compliance with Nasdaq's listing requirements, but we can provide no assurance that any such action taken by us would allow our common stock to become listed again, stabilize the market price or improve the liquidity of our common stock, or prevent future non-compliance with Nasdaq's listing requirements.

If our shares become subject to the penny stock rules, it would become more difficult to trade our shares.

The SEC has adopted rules that regulate broker-dealer practices in connection with transactions in penny stocks. Penny stocks are generally equity securities with a price of less than $5.00, other than securities registered on certain national securities exchanges or authorized for quotation on certain automated quotation systems, provided that current price and volume information with respect to transactions in such securities is provided by the exchange or system. If we do not retain a listing on The Nasdaq Capital Market, and if the price of our common stock is less than $5.00, our common stock will be deemed a penny stock. The penny stock rules require a broker-dealer, before a transaction in a penny stock not otherwise exempt from those rules, to deliver a standardized risk disclosure document containing specified information. In addition, the penny stock rules require that before effecting any transaction in a penny stock not otherwise exempt from those rules, a broker-dealer must make a special written determination that the penny stock is a suitable investment for the purchaser and receive (i) the purchaser's written acknowledgment of the receipt of a risk disclosure statement; (ii) a written agreement to transactions involving penny stocks; and (iii) a signed and dated copy of a written suitability statement. These disclosure requirements may have the effect of reducing the trading activity in the secondary market for our common stock, and therefore stockholders may have difficulty selling their shares.

Our quarterly operating results may fluctuate significantly.

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:

- the rate of adoption and/or continued use of our current assays and our planned future assays by healthcare practitioners;
- variations in the level of expenses related to our development programs;
- addition or reduction of resources for sales and marketing;
- addition or termination of clinical utility studies;
- any intellectual property infringement lawsuit in which we may become involved;
- third-party payer determinations affecting our assays; and
- regulatory developments affecting our assays.

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 stock to fluctuate substantially.

If securities or industry analysts issue an adverse opinion regarding our stock or do not publish research or reports about our company, our stock price and trading volume could decline.

The trading market for our common stock will depend in part on the research and reports that equity research analysts publish about us, our business and our competitors. We do not control these analysts or the content and opinions or financial models included in their reports. Securities analysts may elect not to provide research coverage of our company, and such lack of research coverage may adversely affect the market price of our common stock. The price of our common stock could also decline if one or more equity research analysts downgrade our common stock or if those analysts issue other unfavorable commentary or cease publishing reports about us or our business. If one or more equity research analysts cease coverage of our company, we could lose visibility in the market, which in turn could cause our stock price to decline.

Future sales of our common stock or other securities, or the perception that future sales may occur, may cause the market price of our common stock to decline, even if our business is doing well.

Sales of substantial amounts of our common stock or other securities, or the perception that these sales may occur, could materially and adversely affect the price of our common stock and could impair our ability to raise capital through the sale of additional equity securities. For example, in May 2018, the SEC declared effective a shelf registration statement filed by us. This shelf registration statement allows us to issue any combination of our common stock, preferred stock, debt securities and warrants from time to time until expiry in May 2021 for an aggregate initial offering price of up to $50 million, subject to certain limitations for so long as our public float is less than $75 million. The specific terms of future offerings, if any, under this shelf registration statement would be established at the time of such offering. Depending on a variety of factors, including market liquidity of our common stock, the sale of shares under this shelf registration statement may cause the trading price of our common stock to decline. The sale of a substantial number of shares of our common stock under this shelf registration statement, or anticipation of such sales, could cause the trading price of our common stock to decline or make it more difficult for us to sell equity or equity-related securities in the future at a time and at a price that we might otherwise desire.

We had outstanding 4,629,174 shares of common stock as of December 31, 2018, of which no more than 31,415 are restricted securities that may be sold only in accordance with the resale restrictions under Rule 144 of the Securities Act. In addition, as of December 31, 2018, we had outstanding preferred stock convertible into 976,157 shares of our common stock, options to purchase 185,154 shares of our common stock, 360 shares of common stock were issuable upon the settlement of outstanding restricted stock units, or RSUs, and 4,694,943 shares of our common stock were issuable upon the exercise of outstanding warrants. Shares issued upon the exercise of stock options or upon the settlement of outstanding RSUs generally will be eligible for sale in the public market, except that affiliates will continue to be subject to volume limitations and other requirements of Rule 144 under the Securities Act. The issuance or sale of such shares could depress the market price of our common stock.

In the future, we also may issue our securities if we need to raise additional capital. The number of new shares of our common stock issued in connection with raising additional capital could constitute a material portion of the then-outstanding shares of our common stock.

If we are unable to favorably assess the effectiveness of our internal control over financial reporting, investors may lose confidence in our financial reporting and our stock price could be materially adversely affected.

Effective internal controls over financial reporting are necessary for us to provide reliable financial reports and, together with adequate disclosure controls and procedures, are designed to prevent fraud. Any failure to implement required new or improved controls, or difficulties encountered in their implementation could cause us to fail to meet our reporting obligations. In addition, any testing by us conducted in connection with Section 404(a) of the Sarbanes-Oxley Act, or the subsequent testing by our independent registered public accounting firm conducted in connection with Section 404(b) of the Sarbanes-Oxley Act after our public float is at least $75 million and we no longer qualify as an “emerging growth company,” may reveal deficiencies in our internal controls over financial reporting that are deemed to be material weaknesses or that may require prospective or retroactive changes to our consolidated financial statements or identify other areas for further attention or improvement. Inferior internal controls could also cause investors to lose confidence in our reported financial information, which could have a negative effect on the trading price of our common stock.

We are required to disclose changes made in our internal control procedures on a quarterly basis and our management is required to assess the effectiveness of these controls annually. However, for as long as we are an “emerging growth company” under the recently enacted JOBS Act, our independent registered public accounting firm will not be required to attest to the effectiveness of our internal control over financial reporting pursuant to Section 404. An independent assessment of the effectiveness of our internal controls could detect problems that our management’s assessment might not. Undetected material weaknesses in our internal controls could lead to financial statement restatements and require us to incur the expense of remediation.

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

We are an emerging growth company, as defined in the JOBS Act. For as long as we continue to be an emerging growth company, we may take advantage of exemptions from various reporting requirements that are applicable to other public companies that are not emerging growth companies, including not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act of 2002, reduced disclosure obligations regarding executive compensation in our periodic reports and proxy statements and exemptions from the requirements of holding nonbinding advisory votes on executive compensation and stockholder approval of any golden parachute payments not previously approved. We could be an emerging growth company until December 31, 2019, although circumstances could cause us to lose that status earlier, including if the market value of our common stock held by non-affiliates exceeds $700 million as of any June 30 before that time 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, we would cease to be an emerging growth company immediately. Even after we no longer qualify as an emerging growth company, we may still qualify as a “smaller reporting company” which would allow us to take advantage of many of the same exemptions from disclosure requirements including not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act, as well as reduced disclosure obligations regarding executive compensation in our periodic reports and proxy statements. We cannot predict if investors find our common stock less attractive because we may rely on these exemptions. If some investors find our common stock less attractive as a result, there may be a less active trading market for our common stock and our stock price may be more volatile.

Under the JOBS Act, emerging growth companies can also delay adopting new or revised accounting standards until such time as those standards apply to private companies. We have irrevocably elected not to avail ourselves of this exemption from new or revised accounting standards and, therefore, are subject to the same new or revised accounting standards as other public companies that are not emerging growth companies. As a result, changes in rules of U.S. generally accepted accounting principles or their

interpretation, the adoption of new guidance or the application of existing guidance to changes in our business could significantly affect our financial position and results of operations.

We have incurred and will continue to incur significant 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.

As a public company, we are subject to the reporting requirements of the Securities Exchange Act of 1934, as amended, the Dodd-Frank Wall Street Reform and Consumer Protection Act, or the Dodd-Frank Act, the listing requirements of The Nasdaq Stock Market and other applicable securities rules and regulations. Compliance with these rules and regulations has increased and will continue to increase our legal and financial compliance costs, make some activities more difficult, time-consuming or costly, and increase demand on our systems and resources. The Sarbanes-Oxley Act requires, among other things, that we maintain effective disclosure controls and procedures and internal control over financial reporting. In order to maintain and, if required, improve our disclosure controls and procedures and internal control over financial reporting to meet this standard, significant resources and management oversight may be required. As a result, management's attention may be diverted from other business concerns, which could harm our business and operating results. Further, there are significant corporate governance and executive compensation related provisions in the Dodd-Frank Act, enacted in 2010, that require the SEC to adopt additional rules and regulations in these areas such as "say on pay" and proxy access. Recent legislation permits smaller "emerging growth companies" to implement many of these requirements over a longer period. We intend to continue taking advantage of this new legislation but cannot guarantee that we will not be required to implement these requirements sooner than budgeted or planned and thereby incur unexpected expenses. Stockholder activism, the current political environment and the current high level of government intervention and regulatory reform may lead to substantial new regulations and disclosure obligations, which may lead to additional compliance costs and impact the manner in which we operate our business in ways we cannot currently anticipate.

In addition, changing laws, regulations and standards relating to corporate governance and public disclosure are creating uncertainty for public companies, increasing legal and financial compliance costs and making some activities more time consuming. These laws, regulations and standards are 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 intend to invest resources to comply with evolving laws, regulations and standards, and this investment may result in increased general and administrative expenses and a diversion of management's time and attention from revenue-generating activities to compliance activities. If our efforts to comply with new laws, regulations and standards differ from the activities intended by regulatory or governing bodies due to ambiguities related to practice, regulatory authorities may initiate legal proceedings against us and our business may be harmed.

Anti-takeover provisions of our certificate of incorporation, our bylaws and 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 the current members of our board and management.

Certain provisions of our amended certificate of incorporation and amended and restated bylaws could discourage, delay or prevent a merger, acquisition or other change of control that stockholders may consider favorable, including transactions in which you might otherwise receive a premium for your shares. Furthermore, these provisions could prevent or frustrate attempts by our stockholders to replace or remove members of our Board of Directors. (For example, Delaware law provides that if a corporation has a classified board of directors, stockholders cannot remove any director during his or her term without cause.) These provisions also could limit the price that investors might be willing to pay in the future for our common stock, thereby depressing the market price of our common stock. Stockholders who wish to participate in these transactions may not have the opportunity to do so. These provisions, among other things:

- classify our Board of Directors into three classes of equal (or roughly equal) size, with all directors serving for a three-year term and the directors of only one class being elected at each annual meeting of stockholders, so that the terms of the classes of directors are "staggered";
- allow the authorized number of directors to be changed only by resolution of our Board of Directors;
- authorize our Board of Directors to issue, without stockholder approval, preferred stock, the rights of which will be determined at the discretion of the Board of Directors and that, if issued, could operate as a "poison pill" to dilute the stock ownership of a potential hostile acquirer to prevent an acquisition that our Board of Directors does not approve;
- establish advance notice requirements for stockholder nominations to our Board of Directors or for stockholder proposals that can be acted on at stockholder meetings; and
- limit who may call a stockholders meeting.

In addition, we are governed by the provisions of Section 203 of the Delaware General Corporation Law, or DGCL, which may, unless certain criteria are met, prohibit large stockholders, in particular those owning 15% or more of the voting rights on our common stock, from merging or combining with us for a prescribed period of time.

Because we do not expect to pay cash dividends for the foreseeable future, you must rely on appreciation of our common stock price for any return on your investment. Even if we change that policy, we may be restricted from paying dividends on our common stock.

We do not intend to pay cash dividends on shares of our common stock for the foreseeable future. Any determination to pay dividends in the future will be at the discretion of our Board of Directors and will depend upon results of operations, financial performance, contractual restrictions, restrictions imposed by applicable law and other factors our Board of Directors deems relevant. Accordingly, you will have to rely on capital appreciation, if any, to earn a return on your investment in our common stock. Investors seeking cash dividends in the foreseeable future should not purchase our common stock.

The recently passed comprehensive tax reform bill could adversely affect our business and financial condition.

On December 22, 2017, the President of the United States signed into law new legislation that significantly revises the Internal Revenue Code of 1986, as amended, or the Code. The newly enacted federal income tax law, among other things, contains significant changes to corporate taxation, including reduction of the corporate tax rate from a top marginal rate of 35% to a flat rate of 21%, limitation of the tax deduction for interest expense to 30% of adjusted earnings (except for certain small businesses), limitation of the deduction for net operating losses to 80% of current year taxable income and elimination of net operating loss carrybacks, one time taxation of offshore earnings at reduced rates regardless of whether they are repatriated, elimination of U.S. tax on foreign earnings (subject to certain important exceptions), immediate deductions for certain new investments instead of deductions for depreciation expense over time, and modifying or repealing many business deductions and credits. Notwithstanding the reduction in the corporate income tax rate, the overall impact of the new federal tax law is uncertain and our business and financial condition could be adversely affected. In addition, it is uncertain if and to what extent various states will conform to the newly enacted federal tax law. The impact of this tax reform on holders of our common stock is also uncertain and could be adverse. We urge our stockholders to consult with their legal and tax advisors with respect to this legislation and the potential tax consequences of investing in or holding our common stock.

Our effective tax rate may fluctuate, and we may incur obligations in tax jurisdictions in excess of accrued amounts.

We are subject to taxation in numerous U.S. states and territories. As a result, our effective tax rate is derived from a combination of applicable tax rates in the various places that we operate. In preparing our financial statements, we estimate the amount of tax that will become payable in each of such places. Nevertheless, our effective tax rate may be different than experienced in the past due to numerous factors, including passage of the newly enacted federal income tax law, the results of examinations and audits of our tax filings, our inability to secure or sustain acceptable agreements with tax authorities, changes in accounting for income taxes and changes in tax laws. Any of these factors could cause us to experience an effective tax rate significantly different from previous periods or our current expectations and may result in tax obligations in excess of amounts accrued in our financial statements.

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

Our ability to utilize our estimated federal net operating loss, carryforwards and federal tax credits may be limited under Sections 382 and 383 of the Code. Under the newly enacted federal income tax law, federal net operating losses incurred in 2018 and in future years may be carried forward indefinitely, but the deductibility of such federal net operating losses is limited. It is uncertain if and to what extent various states will conform to the newly enacted federal tax law. In addition, the limitations apply if an “ownership change,” as defined by Section 382 of the Code, occurs. If we have experienced an ownership change at any time since our formation, we may already be subject to limitations on our ability to utilize our existing net operating losses and other tax attributes to offset taxable income. Future changes in our stock ownership (including in connection with future offerings, as well as other changes that may be outside of our control), may trigger an ownership change and, consequently, limitations under Sections 382 and 383 of the Code. As a result, if we earn net taxable income, our ability to use our estimated pre-change net operating loss carryforwards and other tax attributes to offset United States federal taxable income may be subject to limitations, which could potentially result in increased future tax liability to us. As of December 31, 2017, we had estimated federal and state net operating loss carryforwards of approximately $13.6 million and $15.0 million, respectively, and estimated federal and California research and development credits of approximately $5,000 and $3,395,000, respectively, which could be limited if we have experienced or do experience any “ownership changes.” We have not completed a study to assess whether an ownership change has occurred or whether there have been multiple ownership changes since our formation, due to the complexity and cost associated with such a study, and the fact that there may be additional ownership changes in the future, however, we believe ownership changes likely occurred in each year from 2015 through 2018. As a result, we have estimated that the use of our net operating loss is limited and the amounts above represent the remaining net operating loss carryforwards and research and development credits we estimate can be used in the future, which remain fully offset by a valuation allowance to reduce the net asset to zero.

We could be subject to securities class action litigation.

In the past, securities class action litigation has often been brought against a company following a decline in the market price of its securities. This risk is especially relevant for us because early-stage life sciences companies 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 resources, which could harm our business.

Risks Relating to This Offering

If you purchase our securities in this offering, you may incur immediate and substantial dilution in the book value of your shares.

The combined public offering price per share of our common stock and related warrant may be substantially higher than the net tangible book value per share of our common stock immediately prior to the offering. After giving effect to the sale of 6,250,000 shares of our common stock and related warrants in this offering, at a combined public offering price of $1.20 per share and related warrant, and after deducting the underwriting discounts and commissions and estimated offering expenses payable by us and attributing no value to the warrants sold in this offering, purchasers of our common stock in this offering will incur an immediate increase of $0.34 per share in the net tangible book value of the common stock they acquire. In the event that you exercise your warrants, you may experience dilution to the extent that the exercise price of the warrants is higher than the tangible book value per share of our common stock. For a further description of the dilution that investors in this offering may experience, see "Dilution."

In addition, to the extent that outstanding stock options or warrants have been or may be exercised or other shares issued, you may experience further dilution.

We have broad discretion in the use of the net proceeds we receive from this offering and may not use them effectively.

Our management will have broad discretion in the application of the net proceeds we receive in this offering, including for any of the purposes described in the section entitled "Use of Proceeds," and you will not have the opportunity as part of your investment decision to assess whether our management is using the net proceeds appropriately. Because of the number and variability of factors that will determine our use of our net proceeds from this offering, their ultimate use may vary substantially from their currently intended use. The failure by our management to apply these funds effectively could result in financial losses that could have a material adverse effect on our business and cause the price of our common stock to decline. Pending their use, we may invest our net proceeds from this offering in short-term, investment-grade, interest-bearing securities. These investments may not yield a favorable return to our stockholders.

Future sales of substantial amounts of our common stock could adversely affect the market price of our common stock.

We may choose to raise additional capital due to market conditions or strategic considerations even if we believe we have sufficient funds for our current or future operating plans. If additional capital is raised through the sale of equity or convertible debt securities, or perceptions that those sales could occur, the issuance of these securities could result in further dilution to investors purchasing our common stock in this offering or result in downward pressure on the price of our common stock, and our ability to raise capital in the future.

Holders of our warrants will have no rights as a common stockholder until they acquire our common stock.

Until you acquire shares of our common stock upon exercise of your warrants, you will have no rights with respect to shares of our common stock issuable upon exercise of your warrants. Upon exercise of your warrants, you will be entitled to exercise the rights of a common stockholder only as to matters for which the record date occurs after the exercise date.

The warrants may not have any value.

Each warrant will have an exercise price of $1.20 per share and will expire on the fifth anniversary of the date they first become exercisable. In the event our common stock price does not exceed the exercise price of the warrants during the period when the warrants are exercisable, the warrants may not have any value.

There is no public market for the warrants to purchase shares of our common stock being offered in this offering.

There is no established public trading market for the warrants being offered in this offering, and we do not expect a market to develop. In addition, we do not intend to apply to list the warrants on any national securities exchange or other nationally recognized trading system, including The Nasdaq Capital Market. Without an active trading market, the liquidity of the warrants will be limited.

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus contains forward-looking statements, which reflect our current expectations and projections about future events and financial trends that we believe may affect our business, financial condition and results of operations. These forward-looking statements speak only as of the date of this prospectus and are subject to a number of risks, uncertainties and assumptions described under the sections in this prospectus entitled “Risk Factors” and “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and elsewhere in this prospectus. Forward-looking statements are identified by terms such as “may,” “will,” “should,” “expect,” “plan,” “anticipate,” “could,” “intend,” “target,” “project,” “contemplates,” “believes,” “estimates,” “predicts,” “potential” or “continue” or the negative of these terms or other similar expressions. Readers are cautioned not to place undue reliance on these forward-looking statements, which are based on the information available to management at this time and which speak only as of this date. Examples of our forward-looking statements include:

- our ability to increase sales of our products, assays and services;
- our ability to continually develop new products, diagnostic assays, services and enhance our current products, assays and services and future products, assays, and services;
- our ability to effectively compete with other products, diagnostic assays, methods and services that now exist or may hereafter be developed;
- our ability to expand our international business;
- our ability to obtain coverage and adequate reimbursement from governmental and other third-party payers for assays and services;
- our expectations regarding the use of our existing cash and the expected net proceeds of this offering;
- our ability to enter into agreements with commercialization partners for the sales, marketing and commercialization of our current products, assays and services, and our planned future products, assays and services;
- our ability to satisfy any applicable United States and international regulatory requirements with respect to products, assays and services; and
- our ability to obtain or maintain patents or other appropriate protection for the intellectual property utilized in our current and planned products, assays and services.

Because forward-looking statements are inherently subject to risks and uncertainties, some of which cannot be predicted or quantified and some of which are beyond our control, you should not rely on these forward-looking statements as predictions of future events. The events and circumstances reflected in our forward-looking statements may not be achieved or occur and actual results could differ materially from those projected in the 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. 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. The forward-looking statements contained in this prospectus are excluded from the safe harbor protection provided by the Private Securities Litigation Reform Act of 1995 and Section 27A of the Securities Act of 1933, as amended, or the Securities Act.

This prospectus also refers to estimates and other statistical data made by independent parties and by us relating to market size and growth and other data about our industry. This data involves a number of assumptions and limitations, and you are cautioned not to give undue weight to such estimates. In addition, projections, assumptions and estimates of our future performance and the future performance of the markets in which we operate are necessarily subject to a high degree of uncertainty and risk.

USE OF PROCEEDS

The net proceeds of this offering will be approximately $6.8 million, after deducting the underwriting discounts and commissions and estimated offering expenses payable by us, and excluding the proceeds, if any, from the exercise of the warrants. If the underwriters exercise their option to purchase additional shares and warrants in full, our net proceeds from this offering will be approximately $7.8 million, excluding the proceeds, if any, from the exercise of the warrants. We currently intend to use the net proceeds of the offering for general corporate purposes and to fund ongoing operations and expansion of our business, including, but not limited to, initiatives to:

- fund our commercial strategy;
- complete a physician portal for our pathology partnership strategy;
- launch our pharma partnership strategy;
- implement laboratory automation initiatives; and
- outsource microchannel manufacturing.

DIVIDEND POLICY

We have never declared dividends on our equity securities, and currently do not plan to declare dividends on shares of our common stock in the foreseeable future. We expect to retain our future earnings, if any, for use in the operation and expansion of our business. Subject to the foregoing, the payment of cash dividends in the future, if any, will be at the discretion of our board of directors and will depend upon such factors as earnings levels, capital requirements, our overall financial condition and any other factors deemed relevant by our board of directors.

SUMMARY FINANCIAL DATA

The following tables set forth a summary of our historical financial data as of, and for the period ended on, the dates indicated. We have derived the statement of operations data for the years ended December 31, 2016 and 2017 and the balance sheet data as of December 31, 2017 from our audited financial statements appearing elsewhere in this prospectus. We have derived the statements of operations data for the nine months ended September 30, 2017 and 2018 and balance sheet data as of September 30, 2018 from our unaudited financial statements appearing elsewhere in this prospectus. Historical amounts presented herein reflect the July 6, 2018 one for thirty share reverse split. The unaudited financial statements have been prepared on a basis consistent with our audited financial statements included in this prospectus and, in the opinion of management, reflect all adjustments, consisting only of normal recurring adjustments, necessary to fairly state our financial position as of September 30, 2018 and results of operations for the nine months ended September 30, 2017 and 2018. You should read this data together with our financial statements and related notes appearing elsewhere in this prospectus and the section in this prospectus entitled "Management's Discussion and Analysis of Financial Condition and Results of Operations." Our historical results for any prior period are not necessarily indicative of our future results.

	Year ended December 31,		For the nine months ended September 30,	
	2016	2017	2017	2018
			(unaudited)	(unaudited)
	(in thousands, except share and per share data)			
Statement of Operations Data:				
Net revenues	$3,223	$5,068	$4,073	$2,390
Costs and expenses:				
Cost of revenues	6,920	9,345	6,985	7,616
Research and development expenses	2,713	3,365	2,456	3,180
General and administrative expenses	6,561	7,190	5,539	5,441
Sales and marketing expenses	5,054	6,344	4,701	4,473
Total costs and expenses	21,248	26,243	19,682	20,711
Loss from operations	(18,025)	(21,175)	(15,608)	(18,320)
Total other income/(expense)	(372)	(431)	(334)	(237)
Loss before income taxes	(18,397)	(21,606)	(15,942)	(18,557)
Income tax expense	(2)	(7)	(5)	(1)
Net loss and comprehensive loss	$(18,399)	$(21,614)	$(15,947)	$(18,558)
Deemed dividend related to warrants down round provision	—	—	—	(636)
Net loss attributable to common shareholders	$(18,399)	$(21,614)	$(15,947)	$(19,194)
Weighted-average shares outstanding used in computing net loss per common share:				
Basic	319,276	916,599	860,539	2,322,749
Diluted	319,276	916,599	860,539	2,320,111
Net loss per common share				
Basic	$(57.63)	$(23.58)	$(18.53)	$(8.26)
Diluted	$(57.63)	$(23.58)	$(18.53)	$(8.27)

	As of December 31, 2017 Actual	As of September 30, 2018 Actual (Unaudited)
Balance Sheet Data (in thousands):		
Cash	$2,147	$8,956
Total assets	$7,379	$14,552
Credit facility, net of discount	$1,169	$—
Total liabilities	$6,083	$5,613
Total shareholders' equity	$1,296	$8,938

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

The following discussion of our financial condition and results of operations should be read together with our financial statements and related notes included elsewhere in this prospectus. This discussion contains forward-looking statements based upon our current plans, estimates, beliefs and expectations that involve risks, uncertainties and assumptions. Our actual results may differ materially from those anticipated in these forward-looking statements as a result of various factors, including those set forth under the sections entitled "Risk Factors," "Special Note Regarding Forward-Looking Statements" and elsewhere in this prospectus.

Company Overview

We are an early stage molecular oncology diagnostics company that develops and commercializes proprietary circulating tumor cell, or CTC, and circulating tumor DNA, or ctDNA, assays utilizing a standard blood sample, or "liquid biopsy." Our current and planned assays are intended to provide information to aid healthcare providers to identify specific oncogenic alterations that may qualify a subset of cancer patients for targeted therapy at diagnosis, progression or used for monitoring in order to identify specific resistance mechanisms. Sometimes traditional procedures, such as surgical tissue biopsies, result in tumor tissue that is insufficient and/or unable to provide the molecular subtype information necessary for clinical decisions. Our assays, performed on blood, have the potential to provide more contemporaneous information on the characteristics of a patient's disease when compared with tissue biopsy and radiographic imaging.

Our current assays and our planned future assays focus on key solid tumor indications utilizing our Target-Selector™ liquid biopsy technology platform for the biomarker analysis of CTCs and ctDNA from a standard blood sample. Our patented Target-Selector CTC offering is based on an internally developed microfluidics-based cell capture and analysis platform, with enabling features that change how information provided by CTC testing is used by clinicians. Our CTC technology could also be validated on cerebral spinal fluid in order to provide information for patients with central nervous system (CNS) tumors both primary and metastatic. Our patented Target-Selector ctDNA technology enables detection of mutations and genome alterations with enhanced sensitivity and specificity, and is applicable to nucleic acid from ctDNA, and could potentially be validated for other sample types such as bone marrow, pleural effusions, ascitic fluid, tissue (surgical resections and/or biopsies) or cerebrospinal fluid. Our Target-Selector CTC and ctDNA platforms provide both biomarker detection as well as monitoring capabilities and require only a patient blood sample. We believe that our Target-Selector platform technology has the potential to be developed and commercialized as in vitro diagnostic (IVD) test kits, and we are currently pursuing this strategy.

At our corporate headquarters facility located in San Diego, California, we operate a clinical laboratory that is certified under the Clinical Laboratory Improvement Amendments of 1988, or CLIA, and accredited by the College of American Pathologists, or CAP. We also performed research and development that led to our current assays, and continue to perform research and development for our planned assays, at this same facility. In addition, we manufacture our microfluidic channels, related equipment and certain reagents. The assays we offer and intend to offer are classified as laboratory developed tests, or LDTs, under CLIA regulations. CLIA certification is required before any clinical laboratory, including ours, may perform testing on human specimens for the purpose of obtaining information for the diagnosis, prevention, or treatment of disease or the assessment of health. In addition, we participate in and have received CAP accreditation, which includes rigorous biennial laboratory inspections and adherence to specific quality standards.

Our primary sales strategy is to engage medical oncologists and other physicians in the United States at private and group practices, hospitals, laboratories and cancer centers. In addition, we market our clinical trial and research services to pharmaceutical and biopharmaceutical companies and clinical research organizations. Additionally, commencing in October 2017, our pathology partnership program, branded as Empower TC™, provides the unique ability for pathologists to participate in the interpretation of liquid biopsy results and is available to pathology practices and hospital systems throughout the United States. Further, sales to laboratory supply distributors of our proprietary blood collection tubes, or BCTs, commenced during the three months ending June 30, 2018, which allow for the intact transport of liquid biopsy samples for research use only, or RUO, from regions around the world. We also plan to develop and market kits containing our patented and proprietary Target Selector testing to laboratories and researchers worldwide.

Our revenue generating efforts are focused in three areas:

- medical oncologists, surgical oncologists, pulmonologists, pathologists and other physicians who use the biomarker information we provide in order to determine the best treatment plan for their patients;
- providing laboratory services utilizing both our CTC and ctDNA testing in order to help pharmaceutical and biopharmaceutical companies developing drug candidate therapies to treat cancer; and

- licensing and/or selling our proprietary testing and/or technologies, including our BCTs, to partners in the United States and abroad.

Assays, Products and Services

We have commercialized our Target-Selector assays for a number of solid tumor indications such as: breast cancer, non-small cell lung cancer, or NSCLC, gastric cancer, colorectal cancer, prostate cancer, melanoma, pancreaticobiliary cancer, and ovarian cancer. These assays utilize our dual CTC and ctDNA technology platforms and provide biomarker analysis from a patient's blood sample.

In the case of our breast and gastric cancer offerings, biomarker analysis involves fluorescence in situ hybridization, or FISH, for the detection and quantitation of the human epidermal growth factor receptor 2, or HER2, gene copy number as well as immunocytochemical, or ICC, analysis of estrogen receptor, or ER, protein, progesterone receptor, or PR, protein, and androgen receptor, or AR, protein, which are currently commercially available. A patient's HER2 status provides the physician with information about the appropriateness of therapies such as Herceptin® or Tykerb®. ER and PR status provides the physician with information about the appropriateness of endocrine therapies such as tamoxifen and aromatase inhibitors.

Our lung cancer biomarker analysis offering currently includes FISH testing for ALK, ROS1, RET, MET and FGFR1 gene rearrangements, as well as analysis for the T790M, Deletion 19, and L858R mutations of the epidermal growth factor receptor, or EGFR gene, as well as BRAF, KRAS and NRAS. The L858R mutation of the EGFR gene and Exon 19 deletions as activators of EGFR kinase activity are associated with the use of the drugs Tarceva®, Gilotrif® and Iressa®. For lung cancer, we also offer a resistance profile assay consisting of the biomarkers MET, HER2 (both of which we perform using our technology for CTCs), KRAS, and T790M (both of which are performed using ctDNA in plasma). These assays can be used by physicians to identify the mechanism causing disease progression for patients with NSCLC who are being treated with tyrosine kinase inhibitor, or TKI, therapy and therefore may qualify patients for inclusion in a clinical trial. In November 2015, Tagrisso® was approved by the U.S. Food and Drug Administration, or FDA, providing another biomarker-based therapy for the treatment of patients with EGFR-related lung cancer. Tagrisso® is indicated for the treatment of patients with metastatic disease, who have progressed on or after EGFR TKI therapy, and who have acquired a T790M resistance mutation. Recently, the FDA approved the combination of Novartis' Tafinlar® (dabrafenib) and Mekinist® (trametinib) for the treatment of patients with metastatic NSCLC whose tumors express the BRAF V600E mutation, an FDA "breakthrough therapy" designation for patients who have received prior chemotherapy. This combination was approved in Europe for the same indication in March 2017. BRAF mutations, which appear in approximately 1-3% of NSCLC cases globally, are associated with Zelboraf® and Tafinlar® treatment, as these BRAF inhibitors are both approved for the treatment of patients with melanoma.

In September 2017, we launched our assay for mutations of the NRAS oncogene, which can be used to detect and monitor an actionable biomarker associated with multiple cancer types such as metastatic melanoma, colorectal and lung cancer. As a result, we now offer 15 CLIA-certified liquid biopsy tests utilizing our Target-Selector platform to determine the status of key cancer biomarkers listed in the National Comprehensive Cancer Network Guidelines®. Our NRAS assay combines our proprietary switch blocker technology for improved mutation detection with next generation sequencing, resulting in ultra-high sensitivity.

Fibroblast growth receptor 1, or FGFR1, amplification is offered using our CTC technology. FGFR1 is present in several tumor types, including both NSCLC and small cell lung cancer, or SCLC, and has been shown to be a prognostic indicator of progression. FGFR1 is also a key target for several drugs undergoing clinical development.

We analytically validated PD-L1 testing utilizing our CTC technology in 2016. PD-L1 is a biomarker that is informative for immuno-oncology therapies currently marketed for lung cancer and melanoma, as well as therapies in development for multiple tumor types. We collaborated with David Rimm, M.D., Ph.D., a pathologist at Yale Medical School and a scientific advisor to us, on the analytical development of this assay.

We plan to release additional blood-based biomarker assays, such as those that test for ESR1, to our current menu of liquid biopsy assays using blood samples. In addition, we plan to complete the development and offer multiplexed biomarker tests, which will allow the detection and quantitative monitoring of multiple biomarkers in a single assay.

In August 2017, we announced that we had executed a distribution agreement for our proprietary blood collection tubes with VWR International, LLC which can preserve intact cells (such as CTCs) for up to 96 hours and ctDNA for up to 8 days, allowing for the intact transport of RUO liquid biopsy samples from regions around the world.

In October 2017, we launched our pathology partnership initiative, branded as Empower TC, expanding access of our proprietary liquid biopsy testing to community pathologists and hospitals throughout the United States. The aim of this program is to incorporate community pathologists into the review of biomarkers found in liquid biopsy for patients diagnosed with cancer. Pathologists are now enabled to interpret our liquid biopsy results locally, while patient specimens will continue to be sent to us for processing in our CLIA-certified, CAP-accredited high complexity laboratory.

Pharmaceutical, Research and Health Economic Collaborations

We continue to execute on our strategies intended to expand our business globally, as well as to engage with pharmaceutical companies on clinical trials and assay development. We have preferred provider agreements in place in Mexico with Quest Diagnostics to support testing for Astra Zeneca. In addition, we have distribution agreements in place in Mexico, Uruguay, Turkey, the Czech Republic, the Philippines, Lebanon, Columbia, Israel and Canada.

In March 2013, we published a study in *Cancer Medicine* in collaboration with a group of breast cancer surgeons, pathologists and basic researchers at The University of Texas MD Anderson Cancer Center. In this study, our assay and a version adapted for use with bone marrow samples demonstrated the ability to identify HER2 positive CTCs and disseminated tumor cells (DTCs) seen in bone marrow of patients who had been previously classified as HER2 negative by tumor tissue analysis. A HER2 positive result in a patient with breast cancer indicates to the physician that there is likely to be a survival benefit from treatment with Herceptin®, as demonstrated in a number of large clinical studies.

As a follow up to the CTC findings published in *Cancer Medicine*, we were involved in a clinical study led by investigators at the Dana-Farber Cancer Institute. Study enrollment was completed. During the screening phase of this study, our CLIA-certified, CAP accredited laboratory tested blood samples from a cohort of patients with HER2 negative tissue status, with the aim to identify individuals with HER2 positive CTCs. These patients were then assigned to chemotherapy plus Herceptin®. Additional CTC testing with *HER2* FISH biomarker analyses were performed at subsequent time points. At the December 2014 San Antonio Breast Cancer Symposium, we presented findings that of 311 patients with HER2 negative tissue status, 22% had CTCs with *HER2* gene amplification at disease progression. *HER2* gene amplification subsequently categorized these patients as potential candidates for anti-HER2 therapy as the cancer evolved. Moreover, our multi-antibody CTC capture method identified a substantial subset of patients who would not likely have had detectable CTCs with commonly used CTC capture technologies. This added 10% (included in the 22%) to the number of women who were candidates for this highly specific targeted therapy.

With our cooperation, researchers at Columbia University published a study in the journal *Clinical and Translational Oncology* in January 2015. The study demonstrated the high correlation (79%) of circulating tumor cells, primary tumor tissue biopsy and metastatic tumor tissue biopsy in the determination of hormone receptor status (ER/PR) of breast cancer patients. The investigators also found that this high correlation was strongest when comparing metastatic tissue biopsy to CTCs (83%). The conclusion of the study was that determining ER/PR status in CTCs using our platform is feasible, with high concordance in ER/PR between tumor tissue (as determined with immunohistochemistry, or IHC) and CTCs (as determined with immunocytochemistry, or ICC). The authors suggest a larger trial to determine the prognostic significance of these findings.

In June 2015, we presented the clinical validation data of our ctDNA assay in collaboration with the University of California, San Diego. A very high level of concordance to tissue (88%) was demonstrated together with >95% analytical sensitivity and 99% analytical specificity, supporting our offering of a validated, robust non-invasive solution for mutation identification and monitoring in patients with lung cancer. The FDA approval of Tagrisso®, a third-generation tyrosine kinase inhibitor, presented an opportunity for patients to be monitored using a ctDNA assay.

During 2016, we announced a pharmaceutical collaboration agreement that provides testing for a clinical trial, which includes metastatic lung cancer patients with leptomeningeal or brain metastases. In this exploratory trial, we are testing both cerebrospinal fluid and blood for molecular alterations that could be impacted by treatment. In April 2016, we announced a study collaboration conducted with Dr. Giuseppe Giaccone at the MedStar Georgetown University Hospital to assess resistance biomarkers in NSCLC patients treated with EGFR inhibitors or chemotherapy. Later in 2016, we announced another collaboration involving a study presented at the European Society for Medical Oncology, or ESMO, Annual Congress in October 2016, evaluating the detection of EGFR alterations (del19, L858R and T790M) by our Target-Selector liquid biopsy. Subsequent to this study, we have earned business in both Mexico and Columbia for EGFR testing in blood to qualify patients for the pharmaceutical company's targeted therapy. The relationship also resulted during the following year, in a study that includes peripheral blood CTC assessment of PD-L1 protein expression in patients undergoing chemotherapy as a monotherapy or in combination with a checkpoint inhibitor. In December 2016, we announced a clinical study agreement with Columbia University Medical Center to evaluate the clinical utility of our Target-Selector platform to diagnose leptomeningeal metastases (LM) in breast cancer patients. Dr. Kevin Kalinsky leads the study to test CTCs in cerebrospinal fluid and blood, where CTC analysis will be compared to standard methods for confirming LM diagnosis.

In May 2017, we announced jointly with the Addario Lung Cancer Medical Institute, or ALCMI, entry into a clinical collaboration and initiation of the ALCMI-009 liquid biopsy clinical study. This large-scale study was developed and will be conducted by ALCMI with its consortium of leading oncology centers. The prospective, multi-center study will utilize our Target-Selector testing platform and services to detect and assess cancer biomarkers found in both CTCs and ctDNA from the blood of patients with lung cancer.

In May 2017, we entered into a clinical study agreement with the University of Texas Southwestern Medical Center. Led by recognized oncologist and ALK alteration researcher, Dr. Saad Khan, the study is designed to evaluate the clinical utility of our Target-Selector platform for patients diagnosed with ALK-positive NSCLC and treated with ALK-inhibitor therapy. A second arm of the study will evaluate patients with rare cancers such as anaplastic thyroid cancer to determine if driver mutations such as ALK rearrangements can be identified and treated with targeted therapy to improve patient outcomes.

In November 2017, we announced a collaboration involving 100 patients in a clinical study with the University of California, San Diego. The study entails clinical validation of specified PD-L1 antibody clones on our Target-Selector CTC platform. Concordance of PD-L1 protein expression in tissue biopsy versus liquid biopsy, as well as correlation of therapeutic response with PD-L1 liquid biopsy status, are the study objectives.

A scientific abstract was submitted in November 2017 in collaboration with Dr. Shilpa Gupta from the Masonic Cancer Center at the University of Minnesota. The abstract was accepted as a poster presentation for the April 2018 American Association for Cancer Research (AACR) Annual meeting. The results demonstrate proof-of-concept use of Biocept's Target Selector™ CTC platform to correlate CTC count with clinical responses in refractory testicular cancer patients undergoing therapy. This work is part of a Phase 2 clinical trial of brentuximab vedontin (an anti-CD-30 antibody) with bevacizumab in refractory CD-30 + germ cell tumors. The capability of the Target Selector™ CTC platform to monitor this rare cancer type has potential for a precision medicine-based approach to guide treatment decisions for these patients.

Two complementary posters on the highly sensitive Target Selector ctDNA assays were presented in 2018. The first poster entitled "Biocept Study Shows Incorporation of Thermo Fisher QuantStudio 5 PCR Instrument into Target Selector Platform Improves Sensitivity and Specificity in Detection of Lung Cancer Biomarkers" was presented in January 2018 at the Fifth AACR-IASLC International Joint Conference: Lung Cancer Translational Science from the Bench to the Clinic. The related poster, entitled "Validation of highly sensitive TargetSelector™ ctDNA assays for *EGFR*, *BRAF*, and *KRAS* mutations" was presented at the April 2018 American Association for Cancer Research annual meeting. Together, these posters highlight improvements to the Target Selector ctDNA platform, enabling more sensitive mutation detection down to a single copy, thereby increasing the likelihood of identifying actionable molecular drivers towards guiding targeted therapy decisions and better management of a patient's cancer.

During the first half of 2018, three key case studies were published in peer-reviewed journals. In April, the 2018 Spring issue of *Oncology & Hematology Review* featured a case report demonstrating the clinical utility of Biocept's CTC platform whereby identification of an *ALK* rearrangement enabled sequential targeted therapy and improved quality of life in a patient with non-small cell lung cancer. This case illustrated the use of our technology to monitor therapeutic response and early detection of drug resistance to manage patient disease through the course of treatment with various ALK inhibitors. A Letter to the Editor in the May 2018 issue of *Journal of Thoracic Oncology* described the identification of a *ROS1* rearrangement by Biocept CTC analysis using FISH (fluorescent in situ hybridization). The *ROS1* translocation was concordant with tissue biopsy. In contrast, next-generation sequencing analysis of plasma by another vendor failed to detect the genetic alteration in the patient with lung cancer. Also in May 2018, a case report describing the application of our CTC technology in the management of metastatic breast cancer was published in *Clinics in Oncology.* This work described a patient with recurrent breast cancer where numerous tissue-based evaluations of the individual's bone-only metastases had repeated challenges or inclusive results. *HER2* amplification detected in CTCs from blood provided crucial information towards changing treatment strategies to include anti-HER therapy, consequently extending and improving the patient's quality of life. Each of the three published cases provide real-life examples in lung and breast cancer towards establishing the importance of liquid biopsy to identify and monitor clinically actionable biomarkers to improve outcomes of patients with cancer.

In July 2018, we announced a collaboration involving two studies with the University of California, San Diego. Each of the two studies will enroll 100 patients with solid tumors, for a total of 200 patients. One study will assess the feasibility of using our CTC and ctDNA methodologies to predict post-resection disease recurrence in patients with Stage II or III cancer; the other study will use our technology to predict response to therapy in patients with metastatic disease. Dr. Rebecca Shatsky and Dr. Razelle Kurzrock are the investigators key to both studies.

In August 2018, we announced a Quality Improvement Initiative with Highmark Health to help improve molecular testing rates of NCCN Category I Guidelines for non-small cell lung cancer. The Initiative aims to improve health outcomes by using liquid biopsy to more rapidly assess a patient's actionable biomarker status towards selecting appropriate therapy, while reducing the overall cost of care. The project will evaluate at least 100 patients in the Highmark Health-affiliated Allegheny Health Network (AHN) Cancer Institute. Patients will receive our CTC and ctDNA testing in addition to tissue biopsy with the goal of obtaining biomarker status results for a higher percentage of patients compared to standard testing.

Two scientific posters featuring the Target Selector™ CTC and ctDNA platforms were presented in September 2018 at the International Association for the Study of Lung Cancer (IASLC) 19th World Conference on Lung Cancer. Data from these clinical studies demonstrate the ability of our technology to detect and monitor CTC counts and actionable biomarkers in both blood and cerebrospinal fluid (CSF) of patients with advanced NSCLC. The first poster described interim results of a collaboration with Dr. Janakiraman Subramanian at the Saint Luke's Cancer Institute in Kansas City, Missouri. This study evaluates CTC enumeration in advanced stage NSCLC patients before and during the course of chemotherapy. Interim results suggest that CTC counts may have prognostic and predictive potential to assess therapeutic benefit. The second poster was in collaboration with Kadmon Corporation, featuring CTC and ctDNA analyses and monitoring in the CSF of NSCLC patients with leptomeningeal metastases who were treated with tesevatib in Kadmon's clinical trial KD019-206. In this study, alterations detected in the CSF of patients were concordant with original tissue biopsies, and serial monitoring of CTCs and ctDNA biomarkers in CSF were consistent with the overall clinical.

Provider Agreements

In January 2017, we announced that we had secured an in-network provider agreement with Blue Cross Blue Shield of Texas, the largest provider of health benefits in Texas. In addition, we entered into a national master business agreement with the Blue Cross Blue Shield Association, a not-for-profit trade association that provides multiple services for its 38-member Blue Cross and Blue Shield health plan companies across the U.S., including forming national strategic vendor partnerships. We were selected by the Blue Cross Blue Shield Association based on a rigorous request-for-proposal progress. This agreement establishes pricing for our Target-Selector liquid biopsy testing service through the Blue Cross Blue Shield Association's group purchasing organization, CareSourcing Workgroup. The pricing offered by the CareSourcing Workgroup group purchasing organization is available to those Blue Cross and Blue Shield member health plans that have, or may seek, in-network agreements with us.

In June 2017, we entered into a participating provider agreement with MediNcrease Health Plans, LLC and a preferred provider agreement with Scripps Health Plan Services, Inc., both establishing pricing for our Target-Selector liquid biopsy testing service.

In December 2017, we signed an agreement with Wellmark, Inc., the largest health insurer in Iowa and South Dakota. The agreement marks our third Blue Cross Blue Shield contract and enables patients diagnosed with cancer the ability to access our proprietary testing services in-network under their Wellmark health plan.

We are currently contracted with nine preferred provider organization networks, three large health plans, and five regional independent physician associations, and expect to continue to gain contracts in order to be considered as an "in-network" provider with additional plans.

Patents and Technology

We have issued patents with broad claims covering our blood collection tube, antibody cocktail approach, microchannel, CTC detection methodologies, and ctDNA analysis. In addition to issued patents in the U.S., we have patents for our proprietary microchannel in China, Korea, Europe, Hong Kong, Canada and Japan, and for our antibody cocktail in Australia, Europe, Hong Kong and Japan. Our patent estate continues to evolve, and in addition to the broad patent estate around our CTC platform, we also have issued patents in the U.S., Australia, Europe and China for our novel switch blocker technology, solidifying our proprietary enrichment methodology for detecting ctDNA with very high sensitivity. Our CTC platform patents were filed from 2005 through 2012, and we expect to have patent protection into the 2030s. Our CTC patents and applications cover not only cancer as a target, but also prenatal and other rare cells of interest. Recently allowed patents in the U.S. cover the capture of "any target of interest on any solid surface" using our antibody capture approach. The patent for our proprietary specimen collection tubes expire in 2031, and the patents for our ctDNA technology expire in the early 2030's.

As of September 30, 2018, we owned 30 issued patents and 19 patents pending related to our current technologies. Of these, eight were issued and five were pending patents in the U.S., while 22 were issued and 14 were pending patents in non-U.S. territories. Separately, we also owned seven issued patents related to our earlier microarray and cell analysis technology.

Results of Operations

Three Months Ended September 30, 2017 and 2018

The following table sets forth certain information concerning our results of operations for the periods shown:

	Three months ended September 30,		Change	
	2017	2018	$	%
(dollars in thousands)				
Net revenues	$1,111	$762	$(349)	(31%)
Cost of revenues	2,487	2,482	(5)	(0%)
Research and development expenses	856	1,090	234	27%
General and administrative expenses	1,835	1,794	(41)	(2%)
Sales and marketing expenses	1,676	1,404	(272)	(16%)
Loss from operations	(5,743)	(6,008)	(265)	5%
Interest expense	(88)	(64)	24	(27%)
Other income	13	24	11	100%
Loss before income taxes	(5,818)	(6,048)	(230)	4%
Income tax expense	(3)	—	3	(100%)
Net loss	$(5,821)	$(6,048)	$(227)	4%

Net Revenues

Net revenues were approximately $762,000 for the three months ended September 30, 2018, compared with approximately $1,111,000 for the same period in 2017, a decrease of $349,000, or 31%. On March 31, 2017, we converted from cash-based revenue recognition for our commercial revenues to accrual-based revenue recognition. Of the $1,111,000 of net revenues recognized during the three months ended September 30, 2017, $1,009,000 related to revenues recognized on an accrual basis, while $102,000 related to revenues recognized upon the receipt of cash, as compared to the same period in 2018 when $762,000 of revenues were recognized on an accrual basis and no revenues were recognized upon the receipt of cash.

Commercial revenues decreased $346,000 during the three months ended September 30, 2018 as compared to the same period in 2017 due to the $102,000 of non-recurring revenue recognized for the three months ended September 30, 2017 which was not incurred in the same period in 2018. However, the remaining decrease was related to a decrease in the quantity of commercial accessions delivered. The following table sets forth certain information regarding commercial accessions received during the three months ended September 30, 2017 and 2018:

	Three months ended September 30,		Change	
	2017	2018	# / $	%
# Commercial accessions received	1,009	717	(292)	(29%)
$ Value estimated per commercial accession received	$1,035	$1,235	$200	19%

Additionally, there was a $3,000 decrease in development services revenues during the three months ended September 30, 2018 as compared to the same period in 2017, which was primarily related to a decrease in development services accessions delivered as follows:

	Three months ended September 30,		Change	
	2017	2018	# / $	%
# Development services accessions delivered	178	176	(2)	(1%)
$ Value per development services accession delivered	$379	$361	$(18)	(5%)

Costs and Expenses

Cost of Revenues. Cost of revenues was approximately $2,482,000 for the three months ended September 30, 2018, compared with approximately $2,487,000 for the same period in 2017, a decrease of $5,000. Although cost of revenues was relatively flat as compared to the same period last year, the Company saw an increase in costs associated with validation of molecular oncology assay panel for next generation sequencing related to its collaboration with Thermo Fisher Scientific, and an increase in costs associated with calibrations and CLIA validations to improve upon existing equipment specifications and testing protocols.

Research and Development Expenses. Research and development expenses were approximately $1,090,000 for the three months ended September 30, 2018, compared with approximately $856,000 for the same period in 2017, an increase of $234,000, or 27%. The increase was primarily attributable to an increase of $168,000 in laboratory costs allocated from cost of revenues associated with increased research and development activities during the three months ended September 30, 2018 as compared to the same period in 2017. Additionally, cost of research studies in collaboration with academic and healthcare institutions increased $58,000, and facilities costs increased $10,000 compared to the same period in 2017.

General and Administrative Expenses. General and administrative expenses were approximately $1,794,000 for the three months ended September 30, 2018, compared with approximately $1,835,000 during the same period in 2017, a decrease of $41,000, or 2%. The decrease was primarily attributable to a decrease in stock based compensation expenses of $196,000, partially offset by increased personnel costs of $118,000 and office expenses of $36,000.

Sales and Marketing Expenses. Sales and marketing expenses were approximately $1,404,000 for the three months ended September 30, 2018 compared with approximately $1,676,000 for the same period in 2017, a decrease of $272,000, or 16%. The decrease was primarily attributable to a decrease of $319,000 in headcount-related expenses, a decrease of $146,000 in sales commission expense related to lower sales volume, partially offset by an increase in consulting services of $49,000 and office expenses of $19,000.

Income Tax Expense

Over the past several years we have generated operating losses in all jurisdictions in which we may be subject to income taxes. As a result, we have accumulated significant net operating losses and other deferred tax assets. Because of our history of losses and the uncertainty as to the realization of those deferred tax assets, a full valuation allowance has been recognized. We do not expect to report a provision for income taxes until we have a history of earnings, if ever, that would support the realization of our deferred tax assets.

We have not completed a study to assess whether an ownership change has occurred or whether there have been multiple ownership changes since our formation, due to the complexity and cost associated with such a study, and the fact that there may be additional ownership changes in the future, however, we believe ownership changes likely occurred in each year from 2015 through 2018. As a result, we have estimated that the use of our net operating loss is limited and the remaining net operating loss carryforwards and research and development credits we estimate can be used in the future remain fully offset by a valuation allowance to reduce the net asset to zero.

Nine Months Ended September 30, 2017 and 2018

The following table sets forth certain information concerning our results of operations for the periods shown:

	Nine months ended September 30,		Change	
	2017	2018	$	%
(dollars in thousands)				
Net revenues	$4,073	$2,391	$(1,682)	(41%)
Cost of revenues	6,985	7,616	631	9%
Research and development expenses	2,456	3,180	724	29%
General and administrative expenses	5,539	5,441	(98)	(2%)
Sales and marketing expenses	4,701	4,474	(227)	(5%)
Loss from operations	(15,608)	(18,320)	(2,712)	17%
Interest expense	(385)	(231)	154	(40%)
Other income	51	(6)	(57)	(112%)
Loss before income taxes	(15,942)	(18,557)	(2,615)	16%
Income tax expense	(5)	(1)	4	(80%)
Net loss	$(15,947)	$(18,558)	$(2,611)	16%

Net Revenues

Net revenues were approximately $2,391,000 for the nine months ended September 30, 2018, compared with approximately $4,073,000 for the same period in 2017, a decrease of $1,682,000, or 41%. For the nine months ended September 30, 2018 all revenues were recognized on an accrual basis whereas of the $4,073,000 of revenues recognized during the nine months ended September 30, 2017, $2,915,000 related to revenues recognized on an accrual basis, while $1,158,000 related to revenues recognized upon the receipt of cash. During the three months ended March 31, 2017, we converted from cash-based revenue recognition for our commercial revenues, to accrual-based revenue recognition. As a result of the change to accrual-based revenue recognition, we recognized total non-recurring revenue of $839,000 during the nine months ended September 30, 2017 for cases delivered on or prior to December 31, 2016, and the incremental revenue as a result of the change to accrual-based revenue recognition for commercial cases was approximately $1,042,000.

Commercial revenues decreased approximately $1,640,000 primarily due to the $1,452,000 of non-recurring revenue recognized for the nine months ended September 30, 2017 which was not incurred in the same period in 2018. The remaining decrease was due to a decrease in commercial accessions received during the nine months ended September 30, 2018 compared to the same period in 2017 as set forth in the following table:

	Nine months ended September 30,		Change	
	2017	2018	# / $	%
# Commercial accessions received	2,947	2,478	(469)	(16%)
$ Value estimated per commercial accession received	$1,098	$1,162	$64	6%

Additionally, revenues for development services decreased approximately $42,000 during the nine months ended September 30, 2018 as compared to the same period in 2017, due to a decrease in development cases delivered and in the value per development case delivered as follows:

	Nine months ended September 30,		Change	
	2017	2018	# / $	%
# Development services cases delivered	575	474	(101)	(18%)
$ Value per development services accession delivered	$368	$337	$(32)	(9%)

Costs and Expenses

Cost of Revenues. Cost of revenues was approximately $7,616,000 for the nine months ended September 30, 2018, compared with approximately $6,985,000 for the same period in 2017, an increase of $631,000, or 9%. The increase was primarily attributable to an increase of $614,000 in facility and office expenses with respect to computer equipment, software amortization, depreciation expense, and allocated information technology and facility charges as we invested in upgrading our laboratory equipment and information system and maintain our facility. Additionally, there was an increase of $256,000 in materials, shipping and other direct costs, due primarily to assay validations, as well as an increase of $228,000 in consulting and outside service costs. These increases were partially offset by a decrease of $449,000 resulting from greater laboratory costs charged to the research and development department associated with increased research and development activities.

Research and Development Expenses. Research and development expenses were approximately $3,180,000 for the nine months ended September 30, 2018, compared with approximately $2,456,000 for the same period in 2017, an increase of $724,000, or 29%. The increase was primarily attributable to higher laboratory allocation costs of $467,000, an increase of $163,000 in personnel related costs, and higher allocated facilities costs of $45,000 as we focused on the development and deployment of next generation sequencing, support and implementation of data-intensive laboratory processes, and new product validations. Additionally, research and development expenses saw an increase of $53,000 related to the cost of research studies done in collaboration with academic and healthcare institutions.

General and Administrative Expenses. General and administrative expenses were approximately $5,441,000 for the nine months ended September 30, 2018, compared with approximately $5,539,000 during the same period in 2017, a decrease of $98,000, or 2%. The decrease was primarily due to lower headcount-related expenses of $127,000, partially offset by an increase in audit and accounting fees of $35,000.

Sales and Marketing Expenses. Sales and marketing expenses were approximately $4,474,000 for the nine months ended September 30, 2018 compared with approximately $4,701,000 for the same period in 2017, a decrease of $227,000 or 5%. The decrease was primarily attributable to a decrease of $102,000 in sales commission expense due to lower sales volume, a decrease of $86,000 in travel and related expenses, and a decrease of $41,000 in personnel recruiting costs.

Income Tax Expense

Over the past several years we have generated operating losses in all jurisdictions in which we may be subject to income taxes. As a result, we have accumulated significant net operating losses and other deferred tax assets. Because of our history of losses and the uncertainty as to the realization of those deferred tax assets, a full valuation allowance has been recognized. We do not expect to report a provision for income taxes until we have a history of earnings, if ever, that would support the realization of our deferred tax assets.

We have not completed a study to assess whether an ownership change has occurred or whether there have been multiple ownership changes since our formation, due to the complexity and cost associated with such a study, and the fact that there may be additional ownership changes in the future, however, we believe ownership changes likely occurred in each year from 2015 through 2018. As a result, we have estimated that the use of our net operating loss is limited and the remaining net operating loss carryforwards and research and development credits we estimate can be used in the future remain fully offset by a valuation allowance to reduce the net asset to zero.

Years Ended December 31, 2016 and 2017

The following table sets forth certain information concerning our results of operations for the periods shown:

	For the year ended December 31,		Change	
	2016	2017	$	%
(dollars in thousands)				
Net revenues	$3,223	$5,069	$1,846	57%
Cost of revenues	6,920	9,345	2,425	35%
Research and development expenses	2,713	3,365	652	24%
General and administrative expenses	6,561	7,190	629	10%
Sales and marketing expenses	5,054	6,344	1,290	26%
Loss from operations	(18,025)	(21,175)	(3,150)	17%
Interest expense, net	(526)	(482)	44	(8%)
Other income	154	51	(103)	(67%)
Loss before income taxes	(18,397)	(21,606)	(3,209)	17%
Income tax expense	(2)	(8)	(6)	300%
Net loss	$(18,399)	$(21,614)	$(3,215)	17%

Net Revenues

Net revenues were approximately $5,069,000 for the year ended December 31, 2017, compared with approximately $3,223,000 for the same period in 2016, an increase of $1,846,000, or 57%. Of the $5,069,000 of net revenues recognized during the year ended December 31, 2017, $3,843,000 related to revenues recognized on an accrual basis, while $1,226,000 related to revenues recognized upon the receipt of cash, as compared to the same period in 2016 when $240,000 of revenues were recognized on an accrual basis and $2,983,000 of revenues were recognized upon the receipt of cash. During the three months ended March 31, 2017, we converted from cash-based revenue recognition for our commercial revenues to accrual-based revenue recognition. As a result of the change to accrual-based revenue recognition, we recognized total nonrecurring net revenue of $843,000 during the year ended December 31, 2017, which represents the estimated value of net accounts receivable at December 31, 2016 that was recognized as revenue during the year ended December 31, 2017, and the incremental net revenue recorded as a result of the change was $1,139,000, which represents the total amount of net revenue recorded in excess of the amount of commercial cash collections.

Total cash collections for commercial cases were $3,658,000 during the year ended December 31, 2017 as compared to $2,983,000 during the same period in 2016, an increase of $675,000 owed primarily to improvements in billing and collection timeliness and effectiveness, as well as increases in accession volume and the expected value per accession received prior to and during the year ended December 31, 2017 as compared to the same period in 2016. The net estimated revenue per commercial accession delivered since converting from cash-based revenue recognition to accrual-based revenue recognition on March 31, 2017 and through December 31, 2017 was approximately $988, based on 2,880 commercial accessions delivered and approximately $2,845,000 in corresponding commercial accrual-based revenues during that period. The $1,139,000 in incremental net revenue recognized was primarily related to the $843,000 of nonrecurring net revenue recognized as a result of converting to the accrual basis

of revenue recognition, as well as increases in the expected value per accession received prior to and during the year ended December 31, 2017 as compared to the same period in 2016 and increased commercial case volumes received, as follows:

	Year ended December 31,		Change	
	2016	2017	# / $	%
# Commercial accessions received	3,676	3,768	92	3%
$ Value estimated per commercial accession received	$988	$ 1,117	$129	13%

Additionally, there was a $32,000 increase in development services revenues during the year ended December 31, 2017 as compared to the same period in 2016, which was primarily related to increased development services case volumes delivered partially offset by a decrease in the estimated value per development services case delivered, as follows:

	Year ended December 31,		Change	
	2016	2017	#	%
# Development services cases delivered	537	747	210	39%
$ Value estimated per development services accession delivered	$447	$365	$(82)	(18%)

Costs and Expenses

Cost of Revenues. Cost of revenues was approximately $9,345,000 for the year ended December 31, 2017, compared with approximately $6,920,000 for the year ended December 31, 2016, an increase of $2,425,000, or 35%. The increase was primarily attributable to an increase of $1,407,000 in personnel costs mainly related to higher assay volume as the average number of full-time laboratory and manufacturing employees increased from 28 full-time employees during the year ended December 31, 2016 to 39 full-time employees during the same period in 2017, as we created excess laboratory accession throughput capacity of approximately 30% as of December 31, 2017 in advance of an anticipated increase in accession volumes resulting from our expanded sales force and pathology partnership initiative. Additionally, there was an increase of $660,000 in depreciation expense, computer equipment, software amortization, and allocated information technology and facility charges as we implemented our pathology partnership initiative, invested in upgrading our laboratory equipment and information system and maintaining our facility, as well as increases of $404,000 in materials, shipping and other direct costs and $135,000 in third-party service provider and consulting costs associated with higher assay volume. These increases were partially offset by a decrease of $202,000 resulting from greater laboratory costs charged to research and development expenses associated with increased research and development activities.

Research and Development Expenses. Research and development expenses were approximately $3,365,000 for the year ended December 31, 2017, compared with approximately $2,713,000 for the year ended December 31, 2016, an increase of $652,000, or 24%. The increase was primarily attributable to an increase of $264,000 in higher personnel costs as the average headcount in our research and development function increased to 12 full-time employees during the year ended December 31, 2017 from 10 full-time employees during the same period in 2016, as we focus on the development and deployment of next generation sequencing, support and implementation of data-intensive laboratory processes, and new product validations. Additionally, there was an increase of $202,000 in laboratory costs allocated from cost of revenues and an increase of $99,000 in materials and other costs associated with increased research and development activities during the year ended December 31, 2017 as compared to the same period in 2016, as well as an increase of $49,000 in computer equipment, software and laboratory equipment preventative maintenance costs and an increase of $37,000 in allocated facilities charges.

General and Administrative Expenses. General and administrative expenses were approximately $7,190,000 for the year ended December 31, 2017, compared with approximately $6,561,000 for the year ended December 31, 2016, an increase of $629,000, or 10%. The increase was primarily due to an increase of $705,000 in non-stock-based compensation personnel costs and travel expenses as the average headcount included in the general and administrative function rose from 9 full-time employees during the year ended December 31, 2016 to 13 full-time employees during the same period in 2017, primarily resulting from bringing our billing function in-house in April 2017. Additionally, there was an increase of $247,000 in third-party service provider and consulting fees associated with increased commercial and strategic activities and our expanded investor relations function during the year ended December 31, 2017, in addition to increases of $157,000 in legal fees, $80,000 in accounting and audit fees, and $75,000 in computer equipment, office expenses, and other general and administrative costs associated with increased commercial and strategic activities. These increases were partially offset by decreases of $373,000 in stock-based compensation expense, $157,000 in directors and officers insurance costs, and $109,000 in third-party billing provider costs resulting from bringing our billing function in-house in April 2017.

Sales and Marketing Expenses. Sales and marketing expenses were approximately $6,344,000 for the year ended December 31, 2017 compared with approximately $5,054,000 for the year ended December 31, 2016, an increase of $1,290,000, or

26%. The increase was primarily attributable to an increase of $1,194,000 in personnel and travel costs as the average headcount included in the sales and marketing function rose from 15 full-time employees during the year ended December 31, 2016 to 20 full-time employees during the same period in 2017 as we expanded our sales force, as well as increases of $114,000 in marketing materials, trade show and conference costs and $107,000 in computer equipment, allocated information technology costs, shipping and other office expenses associated with the expanded sales force and commercial activities, which were partially offset by a decrease of $126,000 in third-party service provider and consulting fees.

Income Tax Expense

Over the past several years we have generated operating losses in all jurisdictions in which we may be subject to income taxes. As a result, we have accumulated significant net operating losses and other deferred tax assets. Because of our history of losses and the uncertainty as to the realization of those deferred tax assets, a full valuation allowance has been recognized. We do not expect to report a provision for income taxes until we have a history of earnings, if ever, that would support the realization of our deferred tax assets.

We have not completed a study to assess whether an ownership change has occurred or whether there have been multiple ownership changes since our formation, due to the complexity and cost associated with such a study, and the fact that there may be additional ownership changes in the future, however, we believe ownership changes likely occurred in each year from 2015 through 2018. As a result, we have estimated that the use of our net operating loss is limited and the remaining net operating loss carryforwards and research and development credits we estimate can be used in the future remain fully offset by a valuation allowance to reduce the net asset to zero.

Inflation

We do not believe that inflation has had a material adverse impact on our business or operating results during the periods presented.

Liquidity and Capital Resources

Cash Flows

Our net cash flow from operating, investing and financing activities for the periods below were as follows:

	Nine months ended September 30,	
	2017	2018
(dollars in thousands)		
Cash provided by/ (used in):		
Operating activities	$(13,897)	$(16,937)
Investing activities	(1,056)	(145)
Financing activities	16,222	23,892
Net increase in cash	$1,269	$6,810

Cash Used in Operating Activities. Net cash used in operating activities was $16.9 million for the nine months ended September 30, 2018, compared to net cash used in operating activities of $13.9 million for the same period in 2017. The net increase of $3.0 million in cash used was primarily related to an increase in cash used to fund our net loss.

Cash Used in Investing Activities. Net cash used in investing activities of approximately $145,000 and $1.1 million during the nine months ended September 30, 2018 and 2017, respectively, was related to purchases of fixed assets.

Cash Provided by Financing Activities. Net cash provided by financing activities was $23.9 million for the nine months ended September 30, 2018, compared to net cash provided by financing activities of $16.2 million for the same period in 2017. Our primary sources of cash from financing activities during the nine months ended September 30, 2018 consisted of $25.7 million in net proceeds from our common stock and warrant financing transaction in January 2018, rights offering completed in August 2018, and registered direct financing transaction completed in September of 2018, which was partially offset by $1.2 million of principal payments made on indebtedness. Our primary sources of cash from financing activities during the nine months ended September 30, 2017 consisted of $8.6 million and $2.0 million in net proceeds from our offerings in March 2017 and August 2017, respectively, as well as proceeds of $7.5 million from the exercise of common stock warrants sold in our offering in October 2016, which were partially offset by $1.9 million of principal payments made on indebtedness.

Our net cash flow from operating, investing and financing activities for the periods below were as follows:

	For the year ended December 31,	
	2016	2017
(dollars in thousands)		
Cash provided by/(used in):		
Operating activities	$(15,697)	$(19,651)
Investing activities	(451)	(1,400)
Financing activities	11,936	18,588
Net increase/(decrease) in cash	$(4,212)	$(2,463)

Cash Used in Operating Activities. Net cash used in operating activities was $19.7 million for the year ended December 31, 2017, compared to net cash used in operating activities of $15.7 million for the year ended December 31, 2016. The net increase of $4.0 million in cash used was primarily related to an increase of $3.2 million in cash used to fund our net loss, as well as a decrease of $0.6 million in net cash provided by operating assets and liabilities and a net decrease of $0.2 million in non-cash expenses primarily related to stock-based compensation expense.

Cash Used in Investing Activities. Net cash used in investing activities of approximately $1,400,000 and $451,000 during the years ended December 31, 2017 and 2016, respectively, was related to purchases of fixed assets.

Cash Provided by Financing Activities. Net cash provided by financing activities was $18.6 million for the year ended December 31, 2017, compared to net cash provided by financing activities of $11.9 million for the year ended December 31, 2016. Our primary sources of cash from financing activities during the year ended December 31, 2017 consisted of $8.6 million, $2.0 million and $2.9 million in net proceeds from our offerings in March, August and December 2017, respectively, as well as proceeds of $7.5 million from the exercise of common stock warrants sold in our offering in October 2016, which were partially offset by $2.6 million of principal payments made on indebtedness. Our primary sources of cash from financing activities during the year ended December 31, 2016 related to $9.0 million and $4.3 million in net proceeds from our offerings in October and May 2016, respectively, as well as $0.5 million in net proceeds received from the sale of common stock to Aspire Capital, which were partially offset by $1.8 million of principal payments made on indebtedness.

Liquidity, Capital Resources and Expenditure Requirements

We expect to continue to incur substantial operating losses in the future. It may take several years to achieve positive operational cash flow, or we may not ever achieve positive operational cash flow. We expect that we will use the net proceeds from our sale of equity securities, if any, cash received from the licensing of our technology, if any, and our revenues from operations to hire sales and marketing personnel, support increased sales and marketing activities, fund further research and development, clinical utility studies and future enhancements of our assays, acquire equipment, implement automation and scale our capabilities to prepare for significant assay volume, for general corporate purposes and to fund ongoing operations and the expansion of our business, including the increased costs associated with expanded commercial activities. We may also use the net proceeds from our sale of equity securities, if any, cash received from the licensing of our technology, if any, and our revenues from operations to acquire or invest in businesses, technologies, services or products, although we do not have any current plans to do so.

As of September 30, 2018, our cash totaled $9.0 million, and our outstanding net indebtedness totaled $1.7 million. While we currently are in the commercialization stage of operations, we have not yet achieved profitability and anticipate that we will continue to incur net losses for the foreseeable future. We have determined that there is substantial doubt about our ability to continue as a going concern for the one-year period following the date that our unaudited condensed financial statements for the three and nine months ended September 30, 2018 were issued, and we expect that we will need additional financing to execute on our current or future business strategies beyond December 2018.

On September 20, 2018, the Company completed an offering of 642,438 shares of the Company’s common stock and pre-funded warrants to purchase up to an aggregate of 120,000 shares of its common stock. The shares were sold at a purchase price of $3.285 per share and the pre-funded warrants were sold at a purchase price of $3.275 per pre-funded warrant which represents the per share purchase price for the shares less the $0.01 per share exercise price for each such pre-funded warrant. The net proceeds to the Company from this offering were approximately $2.2 million, after deducting expenses related to the offering including dealer-manager fees and expenses, and excluding any proceeds received upon exercise of any warrants. In addition, in a concurrent private placement, the Company issued to purchasers a warrant to purchase one share of the Company’s common stock for each share and pre-funded warrant purchased for cash in the offering. All warrants issued in this offering have an exercise price of $3.16 per share, are exercisable upon the six-month anniversary of issuance and expire five years from such date.

On August 13, 2018, the Company completed a rights offering. Pursuant to the rights offering, the Company sold an aggregate of 11,587 units consisting of an aggregate of 11,587 shares of Series A Preferred Stock and 2,549,140 warrants, with each warrant exercisable for one share of our common stock at an exercise price of $4.53 per share, resulting in net proceeds to the Company of approximately $10.2 million, after deducting expenses relating to the Rights Offering, including dealer-manager fees and expenses, and excluding any proceeds received upon exercise of any warrants.

In May 2018, the SEC declared effective a shelf registration statement filed by us, which expires in May 2021. The shelf registration statement allows us to issue any combination of our common stock, preferred stock, debt securities and warrants from time to time for an aggregate initial offering price of up to $50 million, subject to certain limitations for so long as our public float is less than $75 million.

On January 30, 2018, we received net cash proceeds of approximately $13.3 million from the closing of a follow-on public offering of 1,095,153 shares of our common stock and warrants to purchase up to an aggregate of 1,095,153 shares of our common stock at a combined offering price of $13.50 per unit. Subsequent to the closing of this offering, no additional cash proceeds have been received from the exercise of warrants sold in this offering, with approximately $16.4 million in gross warrant proceeds remaining outstanding and available to be exercised at $4.53 per share, which is subject to down round adjustment, until their expiration in January 2023.

Pursuant to a common stock and warrant purchase agreement dated August 9, 2017 between us and Ally Bridge LB Healthcare Master Fund Limited, or Ally Bridge, we received net cash proceeds of approximately $2.0 million from the sale of our common stock and warrants. Subsequent to the closing of this offering, no additional cash proceeds had been received from the exercise of warrants sold in this offering, with approximately $2.2 million in gross warrant proceeds remaining outstanding and available to be exercised at $45.00 per share until their expiration in August 2022.

We expect that we will need additional financing to execute on our current or future business strategies. Until we can generate significant cash from operations, including assay revenues, we expect to continue to fund operations with the proceeds from offerings of our equity securities or debt, or transactions involving product development, technology licensing or collaboration. For example, we have an effective shelf registration statement on file with the SEC which allows us to issue any combination of our common stock, preferred stock, debt securities and warrants from time to time until expiry in May 2021, subject to certain restrictions that apply for so long as our public float is less than $75 million. The specific terms of future offerings, if any, under this shelf registration statement would be established at the time of such offering. We can provide no assurances that any sources of a sufficient amount of financing will be available to us on favorable terms, if at all. If we are unable to raise a sufficient amount of financing in a timely manner, we would likely need to scale back our general and administrative activities and certain of our research and development activities. Our forecast pertaining to our current financial resources and the costs to support our general and administrative and research and development activities are forward-looking statements and involve risks and uncertainties. Actual results could vary materially and negatively as a result of a number of factors, including:

- our ability to secure financing and the amount thereof;
- the costs of operating and enhancing our laboratory facilities;
- the costs of developing our anticipated internal sales and marketing capabilities;
- the scope, progress and results of our research and development programs, including clinical utility studies;
- the scope, progress, results, costs, timing and outcomes of the clinical utility studies for our diagnostic assays;
- our ability to manage the costs for manufacturing our microfluidic channels;
- the costs of maintaining, expanding and protecting our intellectual property portfolio, including potential litigation costs and liabilities;
- our ability to obtain adequate reimbursement from governmental and other third-party payers for our assays and services;
- the costs of additional general and administrative personnel, including accounting and finance, legal and human resources, as a result of becoming a public company;
- our ability to collect revenues; and
- other risks discussed in our other filings with the SEC.

We may raise additional capital to fund our current operations and to fund expansion of our business to meet our long-term business objectives through public or private equity offerings, debt financings, borrowings or strategic partnerships coupled with an investment in our company or a combination thereof. If we raise additional funds through the issuance of convertible debt

securities, or other debt securities, these securities could be secured and could have rights senior to those of our common stock. In addition, any new debt incurred by us could impose covenants that restrict our operations. The issuance of any new equity securities will also dilute the interest of our current stockholders. Given the risks associated with our business, including our unprofitable operating history and our ability or inability to develop additional assays, additional capital may not be available when needed on acceptable terms, or at all. If adequate funds are not available, we will need to curb our expansion plans or limit our research and development activities, which would have a material adverse impact on our business prospects and results of operations.

Off-Balance Sheet Arrangements

We have not engaged in any off-balance sheet arrangements as defined in Item 303(a)(4) of Regulation S-K.

Critical Accounting Policies and Significant Judgments and Estimates

Our management's discussion and analysis of financial condition and results of operations is based on our financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States of America. The preparation of our financial statements requires us to make estimates and judgments that affect the reported amounts of assets, liabilities, revenue and expenses and related disclosure of contingent assets and liabilities. On an ongoing basis, we evaluate our estimates based on historical experience and make various assumptions, which management believes to be reasonable under the circumstances, which form the basis for judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

The notes to our audited financial statements, which are included elsewhere in this Annual Report, contain a summary of our significant accounting policies. We consider the following accounting policies critical to the understanding of the results of our operations:

- Revenue recognition;
- stock-based compensation; and
- going concern.

Revenue Recognition and Accounts Receivable

Our commercial revenues are generated from diagnostic services provided to patient's physicians and billed to third-party insurance payers such as managed care organizations, Medicare and Medicaid and patients for any deductibles, coinsurance or copayments that may be due. Through December 31, 2017, we recognized revenue in accordance with the provisions of Accounting Standards Codification, or ASC, 954-605, Health Care Entities-Revenue Recognition, which required that four basic criteria must be met prior to recognition of revenue: (1) persuasive evidence of an arrangement existed; (2) delivery had occurred and title and the risks and rewards of ownership had been transferred to the client or services had been rendered; (3) the price was fixed or determinable; and (4) collectability was reasonably assured. Commencing on March 31, 2017, we recognized commercial revenue related to billings for assays delivered and billed to Medicare and other third-party payers on an accrual basis when amounts that will ultimately be realized can be estimated upon delivery, whereby prior to March 31, 2017, we recognized revenues for our commercial diagnostic services on a cash basis as collected because the amounts ultimately expected to be received could not be estimated upon delivery due to insufficient collection history experience. Commencing on January 1, 2018, we recognize revenue in accordance with ASC 606, Revenue from Contracts with Customers, or ASC 606, which requires that an entity recognize revenue when it transfers promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled to in exchange for those goods or services. We adopted the provisions of ASC 606 using the modified retrospective application method applied to all contracts, which did not impact amounts previously reported by us, nor did it require a cumulative effect adjustment upon adoption, as our method of recognizing revenue under ASC 606 was analogous to the method utilized immediately prior to adoption. Accordingly, there is no need for us to disclose the amount by which each financial statement line item was affected as a result of applying the new standard and an explanation of significant changes.

Our gross commercial revenues billed are subject to estimated deductions for such contractual discounts, payer-specific allowances and other reserves to arrive at reported net revenues, which relate to differences between amounts billed and corresponding amounts estimated to be subsequently collected. These third-party payer discounts and sales allowances are estimated based on a number of assumptions and factors, including historical payment trends, seasonality associated with the annual reset of patient deductible limits on January 1 of each year, and current and estimated future payments. The estimates of amounts that will ultimately be realized from commercial diagnostic services require significant judgment by us. Patients do not enter into direct agreements with us that commit them to pay any portion of the cost of the tests in the event that they have not met their annual deductible limit under their insurance policy, if any, or if their insurance otherwise declines to reimburse us. Adjustments to the estimated payment amounts

are recorded at the time of final collection and settlement of each transaction as an adjustment to commercial revenue. The estimation process used to determine third-party payer discounts and sales allowance has been applied on a consistent basis since March 31, 2017, and no significant subsequent adjustments have been necessary to increase or decrease these discounts and allowances as a result of changes in underlying estimates.

Contracts

For our commercial revenues, while we market directly to physicians, our customer is the patient. Patients do not enter into direct agreements with us that commit either them to pay any portion of the cost of the tests if they have not met their annual deductible limit under their insurance policy, if any, or if their insurance otherwise declines to reimburse us. Accordingly, we establish a contract with a commercial patient in accordance with other customary business practices, as follows:

- Approval of a contract is established via the order and accession, which are submitted by the patient's physician.
- We are obligated to perform our diagnostic services upon receipt of a sample from a physician, and the patient and/or applicable payer are obligated to reimburse us for services rendered based on the patient's insurance benefits.
- Payment terms are a function of a patient's existing insurance benefits, including the impact of coverage decisions with CMS and applicable reimbursement contracts established between us and payers, unless the patient is a self-pay patient, whereby we bill the patient directly after the services are provided.
- Once we deliver a patient's assay result to the ordering physician, the contract with a patient has commercial substance, as we are legally able to collect payment and bill an insurer and/or patient, regardless of payer contract status or patient insurance benefit status.
- Consideration associated with commercial revenues is considered variable and constrained until fully adjudicated, with net revenues recorded to the extent that it is probable that a significant reversal will not occur.

Our development services revenues are supported by contractual agreements and generated from assay development services provided to entities, as well as certain other diagnostic services provided to physicians, and revenues are recognized upon delivery of the performance obligations in the contract.

Performance Obligations

A performance obligation is a promise in a contract to transfer a distinct good or service, or a bundle of goods or services, to the customer. For commercial and development services revenues, our contracts have a single performance obligation, which is satisfied upon rendering of services, which culminates in the delivery of a patient's assay result(s) to the ordering physician or entity. The duration of time between accession receipt and delivery of a valid assay result to the ordering physician or entity is typically less than two weeks. Accordingly, we elected the practical expedient and therefore, does not disclose the value of unsatisfied performance obligations.

Transaction Price

The transaction price is the amount of consideration that we expect to collect in exchange for transferring promised goods or services to a customer, excluding amounts collected on behalf of third parties, such as sales taxes. The consideration expected from a contract with a customer may include fixed amounts, variable amounts, or both. Our gross commercial revenues billed, and corresponding gross accounts receivable, are subject to estimated deductions for such allowances and reserves to arrive at reported net revenues, which relate to differences between amounts billed and corresponding amounts estimated to be subsequently collected, and is deemed to be variable although the variability is not explicitly stated in any contract. Rather, the implied variability is due to several factors, such as the payment history or lack thereof for third-party payers, reimbursement rate changes for contracted and non-contracted payers, any patient co-payments, deductibles or compliance incentives, the existence of secondary payers and claim denials. We estimate the amount of variable consideration using the most likely amount approach to estimating variable consideration for third-party payers, including direct patient bills, whereby the estimated reimbursement for services are established by payment histories on CPT codes for each payer, or similar payer types. When no payment history is available, the value of the account is estimated at Medicare rates, with additional other payer-specific reserves taken as appropriate. Collection periods for billings on commercial revenues range from less than 30 days to several months, depending on the contracted or non-contracted nature of the payer, among other variables. The estimates of amounts that will ultimately be realized from commercial diagnostic services for non-contracted payers require significant judgment by management.

We limit the amount of variable consideration included in the transaction price to the unconstrained portion of such consideration. Revenue is recognized up to the amount of variable consideration that is not subject to a significant reversal until additional information is obtained or the uncertainty associated with the additional payments or refunds is subsequently resolved. Differences between original estimates and subsequent revisions, including final settlements, represent changes in the estimate of variable consideration and are included in the period in which such revisions are made. We monitor our estimates of transaction price to depict conditions that exist at each reporting date. If we subsequently determine that we will collect more consideration than we originally estimated for a contract with a customer, we will account for the change as an increase in the estimate of the transaction price in the period identified as an increase to revenue. Similarly, if we subsequently determine that the amount it expects to collect from a customer is less than it originally estimated, we will generally account for the change as a decrease in the estimate of the transaction price as a decrease to revenue, provided that such downward adjustment does not result in a significant reversal of cumulative revenue recognized. Revenue recognized from changes in transaction prices was not significant during the three and nine months ended September 30, 2018.

Allocate Transaction Price

For our commercial revenues, the entire transaction price is allocated to the single performance obligation contained in a contract with a customer. For our development services revenues, the contracted transaction price is allocated to each single performance obligation contained in a contract with a customer as performed.

Point-in-time Recognition

Our single performance obligation is satisfied at a point in time, and that point in time is defined as the date a patient's successful assay result is delivered to the patient's ordering physician or entity. We consider this date to be the time at which the patient obtains control of the promised diagnostic assay service.

Contract Balances

The timing of revenue recognition, billings and cash collections results in accounts receivable recorded in our condensed balance sheets. Generally, billing occurs subsequent to delivery of a patient's test result to the ordering physician or entity, resulting in an account receivable.

Practical Expedients

We do not adjust the transaction price for the effects of a significant financing component, as at contract inception, we expect the collection cycle to be one year or less.

We expense sales commissions when incurred because the amortization period is one year or less, which are recorded within sales and marketing expenses.

We incur certain other costs that are incurred regardless of whether a contract is obtained. Such costs are primarily related to legal services and patient communications. These costs are expensed as incurred and recorded within general and administrative expenses.

Stock-Based Compensation

We account for stock-based compensation under the provisions of ASC Topic 718, Compensation-Stock Compensation, which requires the measurement and recognition of compensation expense for all stock-based awards made to employees and directors based on estimated fair values on the grant date. We estimate the fair value of stock option awards on the date of grant using the Black-Scholes option pricing model, or Black-Scholes valuation model. The fair value of RSUs is determined by the price of our common stock on the date of grant. The value of the portion of the award that is ultimately expected to vest is recognized as expense over the requisite service periods using the straight-line method. We estimate forfeitures at the time of grant and revise our estimates in subsequent periods if actual forfeitures differ from those estimates.

We account for stock-based compensation awards to non-employees in accordance with ASC Topic 505-50, Equity-Based Payments to Non-Employees. Under ASC 505-50, we determine the fair value of the warrants or stock-based compensation awards granted as either the fair value of the consideration received, or the fair value of the equity instruments issued, whichever is more reliably measurable. All issuances of equity instruments issued to non-employees as consideration for goods or services received by us are accounted for based on the fair value of the equity instruments issued. These awards are recorded in expense and additional paid-in capital in stockholders' equity over the applicable service periods based on the fair value of the options at the end of each period.

Calculating the fair value of stock-based awards requires the input of highly subjective assumptions into the Black-Scholes valuation model. Stock-based compensation expense is calculated using our best estimate, which involves inherent uncertainties, and the application of our management's judgment. Significant estimates include the fair value of our common stock at the date of grant for awards granted prior to our initial public offering, the expected life of the stock option, stock price volatility, risk-free interest rate and forfeiture rate.

Going Concern

We assess and determine our ability to continue as a going concern under the provisions of ASC Topic 205-40, Presentation of Financial Statements-Going Concern, which requires us to evaluate whether there are conditions or events that raise substantial doubt about our ability to continue as a going concern within one year after the date that our annual and interim financial statements are issued. Certain additional financial statement disclosures are required if such conditions or events are identified. If and when an entity's liquidation becomes imminent, financial statements should be prepared under the liquidation basis of accounting.

Determining the extent, if any, to which conditions or events raise substantial doubt about our ability to continue as a going concern, or the extent to which mitigating plans sufficiently alleviate any such substantial doubt, as well as whether or not liquidation is imminent, requires significant judgment by us. We have determined that there is substantial doubt about our ability to continue as a going concern for the one-year period following the date that our financial statements for the year ended December 31, 2017 were issued, which have been prepared assuming that we will continue as a going concern. We have not made any adjustments to reflect the possible future effects on the recoverability and classification of assets or the amounts and classification of liabilities that may result from the possible inability of us to continue as a going concern.

BUSINESS

We are an early stage molecular oncology diagnostics company that develops and commercializes proprietary circulating tumor cell, or CTC, and circulating tumor DNA, or ctDNA, assays utilizing a standard blood sample, or "liquid biopsy." Our current and planned assays are intended to provide information to aid healthcare providers to identify specific oncogenic alterations that may qualify a subset of cancer patients for targeted therapy at diagnosis, progression or used for monitoring in order to identify specific resistance mechanisms. Sometimes traditional procedures, such as surgical tissue biopsies, result in tumor tissue that is insufficient and/or unable to provide the molecular subtype information necessary for clinical decisions. Our assays, performed on blood, have the potential to provide more contemporaneous information on the characteristics of a patient's disease when compared with tissue biopsy and radiographic imaging.

Our current assays and our planned future assays focus on key solid tumor indications utilizing our Target-Selector™ liquid biopsy technology platform for the biomarker analysis of CTCs and ctDNA from a standard blood sample. Our patented Target-Selector CTC offering is based on an internally developed microfluidics-based cell capture and analysis platform, with enabling features that change how information provided by CTC testing is used by clinicians. Our CTC technology could also be validated on cerebral spinal fluid in order to provide information for patients with central nervous system (CNS) tumors both primary and metastatic. Our patented Target-Selector ctDNA technology enables detection of mutations and genome alterations with enhanced sensitivity and specificity, and is applicable to nucleic acid from ctDNA, and could potentially be validated for other sample types such as bone marrow, pleural effusions, ascitic fluid, tissue (surgical resections and/or biopsies) or cerebrospinal fluid. Our Target-Selector CTC and ctDNA platforms provide both biomarker detection as well as monitoring capabilities and require only a patient blood sample. We believe that our Target-Selector platform technology has the potential to be developed and commercialized as in vitro diagnostic (IVD) test kits, and we are currently pursuing this strategy.

At our corporate headquarters facility located in San Diego, California, we operate a clinical laboratory that is certified under the Clinical Laboratory Improvement Amendments of 1988, or CLIA, and accredited by the College of American Pathologists, or CAP. We also performed research and development that led to our current assays, and continue to perform research and development for our planned assays, at this same facility. In addition, we manufacture our microfluidic channels, related equipment and certain reagents. The assays we offer and intend to offer are classified as laboratory developed tests, or LDTs, under CLIA regulations. CLIA certification is required before any clinical laboratory, including ours, may perform testing on human specimens for the purpose of obtaining information for the diagnosis, prevention, or treatment of disease or the assessment of health. In addition, we participate in and have received CAP accreditation, which includes rigorous biennial laboratory inspections and adherence to specific quality standards.

Our primary sales strategy is to engage medical oncologists and other physicians in the United States at private and group practices, hospitals, laboratories and cancer centers. In addition, we market our clinical trial and research services to pharmaceutical and biopharmaceutical companies and clinical research organizations. Additionally, commencing in October 2017, our pathology partnership program, branded as Empower TC™, provides the unique ability for pathologists to participate in the interpretation of liquid biopsy results and is available to pathology practices and hospital systems throughout the United States. Further, sales to laboratory supply distributors of our proprietary blood collection tubes, or BCTs, commenced during the three months ending June 30, 2018, which allow for the intact transport of liquid biopsy samples for research use only, or RUO, from regions around the world.

Our revenue generating efforts are focused in three areas:

- medical oncologists, surgical oncologists, pulmonologists, pathologists and other physicians who use the biomarker information we provide in order to determine the best treatment plan for their patients;
- laboratory services utilizing both our CTC and ctDNA testing in order to help pharmaceutical and biopharmaceutical companies developing drug candidate therapies to treat cancer; and
- licensing and/or selling our proprietary testing and/or technologies, including our BCTs, to partners in the United States and abroad.

Market Overview

Cancer Market Overview

Despite many advances in the treatment of cancer, it remains one of the greatest areas of unmet medical need. According to the World Cancer Report 2014, cancers figure among the leading causes of morbidity and mortality worldwide, and according to the World Health Organization, there were approximately 14 million new cases and 8.8 million cancer related deaths in 2015. The number of new cases is also expected to rise by approximately 70% over the next two decades. According to the World Health Organization, the most common causes of cancer death are cancers of the lung (21%), liver (10%), colon (9%), stomach (9%), and breast (7%). The incidence of, and deaths caused by, the major cancers are staggering. According to the National Cancer Institute, there were approximately 249,000 new cases of breast cancer and approximately 224,000 new cases of lung cancer diagnosed in the

United States in 2016, with over 3.5 million patients who have had a diagnosis of these cancers and are either living with these diseases and are undergoing treatment or are being monitored. For example, in breast cancer, many women have been deemed cancer-free, but continue to undergo periodic monitoring to assure there has been no disease recurrence. Our commercialized assays and our other planned future assays only require a readily accessible standard blood sample and thus may be used to help manage these patients, including supporting the selection of appropriate treatment, at multiple time points during the course of their disease. Because our assays require only a standard blood sample, they can be particularly useful when there is no currently available biopsy or surgical material, as is often the case in lung cancer, even at the time of initial evaluation. For example, up to 25% of patients with stage I non-small cell lung cancer, or NSCLC, are not surgically treated for various reasons, including patient status (consensus statement from the American College of Chest Physicians and the Society of Thoracic Surgeons; *Chest*, Dec. 2012). This is also the case with breast and lung cancers once surgical resection of the tumor has taken place and treatment has been initiated. Patients with breast and lung cancer must often undergo surgical resection of their primary tumor as part of their treatment. Therefore, at the time of progression or recurrence there may be no ability to obtain a tissue biopsy. Additionally, many studies have shown that most tumors mutate during treatment and as the disease progresses, so information from the initial tumor tissue may not be relevant. Again, a significant benefit of our technology is that it allows physicians to assess the current status of the tumors on a real-time basis utilizing a standard blood sample or liquid biopsy.

The following data published by the National Cancer Institute shows estimated new cases and deaths for 2017, and prevalence in 2013, in the United States for the major solid cancers types:

Cancer Type	Est. Incidence (New Cases/Year-2017)	Est. Mortality (Deaths/Year-2017)	Est. Prevalence (Diagnosed and Alive as of 2013)**
Bladder	79,030	16,870	587,426
Breast*	252,710	40,610	3,069,231
Cervical	12,820	4,210	248,920
Colorectal*	95,520	50,260	1,177,556
Endometrial	61,380	10,920	***
Gastric*	28,000	10,960	79,843
Kidney	63,990	14,000	394,336
Lung*	222,500	155,870	415,707
Melanoma*	87,110	9,730	1,034,460
Ovarian	22,440	14,080	195,767
Pancreatic	53,670	43,090	46,620
Prostate*	161,360	26,730	2,850,139
Thyroid	56,870	2,010	637,115

* Areas where we currently have assays or active development programs.

** Includes active disease and disease-free.

*** National Cancer Institute data is unavailable for 2013. 2010 data indicates an estimated prevalence of 600,346.

In addition to the human toll, the financial cost of cancer is overwhelming. An independent study published in 2010 and conducted jointly by the American Cancer Society and LIVESTRONG ranked cancer as the most economically devastating cause of death in the world - estimated to be as high as $1.4 trillion globally. According to an article in the Journal of the National Cancer Institute, the direct cost of cancer deaths in the United States in 2000 was over $115 billion and forecasted to rise to over $157 billion by 2020.

Cancer is a Heterogeneous Disease

Cancer constitutes a heterogeneous class of diseases, characterized by uncontrolled cell growth that results from a combination of both environmental and hereditary risk factors. Many different tissue types can become malignant, such as breast, lung, liver, and skin, and even within a particular tumor there is heterogeneity, with certain cancer cells in a patient bearing specific cellular or genetic biomarkers which others lack. Only in recent years has technology progressed sufficiently to enable researchers to understand many cancers at a cellular and molecular level, attribute specific cancers to associated genetic changes, and determine the extent to which these changes are seen in a patient’s tumor.

Cancer cells contain genetic alterations compared to normal human cells. Common genetic abnormalities correlated to cancer include gains or losses of genetic material on specific chromosomal regions, or loci, or changes in specific genes, or mutations, which ultimately result in detrimental cellular changes followed by cancerous or pre-cancerous conditions. For example, multiple gains or losses on various chromosomes, and the rearrangement of genetic material among chromosomes, or chromosomal

translocations, have been observed in different cancer types, such as HER2 in breast cancer and ALK rearrangements in NSCLC. In addition, mutations within gene sequences, or single nucleotide variations, can give rise to aberrant proteins that do not perform their functions correctly, leading to uncontrolled cell growth. Such genetic alterations can be a result of multiple factors, including genetic predisposition, environmental or lifestyle factors or viral infections. Importantly, these genetic changes or aberrant proteins can be used as biomarkers to help guide appropriate treatment. Detecting these biomarkers, particularly those representing drug targets, or those indicative of responsiveness or resistance of a tumor's cells to specific therapies, helps clinicians to select drugs, design treatment regimens and optimize patient care and management. Assays that provide such predictive information have the potential to dramatically improve treatment outcomes for patients suffering from cancer.

Limitations of Traditional Cancer Diagnostic and Profiling Approaches

Cancer is difficult to diagnose and manage due to its heterogeneity at morphologic, genetic and clinical levels. Traditional methods of diagnosis for solid tumors, routinely used as the initial step in cancer detection, involve a tissue biopsy followed by a pathologist examining a thin slice of potentially cancerous tissue under a microscope. A recently obtained tissue sample is used in combination with chemical staining techniques to enable analysis of the biopsy. After staining, the pathologist determines through visual inspection whether the biopsy contains normal or cancerous cells, with those that are deemed cancerous being graded on a level of aggressiveness. Often an analysis of biomarkers relevant to that tumor type is also performed on the tissue, ranging from IHC to FISH, to mutation analysis by various means such as microarrays and sequencing. After the diagnosis, a clinical workup is performed according to established guidelines for the specific cancer type. From there, the physician determines the stage of progression of the cancer based on a series of clinical measures, such as size, grade, metastasis risk, symptoms and patient history, and decides on a treatment plan that may include surgery, watchful waiting, radiation, chemotherapy, or stem cell transplantation.

This type of analysis is dependent on the availability of a recently obtained tissue biopsy for the pathologist to analyze. Such a biopsy is often not available. A tumor may not be readily accessible for biopsy, a patient's condition may be such that a biopsy is not advised, and for routine periodic patient monitoring to evaluate potential progression or recurrence, a biopsy is a fairly invasive procedure and not typically performed. As the length of time between when the original biopsy, diagnosis or surgery is conducted to the current evaluation of the patient increases, the likelihood that an original biopsy specimen is truly representative of the current disease condition declines, as does the usefulness of the original biopsy for making treatment decisions. This risk intensifies in situations where a drug therapy is being administered, because the drug can put selective pressure on the tumor cells to adapt and change.

Similarly, the heterogeneity referred to above means that different parts or areas of the same tumor can have different molecular features or properties. In evaluating a biopsy specimen, the pathologist will take a few thin slices of the tumor for microscopic review rather than exhaustively analyzing the whole tumor mass. The pathologist can only report on the tumor sections analyzed and if other parts of the tumor have different features, such as biomarkers corresponding to specific treatments, they can be missed. A more representative analysis of the entire tumor, as well as any metastases if they are present, is very helpful.

CTCs, ctDNA and Cancer

CTCs are cancer cells that have detached from the tumor matrix and entered the patient's blood or other bodily fluids. These cells are representative of the tumor and its metastases and can function as their surrogates. Testing CTCs can complement pathologic information drawn from a biopsy or resected tissue sample, helping to ensure that the analysis is comprehensive and not biased by tumor heterogeneity and sampling issues. They can also provide critical data when a biopsy is not possible. Clinical studies have demonstrated that the presence and number of CTCs provides information on the likely course of certain types of disease for the cancer patient, or in other words they are considered "prognostic." Since CTCs are representative of the tumor, they can also be used for biomarker analysis, such as helping to guide therapy selection. Such analyses are "predictive" in that they offer insight into the likely responsiveness or resistance to particular therapies. After surgery and during any subsequent therapy or monitoring period, blood samples can periodically be drawn in a standard manner and analyzed to evaluate a therapy's continuing effectiveness, as well as to detect other biomarkers such as new genetic mutations that may arise as a result of selection pressure by a particular therapy or by chance. Physicians can use this information to determine which therapy is most likely to benefit their patients at particular times through the course of their disease. Treatment decisions based on patient-specific information are the foundation of personalized medicine, and assays that guide a physician in the selection of individualized therapy for a patient are termed "predictive assays."

ctDNA is nucleic acid that is released into blood by dying tumor cells. Cell death occurs in all tissues, especially those that are rapidly dividing, and in cancer, where cell growth is not only rapid but also uncontrolled. Parts of tumors often outgrow their blood supply, resulting in cell death. Tumor cells dying as a result of therapy also release nucleic acid into blood. As a consequence, ctDNA is common in cancer patients and scientists believe that like CTCs, it may be more representative of a patient's entire tumor than a few thin sections from a tissue biopsy, thus reducing the heterogeneity problem. ctDNA is found in the plasma component of blood and is readily accessible in a standard blood sample. Analyzing ctDNA for mutations that are used as biomarkers for therapy

selection shows great promise. One of the strengths of this approach, in addition to not requiring a tissue biopsy, is that it is not dependent on capturing rare tumor cells from blood to provide a sample for testing. The difficulty with this approach is that the cellular context is lost since the ctDNA is mixed with a much larger amount of circulating DNA from normal cells that are continuously dying and being replaced in the body, thus making analysis challenging. This requires a mutation detection methodology with enhanced sensitivity and specificity, to distinguish mutations in particular gene regions in cancer cells from the normal gene sequence present in those same genes in normal cells which co-exist in blood as normal cells die and are replaced in the body. Our Target-Selector technology provides this necessary sensitivity and specificity and creates an opportunity for ctDNA analysis to complement CTC analysis, or potentially to serve as the platform for stand-alone assays.

Given the incidence of cancer in the United States, with an estimated 1,260,000 new cases in 2016 for the major solid tumors targeted by our planned future assay products, the markets for our current and planned future cancer diagnostic assays are very large. Furthermore, these market opportunities are even greater due to the benefits of CTC and ctDNA testing, including not only the ability to offer physicians a simple way to augment an initial tumor biopsy analysis but also to provide a means for relatively frequent monitoring of the tumor's molecular status, utilizing a standard blood sample as a "liquid biopsy." The latter application enables the physician to determine if or how a tumor is changing over time or is responding to therapy and what the next treatment should be. For example, in the United States, the incidence of new cases of breast cancer alone is estimated to be over 232,000 in 2016, and the prevalence of this disease is over 2.8 million (the number of women with a history of breast cancer in the United States, including women being treated and women who have finished treatment), with an estimated 330,000 lumpectomies performed annually in the United States. Of these lumpectomies, 20% need to be repeated because on pathological examination it is shown the procedure did not result in "clean margins," thus suggesting the entire tumor was not removed, according to a Johns Hopkins report. If a CTC assay were performed at the time of initial diagnosis, at the time of surgery, or in lieu of, or as an adjunct to, a PET/CT scan (as a CTC assay has the potential to identify a single tumor cell in a blood sample, while a scan requires a tumor mass of millions of cells to be detectable), to monitor disease progression or test for recurrence, thousands of assays, in breast cancer alone, could be performed per year with still relatively low market penetration.

Use of CTC- and ctDNA-Derived Biomarker Data in Cancer Treatment

CTCs and ctDNA are derived from, and are understood to be representative of, a solid tumor and its metastases and can be analyzed as adjuncts to or in place of the tumor, especially when a recent tumor biopsy is not available. This is also referred to as a liquid biopsy. In theory, almost any analysis that can be performed on tumor tissue can also be performed on CTCs, while ctDNA, because it is only nucleic acid, is more limited. We have focused our analysis of CTCs and ctDNA on known biomarkers associated with specific therapies to support treatment decisions and therapy selection made by physicians. The biomarkers we analyze consist of proteins or protein modifications that can be identified by immunocytochemical means, cytogenetic or chromosomal aberrations, which are detected by FISH. Gene mutations in CTCs or ctDNA are detected by molecular diagnostic assays, including Target-Selector techniques and gene sequencing. Specific examples include (i) for ICC, the detection of the estrogen receptor protein in breast cancer, indicative of the likely responsiveness to hormonal therapies like tamoxifen, often sold under the trade name Nolvadex®, (ii) for FISH, the presence of an amplified HER2 gene in breast cancer, indicative of the likely responsiveness to HER2-targeted agents like trastuzumab, often sold under the trade name Herceptin®, and (iii) for mutation detection, the presence of an EGFR activating mutation in NSCLC like L858R, indicative of the likely responsiveness to EGFR-targeted agents like Tarceva®. All of these biomarkers are currently tested on tumor tissue and can be tested on CTCs, and in the latter case on ctDNA. The resulting information could then be used to guide patient care, and specifically treatment selection.

To date, these types of molecular and genetic detection methods have been successfully utilized to provide predictive information for several cancers including breast, colon, NSCLC, melanoma and others in the form of companion diagnostics, typically performed on tumor tissue. CTC and ctDNA assays, which analyze the same biomarkers in a more convenient standard blood sample test that also permits periodic monitoring, could be used in the same way.

Our Business Strategy

We provide medical oncologists, surgical oncologists, pulmonologists, pathologists and other physicians with a straightforward means to profile and characterize their patients' tumors on a real-time basis by analyzing CTCs and ctDNA found in standard blood draws. Biomarkers are currently detected and analyzed primarily in tissue biopsy specimens. We believe that our technology, which not only provides information on CTC enumeration but also the assessment of treatment-associated biomarkers identified within the CTCs or in ctDNA, will provide information to physicians that improves patient treatment and management and will become a key component of the standard of care for personalized cancer treatment.

Our approach is to develop and commercialize CTC and ctDNA assays and services that enable us to offer standard blood sample based, real-time testing solutions for a range of solid tumor types to oncologists that improve patient treatment with better prognostic and predictive tools. To achieve this, we intend to:

- Develop and commercialize a portfolio of proprietary CTC and ctDNA assays and services, to enable physicians to develop personalized treatment plans. We intend to continue the development of additional prognostic and predictive assays and services to provide information that is essential to personalized cancer treatment. By including predictive information on biomarkers associated with specific therapies in our analysis in addition to CTC enumeration, our assays are designed to provide a more complete profile of a patient's disease than existing CTC tests. The biomarker information will assist physicians in selecting appropriate therapies for individual patients. Our ctDNA assays are expected to offer enhanced sensitivity and specificity based on the Target-Selector technology, enabling earlier detection of therapy-associated mutation targets or resistance markers, again supporting treatment decisions. We have launched our Target-Selector offering in a number of key indications such as breast cancer, lung cancer, gastric cancer, colorectal cancer, prostate cancer, and melanoma, which are performed in our CLIA-accredited testing facility. We plan to perform the necessary validation studies to allow us to commercialize these assays through our clinical laboratory.

- Scale our internal sales and marketing capabilities. Our direct sales force with specialized experience in cancer diagnostic testing focuses on key identified territories in order to provide geographic coverage throughout the United States. At December 31, 2017, we had 14 sales representatives, and depending on our assay volume, we expect to increase this group to 20-25 within two years and potentially 30-35 within five years. This team will educate physicians directly on the benefits of our assays and the clinical data supporting them, as well as provide support to and serve as technical specialists for our partners. In addition to our internal efforts, we are actively seeking commercial partnerships that can increase our market reach.

- Develop and expand our collaborations with leading university hospitals and research centers. We collaborate with key thought leaders, physicians and clinical researchers, including those at Sarah Cannon Research Institute, University of Colorado, the University of California, San Diego, the University of Minnesota, the John Wayne Cancer Institute, Columbia University, Johns Hopkins Medical Institute, Vanderbilt University, University of Texas Southwestern Medical Center, St. Josephs of Orange, St. Luke's Cancer Center, and Georgetown University. Our collaborations enable us to test new technologies, validate the effectiveness and utility of our planned future assays in a clinical setting and provide us access to clinically well-characterized and highly annotated patient data. These samples and data accelerate our validation process and facilitate the testing and refinement of our planned new assays.

- Enhance our efforts in reaching and educating medical oncologists, surgical oncologists, pulmonologists, pathologists and other physicians about CTC and ctDNA assays. According to the State of Cancer Care in America 2014 Report, published in the Journal of Oncology Practice in March 2014, there were approximately 13,400 medical oncologists in the United States or 16,500 if gynecologic and pediatric oncologists are included. With the support of our key thought leader collaborators, we intend to focus on medical oncologists, surgical oncologists, pulmonologists, pathologists and other physicians who treat cancer patients by targeting our sales and marketing efforts on this important customer segment. We believe this will expand and optimize the oncology testing services and personalization of cancer treatment provided by medical oncologists, surgical oncologists, pulmonologists, pathologists and other physicians so that they can better serve their cancer patients.

- Increase our efforts to provide biopharmaceutical companies and clinical research organizations with our current and planned CTC and ctDNA assays and services. Oncology drugs have the potential to be among the most personalized of therapeutics, yet oncology drugs have one of the worst approval rates, at 13.4% for leading indications and 8.2% for secondary indications of cancer drug compounds from first administration in humans to approval (2013, Clinical Pharmacology and Therapeutics). In an effort to improve the outcome of clinical trials for oncology drugs, and more rapidly advance targeted therapeutics, pharmaceutical and biopharmaceutical companies are increasingly looking to companies that have cancer diagnostic assays that specifically address their needs, including the ability to characterize and monitor a patient's tumor over time using CTC and ctDNA assays to analyze biomarkers of interest. There are over 5,000 active trials in the United States in breast, lung, colorectal, prostate and gastric cancers and melanoma according to clinicaltrials.gov. We expect to increase our sales and marketing focus in this business as well as seek additional collaborations and partnerships with diagnostic, pharmaceutical and biopharmaceutical companies.

- Become an enabling technology to cancer targeted therapies. Biopharmaceutical companies will increasingly focus on the personalized cancer diagnostic sector as the potential and prevalence of molecularly targeted oncology therapies approved by the FDA along with companion diagnostics increases. As targeted therapies move into their next phase, the market is beginning to see next generation of drugs such as Astra Zeneca's Tagrisso (Osimertinib) that work after a patient on targeted therapy begin to progress and show a resistance mechanism that is identifiable / targetable, in this case a mutation in EGFR known as T790M. With these drugs, the original biopsy tissue would not show the resistance mechanism, so the patient must either undergo a re-biopsy procedure. In many cases re-biopsy is not medically feasible and liquid biopsy offers a more cost effective and safer alternative in this application. Another area of interest for the pharmaceutical industry is in immuno-oncology. This is the challenge of helping the body to counter the cancer cell's ability to evade the immune system. Several protein-based tests are

being developed in tissue to work as complimentary or companion diagnostics to these new and promising drugs, but the use of these tests will be limited as a result of limitations of tissue biopsies. Another solution would be to test for these proteins with a liquid biopsy-based CTC test rather than relying on tissue biopsies.

- Conduct additional clinical studies with our current CTC and ctDNA assays and assays we plan to introduce in various cancer types. Clinical utility and validation studies for our planned ctDNA assays may rely on archived plasma or blood samples from clinical trials in which patient outcomes are already available, in a retrospective-prospective design that significantly shortens the length of such studies.
- Continue to enhance our current and planned future CTC and ctDNA assays and reduce the costs associated with providing them through internal research and development and partnering with leading technology developers and reagent suppliers. We intend to work closely with select key technology developers and suppliers to further automate the optical interpretation of our current assays and our planned additional CTC assays, including enumeration, immunocytochemical biomarker staining and FISH. We also intend to reduce the costs associated with key material components of these assays, including FISH probes. We have and currently utilize an automation system that significantly reduces the hands-on time of our cytogenetic technologists for microfluidic channel analysis while increasing the uniformity of the data we generate. This system is also expected to provide the ability to evaluate multiple fluorescent signals of different wavelengths simultaneously for multiplexed analysis, further enhancing efficiency.

Our Competitive Advantages

We believe that the competitive advantages of our molecular assays, including our assays which are still under development, would include the following.

Our current Target-Selector molecular assays enable, and we anticipate our planned future CTC and ctDNA assays will each enable, detailed analysis of a patient's cancer utilizing a standard blood sample, facilitating testing at any time, including when a biopsy is not available or inconclusive, offering real-time monitoring of the cancer and the response of the cancer therapy, and allowing medical oncologists, surgical oncologists, pulmonologists, pathologists and other physicians to select timely modifications to treatment regimens. Because CTCs and ctDNA are derived from the primary tumor or its metastases, they function as surrogates for the tumor, with the advantage of being readily accessible in a standard blood sample. This is especially important in situations where a biopsy is not available or advised. The simplicity of obtaining a standard blood sample permits repeat testing in a monitoring mode to detect recurrence or progression and to offer information on treatment modifications based on a current assessment of the cancer's properties. A key advantage to using Biocept is our ability to interrogate both CTC and ctDNA biomarker targets.

Our current Target-Selector assays each provide, and we anticipate our planned future assays will each provide, more information than competitors' existing tests, including predictive information on biomarkers associated with specific therapies. We anticipate that such additional biomarker information will enable a physician to develop a personalized treatment plan. By including biomarker information in our analysis, in addition to CTC enumeration, our current assays and our planned future assays are designed to provide a more complete profile of a patient's disease than existing CTC or ctDNA. We intend for our assays to contain actionable information to assist physicians in selecting appropriate therapies for individual patients. Our ctDNA assays are expected to offer enhanced sensitivity and specificity based on our patented technology, enabling earlier detection of therapy-associated mutation targets or resistance markers, again supporting treatment decisions.

Our current Target-Selector and our planned future assays are designed to capture and detect a broader range of CTCs than existing tests and to be applicable to, or quickly modifiable for, a wide range of cancer types. Our antibody capture cocktail includes antibodies targeting not only EpCAM, the traditional epithelial CTC capture antigen utilized in the CellSearch® system and in other platforms, but also other epithelial antigens as well as mesenchymal and cancer stem cell antigens, indicative of cells having undergone the epithelial-to-mesenchymal transition. These cells may be more relevant for metastasis. Our detection methods include cytokeratin staining with a broader range of cytokeratin isotypes than existing CTC tests, and we have introduced additional staining which would enable detection of cells specifically captured with our antibody cocktail, including EMT cells lacking cytokeratin. We believe that through our enhanced staining, more CTCs and different types of CTCs will be able to be identified and potentially at earlier stages of disease, resulting in fewer non-informative cases and more information for physicians.

Our current and planned CTC and ctDNA Target-Selector assays will be flexible and readily configurable to accommodate new biomarkers with clinical relevance as they are identified. In theory, our platforms permit essentially any analysis that is currently performed on tumor tissue to be performed on CTCs, including immunocytochemical staining, FISH and molecular analysis. As new therapies are approved, and to the extent that they are targeted therapies for which knowledge of a particular gene amplification event, mutation or presence, absence or modification, such as phosphorylation, of a protein are indicative of likely response or resistance to that therapy, we will be able to include them in our assays with minimal changes. This is attractive to pharmaceutical and biotechnology companies that are developing such therapies or seeking ways to make their clinical trials more efficient, as this flexibility enables them to focus on patients more likely to respond to a particular therapy and demonstrate a benefit from that therapy.

Collaborative relationships with physicians at Sarah Cannon Research Institute, University of Colorado, the University of California, San Diego, the University of Minnesota, the John Wayne Cancer Institute, Columbia University, Johns Hopkins Medical Institute, Vanderbilt University, University of Texas Southwestern Medical Center, St. Josephs of Orange, St. Luke's Cancer Center, and Georgetown University. We have worked closely with a number of physicians at institutions on various collaborative projects in different cancer types including breast, NSCLC, prostate, colorectal, ovarian, bladder, renal and endometrial. These projects provide us access to leading researchers, clinicians and key thought leaders, access to valuable patient samples and insight into clinical applications for our assays. Some of these projects have resulted in publications in leading journals, such as Cancer Discovery and Cancer Medicine, which enhances our standing in the oncology community and supports our marketing efforts.

Our planned Target-Selector mutation assays would not be platform dependent. These assays are being designed to be able to be performed on almost any molecular instrument, which will provide flexibility in laboratory operations. To the extent we elect to develop these assays as IVDs, including by pursuing CE marks for such assays to be marketed outside the United States, the ability to rapidly deploy them on different approved instrument platforms already in many laboratories should greatly simplify their distribution and commercialization.

Our Assays, Products and Services

Assays, Products and Services

We have commercialized our Target-Selector assays for a number of solid tumor indications such as: breast cancer, NSCLC, gastric cancer, colorectal cancer, prostate cancer, melanoma, pancreaticobiliary cancer, and ovarian cancer. These assays utilize our dual CTC and ctDNA technology platforms and provide biomarker analysis from a patient's blood sample.

Our current assays and our planned near-term cancer diagnostic assays and clinical trial services include:

- *CTC and ctDNA Testing*. Our current assays and our other planned cancer diagnostic assays are based on our Target-Selector technologies and are currently intended to be performed only in our clinical laboratory. After completing testing, we or our partners provide our customers with an easy to understand report that describes the results of the analyses performed, which is designed to help medical oncologists, surgical oncologists, pulmonologists, pathologists and other physicians make better decisions about the treatment of their patients.
- *Clinical Trial Services.* We plan to utilize our clinical laboratory and translational research capabilities to provide clinical trial and research services to pharmaceutical and biopharmaceutical companies and clinical research organizations to improve the efficiency and economic viability of their clinical trials. Our clinical trials and translational research services could leverage our knowledge of CTCs and ctDNA and our ability to develop and implement new cytogenetic, immunocytochemical and molecular diagnostic assays. Our current assays can, and our other planned cancer diagnostic assays and biomarker assays are anticipated to be able to, help optimize clinical trial patient selection, and as a result potentially improve the likelihood of success of the clinical trial. With positive results in a clinical trial, our assays would more easily then move into standard clinical practice, helping physicians select the most appropriate therapy for their patients.

In the case of our breast and gastric cancer offerings, biomarker analysis involves fluorescence in situ hybridization, or FISH, for the detection and quantitation of the human epidermal growth factor receptor 2, or HER2, gene copy number as well as immunocytochemical, or ICC, analysis of estrogen receptor, or ER, protein, progesterone receptor, or PR, protein, and androgen receptor, or AR, protein, which are currently commercially available. A patient's HER2 status provides the physician with information about the appropriateness of therapies such as Herceptin® or Tykerb®. ER and PR status provides the physician with information about the appropriateness of endocrine therapies such as tamoxifen and aromatase inhibitors.

Our lung cancer biomarker analysis offering currently includes FISH testing for ALK, ROS1, RET, MET and FGFR1 gene rearrangements, as well as analysis for the T790M, Deletion 19, and L858R mutations of the epidermal growth factor receptor, or EGFR gene, as well as BRAF, KRAS and NRAS. The L858R mutation of the EGFR gene and Exon 19 deletions as activators of EGFR kinase activity are associated with the use of the drugs Tarceva®, Gilotrif® and Iressa®. For lung cancer, we also offer a resistance profile assay consisting of the biomarkers MET, HER2 (both of which we perform using our technology for CTCs), KRAS, and T790M (both of which are performed using ctDNA in plasma). These assays can be used by physicians to identify the mechanism causing disease progression for patients with NSCLC who are being treated with tyrosine kinase inhibitor, or TKI, therapy and therefore may qualify patients for inclusion in a clinical trial. In November 2015, Tagrisso® was approved by the FDA, providing another biomarker-based therapy for the treatment of patients with EGFR-related lung cancer. Tagrisso® is indicated for the treatment of patients with metastatic disease, who have progressed on or after EGFR TKI therapy, and who have acquired a T790M resistance mutation. Recently, the FDA approved the combination of Novartis' Tafinlar® (dabrafenib) and Mekinist® (trametinib) for the treatment of patients with metastatic NSCLC whose tumors express the BRAF V600E mutation, an FDA "breakthrough therapy" designation for patients who have received prior chemotherapy. This combination was approved in Europe for the same indication in

March 2017. BRAF mutations, which appear in approximately 1-3% of NSCLC cases globally, are associated with Zelboraf® and Tafinlar® treatment, as these BRAF inhibitors are both approved for the treatment of patients with melanoma.

In September 2017, we launched our assay for mutations of the NRAS oncogene, which can be used to detect and monitor an actionable biomarker associated with multiple cancer types such as metastatic melanoma, colorectal and lung cancer. As a result, we now offer 15 CLIA-certified liquid biopsy tests utilizing our Target-Selector platform to determine the status of key cancer biomarkers listed in the National Comprehensive Cancer Network Guidelines®. Our NRAS assay combines our proprietary switch blocker technology for improved mutation detection with next generation sequencing, or NGS, resulting in ultra-high sensitivity.

Fibroblast growth receptor 1, or FGFR1, amplification is offered using our CTC technology. FGFR1 is present in several tumor types, including both NSCLC and small cell lung cancer, or SCLC, and has been shown to be a prognostic indicator of progression. FGFR1 is also a key target for several drugs undergoing clinical development.

We analytically validated PD-L1 testing utilizing our CTC technology in 2016. PD-L1 is a biomarker that is informative for immuno-oncology therapies currently marketed for lung cancer and melanoma, as well as therapies in development for multiple tumor types. We collaborated with David Rimm, M.D., Ph.D., a pathologist at Yale Medical School and a scientific advisor to us, on the analytical development of this assay.

We plan to release additional blood-based biomarker assays, such as those that test for ESR1, to our current menu of liquid biopsy assays using blood samples. In addition, we plan to complete the development and offer multiplexed biomarker tests, which will allow the detection and quantitative monitoring of multiple biomarkers in a single assay.

In August 2017, we announced that we had executed a distribution agreement for our proprietary blood collection tubes with VWR International, LLC which can preserve intact cells (such as CTCs) for up to 96 hours and ctDNA for up to 8 days, allowing for the intact transport of RUO liquid biopsy samples from regions around the world.

In October 2017, we launched our pathology partnership initiative, branded as Empower TC, expanding access of our proprietary liquid biopsy testing to community pathologists and hospitals throughout the United States. The aim of this program is to incorporate community pathologists into the review of biomarkers found in liquid biopsy for patients diagnosed with cancer. Pathologists are now enabled to interpret our liquid biopsy results locally, while patient specimens will continue to be sent to us for processing in our CLIA-certified, CAP-accredited high complexity laboratory.

Pharmaceutical and Research Collaborations and Studies

We continue to execute on our strategies intended to expand our business globally, as well as to engage with pharmaceutical companies on clinical trials and assay development. We have preferred provider agreements in place in Mexico with Quest Diagnostics to support testing for Astra Zeneca. In addition, we have distribution agreements in place in Mexico, Uruguay, Turkey, the Czech Republic, the Philippines, Lebanon, Columbia, Israel and Canada.

In March 2013, we published a study in *Cancer Medicine* in collaboration with a group of breast cancer surgeons, pathologists and basic researchers at The University of Texas MD Anderson Cancer Center. In this study, our assay and a version adapted for use with bone marrow samples demonstrated the ability to identify HER2 positive CTCs and disseminated tumor cells (DTCs) seen in bone marrow of patients who had been previously classified as HER2 negative by tumor tissue analysis. A HER2 positive result in a patient with breast cancer indicates to the physician that there is likely to be a survival benefit from treatment with Herceptin®, as demonstrated in a number of large clinical studies.

As a follow up to the CTC findings published in *Cancer Medicine*, we were involved in a clinical study led by investigators at the Dana-Farber Cancer Institute. Study enrollment was completed. During the screening phase of this study, our CLIA-certified, CAP accredited laboratory tested blood samples from a cohort of patients with HER2 negative tissue status, with the aim to identify individuals with HER2 positive CTCs. These patients were then assigned to chemotherapy plus Herceptin®. Additional CTC testing with *HER2* FISH biomarker analyses were performed at subsequent time points. At the December 2014 San Antonio Breast Cancer Symposium, we presented findings that of 311 patients with HER2 negative tissue status, 22% had CTCs with *HER2* gene amplification at disease progression. *HER2* gene amplification subsequently categorized these patients as potential candidates for anti-HER2 therapy as the cancer evolved. Moreover, our multi-antibody CTC capture method identified a substantial subset of patients who would not likely have had detectable CTCs with commonly used CTC capture technologies. This added 10% (included in the 22%) to the number of women who were candidates for this highly specific targeted therapy.

With our cooperation, researchers at Columbia University published a study in the journal *Clinical and Translational Oncology* in January 2015. The study demonstrated the high correlation (79%) of circulating tumor cells, primary tumor tissue biopsy and metastatic tumor tissue biopsy in the determination of hormone receptor status (ER/PR) of breast cancer patients. The investigators also found that this high correlation was strongest when comparing metastatic tissue biopsy to CTCs (83%). The conclusion of the study was that determining ER/PR status in CTCs using our platform is feasible, with high concordance in ER/PR between tumor tissue (as determined with immunohistochemistry, or IHC) and CTCs (as determined with immunocytochemistry, or ICC). The authors suggest a larger trial to determine the prognostic significance of these findings.

In June 2015, we presented the clinical validation data of our ctDNA assay in collaboration with the University of California, San Diego. A very high level of concordance to tissue (88%) was demonstrated together with >95% analytical sensitivity and 99% analytical specificity, supporting our offering of a validated, robust non-invasive solution for mutation identification and monitoring in patients with lung cancer. The FDA approval of Tagrisso®, a third-generation tyrosine kinase inhibitor, presented an opportunity for patients to be monitored using a ctDNA assay.

During 2016, we announced a pharmaceutical collaboration agreement that provides testing for a clinical trial, which includes metastatic lung cancer patients with leptomeningeal or brain metastases. In this exploratory trial, we are testing both cerebrospinal fluid and blood for molecular alterations that could be impacted by treatment. In April 2016, we announced a collaboration involving a study conducted with Dr. Giuseppe Giaccone at the MedStar Georgetown University Hospital to assess resistance biomarkers in NSCLC patients treated with EGFR inhibitors or chemotherapy. Also in 2016, we announced another collaboration involving a study presented at the European Society for Medical Oncology, or ESMO, Annual Congress in October 2016, evaluating the detection of EGFR alterations (del19, L858R and T790M) by our Target-Selector liquid biopsy. Subsequent to this study, we have earned business in both Mexico and Columbia for EGFR testing in blood to qualify patients for a pharmaceutical company's targeted therapy. The relationship also resulted in a 2017 study that includes peripheral blood CTC assessment of PD-L1 protein expression in patients undergoing chemotherapy as a monotherapy or in combination with a checkpoint inhibitor. In December 2016, we announced a clinical study agreement with Columbia University Medical Center to evaluate the clinical utility of our Target-Selector platform to diagnose leptomeningeal metastases, or LM, in breast cancer patients. Dr. Kevin Kalinsky leads the study to test CTCs in cerebrospinal fluid and blood, where CTC analysis will be compared to standard methods for confirming LM diagnosis.

In May 2017, we announced jointly with the Addario Lung Cancer Medical Institute, or ALCMI, entry into a clinical collaboration and initiation of the ALCMI-009 liquid biopsy clinical trial. This large-scale trial was developed and will be conducted by ALCMI with its consortium of leading oncology centers. The prospective, multi-center study will utilize our Target-Selector testing platform and services to detect and assess cancer biomarkers found in both CTCs and ctDNA from the blood of patients with lung cancer.

In May 2017, we entered into a clinical study agreement with the University of Texas Southwestern Medical Center. Led by recognized oncologist and ALK alteration researcher, Dr. Saad Khan, the study is designed to evaluate the clinical utility of our Target-Selector platform for patients diagnosed with ALK-positive NSCLC and treated with ALK-inhibitor therapy. A second arm of the study will evaluate patients with rare cancers such as anaplastic thyroid cancer to determine if driver mutations such as ALK rearrangements can be identified and treated with targeted therapy to improve patient outcomes.

In November 2017, we announced a collaboration involving 100 patients in a clinical study with the University of California, San Diego. The study entails clinical validation of the PD-L1 antibody clones 28-8 and 22C3 on our Target-Selector CTC platform. Concordance of PD-L1 protein expression in tissue biopsy versus liquid biopsy, as well as correlation of therapeutic response with PD-L1 liquid biopsy status, are the study objectives.

A scientific abstract was submitted in November 2017 in collaboration with Dr. Shilpa Gupta from the Masonic Cancer Center at the University of Minnesota. The abstract was accepted as a poster presentation for the April 2018 American Association for Cancer Research (AACR) Annual meeting. The results demonstrate proof-of-concept use of Biocept's Target Selector™ CTC platform to correlate CTC count with clinical responses in refractory testicular cancer patients undergoing therapy. This work is part of a Phase 2 clinical trial of brentuximab vedontin (an anti-CD-30 antibody) with bevacizumab in refractory CD-30 + germ cell tumors. The capability of the Target Selector™ CTC platform to monitor this rare cancer type has potential for a precision medicine-based approach to guide treatment decisions for these patients.

Two complementary posters on the highly sensitive Target Selector ctDNA assays were presented in 2018. The first poster entitled "Biocept Study Shows Incorporation of Thermo Fisher QuantStudio 5 PCR Instrument into Target Selector Platform Improves Sensitivity and Specificity in Detection of Lung Cancer Biomarkers" was presented in January 2018 at the Fifth AACR-IASLC International Joint Conference: Lung Cancer Translational Science from the Bench to the Clinic. The related poster, entitled "Validation of highly sensitive TargetSelector™ ctDNA assays for *EGFR*, *BRAF*, and *KRAS* mutations" was presented at the April 2018 American Association for Cancer Research annual meeting. Together, these posters highlight improvements to the Target

Selector ctDNA platform, enabling more sensitive mutation detection down to a single copy, thereby increasing the likelihood of identifying actionable molecular drivers towards guiding targeted therapy decisions and better management of a patient's cancer.

During the first half of 2018, three key case studies were published in peer-reviewed journals. In April, the 2018 Spring issue of *Oncology & Hematology Review* featured a case report demonstrating the clinical utility of Biocept's CTC platform whereby identification of an *ALK* rearrangement enabled sequential targeted therapy and improved quality of life in a patient with non-small cell lung cancer. This case illustrated the use of our technology to monitor therapeutic response and early detection of drug resistance to manage patient disease through the course of treatment with various ALK inhibitors. A Letter to the Editor in the May 2018 issue of *Journal of Thoracic Oncology* described the identification of a *ROS1* rearrangement by Biocept CTC analysis using FISH (fluorescent in situ hybridization). The *ROS1* translocation was concordant with tissue biopsy. In contrast, next-generation sequencing analysis of plasma by another vendor failed to detect the genetic alteration in the patient with lung cancer. Also in May 2018, a case report describing the application of our CTC technology in the management of metastatic breast cancer was published in *Clinics in Oncology.* This work described a patient with recurrent breast cancer where numerous tissue-based evaluations of the individual's bone-only metastases had repeated challenges or inclusive results. *HER2* amplification detected in CTCs from blood provided crucial information towards changing treatment strategies to include anti-HER therapy, consequently extending and improving the patient's quality of life. Each of the three published cases provide real-life examples in lung and breast cancer towards establishing the importance of liquid biopsy to identify and monitor clinically actionable biomarkers to improve outcomes of patients with cancer.

In July 2018, we announced a collaboration involving two studies with the University of California, San Diego. Each of the two studies will enroll 100 patients with solid tumors, for a total of 200 patients. One study will assess the feasibility of using our CTC and ctDNA methodologies to predict post-resection disease recurrence in patients with Stage II or III cancer; the other study will use our technology to predict response to therapy in patients with metastatic disease. Dr. Rebecca Shatsky and Dr. Razelle Kurzrock are the investigators key to both studies.

In August 2018, we announced a Quality Improvement Initiative with Highmark Health to help improve molecular testing rates of NCCN Category I Guidelines for non-small cell lung cancer. The Initiative aims to improve health outcomes by using liquid biopsy to more rapidly assess a patient's actionable biomarker status towards selecting appropriate therapy, while reducing the overall cost of care. The project will evaluate at least 100 patients in the Highmark Health-affiliated Allegheny Health Network (AHN) Cancer Institute. Patients will receive our CTC and ctDNA testing in addition to tissue biopsy with the goal of obtaining biomarker status results for a higher percentage of patients compared to standard testing.

Two scientific posters featuring the Target Selector™ CTC and ctDNA platforms were presented in September 2018 at the International Association for the Study of Lung Cancer (IASLC) 19th World Conference on Lung Cancer. Data from these clinical studies demonstrate the ability of our technology to detect and monitor CTC counts and actionable biomarkers in both blood and cerebrospinal fluid (CSF) of patients with advanced NSCLC. The first poster described interim results of a collaboration with Dr. Janakiraman Subramanian at the Saint Luke's Cancer Institute in Kansas City, Missouri. This study evaluates CTC enumeration in advanced stage NSCLC patients before and during the course of chemotherapy. Interim results suggest that CTC counts may have prognostic and predictive potential to assess therapeutic benefit. The second poster was in collaboration with Kadmon Corporation, featuring CTC and ctDNA analyses and monitoring in the CSF of NSCLC patients with leptomeningeal metastases who were treated with tesevatib in Kadmon's clinical trial KD019-206. In this study, alterations detected in the CSF of patients were concordant with original tissue biopsies, and serial monitoring of CTCs and ctDNA biomarkers in CSF were consistent with the overall clinical.

In December 2018, we announced that we entered into a Software License and Laboratory Data Supply Agreement with Prognos, Inc. Prognos has built a data repository of 20 billion laboratory records and applies artificial intelligence (AI) to clinical laboratory diagnostics to predict cancer and other diseases. Prognos has 1,000 proprietary learning clinical algorithms to enable earlier patient identification of disease for enhanced treatment decision-making, risk management and quality improvement. Prognos markets their database and clinical algorithms to biopharmaceutical and healthcare delivery organizations.

Under the agreement, we will supply de-identified data from our liquid biopsy testing to Prognos and will utilize Prognos' proprietary Opal® de-identification software in accordance with the Health Insurance Portability and Accountability Act of 1996 to collect and transmit the data to Prognos. We will receive reimbursement for setup fees for the interface to Prognos software and will also receive a percentage of the revenue generated from Prognos' contracts based on the percentage of our data included in the contract.

On January 28, 2019 we announced the launch of research-use-only (RUO) kits, which are intended to enable molecular laboratories around the world to utilize our Target Selector™ ctDNA assays to perform liquid biopsy testing. The first available kit is for the high-sensitivity detection of EGFR oncogene mutations, which are among the most frequently evaluated biomarkers for lung cancer. Additional RUO test kits for other oncogene mutations are planned for launch in the future. We intend to market these kits to molecular laboratories in the U.S. and key international markets.

Provider Agreements

In January 2017, we announced that we had secured an in-network provider agreement with Blue Cross Blue Shield of Texas, the largest provider of health benefits in Texas. In addition, we entered into a national master business agreement with the Blue Cross Blue Shield Association, a not-for-profit trade association that provides multiple services for its 38-member Blue Cross and Blue Shield health plan companies across the U.S., including forming national strategic vendor partnerships. We were selected by the Blue Cross Blue Shield Association based on a rigorous request-for-proposal progress. This agreement establishes pricing for our Target-Selector liquid biopsy testing service through the Blue Cross Blue Shield Association's group purchasing organization, CareSourcing Workgroup. The pricing offered by the CareSourcing Workgroup group purchasing organization is available to those Blue Cross and Blue Shield member health plans that have, or may seek, in-network agreements with us.

In June 2017, we entered into a participating provider agreement with MediNcrease Health Plans, LLC and a preferred provider agreement with Scripps Health Plan Services, Inc., both establishing pricing for our Target-Selector liquid biopsy testing service.

In December 2017, we signed an agreement with Wellmark, Inc., the largest health insurer in Iowa and South Dakota. The agreement marks our third Blue Cross Blue Shield contract and enables patients diagnosed with cancer the ability to access our proprietary testing services in-network under their Wellmark health plan.

We are currently contracted with nine preferred provider organization networks, three large health plans, and five regional independent physician associations, and expect to continue to gain contracts in order to be considered as an "in-network" provider with additional plans.

Laboratory Testing

From our CLIA-certified laboratory in San Diego, California, we provide test results from our current and planned CTC and ctDNA assays to medical oncologists, surgical oncologists, pulmonologists, pathologists and other physicians in community hospitals, cancer centers, group practices and offices. At the federal level, clinical laboratories, such as ours, must be certified under CLIA in order for us to perform testing on human specimens. Our laboratory is also accredited by CAP, which is one of six accreditation organizations approved by the Centers for Medicare and Medicaid Services, or CMS, under CLIA. Our clinical laboratory is located in California and we hold the requisite license from the California Department of Public Health to operate our laboratory. In addition, we hold licenses issued by the states of Florida, Maryland, Pennsylvania and Rhode Island to test specimens from patients in those states or received from ordering physicians from those states. In addition, our clinical reference laboratory is required to be licensed on a product-specific basis by New York as an out of state laboratory and our products, as LDTs, must be approved by the New York State Department of Health before they are offered in New York. As part of this process, the State of New York requires validation of our assays. We are currently in the process of addressing the requirements for licensure in New York, and we have obtained all required licenses and approvals in all other states requiring licensure of out-of-state laboratories.

Clinical Trial Services

Industry research has shown many promising drugs have produced disappointing results in clinical trials. For example, a study by Princess Margaret Hospital in Toronto estimated that over a five-year study period 85% of the new therapies for solid tumors which were tested in early clinical trials in the United States, Europe and Japan failed, and that of those that survive through to Phase III trials only a third will actually be approved. Given such a high failure rate of oncology drugs in clinical development, combined with constrained budgets for pharmaceutical and biopharmaceutical companies, there is a significant need for drug developers to utilize molecular diagnostics to help decrease these failure rates. For specific molecular-targeted therapeutics, the identification of appropriate biomarkers may help to optimize clinical trial patient selection and success rates by helping clinicians identify patients that are most likely to benefit from a therapy based on their individual genetic profile.

In addition to testing for physicians and their patients, we offer clinical trials testing services to help increase the efficiency and economic viability of clinical trials for pharmaceutical and biopharmaceutical companies and clinical research organizations. Our clinical trial services will be aimed at developing customizable assays and techniques utilizing CTC and ctDNA technologies to provide sensitive, real-time characterization of an individual patient's tumors using a standard blood sample. These

assays may be useful as, and ultimately developed into, companion diagnostics associated with a specific therapeutic. Additionally, through our services we may gain further insights into biomarkers for disease progression and drug resistance, as well as those associated with current drug development efforts, which we can incorporate into assays.

Assay Development Process

Our Target-Selector assays were, and our planned additional CTC and ctDNA assays are being, developed and validated in conjunction with leading academic and clinical research centers to ensure that the needs of the clinical community are being met with the latest research on key biomarkers that affect patient care. We utilize a research and validation process to help ensure that we are providing diagnostic, prognostic and predictive information that is clinically relevant and accurate. The time-frame for this process from design through development and market launch is dependent upon, among other things, the biomarkers in question having been discovered and validated before we incorporate them in an assay, the specific clinical claims we plan to pursue, and the availability of high-quality samples for validation. Our development protocol calls for us to monitor and review the process in four stages as detailed below:

- **Stage 1, Research**. We review known, validated biomarkers, preferably associated with a specific therapeutic or other high value treatment decision and discuss with clinical collaborators and key thought leaders to characterize the opportunity, the specific clinical setting and the product profile of the candidate assay.
- **Stage 2, Assay Development**. We design the assay, which typically has two parts: efficient capture of CTCs and/or ctDNA from the targeted cancer type and development of the biomarker assays that will be included. For example, the first part may involve modification of the antibody capture cocktail and the second could include development of specific Target-Selector mutation assays or testing of FISH probes. The assay will be used on normal control specimens and clinical samples to assure performance and the process includes defining the performance characteristics of the assay as well as developing standard protocols for our CLIA-certified, CAP accredited, and state-licensed laboratory, where the assay will ultimately be performed. This assessment includes such features as reproducibility, accuracy, sensitivity, and specificity.
- **Stage 3, Clinical Validation**. When the assay is performing as desired it is validated on clinical samples, typically in comparison to the existing gold standard for that biomarker, which is usually tumor tissue analysis. Depending on the tumor type and specimen requirement, samples are collected from patients through collaborators, or in the case of ctDNA assays, from sample banks, where clinical information on the patients, including outcomes, is already available.
- **Stage 4, Availability for Commercialization**. Upon the completion of clinical validation and before launch, we take several steps to prepare an assay for marketing as an LDT. We create standard operating procedures and quality assurance and quality control measures to ensure repeatability and high standards of quality. We train both our commercial and laboratory staff on the interpretation and use of the data. Licenses and approvals for our laboratory to perform or use LDTs have been obtained from the appropriate regulatory authorities, such as CMS, which oversees CLIA, and different state regulatory bodies.

We currently offer 15 assays that are available for clinical use that have completed all four stages of the development protocol. Other assays for both CTCs and ctDNA are in earlier stages of development. Markers for such assays include, but are not limited to, ESR1 and a multiplexed assay.

We may be required to seek FDA clearance or approval to expand the commercial use of assays to other laboratories and testing sites in the United States. We may also need to complete additional activities to submit each of these assays for regulatory clearance or approval before commercialization in each of the international markets where introduction is planned.

If the FDA finalizes its current draft guidance on a risk-based framework for regulation of LDTs, our process would also need to allow for obtaining FDA review, clearance or approval, as applicable, which would add delay, expense and risk to our current assay development process. In November 2016, the FDA put the process to review and issue this guidance on hold and has not yet provided further information as to when the process will move forward.

Research and Development

We incurred research and development expenses of $3.4 million and $3.2 million for the year ended December 31, 2017 and the nine-month period ended September 30, 2018, respectively, which represented 66% and 133% of our net revenues, respectively. Research and development expenses represented 13% and 15% of our total costs and expenses for the year ended December 31, 2017 and the nine-month period ended September 30, 2018, respectively. Major components of research and development expenses were direct personnel costs, laboratory equipment, consumables and overhead expenses.

Technology Development

In addition to developing new CTC and ctDNA assays for different cancers to be offered through our CLIA laboratory and adapting additional predictive biomarkers to these assays as their importance is demonstrated by the scientific and clinical research communities, we continue to focus on improving the base technologies underlying our assays and processes. We are exploring various ways to improve CTC capture efficiency and detection, as well as approaches to sub-categorize CTCs into different populations that may have clinical relevance. For example, by determining which antigens individual CTCs expressed that enabled their capture, we could differentiate, and enumerate, various CTC phenotypes, for example, epithelial versus mesenchymal. We are also working to simplify the assay process, and in general to provide a broader range of useful data on a patient's cancer to assist the physician in determining an appropriate treatment. Some of these projects and initiatives include:

- **Improve Ability to Capture CTCs**

Continued modification and optimization of our microfluidic channel as a way to further enhance CTC capture efficiency. Capture efficiency directly impacts sensitivity, informative rate, and the ability to perform accurate and reliable biomarker analyses on the CTCs, all of which increase the value of our offering. We are utilizing some of our early research experience to improve CTC capture rates and reduce background contamination from normal white blood cells.

- **Automation of Our Assay Process**

Development of automation throughout the assay process, but particularly at the visual evaluation steps, which include enumeration, any ICC for biomarkers beyond those used to identify CTCs, for example protein biomarkers, and FISH analysis, is a way to drive efficiencies, reduce costs, speed up turnaround time, and generate more reliable, uniform, and in some cases more sensitive data. We have implemented an automation solution for the visual analysis, which has been validated and implemented in our CLIA laboratory. We have also adapted a semi-automated system for the separation, processing and washing steps before running a sample on the microfluidic channel, which has also been validated and implemented in the CLIA laboratory. We are currently evaluating further steps in automation, including pipetting. These measures will reduce costs and time as well as allow for higher-throughput as sample volumes increase.

- **Development of Second Generation Platform for CTC Testing**

We are continuing to evaluate and develop techniques for CTC capture that take advantage of our antibody enrichment cocktail and our staining technology to modify our current CTC process into a simpler IVD testing kit format. In addition to reducing internal costs, such an advance would enable us to offer a testing kit format that can access the worldwide CTC testing market. The distribution of such kits could create a new business opportunity for us.

- **Utilization of ctDNA Technology for Highly Multiplexed Mutation Testing**

The ctDNA technology should enable us to multiplex mutation testing such that larger panels of genes can be analyzed in a single step and interfaced with genetic sequencing. This should position us for the analysis at the molecular level of whole signaling pathways or enzyme cascades. We plan to take advantage of the sensitivity and specificity of the ctDNA technology and leverage interest in the clinical research community for detecting any actionable biomarker in a particular tumor, as opposed to only those that are known to occur at relatively higher frequencies in that type of tumor. Such multiplexed mutation assays, relying on our ctDNA technology, could provide a more global evaluation of a tumor through analysis of either CTCs or ctDNA. This would offer a broader range of potential treatment options as well as enable the monitoring of the effectiveness of those treatments over time.

- **Development of Single Cell CTC Isolation Techniques for Molecular Analysis**

Tumor heterogeneity is a well-recognized problem for tissue analysis and is in part addressed by focusing on CTCs, which may provide a more universal sampling of a tumor. One result of this can be a diverse population of CTCs in a sample, with different phenotypes and genotypes represented. We are working with a collaborator on techniques for subsequent sorting of our highly enriched CTC samples released from our microfluidic channels into pools of CTCs with similar phenotypes, and ultimately to single CTCs, for molecular analysis.

Translational/Clinical Research

In the course of our research and validation studies, we have processed and analyzed thousands of normal control and cancer patient samples. Our initial focus has been on breast cancer, where validation studies for our CTC assay, including enumeration of CTCs on the Biocept platform compared to the CellSearch® system, and HER2 FISH performed on CTCs and compared with HER2

analysis performed on tumor tissue from the same patients, involved over 120 patient samples. The results of our validation studies, and the demonstration of a reliable and reproducible method for CTC capture and analysis using our platform were published in a paper entitled “Novel Platform for the Detection of Cytokeratin Positive (CK+) and Cytokeratin Negative (CK-) CTCs” appearing in the December 2011 issue of Cancer Discovery and a paper entitled “Efficient capture of circulating tumor cells with a novel immunocytochemical microfluidic device” appearing in the September 2011 issue of *BioMicrofluidics*.

Additional studies were conducted in breast and other tumor types, including lung, prostate and colorectal cancers, utilizing patient samples for comparison to the CellSearch® system. In head-to-head studies, our system detected cytokeratin positive CTCs in comparable numbers of breast cancer patients, and in considerably more patients in the other cancer types (*Cancer Discovery*, December 2011). Moreover, the results clearly demonstrated that the use of our antibody enrichment cocktail enabled recovery of more CTCs compared to using only anti-EpCAM antibodies. This data served as a clinical validation study for CTC enumeration. When our staining is applied to detect cytokeratin-negative CTCs, we expect to see far more CTCs based on preliminary studies reported in a paper entitled “Detection of EpCAM-Negative and Cytokeratin-Negative CTCs in Peripheral Blood” appearing in the 2011 issue of the *Journal of Oncology*.

Our system has the added advantage of post-capture immunofluorescent, cytogenetic and molecular genomic analyses of the CTCs. Cells captured by Biocept’s proprietary Target-Selector system can be analyzed directly within the microfluidic channel, removing the need to re-deposit cells on a slide and thereby minimizing cell loss or damage. Furthermore, given the transparency of the microfluidic channel, captured cells can be immediately analyzed on a microscope. Together, these two important features allow for a very efficient process that is well suited for a LDT performed in a CLIA laboratory. The post-capture analyses directed towards evaluation of biomarkers, are particularly important and valuable to physicians and patients since they focus on actionable information related to therapy selection. We have performed a number of clinical research studies in collaboration with The University of Texas MD Anderson Cancer Center investigators involving various tumor types, including breast, ovarian, endometrial, lung, colorectal, bladder and prostate cancers.

In a collaboration with physicians and researchers at The University of Texas MD Anderson Cancer Center, we evaluated matched samples of tumor tissue, blood for CTCs and bone marrow for DTCs in recently diagnosed breast cancer patients for evidence of HER2 amplification. Positive HER2 status would indicate eligibility for HER2-targeted therapies like Herceptin®, a potentially life-saving treatment. These results were presented at both the 2011 and 2012 annual meetings of the American Society of Clinical Oncology. In a study published in *Cancer Medicine* (2013, 2(2) 226-233) involving 95 patients, HER2 positive CTCs and/or DTCs were identified in 18.9% of cases in which the primary tumor was HER2 negative. In the same cohort of patients, only 12.6% were HER2 positive in their primary tumor. In other words, beyond the 12 (of the 95) which traditional tumor tissue analysis had indicated could benefit from Herceptin-based therapy, the Target-Selector assay detected 18 (of the 95 patients) who (despite the fact they were identified as being HER2 negative by primary-tumor testing) could benefit from Herceptin-based therapy. Patients classified as HER2 negative based on tumor tissue and found to have HER2 positive CTCs and/or DTCs will continue to be followed by our collaborators at The University of Texas MD Anderson Cancer Center to assess their overall and progression-free survival. Tumor heterogeneity is one likely cause of the discordance for HER2 status between tumor tissue and our assay performed on blood and bone marrow samples. Tumor heterogeneity indicates an important clinical application for the CTC analysis with the Target-Selector assay. Our technology can use a standard blood sample to confirm and crosscheck tissue analysis performed by the pathologist at the time of biopsy or surgery, especially if HER2 negative.

Our Target-Selector platform is well suited towards blood-based analysis of breast cancer biomarkers. A 24-patient study published with Columbia University (*Clinical and Translational Oncology*, 2015, 17(7):539-46) demonstrated the feasibility of CTC testing to evaluate ER and PR status in metastatic breast cancer (mBC) patients. Results showed a concordance of 83% and 68% in ER/PR status between CTCs vs. metastatic tissue tumor, and CTCs vs. primary tissue, respectively. More recently, a December 2016 San Antonio Breast Cancer Symposium poster presentation featured the evaluation of 74 mBC patients. This collaborative work with the Sarah Cannon Research Institute, demonstrated detection of CTCs in 99% of mBC patient samples. In addition, ER protein expression concordance was 84% in cytokeratin positive cells and 18% in cytokeratin negative cells. FISH-based analysis of captured CTCs displayed tissue concordances of 93% and 68% for HER2 gene amplification in cytokeratin positive CTCs and cytokeratin negative CTCs, respectively; FGFR1 amplification concordances to tissue were 79% and 67% for cytokeratin positive CTCs and cytokeratin negative CTCs, respectively. While further investigation is needed to elucidate the significance of cytokeratin negative cells as a possible prognostic indicator to evaluate ER, HER2 and FGFR1 biomarkers in mBC patients, our ability to assess cytokeratin positive and negative CTCs affords a distinct advantage over other CTC technologies that rely solely upon characterization of cytokeratin positive CTCs.

We have also developed proprietary and robust technology to detect and quantify mutant ctDNA in plasma originating from the same blood sample that is used for the previously described CTC analyses. In collaboration between Mexico’s Instituto Nacional de Cancerologia and AstraZeneca, a clinical evaluation of blood-based liquid biopsy mutational profiling using our service was performed on 60 advanced-stage non-small cell lung cancer patients. This poster discussion presentation at the European Society

for Molecular Oncology in October 2016 demonstrated EGFR mutation detection (exon 19 deletions, L858R, and T790) by Target-Selector with 90% sensitivity, 100% specificity, 100% positive predictive value and 90.9% negative predictive value. The same cohort was then presented by the authors of the study at the World Lung Congress in October 2017. Target-Selector assays are highly sensitive with the ability to detect EGFR mutations down to one mutant copy per milliliter of plasma. The high concordance of ctDNA versus tissue exhibited in this work highlights Target-Selector plasma ctDNA assays as a viable and practical means to detect EGFR activating and acquired resistance mutations relevant for guiding targeted therapy decisions.

Clinical utility studies, which demonstrate the specific clinical setting in which a particular CTC or ctDNA assay is used, and how to use the information generated for medical, specifically treatment-related, decision making is a key part of our strategy and research and development plan. Data resulting from such studies is critical not only in the sales and marketing process, but also for reimbursement, as many health plans and government payers now ask for peer-reviewed publications describing such studies and results before agreeing to coverage of a specific assay. We are involved in and plan to become involved in numerous studies to further demonstrate the clinical utility of our assays.

Sales and Marketing

At December 31, 2018, our sales organization consisted of 10 sales representatives placed in strategic locations around the country that have high concentrations of cancer patients, and we may, depending on assay volume, potentially grow this number to 20-25 sales representatives within two years and to 30-35 within five years. We have defined sales territories and have hired sales professionals with extensive successful experience in clinical oncology sales or oncology diagnostic testing sales from leading biopharmaceutical, pharmaceutical or specialty reference laboratory companies. We plan on growing this specialized, oncology-focused sales force and supporting it with clinical specialists who bring significant technical knowledge in the use of CTC and ctDNA assays. We have also invested in sales headcount focusing on biopharma clinical trial opportunities.

Finally, we have invested in a managed care sales and marketing expert in order to pursue favorable payment and coverage for our liquid biopsy testing services. The key value proposition for these customers will be focused on clinical utility and cost savings by offering our assays as alternatives to expensive surgeries when tumor biopsy tissue is insufficient or not available.

Our sales and marketing efforts are and will be based on a five-part marketing strategy:

- Work with oncologists, other physicians and group practices at community hospitals and cancer centers to educate them on the advantages and opportunities that CTC and ctDNA assays provide for better information, allowing them to select the most appropriate therapy for their patients, and how and when these assays are most effectively used;
- build relationships with key thought leaders in oncology, specifically in the cancer types for which we are offering or plan to offer assays, to educate and support community oncologists;
- collaborate with leading research universities and institutions that enable the validation of our new assays, as well as the generation of clinical utility data;
- partner with pharmaceutical companies for clinical trial work focusing on CTC and ctDNA testing and analysis; and
- add value for the payer community by delivering clinically actionable information and providing a cost-effective alternative to access clinically actionable information through the use of a simple blood test.

We also take advantage of customary marketing channels commonly used by the diagnostic and pharmaceutical industries, such as medical meetings, broad-based publication of our scientific and clinical data, and the Internet. In addition, we provide easy-to-access information to our customers through our website and a data portal for physicians who wish to access test results electronically. Our customers value secure and easily accessible information in order to quickly review their patients' information and begin developing a treatment protocol.

Outside the United States

Outside the United States, where a central laboratory business model is less developed, we will evaluate opportunities with our existing and other partners for the conversion and/or development of our current and planned CTC and ctDNA assays into test systems or IVDs, and related strategies to develop and serve such regional oncology markets. We also plan to sell our clinical trial services to biopharmaceutical companies and research organizations outside the United States.

We plan to cooperate with partners on accessing markets internationally. We plan for this to be accomplished either through partnerships with local groups and distributors or the development of IVD test kits and/or test systems, including instrumentation.

Competition

As a cancer diagnostics company focused on current and planned assays for CTCs and ctDNA from standard blood samples, we rely extensively on our ability to combine novel technology and biomarker information with high-quality, state-of-the art clinical laboratory testing. We believe that we compete principally on the basis of:

- Our ability to utilize standard blood samples, enabling frequent testing of patients through the course of their disease in addition to, or without a biopsy, thereby reducing cost and trauma, saving time, and providing real-time information on the current status of the tumor;
- our ability to include biomarker information in our analysis, in addition to CTC enumeration, thereby providing a more complete profile of a patient's disease than existing CTC tests. This clinically actionable information can assist physicians in selecting more personalized treatment plans for individual patients;
- our current and planned future CTC assays' ability to capture and detect a broader range of CTC phenotypes than existing tests, and potentially at earlier stages of disease, resulting in fewer non-informative cases and more information for physicians. For example, our antibody capture cocktail targets not only EpCAM but also other epithelial antigens as well as mesenchymal and cancer stem cell antigens, indicative of cells having undergone the epithelial-to-mesenchymal transition. These cells may be more relevant for metastasis;
- our ability to rapidly integrate new biomarkers, either validated in academic laboratories or of interest to pharmaceutical and biopharmaceutical companies in the context of their new therapies, into our current and planned future assays, facilitating the expansion of actionable information for medical oncologists, surgical oncologists, pulmonologists, pathologists and other physicians;
- our research and clinical collaborations with key academic and clinical study groups, which enhance our research and development resources and, by enhancing our standing in the oncology community, support our marketing efforts; and
- our current and planned ctDNA assays based on our patented technology, which currently offer and are expected to continue to offer enhanced sensitivity and specificity in detecting mutation targets or resistance markers, again supporting treatment decisions.

We believe that we compete favorably with respect to these factors, although we cannot assure you that we will be able to continue to do so in the future or that new products or assays that perform better than our current and planned future assays and services will not be introduced. We believe that our continued success depends on our ability to:

- Expand and enhance our current and planned Target-Selector assays to provide clinically meaningful information in additional cancers;
- work with clinicians to design and implement clinical studies that demonstrate the clinical utility of our products;
- continue to innovate and maintain scientifically advanced technology including development, regulatory approvals, and commercialization of Target-Selector IVD test kits;
- successfully market and sell assays;
- continue to comply with regulatory guidelines and obtain appropriate regulatory approvals in the United States and abroad as applicable;
- continue to validate our pipeline of assays;
- conduct or collaborate with clinical utility studies to demonstrate the application and medical value of our assays;
- continue to seek to obtain positive coverage and reimbursement decisions from Medicare and private third-party payers;
- continue to enter into sales and marketing partnerships;
- maintain existing and enter into new research and clinical collaborations with key academic and clinical study groups;
- continue to attract and retain skilled scientific, clinical, laboratory, and marketing personnel;
- continue to participate in and gain clinical trial work through biopharma partnerships;
- receive payment for the testing we provide for patients;
- obtain patents or other protection for our technologies, assays and services; and
- obtain and maintain our clinical reference laboratory accreditations and licenses.

Our principal competition comes from mainstream diagnostic methods, used by medical oncologists, surgical oncologists, pulmonologists, pathologists and other physicians for many years, which focus on tumor tissue analysis. The methods or behavior of medical oncologists, surgical oncologists, pulmonologists, pathologists and other physicians may be difficult to change regarding the use of our CTC and ctDNA testing, including molecular diagnostic testing, in their practices in conjunction with or instead of tissue biopsies and analysis. In addition, companies offering capital equipment and kits or reagents to local pathology laboratories represent another source of potential competition. These kits are used directly by the pathologist, which can facilitate adoption. Historically, we have focused our marketing and sales efforts on medical oncologists rather than pathologists, although commencing in October 2017, our Empower TC offering provides the unique ability for pathologists to participate in the interpretation of liquid biopsy results and is available to pathology practices and hospital systems throughout the United States.

We also face competition from companies that offer products or are conducting research to develop products for CTC or ctDNA testing in various cancers. CTC and ctDNA testing is a new area of science and we cannot predict what assays others will develop that may compete with or provide results similar or superior to the results we are able to achieve with the assays we develop. Competitors include but are not limited to companies such as Atossa, Agena, Qiagen, Roche, Guardant Health, Menarini Silicon Biosystems (now owns Janssen Diagnostics), Alere (Adnagen), Illumina, Apocell, EPIC Sciences, Clearbridge Biomedics, Biodesix, Thermo Fisher Scientific, Foundation Medicine, Neogenomics, Cynvenio Biosystems, Genomic Health, Fluxion Biosciences, RareCells, ScreenCell, and Sysmex. Some of these groups, in addition to operating research and development laboratories, are establishing CLIA-certified testing laboratories while others are focused on selling equipment and reagents.

There are a number of companies which are focused on the oncology diagnostic market, such as Cancer Genetics, Caris, Neogenomics, Agendia and Genoptix, who while not currently offering CTC or ctDNA assays are selling to the medical oncologists and pathologists and could develop or offer CTC or ctDNA assays. Large laboratory services companies such as Quest and LabCorp provide more generalized cancer diagnostic testing but could also offer a CTC or ctDNA testing services. Companies like Abbott, Danaher, Qiagen, Thermo Fisher Scientific and others could develop equipment or reagents in the future as well.

Some of our present and potential competitors have widespread brand recognition and substantially greater financial and technical resources and development, production and marketing capabilities than we do. Others may develop lower-priced, less complex assays that payers, medical oncologists, surgical oncologists, pulmonologists, pathologists and other physicians could view as functionally equivalent to our current or planned future assays, which could force us to lower the list price of our assays and impact our operating margins and our ability to achieve and maintain profitability. In addition, technological innovations that result in the creation of enhanced diagnostic tools that are more sensitive or specific than ours may enable other clinical laboratories, hospitals, physicians or medical providers to provide specialized diagnostic assays similar to ours in a more patient-friendly, efficient or cost-effective manner than is currently possible. If we cannot compete successfully against current or future competitors, we may be unable to increase or create market acceptance and sales of our current or planned future assays, which could prevent us from increasing or sustaining our revenues or achieving or sustaining profitability.

We expect that biopharmaceutical companies will increasingly focus attention and resources on the personalized cancer diagnostic sector as the potential and prevalence of molecularly targeted oncology therapies approved by the FDA along with companion diagnostics increases. For example, the FDA has approved three such agents-Xalkori® from Pfizer Inc. along with its companion anaplastic lymphoma kinase FISH test from Abbott Laboratories, Inc., Zelboraf® from Daiichi-Sankyo/Genentech/Roche along with its companion B-RAF kinase V600 mutation test from Roche Molecular Systems, Inc. and Tafinlar® from GlaxoSmithKline along with its companion B-RAF kinase V600 mutation test from bioMerieux. Since companion diagnostic tests are part of FDA labeling, non-FDA cleared tests such as ours would be considered an off-label use and this may limit our access to this market segment.

Additionally, projects related to cancer diagnostics and particularly genomics have received increased government funding, both in the United States and internationally. As more information regarding cancer genomics becomes available to the public, we anticipate that more products aimed at identifying targeted treatment options will be developed and that these products may compete with ours. In addition, competitors may develop their own versions of our current or planned future assays in countries where we did not apply for patents or where our patents have not issued and compete with us in those countries, including encouraging the use of their assay by physicians or patients in other countries.

Third-Party Suppliers and Manufacturers

Some of the components used in our current or planned future products are currently sourced from a supplier for which alternative suppliers exist, but we have not validated the products of such alternative suppliers, and substitutes for these components might not be able to be obtained easily or may require substantial design or manufacturing modifications. Any significant problem experienced by any one of our suppliers may result in a delay or interruption in the supply of components to us until that supplier cures the problem or an alternative source of the component is located and qualified. Any delay or interruption would likely lead to a delay or interruption in our manufacturing operations. The inclusion of substitute components must meet our product specifications and could require us to qualify the new supplier with the appropriate government regulatory authorities.

Patents and Technology

The proprietary nature of, and protection for, our products, services, processes, and know-how are important to our business. Our success depends in part on our ability to protect the proprietary nature of our products, services, technology, and know-how, to operate without infringing on the proprietary rights of others, and to prevent others from infringing our proprietary rights. We seek patent protection in the United States and internationally for our products, services and other technology. Our policy is to patent or in-license the technology, inventions and improvements that we consider important to the development of our business.

We also rely on trade secrets, know-how, and continuing innovation to develop and maintain our competitive position. We cannot be certain that patents will be granted with respect to any of our pending patent applications or with respect to any patent applications filed by us in the future, nor can we be sure that any of our existing patents or any patents granted to us in the future will be commercially useful in protecting our technology.

Our success depends on an intellectual property portfolio that supports our future revenue streams and erects barriers to our competitors. We are maintaining and building our patent portfolio through filing new patent applications, prosecuting existing applications, and licensing and acquiring new patents and patent applications.

Despite these measures, any of our intellectual property and proprietary rights could be challenged, invalidated, circumvented, infringed or misappropriated, or such intellectual property and proprietary rights may not be sufficient to permit us to take advantage of current market trends or otherwise to provide competitive advantages. For more information, see the section entitled “Risk Factors - Intellectual Property Risks Related to Our Business.”

We have issued patents with broad claims covering our blood collection tube, antibody cocktail approach, microchannel, CTC detection methodologies, and ctDNA analysis. In addition to issued patents in the U.S., we have patents for our proprietary microchannel in China, Korea, Europe, Hong Kong, Canada and Japan, and for our antibody cocktail in Australia, Europe, Hong Kong and Japan. Our patent estate continues to evolve, and in addition to the broad patent estate around our CTC platform, we also have issued patents in the U.S., Australia, Europe and China for our novel switch blocker technology, solidifying our proprietary enrichment methodology for detecting ctDNA with very high sensitivity. Our CTC platform patents were filed from 2005 through 2012, and we expect to have patent protection into the 2030s. Our CTC patents and applications cover not only cancer as a target, but also prenatal and other rare cells of interest. Recently allowed patents in the U.S. cover the capture of “any target of interest on any solid surface” using our antibody capture approach. The patent for our proprietary specimen collection tubes expire in 2031, and the patents for our ctDNA technology expire in the early 2030’s.

As of December 31, 2018, we owned 31 issued patents and 18 patents pending related to our current technologies. Of these, eight were issued and five were pending patents in the U.S., while 23 were issued and 13 were pending patents in non-U.S. territories. Separately, we also owned seven issued patents related to our earlier microarray and cell analysis technology.

Microfluidic Channels. At December 31, 2018, we had three issued U.S. patents that are related to our current business, and in 2017 and 2018 we received an additional issued patent on our microfluidic channel in each of China and Hong Kong, respectively, in addition to our earlier allowances in Japan, Hong Kong, Europe, China, and South Korea, which cover our microfluidic channel technology. Further U.S. and foreign patent application are pending.

Blood Collection Tubes. In 2015, we received a U.S. patent related to our blood collection tubes, which contain reagents designed to prevent clumping of blood cells and CTCs that could clog the microfluidic channels and disrupt our assays.

Antibody Enrichment Cocktail. At December 31, 2018, we had two issued and one pending U.S. patent application, and two broadly issued European patents, as well as other corresponding foreign patent applications directed to our antibody capture cocktail technology. This technology includes using antibodies to a number of tumor-associated antigens from cancer cells of both epithelial and mesenchymal phenotype, as well as cancer stem cells.

Enhanced Staining. At December 31, 2018, we had one issued U.S. patent, one issued Chinese patent, and one issued Japanese patent, as well as corresponding foreign patent applications directed to this technology.

Target-Selector Mutation Detection Technology. At December 31, 2018, we co-owned one issued and one pending U.S. patent, one issued Australian patent, one issued Chinese, one issued in Japanese, and one issued European (7 countries), as well as additional pending foreign patents with Aegea Biotechnologies, Inc., or Aegea. Under our agreement with Aegea, we have certain exclusive rights for oncology clinical testing and diagnostics as well as limited rights for oncology basic and clinical research. Aegea is responsible for the prosecution of one U.S. application, while we are responsible for the prosecution of the second U.S. application and its corresponding foreign applications. Lyle J. Arnold, Ph.D., our Senior Vice-President of Research & Development and Chief Scientific Officer, is the controlling person of Aegea.

Operations and Production Facilities

Our research and development laboratory, our CLIA-certified, CAP accredited, and state-licensed diagnostic testing laboratory and our manufacturing facility are located in our San Diego, California headquarters. The laboratories employ commercial state-of-the-art equipment as well as custom-made components specific to our CTC process that are generated in a small in-house engineering shop. The manufacturing facility used for the production of our microfluidic channels is a Class 10,000 suite in which polydimethylsiloxane is formed into the base of our proprietary microfluidic channels in a molding process. A glass cover slip suitable for optical analysis is added to seal the channels and make them watertight by making them reactive using plasma techniques. The inside of the microfluidic channels is subsequently chemically derivatized to enable the attachment of binding elements that strongly bind to antibody-tagged or coated CTCs. Because the microfluidic channels have micrometer dimensions, and we are seeking individual cells in a blood sample to interact with the surface of the microfluidic channel, dust particles and other microscopic debris that could clog the channel needs to be avoided.

The process of performing our assays is straightforward. When a health care professional takes a standard blood sample from a patient for CTC or ctDNA testing, he or she will place the blood sample in our blood collection tubes, complete a requisition form, and package the specimen in our shipping kit for direct shipment to us. Once we receive the specimen at our laboratory and we enter all pertinent information about the specimen into our clinical laboratory information system, our laboratory technologists prepare the specimen for processing and analysis. Laboratory technologists, including clinical laboratory technologists and clinical laboratory scientists then conduct the analysis, including enumeration of CTCs and biomarker analysis such as FISH. The data, including images and the processed cells, are sent to our in-house or contracted pathologists or a commercialization partner's pathologists who are experienced in the analysis and evaluation requested by the referring oncologist or pathologist.

After analysis, our in-house or contracted pathologists or a commercialization partner's pathologists use laboratory information systems to prepare a comprehensive report, which may include selected relevant images associated with the specimen. Our Internet reporting portal allows a referring oncologist or pathologist to access his or her patient's test results in real time in a secure manner that we believe to be compliant with the Health Insurance Portability and Accountability Act, or HIPAA, and other applicable standards. The reports are generated in industry standard .pdf formats which allows for high definition color images to be reproduced clearly. We send the results to the ordering physician and bill the payer using third-party medical billing software.

Quality Management Program

We are committed to providing reliable and accurate diagnostic testing to our customers. Accurate specimen identification, timely communication of test results, and prompt correction of errors, is critical. We monitor and improve our performance through a variety of methods, including performance improvement indicators, internal proficiency testing and external quality audits conducted by CAP. All quality concerns and incidents are subject to review and analysis, and our procedures are designed to ensure that we are providing the best services possible to our patients and customers. Protection of patient results from misuse and improper access is imperative and electronic and paper results are guarded via password-protection and identification cards.

We have established a Quality Management Program for our laboratory designed to help ensure accurate and timely test results, to produce consistent high-quality testing services. The Quality Management Program documents the quality assurance and performance improvement plans and policies, and the laboratory quality assurance and quality control procedures necessary to ensure that we offer the highest quality of diagnostic testing services. This program is designed to satisfy all the requirements necessary for local and state licensures and accreditation for clinical diagnostic laboratories by CAP. We follow the policies and procedures for patient and employee safety, hazardous waste disposal and fire codes stated in the general laboratory procedure manual. We believe that all pertinent regulations of CLIA, the Occupational Safety and Health Administration, the Environmental Protection Agency and the FDA are satisfied by following the established guidelines and procedures of our Quality Management Program.

In addition to the compulsory proficiency programs and external inspections required by CMS and other regulatory agencies, we have developed a variety of internal systems and procedures to emphasize, monitor and continuously improve the quality of our operations. We maintain internal quality controls by routinely processing specimens with known diagnoses in parallel with patient specimens. We also have an internally administered proficiency program for specimen testing.

The CAP accreditation program involves unannounced on-site inspections of our laboratories. CAP is an independent, non-governmental organization of board-certified pathologists that accredits laboratories nationwide on a voluntary basis and that has been recognized by CMS as an accreditation organization to inspect laboratories to determine adherence to the CLIA standards.

Third-Party Payer Reimbursement

Revenues from our clinical laboratory testing are derived from several different sources. Depending on the billing arrangement, instructions of the ordering physician and applicable law, parties that reimburse us for our services include:

- Third-party payers that provide coverage to the patient, such as an insurance company, a managed care organization or a governmental payer program;
- physicians or other authorized parties, such as hospitals or independent laboratories, that order the testing service or otherwise refer the services to us;
- patients in cases where the patient has no insurance, has insurance that partially covers the testing, or owes a co-payment, co-insurance or deductible amount;
- collaboration partners; or
- biopharmaceutical companies, universities or researchers for clinical trial work.

We are reimbursed for two categories of testing, anatomic pathology, which includes cell staining and the enumeration component of CTC assays, FISH, ICC and immunofluorescence, and molecular pathology, which includes mutation analysis. Reimbursement under the Medicare program for the diagnostic services that we offer is based on either the Medicare Physician Fee Schedule or the Medicare Clinical Laboratory Fee Schedule, each of which is subject to geographic adjustments and is updated annually. Medical services provided to Medicare beneficiaries that require a degree of physician supervision, judgment or other physician involvement, such as pathology services, are generally reimbursed under the Medicare Physician Fee Schedule, whereas clinical diagnostic laboratory tests are generally reimbursed under the Medicare Clinical Laboratory Fee Schedule. Some of the services that we provide are genetic and molecular testing, which are reimbursed as clinical diagnostic laboratory tests.

Regardless of the applicable fee schedule, Medicare payment amounts are established for each CPT code. In addition, under the Clinical Laboratory Fee Schedule, Medicare also sets a cap on the amount that it will pay for any individual assay. This cap, usually referred to as the National Limitation Amount, is set at a percentage of the median of all the contractor fee schedule amounts for each billing code.

Medicare also has policies that may limit when we can bill directly for our services and when we must instead bill another provider, such as a hospital. When the testing that we perform is done on a specimen that was collected while the patient was in the hospital, as either an inpatient or outpatient, we may be required to bill the hospital for clinical laboratory services and for the technical component of pathology services. Which party is to be billed depends primarily on whether the service was ordered at least 14 days after the patient's discharge from the hospital. Complying with these requirements is complex and time-consuming and may affect our ability to collect for our services. In addition, hospitals may refuse to pay our invoices or may demand pricing that negatively affects our profit margin.

Medicare requires a beneficiary to pay a 20% co-insurance amount for services billed under the Physician Fee Schedule. Medicare covers the remaining 80%. There is currently no patient co-payment or co-insurance amount applicable to testing billed under the Clinical Laboratory Fee Schedule. Patients often have supplemental insurance policies that cover the co-insurance amount for physician services.

Medicare has coverage policies that can be national or regional in scope. Coverage means that assay is approved as a benefit for Medicare beneficiaries. If there is no coverage, neither the supplier nor any other party, such as a reference laboratory, may receive reimbursement from Medicare for the service. There is currently no national coverage policy regarding the CTC enumeration portion of our testing. Because our laboratory is in California, the regional Medicare Administrative Contractor, or MAC, for California is the relevant MAC for all our testing. The previous MAC for California, Palmetto GBA, LLC, or Palmetto, which is contracted with CMS to administer the MolDx program that sets guidelines for coding, coverage and reimbursement of molecular diagnostic assays, adopted a negative coverage policy for CTC enumeration. The current MAC for California, Noridian Healthcare Solutions, LLC, is adopting the coverage policies from Palmetto. Therefore, the enumeration portion of our testing is not currently covered, and we will receive no payment from Medicare for this portion of the service unless and until the coverage policy is changed. Although approximately 76% and 76% of all billable cases received during the year ended December 31, 2017 and the nine-month period ended September 30, 2018, respectively, relate to our Target-Selector biomarker assays, we continue to receive orders for our traditional enumeration testing, which counts disease burden, and therefore the enumeration testing receives no payment from Medicare based upon the existing coverage decision. The CTC enumeration counts disease burden and is a prognostic test, and although oncologists find the information valuable, it does not currently meet many of the medical necessity requirements of Medicare and the payers. We intend to pursue payment for the capture portion of our CTC technology that allows us to run our diagnostic testing for some of our Target-Selector assays.

Reimbursement rates paid by private third-party payers can vary based on whether we are considered to be an "in-network" provider, a participating provider, a covered provider, an "out-of-network" provider or a non-participating provider. These definitions can vary among payers, but we are generally considered an "out-of-network" or non-participating provider by the vast majority of private third-party payers. An in-network provider usually has a contract with the payer or benefits provider. This contract governs, among other things, service-level agreements and reimbursement rates. In certain instances, an insurance company may negotiate an in-network rate for our testing. An in-network provider may have rates that are lower per assay than those that are out-of-network, and that rate can vary widely. The rate varies based on the payer, the testing type and often the specifics of the patient's insurance plan. If a laboratory agrees to contract as an in-network provider, it generally expects to receive quicker payment and access to additional covered patients.

Billing and Billing Codes for Third-Party Payer Reimbursement

CPT codes are the main billing code set used by physicians, hospitals, laboratories and other health care professionals to report separately-payable clinical laboratory and pathology services for reimbursement purposes. The CPT coding system is maintained and updated on an annual basis by the American Medical Association. We believe there are existing codes that describe nearly all of the steps in our testing process. We currently use a combination of codes to bill for our testing and analysis.

In order to ensure our coding is compliant, we have engaged industry experts to provide guidance on the proper coding of our assays. These experts include consultants at Senergene Solutions, LLC, Codemap, LLC and ADVI Health, LLC. However, coding can be complex, and payers may require differing codes for a given assay to effect payment. Changes in coding and reimbursement could adversely impact our revenues going forward, or payers could request that we reimburse them for payments we have already received. There can be no guarantees that Medicare and other payers will establish new positive or adequate coverage policies or reimbursement rates, or not change existing positive coverage policies, in the future.

We are moving forward with plans to obtain reimbursement coverage for the capture components of our assays. For other tests, we are able to utilize existing CPT codes from the Medicare Physician Fee Schedule and Clinical Laboratory Fee Schedule. For these established CPT codes (for example, the codes for molecular testing, FISH and ICC), positive coverage determinations have been adopted as part of national Medicare policy or under applicable Local Coverage Determinations. Specific codes for our assays, however, do not assure an adequate coverage policy or reimbursement rate. Please see the section entitled "Legislative and Regulatory Changes Impacting Clinical Laboratory Tests" for further discussion of certain legislative and regulatory changes to these billing codes and the anticipated impact on our business.

Coverage and Reimbursement for our Current Assays and our Planned Future Assays

Our Medicare Administrative Contractor has issued a negative coverage determination for the enumeration component of all CTC assays. We have received reimbursement for the enumeration component of our assays from some private payers, including major private third-party payers, based on submission of standard CPT codes. FISH, ICC and Molecular Testing CPT codes are the subject of positive coverage national or local Medicare determinations. We believe these codes can be used to bill for the analysis components of our current and planned future CTC assays, however, CMS, Palmetto or Noridian could adopt specific negative coverage policies for CTCs or ctDNA analysis in the future.

We expect these analysis components to have a significantly greater reimbursement value than the enumeration components of our current and anticipated CTC assays, based on a comparison of what we believe CellSearch® enumeration reimbursement rates currently are, versus existing reimbursement rates for analysis components such as FISH and ICC analysis and molecular testing.

Additionally, on March 16, 2018 CMS issued a final determination decision memo for NGS for Medicare Beneficiaries with Advanced Cancer (CAG-00450N). Under this final determination, NGS tests that gain FDA approval or clearance as a companion diagnostic will receive coverage, and the final determination of coverage for NGS tests that are LDTs will be left up to the local MAC. Currently, only 1 of our 15 CLIA validated assays is NGS-based; however, we plan to offer additional NGS assays in the future. To gain coverage for those assays, we will need to apply to Palmetto, which is the MAC that evaluates and recommends payment coverage or denial for molecular testing in our jurisdiction. Historically, Palmetto has offered a path to reimbursement by providing coverage while data is being gathered known as Coverage with Data Development, or CDD. Going forward, the extent to which CDD will be continued, if at all, or to the extent that a process will be available in its place, if any, are unclear.

We believe, based on research showing that approximately 54% of new cancers occur in persons age 65 and older and that almost all Americans age 65 and older are enrolled in Medicare that a substantial portion of the patients for whom we would expect to perform cancer diagnostic assays will have Medicare as their primary medical insurance. We cannot assure you that, even if our current and our planned future assays are otherwise successful, reimbursement for the currently Medicare-covered portions of our

current and our planned future assays would, without Medicare reimbursement for the enumeration portion, produce sufficient revenues to enable us to reach profitability and achieve our other commercial objectives.

Where there is a private or governmental third-party payer coverage policy in place, we bill the payer and the patient in accordance with the established policy. Where there is no coverage policy in place, we pursue reimbursement on a case-by-case basis. Our efforts in obtaining reimbursement based on individual claims, including pursuing appeals or reconsiderations of claims denials, could take a substantial amount of time, and bills may not be paid for many months, if at all. Furthermore, if a third-party payer denies coverage after final appeal, payment may not be received at all. We are working to decrease risks of nonpayment by implementing a revenue cycle management system.

We cannot predict whether, or under what circumstances, payers will reimburse for all components of our assays. Payment amounts can also vary across individual policies. Full or partial denial of coverage by payers, or reimbursement at inadequate levels, would have a material adverse impact on our business and on market acceptance of our assays.

Legislative and Regulatory Changes Impacting Clinical Laboratory Tests

From time to time, Congress has revised the Medicare statute and the formulas it establishes for both the Clinical Laboratory Fee Schedule, or CLFS, and the Physician Fee Schedule, or PFS. Annually, CMS releases the payment amounts under the Medicare fee schedules. The rates are important because they not only determine our reimbursement under Medicare, but those payment amounts are also often used as a basis for payment amounts set by other governmental and private third-party payers. For example, state Medicaid programs are prohibited from paying more than the Medicare fee schedule limit for clinical laboratory services furnished to Medicaid recipients.

In accordance with Section 1833 (h)(2)(A)(i) of the Social Security Act, the annual update to the CLFS for calendar year 2018 is 1.10% (see 42 CFR405.509(b)(1)). With respect to our diagnostic services for which we expect to be reimbursed under PFS, CMS issues a Final Rule on an annual basis. Since 2015, the PFS Final Rules have included both increases and decreases in certain relative value units and geographic adjustment factors used to determine reimbursement for a number of codes used in our current assays and our planned future assays. These codes describe services that we must perform in connection with our assays and we bill for these codes in connection with the services that we provide.

In addition, other legislative changes have been proposed and adopted since the Patient Protection and Affordable Care Act, or ACA, was enacted in March 2010. The Protecting Access to Medicare Act of 2014, or PAMA, was signed to law, which, among other things, significantly alters the current payment methodology under the CLFS. Under the new law, issued in 2016 and the reporting period beginning in 2017 and every three years thereafter (or annually in the case of advanced diagnostic lab tests), clinical laboratories must report laboratory test payment data for each Medicare-covered clinical diagnostic lab test that it furnishes during a time period. The reported data must include the payment rate (reflecting all discounts, rebates, coupons and other price concessions) and the volume of each test that was paid by each private payer (including health insurance issuers, group health plans, Medicare Advantage plans and Medicaid managed care organizations). Beginning in 2018, the Medicare payment rate for each clinical diagnostic lab test is equal to the weighted median amount for the test from the most recent data collection period. The payment rate will apply to laboratory tests furnished by a hospital laboratory if the test is separately paid under the hospital outpatient prospective payment system. The PAMA rate changes to our tests that were impacted did not materially affect our payments beginning in 2018; however, we cannot predict how this may change future payment in coming years. Also, under PAMA, CMS is required to adopt temporary billing codes to identify new tests and new advanced diagnostic laboratory tests that have been cleared or approved by the FDA. For an existing test that is cleared or approved by the FDA and for which Medicare payment is made as of April 1, 2014, CMS is required to assign a unique billing code if one has not already been assigned by the agency. In addition to assigning the code, CMS was required to publicly report payment for the tests no later than January 1, 2016. Further, under PAMA, CMS is required to adopt temporary billing codes to identify new tests and new advanced diagnostic laboratory tests that have been cleared or approved by the FDA. We cannot determine at this time the full impact of PAMA on our business, financial condition and results of operations.

Further, with respect to the Medicare program, Congress has proposed on several occasions to impose a 20% coinsurance charge on patients for clinical laboratory tests reimbursed under the Medicare Clinical Laboratory Fee Schedule, which would require us to bill patients for these amounts. Because of the relatively low reimbursement for many clinical laboratory tests, in the event that Congress were to ever enact such legislation, the cost of billing and collecting for these services would often exceed the amount actually received from the patient and effectively increase our costs of billing and collecting.

Some of our Medicare claims may be subject to policies issued by Palmetto and Noridian Healthcare Solutions, our former and current MACs for California, respectively. Palmetto is contracted with CMS to administer the MolDx program, which sets guidelines for coding, coverage and reimbursement of molecular diagnostic assays. Palmetto has issued a Local Coverage Determination, whereby Palmetto will not cover many molecular diagnostic assays, such as the enumeration component of our current

assays, unless the test is expressly included in a National Coverage Determination issued by CMS or a Local Coverage Determination or coverage article issued by Palmetto. Currently, laboratories may submit coverage determination requests to Palmetto for consideration and apply for a unique billing code for each assay (which is a separate process from the coverage determination). In the event that a non-coverage determination is issued, the laboratory must wait six months following the determination to submit a new request. Palmetto currently has a negative coverage determination for the enumeration component of CTC assays, but there is no such negative coverage determination for the analysis component of such CTC assays. Denial (or continuation of denial) of coverage for the enumeration component of our current and anticipated CTC assays by Palmetto or its successor MAC, Noridian Healthcare Solutions, which adopts coverage policies set by the MolDx program, or reimbursement at inadequate levels, would have a material adverse impact on our business and on market acceptance of our current assays and our planned future assays. Noridian Healthcare Solutions intends to follow, for CTC assays, the positive or negative coverage determinations which from time to time Palmetto makes as well as any coverage policy changes set by the MolDx program. On November 27, 2013, Palmetto denied our request for coverage for the enumeration/detection portion of our testing. We have not received any other indications to suggest that the negative coverage determination will be reversed. The CTC enumeration counts disease burden and is a prognostic test, and although oncologists find this information valuable, it does not meet many of the medical necessity requirements of Medicare and the payers. We intend to pursue payment for the capture portion of our CTC technology that allows us to run our diagnostic testing for some of our Target-Selector assays.

Additionally, the Centers for Disease Control and Prevention, CMS and the Office of Civil Rights issued a final rule in February 2014 to amend both the HIPAA and CLIA regulations. The final rule amended the HIPAA privacy rule to remove the CLIA laboratory exceptions, and as a result, HIPAA-covered laboratories are now required to provide individuals, upon request, with access to their completed test reports. Similarly, the final rule amended CLIA to state that CLIA laboratories and CLIA-exempt laboratories may provide copies of the patient's completed rest reports that, using the laboratory's authentication process, can be identified as belonging to that patient.

Governmental Regulations

Clinical Laboratory Improvement Amendments of 1988 and State Regulation

As a provider of laboratory testing on human specimens for the purpose of diagnosis, prevention, or treatment, we are required to hold certain federal, state and local licenses, certifications and permits to conduct our business. In 1988, Congress enacted CLIA, which established quality standards for all laboratories providing testing to ensure the accuracy, reliability and timeliness of patient test results regardless of where the test was performed. Our laboratory holds a CLIA certificate of accreditation. As to state laws, we are required to meet certain laboratory licensing and other requirements. Our laboratory holds the required licenses from the applicable state agencies in which we operate. For more information on state licensing requirements, see the sections entitled see the section entitled "Governmental Regulations-California State Laboratory Licensing" and "Governmental Regulations-Other States' Laboratory Licensing."

Under CLIA, a laboratory is defined as any facility which performs laboratory testing on specimens derived from humans for the purpose of providing information for the diagnosis, prevention or treatment of disease, or the impairment of, or assessment of health of human beings. CLIA also requires that we hold a certificate applicable to the complexity of the categories of testing we perform and that we comply with certain standards. CLIA further regulates virtually all clinical laboratories by requiring they comply with various operational, personnel, facilities administration, quality and proficiency testing requirements intended to ensure that their clinical laboratory testing services are accurate, reliable and timely. CLIA certification is also a prerequisite to be eligible to be reimbursed for services provided to state and federal health care program beneficiaries. CLIA is user-fee funded. Therefore, all costs of administering the program must be covered by the regulated facilities, including certification and survey costs.

We are subject to survey and inspection every two years to assess compliance with program standards and may be subject to additional unannounced inspections. Laboratories performing high complexity testing are required to meet more stringent requirements than laboratories performing less complex tests. In addition, a laboratory like ours that is certified as "high complexity" under CLIA may obtain analyte-specific reagents, which are used to develop LDTs.

In addition to CLIA requirements, we must comply with the standards set by CAP, which accredits our laboratory. Under CMS requirements, accreditation by CAP is sufficient to satisfy the requirements of CLIA. Therefore, because we are accredited by CAP, we are deemed to also comply with CLIA. CLIA also provides that a state may adopt laboratory regulations that are more stringent than those under federal law, and certain states have implemented their own more stringent laboratory regulatory schemes.

Federal, State and Foreign Fraud and Abuse Laws

A variety of federal and state laws prohibit fraud and abuse. These laws are interpreted broadly and enforced aggressively by various state and federal agencies, including CMS, the Department of Justice, the Office of Inspector General for Health and Human Services, or HHS, and various state agencies. In addition, the Medicare and Medicaid programs increasingly use a variety of contractors to review claims data and to identify improper payments as well as fraud and abuse. These contractors include Recovery Audit Contractors, Medicaid Integrity Contractors and Zone Program Integrity Contractors. In addition, CMS conducts Comprehensive Error Rate Testing audits, the purpose of which is to detect improper Medicare payments. Any overpayments identified must be repaid unless a favorable decision is obtained on appeal. In some cases, these overpayments can be used as the basis for an extrapolation, by which the error rate is applied to a larger universe of claims, and which can result in even higher repayments.

The federal Anti-Kickback Statute prohibits, among other things, knowingly and willfully offering, paying, soliciting, receiving, or providing remuneration, directly or indirectly, to induce or in return for either the referral of an individual, or the furnishing, recommending, or arranging for the purchase, lease or order of any health care item or service reimbursable, in whole or in part, under a federal health care program. The definition of "remuneration" has been broadly interpreted to include anything of value, including gifts, discounts, credit arrangements, payments of cash, ownership interests and providing anything at less than its fair market value. Recognizing that the Anti-Kickback Statute is broad and may technically prohibit many innocuous or beneficial arrangements within the health care industry, the Office of Inspector General for HHS has issued a series of regulatory "safe harbors." These safe harbor regulations set forth certain requirements that, if met, will assure immunity from prosecution under the federal Anti-Kickback Statute. Although full compliance with these provisions ensures against prosecution under the federal Anti-Kickback Statute, the failure of a transaction or arrangement to fit within a specific safe harbor does not necessarily mean that the transaction or arrangement is illegal or that prosecution under the federal Anti-Kickback Statute will be pursued. For further discussion of the impact of federal and state health care fraud and abuse laws and regulations on our business, see the section entitled "Risk Factors-Regulatory Risks Relating to Our Business." We are subject to federal and state health care fraud and abuse laws and regulations and could face substantial penalties if we are unable to fully comply with such laws.

In addition, HIPAA also created new federal crimes, including health care fraud and false statements relating to health care matters. The health care fraud statute prohibits knowingly and willfully executing a scheme to defraud any health care benefit program, including private third-party payers. A violation of this statute is a felony and may result in fines, imprisonment or exclusion from federal health care programs, such as the Medicare and Medicaid programs. The false statements statute prohibits knowingly and willfully falsifying, concealing or covering up a material fact or making any materially false, fictitious or fraudulent statement in connection with the delivery of or payment for health care benefits, items or services. A violation of this statute is a felony and may result in fines, imprisonment or exclusion from federal health care programs.

Finally, another development affecting the health care industry is the increased enforcement of the federal False Claims Act and, in particular, actions brought pursuant to the False Claims Act's "whistleblower" or "qui tam" provisions. The False Claims Act imposes liability on any person or entity that, among other things, knowingly presents, or causes to be presented, a false or fraudulent claim for payment to the federal government. The qui tam provisions of the False Claims Act allow a private individual to bring actions on behalf of the federal government and permit such individuals to share in any amounts paid by the entity to the government in fines or settlement. In addition, various states have enacted false claim laws analogous to the federal False Claims Act, and some of these state laws apply where a claim is submitted to any third-party payer. When an entity is determined to have violated the False Claims Act, it may be required to pay up to three times the actual damages sustained by the government, plus civil penalties ranging from $5,500 to $11,000 for each false claim.

Additionally, the civil monetary penalties statute imposes penalties against any person or entity that, among other things, is determined to have presented or caused to be presented a claim to a federal health program that the person knows or should know is for an item or service that was not provided as claimed or is false or fraudulent.

Also, many states have laws similar to those listed above that may be broader in scope and may apply regardless of payer.

Additionally, in Europe various countries have adopted anti-bribery laws providing for severe consequences, in the form of criminal penalties and/or significant fines for individuals and/or companies committing a bribery offence. Violations of these anti-bribery laws, or allegations of such violations, could have a negative impact on our business, results of operations and reputation. For instance, in the United Kingdom, under the Bribery Act 2010, a bribery occurs when a person offers, gives or promises to give a financial or other advantage to induce or reward another individual to improperly perform certain functions or activities, including any function of a public nature. Bribery of foreign public officials also falls within the scope of the Bribery Act 2010. Under the new regime, an individual found in violation of the Bribery Act 2010 faces imprisonment of up to 10 years. In addition, the individual can be subject to an unlimited fine, as can commercial organizations for failure to prevent bribery.

Physician Referral Prohibitions

Under a federal law directed at "self-referral," commonly known as the Stark Law, there are prohibitions, with certain exceptions, on Medicare and Medicaid payments for laboratory tests referred by physicians who personally, or through a family member, have a "financial relationship"-including an investment or ownership interest or a compensation arrangement-with the clinical laboratory performing the tests. Several Stark Law exceptions are relevant to arrangements involving clinical laboratories, including: (1) fair market value compensation for the provision of items or services; (2) payments by physicians to a laboratory for clinical laboratory services; (3) certain space and equipment rental arrangements that satisfy certain requirements, and (4) personal services arrangements that satisfy certain requirements. The laboratory cannot submit claims to the Medicare Part B program for services furnished in violation of the Stark Law, and Medicaid reimbursements may be at risk as well. Penalties for violating the Stark Law include the return of funds received for all prohibited referrals, fines, civil monetary penalties and possible exclusion from the federal health care programs. Many states have comparable laws that are not limited to Medicare and Medicaid referrals.

Corporate Practice of Medicine

A number of states, including California, do not allow business corporations to employ physicians to provide professional services. This prohibition against the "corporate practice of medicine" is aimed at preventing corporations such as us from exercising control over the medical judgments or decisions of physicians. The state licensure statutes and regulations and agency and court decisions that enumerate the specific corporate practice rules vary considerably from state to state and are enforced by both the courts and regulatory authorities, each with broad discretion. If regulatory authorities or other parties in any jurisdiction successfully assert that we are engaged in the unauthorized corporate practice of medicine, we could be required to restructure our contractual and other arrangements. In addition, violation of these laws may result in sanctions imposed against us and/or the professional through licensure proceedings, and we could be subject to civil and criminal penalties that could result in exclusion from state and federal health care programs.

Direct Billing Laws and Other State Law Restrictions on Billing for Laboratory Services

Laws and regulations in certain states prohibit laboratories from billing physicians or other purchasers for testing that they order. Some of those laws and regulations apply only to anatomic pathology services while others extend to other types of testing. Some states may allow laboratories to bill physicians directly but may prohibit the physician (and, in some cases, other purchasers) from charging more than the purchase price for the services (or may allow only for the recovery of acquisition costs) or may require disclosure of certain information on the invoice. In some cases, and if not prohibited by law or regulation, we may bill physicians, hospitals and other laboratories directly for the services that they order. An increase in the number of states that impose similar restrictions could adversely affect us by encouraging physicians to perform laboratory services in-house or by causing physicians to refer services to other laboratories that are not subject to the same restrictions.

Physician Licensing

A number of the states where specimens originate require that the physician interpreting those specimens be licensed by that particular state. Physicians who fail to comply with these licensure requirements could face fines or other penalties for practicing medicine without a license and we could be required to pay those fines on behalf of our pathologists or subject to liability under the federal False Claims Act and similar state laws if we bill for services furnished by unlicensed pathologists. We do not believe that the services our pathologist performs constitute the practice of medicine in any state that requires out-of-state physician licensure. We believe that our pathologist thus is not required to obtain licensure in any state where he does not reside.

In addition, many states also prohibit the splitting or sharing of fees between physicians and non-physician entities. We do not believe that our contractual arrangements with physicians, physicians group practices or hospitals will subject us to claims under such regulations. However, changes in the laws may necessitate modifications in our relationships with our clients.

California State Laboratory Licensing

Our laboratory is licensed and in good standing under the State of California Department of Public Health standards. Our current licenses permit us to receive specimens obtained in California.

California state laws and regulations also establish standards for the day-to-day operations of clinical laboratories, including physical facility requirements and equipment, quality control and proficiency testing requirements. If we are found to be out of compliance with California statutory or regulatory standards, we may be subject to suspension, restriction or revocation of our laboratory license or assessed civil money penalties. The operator of a noncompliant laboratory may also be found guilty of a misdemeanor under California law. A finding of noncompliance, therefore, may result in harm to our business.

Other States' Laboratory Licensing

Several states require the licensure of out-of-state laboratories that accept specimens from those states. We hold licenses from the states of Florida, Maryland, Pennsylvania and Rhode Island to test specimens from patients in those states or received from ordering physicians in those states. We are currently in the process of addressing the requirements for licensure in New York.

From time to time, other states may require out of state laboratories to obtain licensure in order to accept specimens from such states. If we identify any other state with such requirements or if we are contacted by any other state advising us of such requirements, we intend to follow instructions from the state regulators as to how we should comply with such requirements.

U.S. Food and Drug Administration

We provide our assays as LDTs. Historically; the FDA has exercised enforcement discretion with respect to most LDTs and has not required laboratories that offer LDTs to comply with the agency's requirements for medical devices (e.g., establishment registration, device listing, quality systems regulations, premarket clearance or premarket approval, and post-market controls). In recent years, however, the FDA has stated it intends to end its policy of enforcement discretion and regulate certain LDTs as medical devices. To this end, on October 3, 2014, the FDA issued two draft guidance documents, entitled "Framework for Regulatory Oversight of Laboratory Developed Tests (LDTs)" and "FDA Notification and Medical Device Reporting for Laboratory Developed Tests (LDTs)", respectively, that set forth a proposed risk-based regulatory framework that would apply varying levels of FDA oversight to LDTs. The FDA has indicated that it does not intend to modify its policy of enforcement discretion until the draft guidance documents are finalized. In January 2017, the FDA announced that final guidance on the oversight of LDTs would allow for further public discussion. On January 13, 2017 the FDA issued a "Discussion Paper on Laboratory Developed Tests (LDTs)," which states that the material in the document does not represent a final version of the LDT draft guidance documents that were published in 2014 or position of the FDA; rather, the document is a method to encourage additional dialogue. The timing of when, if at all, the draft guidance documents will be finalized is unclear, and even then, the new regulatory requirements are proposed to be phased-in consistent with the schedule set forth in the guidance. Nevertheless, the FDA may decide to regulate certain LDTs on a case-by-case basis at any time. LDTs with the same intended use as a cleared or approved companion diagnostic are defined in FDA's draft guidance as "high-risk LDTs (Class III medical devices)" for which premarket review would be first to occur.

Failure to comply with applicable FDA regulatory requirements may trigger a range of enforcement actions by the FDA including warning letters, civil monetary penalties, injunctions, criminal prosecution, recall or seizure, operating restrictions, partial suspension or total shutdown of production, and denial of or challenges to applications for clearance or approval, as well as significant adverse publicity.

Other Regulatory Requirements

Our laboratory is subject to federal, state and local regulations relating to the handling and disposal of regulated medical waste, hazardous waste and biohazardous waste, including chemical, biological agents and compounds, blood and bone marrow samples and other human tissue. Typically, we use outside vendors who are contractually obligated to comply with applicable laws and regulations to dispose of such waste. These vendors are licensed or otherwise qualified to handle and dispose of such waste.

The Occupational Safety and Health Administration has established extensive requirements relating to workplace safety for health care employers, including requirements to develop and implement programs to protect workers from exposure to blood-borne pathogens by preventing or minimizing any exposure through needle stick or similar penetrating injuries.

Segment and Geographical Information

We operate in one reportable business segment and historically have derived revenues primarily from within the United States.

Employees

As of December 31, 2018, we had a total of 87 full-time employees, 8 of whom hold doctorate degrees and 11 of whom are engaged in full-time research and development activities, as well as 4 part-time employees. We plan to expand production, sales and marketing and our research and development programs, and we plan to hire additional staff as these initiatives are implemented. None of our employees is represented by a labor union.

Available Information

Our website address is www.biocept.com. We post links to our website to the following filings as soon as reasonably practicable after they are electronically filed with or furnished to the Securities and Exchange Commission, or the SEC: annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, proxy statements, and any amendments to those reports filed or furnished pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934, as amended. All such filings are available through our website free of charge. Our filings may also be read and copied at the SEC's Public Reference Room at 100 F Street, NE, Washington, DC 20549. Information on the operation of the Public Reference Room may be obtained by calling the SEC at 1-800-SEC-0330. The SEC also maintains an internet site at www.sec.gov that contains reports, proxy and information statements, and other information regarding issuers that file electronically with the SEC.

Company Information

We maintain our principal executive offices at 5810 Nancy Ridge Drive, San Diego, California 92121. Our telephone number is (858) 320-8200 and our website address is www.biocept.com. The information contained in, or that can be accessed through, our website is not incorporated into and is not part of this annual report. We were incorporated in California on May 12, 1997 and reincorporated as a Delaware corporation on July 30, 2013.

Executive Officers and Directors

The following table sets forth the name, age and position of each of our directors and executive officers as of December 31, 2018.

Name	Age	Position	Served as an Officer or Director Since
David F. Hale	70	Non-executive Chairman of the Board of Directors	2011
Marsha A. Chandler, Ph. D.(3) (4)	73	Director	2013
Bruce E. Gerhardt, CPA(1)(2)	67	Director	2010
Bruce A. Huebner(1)(2)(4)	68	Director	2013
Michael W. Nall	56	Director, Chief Executive Officer and President	2013
Ivor Royston, M.D.(3)(4)	73	Director	2010
M. Faye Wilson, CPA, MBA(1)(2)(3)	81	Lead Independent Director	2009
Lyle J. Arnold, Ph. D.	72	Senior Vice-President of Research & Development, Chief Scientific Officer	2011
Timothy C. Kennedy	61	Chief Financial Officer, Senior Vice President of Operations and Corporate Secretary	2016
Michael Terry	64	Senior Vice President, Corporate Development	2017
Edwin Hendrick	52	Senior Vice President, Chief Commercial Officer	2018

(1) Audit Committee
(2) Compensation Committee
(3) Nominating and Corporate Governance Committee
(4) Science, Technology and Clinical Affairs Committee

Our board of directors is classified into three classes of one or three directors each, with all directors serving for a three-year term and the directors of only one class being elected at each annual meeting of stockholders, so that the terms of the classes of directors are "staggered." The director in Class I is Mr. Gerhardt. The next election of Class I directors by stockholders will be at our 2020 annual meeting of stockholders, with the elected candidate(s) to then serve until our 2023 annual meeting of stockholders. The directors in Class II are Dr. Chandler, Mr. Huebner and Dr. Royston. The next election of Class II directors by stockholders will be at our 2021 annual meeting of stockholders, with the elected candidates to then serve until our 2024 annual meeting of stockholders. The directors in Class III are Mr. Hale, Mr. Nall and Ms. Wilson. The next election of Class III directors by stockholders will be at our 2019 annual meeting of stockholders, with the elected candidates to then serve until our 2022 annual meeting of stockholders.

Our executive officers are elected by, and serve at the discretion of, our board of directors. There are no family relationships among any of our directors and executive officers. The business experience for the past five years (and, in some instances, for prior years) of each of our executive officers and directors is as follows:

David F. Hale

Mr. Hale was appointed as our Executive Chairman in March 2011. As of and in connection with the closing of our initial public offering on February 10, 2014, Mr. Hale now serves as non-executive Chairman. He is the Chairman and CEO of Hale BioPharma Ventures LLC, a private company focused on the formation and development of biotechnology, specialty pharma, diagnostic and medical device companies. Mr. Hale is currently serving as Executive Chairman and Acting President and CEO of Neurana Pharmaceuticals, Inc. Mr. Hale is a serial entrepreneur who has been involved in the founding and/or development of a number of life sciences companies. He served as the Chairman of Santarus, Inc., a specialty biopharmaceutical company, since 2004 and a member of Santarus' board since 2000, prior to its acquisition by Salix Pharmaceuticals, Ltd. in 2014. He also serves as Chairman of Conatus Pharmaceuticals, Inc, a public company. He was previously President and CEO of CancerVax Corporation from October 1999 through its merger in May 2006 with Micromet, Inc., when he became Chairman of the combined companies. He is a co-founder and served as Chairman of Somaxon Pharmaceuticals, Inc. before its acquisition by Pernix Therapeutics Holdings, Inc., and as Chairman of SkinMedica, Inc., before its acquisition by Allergan, Inc. He also serves as Chairman of Adigica Health, Inc., Clarify Medical, Inc., MDRejuvena, Inc., Neurelis, Inc. and Recros Medica, Inc. In 1982, after joining Hybritech, Inc., the first monoclonal antibody company, he served as COO, President and then Chief Executive Officer, when Hybritech was acquired by Eli Lilly and Co. in 1986. From 1987 until 1997 he was Chairman, President and CEO of Gensia, Inc., which merged with SICOR to

become Gensia Sicor, Inc., which was later acquired by Teva Pharmaceuticals. He was a co-founder and Chairman of Viagene, Inc. from 1987 to 1995, when Viagene was acquired by Chiron, Inc. He was President and CEO of Women First HealthCare, Inc. from late 1997 to June 2000, before joining CancerVax in October 1999. Prior to joining Hybritech, Mr. Hale was Vice President and General Manager of BBL Microbiology Systems, a diagnostics division of Becton, Dickinson & Co. and from 1971 to 1980, held various marketing and sales management positions with Ortho Pharmaceutical Corporation, a division of Johnson & Johnson, Inc.

We selected Mr. Hale to serve on and lead our board of directors due to his public and private company board experience as well as his extensive experience with and knowledge of health care issues and the operational activities of life sciences companies.

Marsha A. Chandler, Ph. D.

Dr. Chandler is Emerita Senior Vice Chancellor and Professor Emerita at the School of Global Policy and Strategy at the University of California, San Diego (UCSD). She is also currently Advisor to the Jacobs School of Engineering at UCSD as well as Advisor to the Lyndon B. Johnson School of Public Affairs at The University of Texas at Austin. She served as the Executive Vice-President/Chief Operating Officer of the Salk Institute for Biological Studies from 2007 to 2015, where she managed approximately 1,000 scientific and administrative personnel and oversaw all institutional fiscal, administrative and fund-raising activities. From 1997 to 2007 she was the Senior Vice Chancellor for Academic Affairs at UCSD, where she was the chief academic officer responsible for the policies and decisions relating to all academic programs and faculty appointments and performance. She was the Acting Chancellor from 2003-04 and holds an appointment as Professor of Political Science in the Graduate School of International Relations and Pacific Studies at UCSD.

Dr. Chandler is a Fellow of the Royal Society of Canada, the highest academic honor bestowed in that country. She received her Ph.D. from The University of North Carolina at Chapel Hill. In 2004, she completed the Advanced Management Program at Harvard Business School.

We selected Dr. Chandler to serve on our board of directors due to her experience in organizational management and her stature in the life sciences community. Dr. Chandler also serves as chair of our nominating and corporate governance committee and as a member of our science, technology and clinical affairs committee.

Bruce E. Gerhardt, CPA

Mr. Gerhardt has been self-employed, practicing as a Certified Public Accountant, since 1986. He is also a tax and business advisor providing tax compliance for small businesses and high income individuals. Prior to 1986, he was a financial vice-president with several companies and a senior accountant with Peat Marwick Mitchell, now KPMG, one of the “Big Four” accounting firms. He earned his Bachelor of Arts Degree from the University of Southern California in 1973 and is a member of the American Institute of Certified Public Accountants.

We selected Mr. Gerhardt to serve on our board of directors due to his experience and expertise in financial accounting and auditing. Mr. Gerhardt also serves as a member of our audit committee and as a member of our compensation committee.

Bruce A. Huebner

Mr. Huebner was a managing director of LynxCom Partners LLC, a healthcare consulting firm, from 2004 through 2016 where his focus was primarily on cancer diagnostics and personalized medicine. In June of 2011, he joined the board of Vermillion, Inc., an ovarian cancer diagnostics company. He assumed the role of Interim Chief Executive Officer and President of Vermillion from November 2012 to March 2013 and then served as Chairman of the Board from March through December 2013. From October 2009 to June 2010, Mr. Huebner served as President and Chief Executive Officer of TrovaGene, Inc., a developer of molecular diagnostics products. From June of 2005 through June of 2008, Mr. Huebner served as President of Osmetech, Inc., a molecular diagnostic microarray products company. From 2002 to 2004, Mr. Huebner was President and Chief Operating Officer of Nanogen, Inc., a publicly held nanotechnology/microarray company. From 1996 to 2002, Mr. Huebner was Executive Vice-President and Chief Operating Officer of Gen-Probe Incorporated, a leader in the development of nucleic acid tests for infectious diseases. Mr. Huebner received his Bachelor of Science degree in Chemistry from the University of Wisconsin-La Crosse and completed a Senior Executive Graduate School program at Columbia University.

We selected Mr. Huebner to serve on our board of directors due to his strong background in cancer diagnostics sales, marketing, operations and reimbursement. Mr. Huebner also serves as chair of our compensation committee, as a member of our audit committee and as a member of our science, technology and clinical affairs committee.

Michael W. Nall

Mr. Nall has over 30 years of healthcare sales and marketing experience, serving as our CEO and President since 2013. Before joining Biocept, Mr. Nall served at Clarient Diagnostic Services, Inc. in positions of increasing responsibility from 2002 through August 2013, with his last position being General Manager, North American Sales and Marketing. While at Clarient, Mr. Nall was also responsible for leading the team assimilating Clarient into GE Healthcare after Clarient was acquired in 2010.

From 1988 until joining Clarient, Mr. Nall served in the diagnostic and medical device industries in various commercial leadership roles for companies including Impath, American Cyanamid, Maquet Surgical, Strato Medical, Horizon Medical Products and Columbia Vital Systems.

Mr. Nall received a Bachelor of Science degree in Business Administration from Central Missouri State University (now known as the University of Central Missouri).

We selected Mr. Nall to serve on our board of directors due to his experience in the cancer diagnostics business, his expertise in the commercialization of products and services such as ours, his background in reimbursement and operations and his status as our chief executive officer and president.

Ivor Royston, M.D.

Dr. Royston currently serves as CEO of Viracta Therapeutics, Inc. From 1990 to 2000, he served as founding President and CEO of The Sidney Kimmel Cancer Center and from 1978 to 1990, he was a member of the oncology faculty of the University of California, San Diego. In addition to being a co-founder of Hybritech, Inc., in 1986 he co-founded IDEC Corporation, which later merged with Biogen to form Biogen Idec. From 1990 to 2017, Dr. Royston was the Founding Managing Partner of Forward Ventures and has been instrumental in the formation, financing and development of numerous biotechnology companies, including Applied Molecular Evolution (acquired by Eli Lilly), Corixa (acquired by GlaxoSmithKline), Dynavax, LigoCyte (acquired by Takeda), Morphotek (acquired by Eisai), Sequana Therapeutics (acquired by Celera), Syndax, TargeGen (acquired by Sanofi-Aventis), and Triangle Pharmaceuticals (acquired by Gilead). He is currently a director of Viracta. Dr. Royston received his B.A. and M.D. degrees from Johns Hopkins University and completed post-doctoral training in internal medicine and medical oncology at Stanford University. In 1997, President Clinton appointed Dr. Royston to a six-year term on the National Cancer Advisory Board.

We selected Dr. Royston to serve on our board of directors due to his extensive experience with emerging life sciences companies. Dr. Royston also serves as chair of our science, technology and clinical affairs committee and as a member of our nominating and governance committee.

M. Faye Wilson, MBA

Ms. Wilson is CEO of Wilson Boyles and Company, a business consulting firm specializing in the development and implementation of successful business strategies. Prior to co-founding Wilson Boyles in 2003, she served as Senior Vice-President, Value Initiatives and Risk Management for The Home Depot, having joined the company in 1998 following a 21-year career at Bank of America. Ms. Wilson was Executive-Vice President of Bank of America and Chairman and President of Security Pacific Financial Services, a wholly owned subsidiary of BancAmerica Corporation.

Ms. Wilson began her banking career as a management trainee in the Corporate Banking Group of Security Pacific National Bank, which merged with and became Bank of America in 1992. Prior to assuming the chairmanship of Security Pacific Financial Services, she was the Executive Vice-President responsible for overseeing credit quality and policy for over 80% of Bank of America’s loan portfolio.

During her Security Pacific career, Ms. Wilson spent time in London as the Managing Director of Corporate Finance for Security Pacific Hoare Govett, where she created new corporate advisory services, debt structuring products and formed a cross-border mergers and acquisitions division for European and U.S. companies. Prior to the London assignment, she was Managing Director of the Leveraged Buyout Group for the Security Pacific Merchant Bank, establishing the bank as lead in high profile transactions. Earlier, as Senior Vice-President and Regional Manager in the Corporate Banking Division with responsibility for multinational corporations, retail industry companies and California based corporations, Ms. Wilson established lead banking relationships with major players in those markets.

Ms. Wilson has served as a director on the corporate boards BioMed Realty Trust, Inc. (a real estate investment trust, until its acquisition by Blackstone Real Estate Partners VIII in 2016), Farmers Insurance Group, The Home Depot, SKM (a Russian public company), and Community National Bank. Currently she is a trustee of The Salk Institute and Chair of the Audit Committee of Sharp Health Group. She remains engaged with the activities of Duke University, her alma mater.

Ms. Wilson received master's degrees in international relations and in business administration from the University of Southern California.

We selected Ms. Wilson to serve as lead independent director on our board of directors due to her extensive experience as a director of public companies, her financial acumen and experience, and her expertise in business strategy. Ms. Wilson also serves as chair of our audit committee, as a member of our compensation committee and as a member of our nominating and governance committee.

Lyle J. Arnold, Ph. D.

Dr. Arnold joined us as Senior Vice-President of Research & Development and Chief Scientific Officer at Biocept in 2011. Dr. Arnold is a biotechnology executive, entrepreneur, and developer of innovative technologies covering therapeutics, molecular diagnostics, and genomics. Prior to joining Biocept, Dr. Arnold founded Aegea Biotechnologies to acquire, develop, and commercialize, next generation nucleic acid technologies. Dr. Arnold has served on the board of directors of numerous companies, including Asuragen and Aegea, as well as, non-profit organizations. Dr. Arnold has also held senior scientific and management positions at Molecular Biosystems (co-founder), Genta, Synteni, Incyte Genomics, Oasis Biosciences (co-founder), and Gen-Probe (now Hologic). In addition, Dr. Arnold was a faculty member in the UCSD School of Medicine and a member of the UCSD Cancer Center. Dr. Arnold is an inventor or co-inventor on 49 issued U.S. patents and more than 160 issued and pending patents worldwide. He is the principal inventor of the chemiluminescent Hybridization Protection Assay (HPA) and associated technologies core to Hologic assays that generate more than $500M in product revenue annually. Dr. Arnold is also the inventor of the patented Switch-Blocker technology for detecting extremely rare genetic events that Biocept uses for interrogating ctDNA for cancer associated mutations. In addition, he has authored more than 50 scientific publications. Dr. Arnold received a B.S. in Chemistry from the University of California at Los Angeles and a Ph.D. in Chemistry/Biochemistry from the University of California at San Diego.

Timothy C. Kennedy

Mr. Kennedy joined us as Chief Financial Officer, Senior Vice-President of Operations and Corporate Secretary in July 2016. Mr. Kennedy has over 30 years of executive, financial, and operational leadership experience, with over 25 years in the clinical diagnostics industry. Mr. Kennedy previously served as Chief Financial Officer of Millennium Health, a privately held leading urine drug testing and pharmacogenetics laboratory company, from 2013 to July 2016. Prior to joining Millennium Health, Mr. Kennedy was Chief Financial Officer and General Manager of PLUS Diagnostics, a urology, gastroenterology and oncology lab from 2008 through 2012. Prior to Plus Diagnostics, Mr. Kennedy held an ownership position in Diagnostic Imaging Management, a multi-site imaging company from 1997 to 2008, expanding from 12 to 33 free-standing centers across the United States. From 1988 to 1997, Mr. Kennedy held a number of management positions with National Health Laboratories, where he served as the Head of Finance, completing over 50 acquisitions and the merger with Roche Biomedical Labs to form LabCorp in 1995. Mr. Kennedy serves on the Board of Directors of MyCircle Health, a data services company that helps patients with chronic health conditions measure, evaluate, control and communicate daily test results to their healthcare providers and physicians. Mr. Kennedy holds a bachelor's degree in Business - Accounting/Information Technology from Keane University.

Michael Terry

Mr. Terry joined us as Senior Vice-President of Commercial Operations in February 2017. A seasoned veteran in the molecular diagnostics and liquid biopsy industries, Mr. Terry has previously served as Executive Vice President, Commercial Operations and Corporate Development of Trovagene, Inc. from 2012 to 2014, as well as Executive Vice President of Sequenom, Inc., where he managed global commercial operations from 2003 to 2005. Mr. Terry's career also includes 4 years at GE Healthcare's Marquette Medical division, where he held key executive positions in sales management, commercial operations and eBusiness from 1997 to 2001. At GE Healthcare, he earned a certification in Six Sigma. Mr. Terry has also served as the Executive Vice President of European Operations for Lumenis Ltd., Vice President of Global Sales for Aspect Medical Systems Inc., and Chief Executive Officer of Ligand Diagnostics. Mr. Terry earned a B.S. in Economics and Business from the University of Wisconsin - Madison.

Edwin Hendrick

Mr. Hendrick joined us as Chief Commercial Officer in August 2018. Mr. Hendrick, in his more than 25 years of diagnostic experience, has lead the commercial operations in both public and private companies. Previous companies that he has held similar roles have been PLUS Diagnostics, Inc., USLabs, Ventana Medical Systems, Inc. and Abbott Laboratories. His most recent role was serving as Chief Commercial Officer at GenomeDx Biosciences Inc. Mr. Hendrick received his Bachelor of Arts from the University of Kentucky in Communication and Advertising.

Director Independence

Our common stock is listed on The Nasdaq Capital Market under the symbol BIOC. Under the rules of The Nasdaq Stock Market, independent directors must comprise a majority of a listed company's board of directors within 12 months after the completion of an initial public offering. In addition, the rules of The Nasdaq Stock Market require that, (i) on the date of the completion of this offering, at least one member of our audit, compensation and nominating and corporate governance committees be independent, (ii) within 90 days after the date of the completion of our initial public offering, a majority of the members of such committees be independent and (iii) within one year after the date of the completion of our initial public offering, all the members of such committees be independent. Audit committee members must also satisfy the independence criteria set forth in Rule 10A-3 under the Exchange Act. Under the rules of The Nasdaq Stock Market, a director will only qualify as an "independent director" if, in the opinion of that company's board of directors, that person does not have a relationship that would interfere with the exercise of independent judgment in carrying out the responsibilities of a director.

In order to be considered to be independent for purposes of Rule 10A-3, a member of an audit committee of a listed company may not, other than in his or her capacity as a member of the audit committee, the board of directors, or any other board committee: (1) accept, directly or indirectly, any consulting, advisory or other compensatory fee from the listed company or any of its subsidiaries or (2) be an affiliated person of the listed company or any of its subsidiaries.

Our board of directors undertook a review of its composition, the composition of its committees and the independence of each director. Based upon information requested from and provided by each director concerning his background, employment and affiliations, including family relationships, our board of directors has determined that Dr. Chandler, Mr. Gerhardt, Mr. Hale, Mr. Huebner, Dr. Royston and Ms. Wilson, or six of our seven directors, do not have a relationship that would interfere with the exercise of independent judgment in carrying out the responsibilities of a director and that each of these directors is "independent" as that term is defined under the rules of The Nasdaq Stock Market.

Our board of directors also determined that (i) Messrs. Gerhardt and Huebner and Ms. Wilson, who compose our audit committee, (ii) Messrs. Gerhardt and Huebner and Ms. Wilson, who compose our compensation committee, (iii) Dr. Chandler, Dr. Royston and Ms. Wilson, who compose our nominating and corporate governance committee, and (iv) Dr. Chandler, Mr. Huebner and Dr. Royston who compose our science, technology and clinical affairs committee, each satisfy the independence standards for those committees established by the applicable rules and regulations of the SEC and The Nasdaq Stock Market. In making this determination, our board of directors considered the relationships that each non-employee director has with us and all other facts and circumstances our board of directors deemed relevant in determining their independence, including the beneficial ownership of our capital stock by each non-employee director. We intend to comply with all size and independence requirements for committees within the applicable time periods.

Summary Compensation Table

The following table shows the compensation awarded to or earned in our last two fiscal years by our principal executive officer and our two most highly compensated executive officers other than our principal executive officer who were serving as executive officers as of December 31, 2018. The persons listed in the following table are referred to herein as the "named executive officers."

Name and Principal Position	Year	Salary ($)(1)	Stock Awards ($)(2)	Option Awards ($)(2)	Non-equity Incentive Plan Compensation ($)(3)	Other Compensation ($)(4)	Total ($)
Michael W. Nall	2018	426,270(5)	—	—	— (6)	13,450(7)	439,720
President and Chief Executive Officer	2017	394,631(5)	112,500	509,476	86,366(6)	36,867(7)	1,139,840
Timothy C. Kennedy	2018	346,241(8)	—	—	— (9)	12,795(10)	359,036
CFO, SVP of Operations	2017	329,569(8)	75,000	150,834	63,750(9)	3,284(10)	622,437
Lyle J. Arnold, Ph.D.	2018	286,828(11)	—	—	— (12)	600(13)	287,428
SVP R&D, Chief Scientific Officer	2017	282,416(11)	75,000	152,086	40,574(12)	600(13)	550,675

(1) The "Salary ($)" column includes salary earned for each named executive officer and the net increase/(decrease) in each named executive officer's accrued vacation balance, or accrued vacation, in each year ended December 31.

(2) The amounts in the "Option Awards ($)" and "Stock Awards ($)" columns reflect the grant date fair values of stock option and RSU awards, respectively, granted during the year. These amounts are determined in accordance with the provisions of FASB ASC Topic 718, rather than an amount paid to or realized by the executive officer. For a description of these stock option and RSU awards, see "Narrative Disclosure to Summary Compensation Table" within this "Executive Compensation" section.

(3) The "Non-equity Incentive Compensation Plan Compensation ($)" column includes discretionary amounts earned by each named executive officer pursuant to an employment agreement or our approved Annual Incentive Plan.

(4) The "Other Compensation ($)" column includes amounts earned by each named executive officer but not otherwise included in amounts within the "Salary ($)," "Stock Awards ($)," "Option Awards ($)," or "Non-equity Incentive Plan Compensation ($)" columns.

(5) 2018 salary amount includes accrued vacation of $1,905. 2017 salary amount includes accrued vacation of $18,857.

(6) 2018 non-equity incentive plan compensation amount excludes a bonus of up to $212,183, or 50% of Mr. Nall's annual base salary, related to the achievement of corporate performance goals during 2018 for which the amount to be awarded is expected to be determined by March 31, 2019. 2017 non-equity incentive plan compensation amount includes a bonus of $86,366 related to the achievement of corporate performance goals during 2017.

(7) 2018 other compensation amount includes $12,250 401K company match benefit we provided, as well as $1,200 of employer paid life insurance premiums for the benefit of Mr. Nall. 2017 other compensation amount includes $20,000 commuting expenses reimbursement benefit we provided to Mr. Nall plus $15,667 of income taxes we paid for Mr. Nall in respect of such benefit as well as $1,200 of employer paid life insurance premiums for the benefit of Mr. Nall.

(8) 2018 salary amount includes accrued vacation of $22,043. 2017 salary amount includes accrued vacation of $17,069.

(9) 2018 non-equity incentive plan compensation amount excludes a bonus of up to $129,679, or 40% of Mr. Kennedy's annual base salary, related to the achievement of both corporate and individual performance goals during 2018 for which the amount to be awarded is expected to be determined by March 31, 2019. 2017 non-equity incentive plan compensation amount includes a bonus of $63,750 related to the achievement of both corporate and individual performance goals during 2017.

(10) 2018 other compensation amount includes $11,595 401K company match benefit we provided, as well as $1,200 of employer paid life insurance premiums for the benefit of Mr. Kennedy. 2017 other compensation amount includes $2,084 401K company match benefit we provided, as well as $1,200 of employer paid life insurance premiums for the benefit of Mr. Kennedy.

(11) 2018 salary amount includes accrued vacation of $2,530. 2017 salary amount includes accrued vacation of $(7,397).

(12) 2018 non-equity incentive plan compensation amount excludes a bonus of up to $99,504, or 35% of Dr. Arnold's annual base salary, related to the achievement of corporate performance goals during 2018 for which the amount to be awarded is expected to be determined by March 31, 2019. 2017 non-equity incentive plan compensation amount includes a bonus of $40,574 related to the achievement of both corporate and individual performance goals during 2017.

(13) 2018 other compensation amount includes $600 of employer paid life insurance premiums for the benefit of Mr. Kennedy. 2017 other compensation amount includes $600 of employer paid life insurance premiums for the benefit of Mr. Kennedy.

Narrative Disclosure to Summary Compensation Table

Michael W. Nall

We entered into an employment agreement effective as of August 26, 2013, as amended on November 6, 2015, with Michael W. Nall, or collectively, the CEO Employment Agreement, in connection with his appointment as our Chief Executive Officer and President. The CEO Employment Agreement provided Mr. Nall the following: (i) a base salary of $350,000 per year; (ii) a housing allowance of $2,000 per month; and (iii) stock options under our Amended and Restated 2013 Equity Incentive Plan, as amended, or the Amended 2013 Plan, to purchase a number of shares of common stock equal to at least 4% of our fully diluted stock outstanding as of August 26, 2013, vesting in equal monthly installments over four years beginning August 15, 2013 with a term of 10 years. During the years ended December 31, 2016 and 2017, Mr. Nall was eligible to participate in our annual incentive plan with a target bonus amount equal to 50% of Mr. Nall's annual base salary, of which 100% was dependent on the achievement of corporate performance goals. Effective as of April 1, 2017 and March 19, 2018, Mr. Nall's base salary was increased to $372,000 and $425,350 per year, respectively, as approved by the compensation committee of our board of directors. Effective as of November 1, 2017, the CEO Employment Agreement was amended to reflect a base salary increase to $412,961 and the removal of the housing allowance of $2,000 per month, as approved by the compensation committee of our board of directors.

The CEO Employment Agreement provides that in the event of termination of Mr. Nall's employment by us without cause or his resignation for good reason, the vesting of any of his outstanding unvested stock options and RSUs which would have vested over the following 12 months will accelerate (unless the applicable stock option or RSU agreement provides for more favorable acceleration terms). Also, in the event of a change of control, if the surviving or acquiring corporation (or its parent company) does not assume or continue Mr. Nall's outstanding unvested stock options or RSUs or substitute similar stock awards for such stock options or RSUs, then all of Mr. Nall's unvested stock options and RSUs will immediately vest and become exercisable, provided Mr. Nall is providing continued service to us immediately prior to the change of control. In addition, solely with respect to Mr. Nall's unvested stock options and RSUs granted prior to November 6, 2015, in the event of a change of control where Mr. Nall's unvested stock options and RSUs are not fully accelerated, the vesting of 50% of any of Mr. Nall's outstanding unvested stock options and RSUs will accelerate on the date of the change of control and the remaining unvested stock options and RSUs will vest on the earliest of (i) the date of the termination of his employment by us without cause, (ii) the date of his resignation for good reason, or (iii) the first anniversary of the change of control (unless the applicable stock option or RSU agreement provides for more favorable acceleration terms). (For example, the foregoing would not apply to the initial stock options grant, which would fully accelerate upon a change in control.) Additionally, if during the 10-day period before a change of control or during the 12-month period following a change of control, Mr. Nall's employment is terminated without cause or Mr. Nall resigns for good reason, then the vesting of each of Mr. Nall's outstanding unvested stock options and RSUs will accelerate immediately. The CEO Employment Agreement provides that if Mr. Nall has a separation from service as a result of his discharge by us without cause or his resignation with good reason then, provided that he gives us an effective waiver and release of claims, he will be entitled to 12 months' salary and up to 12 months of COBRA premiums (or substantially equivalent health insurance coverage).

On May 2, 2017, our board of directors approved the issuance of 100,000 time-based stock options, 6,666 performance-based stock options, 1,666 time-based RSUs, and 833 performance RSUs to Mr. Nall under the Amended 2013 Plan, which were granted on May 31, 2017 with per share estimated grant date fair values of $31.20, $29.70, $45.00 and $45.00, respectively. The exercise price of the time-based and performance stock options of $45.00 per share is equal to the closing price of our common stock on the date of grant, with a term of 10 years from the date of grant. The grant date fair values of the time-based and performance stock options were estimated using a Black-Scholes valuation model. The assumptions used in the Black-Scholes valuation model for the time-based stock options include a volatility rate of 80.0%, a risk-free interest rate of 1.89%, a dividend yield of 0.00%, and an expected term of 6.04 years. The assumptions used in the Black-Scholes valuation model for the performance stock options include a volatility rate of 80.0%, a risk-free interest rate of 1.79%, a dividend yield of 0.00%, and an expected term of 5.29 years. Each time-based stock option award vests over a four-year period with 25% of all shares vesting on the one-year anniversary of the vesting commencement date, or May 2, 2018, with the remainder vesting in 36 equal monthly installments over the following three years from April 2, 2018 through May 2, 2021, subject to continuing service. Vesting of the time-based stock options and RSUs granted on May 31, 2017 occurred on the one-year anniversary of the vesting commencement date, or May 2, 2018. Vesting of the performance stock options and RSUs granted on May 31, 2017 was as determined by our board of directors or our compensation committee of our board of directors upon the achievement of specified corporate goals for 2017. Subsequent to the year ended December 31, 2017, none of the performance stock options and performance RSUs granted on May 31, 2017 were declared vested, and the 7,500 shares underlying these awards were forfeited.

Timothy C. Kennedy

We entered into an employment agreement effective July 25, 2016 with Timothy Kennedy, or the CFO Employment Agreement, in connection with his appointment as our Chief Financial Officer and Senior Vice President of Operations and Corporate Secretary. The CFO Employment Agreement provides Mr. Kennedy the following: (i) a base salary of $305,000 per year; (ii) a target annual bonus of 40% of base salary, pro-rated from employment commencement date for 2016, of which 50% was guaranteed only for 2016; (iii) time-based inducement stock options under our 2013 Plan to purchase 2,222 shares of common stock at its fair market value on the date of grant, with 25% of all shares vesting on the one-year anniversary of the grant date and the remainder vesting in equal monthly installments over the following three years; (iv) performance inducement stock options under our 2013 Plan to purchase 1,111 shares of common stock at its fair market value on the date of grant, with vesting as determined by our board of directors or its compensation committee based on the achievement of specified goals for 2016; and (v) inducement RSUs under our 2013 Plan for 833 shares of common stock, with vesting occurring on the one-year anniversary of the commencement of Mr. Kennedy's employment. During 2017 and 2018, Mr. Kennedy was eligible to participate in our annual incentive plan with 80% of the annual target bonus dependent on the achievement of corporate performance goals and 20% of the annual target bonus dependent on the achievement of individual performance goals. Effective as of April 1, 2017 and March 19, 2018, Mr. Kennedy's base salary was increased to $315,000 and $325,080, respectively, per year as approved by the compensation committee of our board of directors.

The CFO Employment Agreement provides that if Mr. Kennedy's continuous service is terminated without cause or he resigns with good reason (at any time other than during the three months before change in control or during the 12 months following a change in control), then, provided that he gives us an effective waiver and release of claims, he will be entitled to nine months' salary paid as a lump sum on the 10th day following his separation from service, plus up to nine months of COBRA premiums, and notwithstanding any contrary terms of any stock option grant, option agreement or other equity award agreement, he shall receive accelerated vesting for all stock options and other equity awards outstanding as of the date of termination that are subject to time-based vesting requirements and that would have otherwise vested during the 12 month period following the date of his termination without a separation from service. However, if he is terminated without cause or he resigns with good reason within three months before or 12 months after a change in control, then, provided that he gives us an effective waiver and release of claims, he will be entitled to 12 months' salary paid as a lump sum on the 10th day following his separation from service, plus up to 12 months of COBRA premiums, and all of his then-outstanding time-based stock options and other equity awards covering our common stock will fully vest.

On May 2, 2017, our board of directors approved the issuance of 1,666 time-based stock options, 3,333 performance-based stock options, 833 time-based RSUs, and 833 performance RSUs to Mr. Kennedy under the 2013 Plan, which were granted on May 31, 2017 with per share estimated grant date fair values of $31.20, $29.70, $45.00 and $45.00, respectively. The time-based and performance stock options have a term of 10 years from the date of grant and an exercise price of $45.00 per share, which is equal to the closing price of our common stock on the date of grant. The grant date fair values of the time-based and performance stock options were estimated using a Black-Scholes valuation model. The assumptions used in the Black-Scholes valuation model for the time-based stock options include a volatility rate of 80.0%, a risk-free interest rate of 1.89%, a dividend yield of 0.00%, and an expected term of 6.04 years. The assumptions used in the Black-Scholes valuation model for the performance stock options include a volatility rate of 80.0%, a risk-free interest rate of 1.79%, a dividend yield of 0.00%, and an expected term of 5.29 years. Each time-based stock option award vests over a four-year period with 25% of all shares vesting on the one-year anniversary of the vesting commencement date, or May 2, 2018, with the remainder vesting in 36 equal monthly installments over the following three years ending May 2, 2021. Vesting of the time-based RSUs granted on May 31, 2017 occurred on the one-year anniversary of the vesting commencement date, or May 2, 2018. Vesting of the performance-based stock options and RSUs granted on May 31, 2017 was as determined by our board of directors or our compensation committee of our board of directors upon the achievement of specified corporate goals for 2017. Subsequent to the year ended December 31, 2017, none of the performance stock options and performance RSUs granted on May 31, 2017 were declared vested, and the 4,166 shares underlying these awards were forfeited.

Lyle J. Arnold, Ph. D.

We entered into an employment agreement, or the CSO Employment Agreement, as of April 30, 2011 with Lyle J. Arnold in connection with his appointment as our Senior Vice-President of Research and Development and Chief Scientific Officer. The CSO Employment Agreement provided Dr. Arnold a base salary of $250,000 per year. During the years ended December 31, 2016 and 2017, Dr. Arnold was eligible to participate in our annual incentive plan with a target bonus amount equal to 35% of Dr. Arnold's annual base salary, of which 80% was dependent on the achievement of corporate performance goals and 20% was dependent on the achievement of individual performance goals. Effective as of April 4, 2016 and April 1, 2017, Dr. Arnold's base salary was increased to $283,250 and $292,000 per year, respectively, as approved by the compensation committee of our board of directors.

On May 2, 2017, our board of directors approved the issuance of 2,500 time-based stock options, 2,500 performance-based stock options, 833 time-based RSUs, and 833 performance RSUs to Dr. Arnold under the 2013 Plan, which were granted on May 31, 2017 with per share estimated grant date fair values of $31.20, $29.70, $45.00 and $45.00, respectively. The time-based and performance stock options have a term of 10 years from the date of grant and an exercise price of $45.00 per share, which is equal to the closing price of our common stock on the date of grant. The grant date fair values of the time-based and performance stock options were estimated using a Black-Scholes valuation model. The assumptions used in the Black-Scholes valuation model for the time-based stock options include a volatility rate of 80.0%, a risk-free interest rate of 1.89%, a dividend yield of 0.00%, and an expected term of 6.04 years. The assumptions used in the Black-Scholes valuation model for the performance stock options include a volatility rate of 80.0%, a risk-free interest rate of 1.79%, a dividend yield of 0.00%, and an expected term of 5.29 years. Each time-based stock option award vests over a four-year period with 25% of all shares vesting on the one-year anniversary of the vesting commencement date, or May 2, 2018, with the remainder vesting in 36 equal monthly installments over the following three years ending May 2, 2021. Vesting of the time-based RSUs granted on May 31, 2017 occurred on the one-year anniversary of the vesting commencement date, or May 2, 2018. Vesting of the performance-based stock options and RSUs granted on May 31, 2017 was as determined by our board of directors or our compensation committee of our board of directors upon the achievement of specified corporate goals for 2017. Subsequent to the year ended December 31, 2017, none of the performance stock options and performance RSUs granted on May 31, 2017 were declared vested, and the 3,333 shares underlying these awards were forfeited.

Annual Incentive Plan

On May 19, 2014, the compensation committee of our board of directors approved an annual incentive plan, or the Annual Incentive Plan, to provide our employees, including our executive officers, with an incentive for such employees to perform to the best of their abilities, to further our growth, development and financial success, and to enable us to attract and retain highly qualified employees. Each executive officer is eligible for an award based upon the achievement of certain corporate performance goals and objectives approved by the compensation committee and, with respect to our executive officers other than our chief executive officer, individual performance. In 2018, total compensation of $385,699 was paid to employees, including our executive officers, pursuant to the Annual Incentive Plan related to the achievement of both corporate and individual performance goals earned in 2017. In 2019, total estimated compensation of approximately $787,000 is expected to be paid to employees, including our executive officers, pursuant to the Annual Incentive Plan related to the achievement of both corporate and individual performance goals earned in 2018.

OUTSTANDING EQUITY AWARDS

The following table sets forth certain information, on an award-by-award basis, concerning unexercised options to purchase common stock and RSUs that have not yet vested for each named executive officer, which were outstanding as of December 31, 2018. On July 6, 2018, we effected a one-for-thirty reverse stock split of all common shares outstanding as approved by our stockholders and board of directors on June 28, 2018. All per share amounts and share numbers have been adjusted for this reverse stock split as if it had occurred on January 1, 2011.

		Option Awards				Restricted Stock Units	
Name	Grant Date	Number of Securities Underlying Unexercised Options (#) Exercisable	Number of Securities Underlying Unexercised Options (#) Unexercisable(1)	Option Exercise Price ($)	Option Expiration Date	Number of Unvested Securities Underlying (#)	Market Value of Units that are Unvested ($)
Michael W. Nall	7/31/2013	214	—	466.20	7/30/2023	—	—
	7/31/2013	896	—	466.21	7/30/2023	—	—
	6/12/2014	831	—	481.50	6/11/2024	—	—
	6/12/2014	2	—	481.50	6/11/2024	—	—
	8/31/2015	275	278	180.90	8/30/2025	—	—
	8/31/2015	1,113	—	180.90	8/30/2025	—	—
	8/31/2015	211	—	180.90	8/30/2025	—	—
	2/29/2016	—	162	120.60	2/28/2026	—	—
	2/29/2016	393	—	120.60	2/28/2026	—	—
	2/29/2016	334	—	120.60	2/28/2026	—	—
	5/31/2017	1,558	2,377	45.00	5/30/2027	—	—
	5/31/2017	3,958	2,106	45.00	5/30/2027	—	—
Timothy C. Kennedy	7/29/2016	1,342	880	58.50	7/28/2026	—	—
	7/29/2016	546	—	58.50	7/28/2026	—	—
	5/31/2017	659	1,007	45.00	5/30/2027	—	—
Lyle J. Arnold, Ph. D.	3/25/2011	66	—	415.80	3/24/2021	—	—
	7/31/2013	250	—	466.24	7/30/2023	—	—
	5/16/2014	388	—	394.22	5/15/2024	—	—
	8/31/2015	1,142	324	180.90	8/30/2025	—	—
	8/31/2015	477	—	180.90	8/30/2025	—	—
	2/29/2016	—	81	120.63	2/28/2026	—	—
	2/29/2016	196	—	120.61	2/28/2026	—	—
	5/31/2017	989	1,511	45.00	5/30/2027	—	—

(1) The scheduled vesting dates, after December 31, 2018, of these options were as follows:

Mr. Nall: For the option awards granted on July 31, 2013 and June 12, 2014 in the table above, all options awarded are vested and exercisable. For the first option award granted on August 31, 2015 in the table above, either 34 of the unvested option awards will vest in each month of January through August of 2019, subject to continuing service. For the second and third option awards granted on August 31, 2015 in the table above, all options awarded are vested and exercisable. For the first option award granted on February 29, 2016 in the table above, 11 of the unvested option awards will vest monthly from January 2019 through January 2020, subject to continuing service. For the second and third option awards granted on February 29, 2016 in the table above, all options awarded are vested and exercisable. For the first option award granted on May 31, 2017 in the table above, 208 of the unvested option awards will vest monthly in each of January, February, and March 2019, from January through October 2020, and then from January through May 2021, with 108 vesting in April 2019 and 76 vesting in November 2020, subject to continuing service. For the second option award granted on May 31, 2017 in the table above, 208 will vest monthly from May 2019 through December 2019, and 208 vesting in December 2020, with 100 vesting in April 2019 and 131 vesting in November 2020, subject to continuing service.

Mr. Kennedy: For the first option award granted on July 29, 2016 in the table above, 46 of the unvested option awards granted will vest from January 2018, subject to continuing service. For the second option awards granted on July 29, 2016 in the table above, all options awarded are vested and exercisable. For the first option award granted on May 31, 2017 in the table above, 34 will vest monthly from June 2018, subject to continuing service.

Dr. Arnold: For the option awards granted on March 25, 2011 and July 31, 2013 in the table above, all options awarded are vested and exercisable. For the option award granted on May 16, 2014 in the table above, all options awarded are vested and exercisable. For the first option award granted on August 31, 2015 in the table above, 40 of the unvested option awards will vest each month, subject to continuing service. For the second option awards granted on August 31, 2015 in the table above, all options awarded are vested and exercisable. For the first option award granted on February 29, 2016 in the table above, 5 of the unvested option awards will vest in each month from January 2019, subject to continuing service. For the second option award granted on February 29, 2016 in the table above, 52 will vest monthly from June 2018, subject to continuing service.

Potential Payments upon Termination or Change-In-Control

Our employment agreement with Mr. Nall provides that in the event of termination of his employment by us without cause or his resignation for good reason, the vesting of any of his outstanding unvested stock options and RSUs which would have vested over the following 12 months will accelerate (unless the applicable stock option or RSU agreement provides for more favorable acceleration terms). Also, in the event of a change of control, if the surviving or acquiring corporation (or its parent company) does not assume or continue Mr. Nall's outstanding unvested stock options or RSUs or substitute similar stock awards for such stock options or RSUs, then all of Mr. Nall's unvested stock options and RSUs will immediately vest and become exercisable, provided Mr. Nall is providing continued service to us immediately prior to the change of control. In addition, solely with respect to Mr. Nall's unvested stock options and RSUs granted prior to November 6, 2015, in the event of a change of control where Mr. Nall's unvested stock options and RSUs are not fully accelerated, the vesting of 50% of any of Mr. Nall's outstanding unvested stock options and RSUs will accelerate on the date of the change of control and the remaining unvested stock options and RSUs will vest on the earliest of (i) the date of the termination of his employment by us without cause, (ii) the date of his resignation for good reason, or (iii) the first anniversary of the change of control (unless the applicable stock option or RSU agreement provides for more favorable acceleration terms). (For example, the foregoing would not apply to the initial stock options grant, which would fully accelerate upon a change in control.) Additionally, if during the 10-day period before a change of control or during the 12-month period following a change of control, Mr. Nall's employment is terminated without cause or Mr. Nall resigns for good reason, then the vesting of each of Mr. Nall's outstanding unvested stock options and RSUs will accelerate immediately. Our employment agreement with Mr. Nall further provides that if he has a separation from service as a result of his discharge by us without cause or his resignation with good reason then, provided that he gives us an effective waiver and release of claims, he will be entitled to 12 months' salary and up to 12 months of COBRA premiums (or substantially equivalent health insurance coverage).

Our employment agreement with Mr. Kennedy provides that in the event of termination of his employment without cause or if he resigns with good reason within three months before or 12 months after a change in control, then, provided that he gives us an effective waiver and release of claims, he will be entitled to 12 months' salary paid as a lump sum on the 10th day following his separation from service, plus up to 12 months of COBRA premiums, and all of his then-outstanding time-based stock options and other equity awards covering our common stock will fully vest.

Our employment agreement with Dr. Arnold provides that in the event of termination of his employment without cause or if he resigns with good reason within the three months before or 12 months after a change in control, then, provided that he gives us an effective waiver and release of claims, he will be entitled to 12 months' salary paid as a lump sum within 10 business days of the date the waiver and release of claims becomes effective, plus up to 12 months of COBRA premiums, and all of his then-outstanding time-based stock options and other equity awards covering our common stock will fully vest.

The vesting of all stock options and RSUs awarded under the Amended 2013 Plan will accelerate fully in the event that the optionee's continuous service is terminated without cause, or the optionee resigns for good reason, within 10 days before or 12 months after a change in control. In addition, we only have the discretion to accelerate the vesting of awards under the Amended 2013 Plan in connection with a change of control if an outstanding award is not assumed, continued or substituted for by the surviving or acquiring corporation (or its parent company).

DIRECTOR COMPENSATION

On August 10, 2015, our board of directors approved the following cash and equity compensation policies for non-employee members of our board of directors, as recommended by the compensation committee of our board of directors:

- Annual Retainer.

  For service as a director: an annual cash retainer of $25,000 (in addition to any annual cash retainers otherwise paid).

- Board Chair.

  For service as Board Chair: an annual cash retainer of $75,000 (in addition to any annual cash retainers otherwise paid).

- Lead Independent Director.

  For service as Lead Independent Director: an annual cash retainer of $5,000 (in addition to any annual cash retainers otherwise paid).

- Audit Committee.

  For service as Chair of the audit committee: an annual cash retainer of $15,000 (in addition to any annual cash retainers otherwise paid).

  For service as member of the audit committee other than as its Chair: an annual cash retainer of $6,250 (in addition to any annual cash retainers otherwise paid).

- Compensation Committee.

  For service as Chair of the compensation committee: an annual cash retainer of $10,000 (in addition to any annual cash retainers otherwise paid).

  For service as member of the compensation committee other than as its Chair: an annual cash retainer of $5,000 (in addition to any annual cash retainers otherwise paid).

- Nominating and Corporate Governance Committee.

  For service as Chair of the nominating and corporate governance committee: an annual cash retainer of $7,500 (in addition to any annual cash retainers otherwise paid).

  For service as member of the nominating and corporate governance committee other than as its Chair: an annual cash retainer of $3,750 (in addition to any annual cash retainers otherwise paid).

- Initial Awards.

  For each non-employee director who is initially elected or appointed to the board: an option to purchase 8,333 shares of common stock. On March 27, 2017, our board of directors approved an increase in the Initial Award option amount to 30,000 shares.

- Annual Awards.

  For each non-employee director who (i) has been serving on the board for at least 6 months as of the date of any annual meeting of our stockholders and (ii) will continue to serve as a non-employee director immediately following such meeting: an option to purchase 4,166 shares of common stock. On March 27, 2017, our board of directors approved an increase in the annual award option amount to 15,000 shares.

The annual cash retainers shall be earned and paid on a calendar quarterly basis, subject to proration in the case of service during only a portion of a calendar quarter.

On March 27, 2017, our board of directors approved the following cash and equity compensation for non-employee members of our science, technology and clinical affairs committee, as recommended by the compensation committee of our board of directors.

- Science, Technology and Clinical Affairs Committee.

For service as Chair of the science, technology and clinical affairs committee: an annual cash retainer of $10,000 retroactive to March 21, 2017 (in addition to any annual cash retainers otherwise paid).

For service as member of the science, technology and clinical affairs committee other than as its Chair: an annual cash retainer of $5,000 retroactive to March 21, 2017 (in addition to any annual cash retainers otherwise paid).

The per share exercise price of each option granted to our non-employee directors shall equal the fair market value of a share of common stock on the date the option is granted. Each such initial award shall vest and become exercisable in substantially equal installments on each of the first three anniversaries of the vesting commencement date, subject to continuing in service on the board through each such vesting date; provided, that all stock options under the program shall vest in full upon the occurrence of a change in control. Each such annual award shall fully vest and become exercisable on the first anniversary of the vesting commencement date, subject to continuing in service on the board through each such vesting date; provided, that all stock options under the program shall vest in full upon the occurrence of a change in control. The term of each such stock option shall be 10 years from the date the option is granted. Upon a non-employee director's cessation of service on the board for any reason, his or her stock options granted under this program would, to the extent vested on the date of cessation of service, remain exercisable for 12 months following the cessation of his or her service on the board (or such longer period as the board may determine in its discretion on or after the date of such stock options).

On June 28, 2018, option awards exercisable for an aggregate 500 shares of common stock with a vesting commencement date of June 28, 2018 were granted under the 2013 Plan to the six non-employee members of our board of directors related to the grant of annual awards for the June 2018 annual meeting of our shareholders, in accordance with the annual awards amounts noted above in this "Director Compensation" section. These awards have a term of 10 years from the date of grant and an exercise price of $5.70 per share, which is equal to the closing price of our common stock on the date of grant. The grant date fair value of these awards of $4.81 per share was estimated using a Black-Scholes valuation model. The assumptions used in the Black-Scholes valuation model for these awards include a volatility rate of 110.0%, a risk-free interest rate of 2.73%, a dividend yield of 0.00%, and an expected term of 5.00 years.

The following table reflects all compensation awarded to, earned by or paid to the non-employee directors during 2018:

Name	Fees Earned or Paid in Cash ($)	Option Awards ($)(1)(2)	Restricted Stock Awards ($)(1)	Total ($)
Marsha A. Chandler, Ph.D.	37,500	2,405	—	39,905
Bruce E. Gerhardt, CPA	36,250	2,405	—	38,655
David F. Hale	100,000	2,405	—	102,405
Bruce A. Huebner	45,250	2,405	—	48,655
Ivor Royston, M.D.	38,750	2,405	—	41,155
M. Faye Wilson, MBA	53,750	2,405	—	56,155

(1) The amounts in the "Option Awards ($)" and "Restricted Stock Awards ($)" columns reflect the grant date fair values of stock option and RSU awards, respectively, granted during the year. These amounts are determined in accordance with the provisions of FASB ASC Topic 718, rather than an amount paid to or realized by the director.

(2) The amounts in the "Option Awards ($)" column reflect the non-employee director annual awards for both the May 2017 and June 2018 annual meeting of our shareholders.

The following table sets forth the number of option awards and restricted stock awards outstanding for each non-employee director as of December 31, 2018:

Name	Option Awards (#)	Restricted Stock Awards (#)
Marsha A. Chandler, Ph.D.	1,729	—
Bruce E. Gerhardt, CPA	1,560	—
David F. Hale	2,920	—
Bruce A. Huebner	1,718	—
Ivor Royston, M.D.	1,599	—
M. Faye Wilson, MBA	1,871	—

Equity Compensation Plan Information

We have two equity incentive plans: the 2007 Equity Incentive Plan, or 2007 Plan, and the Amended 2013 Plan. Each plan is described below, followed by a description of certain federal income tax consequences with respect to a plan of this type.

2007 Equity Incentive Plan

The following is a summary of the material terms of our 2007 Plan, as amended to date. This description is not complete. For more information, we refer you to the full text of the 2007 Plan.

The purposes of the 2007 Plan are: (i) to secure and retain the services of eligible employees, board members, consultants and other advisors to serve our company and its affiliates, (ii) to provide incentives for such persons to exert maximum efforts for the success of our company and its affiliates and (iii) to provide a means by which they can benefit from increases in the value of our common stock.

The 2007 Plan authorizes the grant of the following types of awards: (i) nonstatutory stock options, or NSOs; (ii) incentive stock options, or ISOs; (iii) restricted stock awards; (iv) RSUs; (v) stock appreciation rights, or SARs; (vi) performance stock awards; and (vii) other stock awards. Awards may be granted to employees, directors, consultants and other service providers of our company and its affiliates. However, ISOs may not be granted to non-employees.

We have authorized a total of 674 shares of common stock for issuance pursuant to all awards granted under the 2007 Plan. The number of shares issued or reserved pursuant to the 2007 Plan (or pursuant to outstanding awards) is subject to adjustment as a result of mergers, consolidations, reorganizations, stock splits, reverse stock splits, stock dividends and other changes in our common stock. Shares subject to awards that have been terminated, expired unexercised, forfeited, settled in cash or cancelled in accordance with the cancellation and regrant procedures under the 2007 Plan will again become available for issuance under the Amended 2013 Plan and shall no longer be available for issuance under the 2007 Plan. Shares of common stock used to pay the exercise price of awards will also again become available for issuance under the Amended 2013 Plan and shall no longer be available for issuance under the 2007 Plan.

However, shares in the following categories may not again be made available for issuance as awards under the Amended 2013 Plan or the 2007 Plan: (i) shares of common stock not issued or delivered as a result of the net settlement of outstanding awards, (ii) shares of common stock used to pay the exercise price of NSOs or ISOs, and (iii) shares of common stock used to pay withholding taxes related to awards.

As of December 31, 2017, 113 shares underlying awards issued pursuant to the 2007 Plan had been settled in shares of common stock and no longer underlie outstanding awards, 560 shares underlie outstanding awards, and no other shares remained available to be subjected to further awards.

Administration. Our board of directors administers the 2007 Plan, subject to the board's authority to delegate some or all of such administration to the compensation committee.

Performance Criteria. Vesting of any awards granted under the 2007 Plan may be made subject to the satisfaction of one or more performance goals established by the board of directors, in addition to or instead of time-vesting. The performance goals may vary from participant to participant, group to group, and period to period. Performance goals may be weighted for different factors and measures.

Transferability. Unless otherwise determined by the board of directors, awards granted under the 2007 Plan are generally not transferable other than by will or by the laws of descent and distribution.

Corporate Transaction. In the event we are acquired in a corporate transaction, as defined in the 2007 Plan, unless otherwise provided in a written agreement between us and the holder of an outstanding 2007 Plan award, the award will be assumed by the successor company or a similar award will be substituted by the successor company. If the successor company does not agree to assume or substitute the award, the vesting of the award will accelerate, and the award will become exercisable in full.

Effectiveness of the 2007 Plan; Amendment and Termination. The 2007 Plan became effective on March 6, 2007. The terms of the Amended 2013 Plan require that any shares available for issuance under the 2007 Plan at the time of the adoption of the Amended 2013 Plan shall become available for issuance under the Amended 2013 Plan and shall no longer be available for issuance under the 2007 Plan. The board may amend, alter or discontinue the 2007 Plan in any respect at any time, subject to certain exceptions, but no amendment may adversely affect the rights of a participant under any awards previously granted, without his or her consent, except that stockholder approval will be needed if required by applicable law.

The 2007 Plan permits us to reprice any stock option granted under the plan without the approval of our stockholders.

U.S. Federal Income Tax Consequences Associated with the 2007 Plan

Following is a summary of the federal income tax consequences of option and other awards under the 2007 Equity Incentive Plan. Optionees and recipients of other rights and awards granted under the 2007 Equity Incentive Plan are advised to consult their personal tax advisors before exercising an option, stock appreciation right or award or disposing of any stock received pursuant to the exercise of an option, stock appreciation right or award. In addition, the following summary is based upon an analysis of the Code, existing laws, judicial decisions, administrative rulings, regulations and proposed regulations, all of which are subject to change and does not address state, local or other tax laws.

Treatment of Options. The Code treats ISOs and NSOs differently. However, as to both types of options, no income will be recognized to the optionee at the time of the grant of the options under the 2007 Equity Incentive Plan.

Generally, upon exercise of an NSO, including an option intended to be an ISO but which has not continued to so qualify at the time of exercise, an optionee will recognize ordinary income tax on the excess of the fair market value of the stock on the exercise date over the option price. In general, if an optionee, in exercising an NSO, tenders shares of our common stock in partial or full payment of the option price, no gain or loss will be recognized on the tender. However, if the tendered shares were previously acquired upon the exercise of an ISO and the tender is within two years after the date of grant or within one year after the date of exercise of the ISO, the tender will be a disqualifying disposition of the shares acquired upon exercise of the ISO.

For ISOs, there is no taxable income to an optionee at the time of exercise. However, the excess of the fair market value of the stock on the date of exercise over the exercise price will be taken into account in determining whether the alternative minimum tax will apply for the year of exercise. If the shares acquired upon exercise are held until at least two years from the date of grant and more than one year from the date of exercise, any gain or loss upon the sale of such shares, if held as capital assets, will be long-term capital gain or loss, measured by the difference between the sales price of the stock and the exercise price. Under current federal income tax law, a long-term capital gain will be taxed at a rate which is less than the maximum rate of tax on ordinary income. If the two-year and one-year holding period requirements are not met, an optionee will recognize ordinary income in the year of disposition in an amount equal to the lesser of (i) the fair market value of the stock on the date of exercise minus the exercise price or (ii) the amount realized on disposition minus the exercise price. The remainder of the gain will be treated as long-term capital gain, depending upon whether the stock has been held for more than a year. If an optionee makes such a disposition, he or she will be obligated to notify us.

In general, if an optionee, in exercising an ISO, tenders shares of our common stock in partial or full payment of the option price, no gain or loss will be recognized on the tender. However, if the tendered shares were previously acquired upon the exercise of another ISO and the tender is within two years after the date of grant or within one year after the date of exercise of the other option, the tender will be a disqualifying disposition of the shares acquired upon exercise of the other option.

As noted above, the exercise of an ISO could subject an optionee to the alternative minimum tax. The application of the alternative minimum tax to any particular optionee depends upon the particular facts and circumstances which exist with respect to the optionee in the year of exercise. However, as a general rule, the amount by which the fair market value of the common stock on the date of exercise of an option exceeds the exercise price of the option will constitute an item of “adjustment” for purposes of determining the alternative minimum taxable income on which the alternative tax may be imposed. As such, this item will enter into the tax base on which the alternative minimum tax is computed and may therefore cause the alternative minimum tax to become applicable in any given year.

Treatment of Stock Appreciation Rights. Generally, the recipient of a stock appreciation right will not recognize any income upon grant of the stock appreciation right. Upon exercise of a stock appreciation right, the holder will recognize ordinary income equal to the fair market value of our common stock at that time.

Treatment of Restricted Stock Awards. Generally, absent an election to be taxed currently under Section 83(b) of the Code, or a Section 83(b) Election, there will be no federal income tax consequences to the recipient upon the grant of a restricted stock award. At the expiration of the restriction period and the satisfaction of any other restrictions applicable to the restricted shares, the recipient will recognize ordinary income equal to the fair market value of our common stock at that time. If a Section 83(b) Election is made within 30 days after the date the restricted stock award is granted, the recipient will recognize an amount of ordinary income at the time of the receipt of the restricted shares equal to the fair market value, determined without regard to applicable restrictions, of the shares of our common stock at such time. If a Section 83(b) Election is made, no additional income will be recognized by the recipient upon the lapse of restrictions on the shares, and before the sale of such shares, but, if the shares are subsequently forfeited, the recipient may not deduct the income that was recognized pursuant to the Section 83(b) Election at the time of the receipt of the shares.

Amended and Restated 2013 Equity Incentive Plan, as Amended

The material features of the Amended 2013 Plan are summarized below. This description is not complete. For more information, we refer you to the full text of the 2013 Plan.

Purpose

The purposes of the Amended 2013 Plan are: (i) to enable us to attract and retain the types of qualified employees, officers, directors, consultants and other service providers who will contribute to our long range success; (ii) to align the interests of employees, officers, directors, consultants and other service providers with those of the stockholders; (iii) to promote the success of our business; and (iv) with respect to inducement awards, provide an inducement material for certain individuals to enter into employment with us within the meaning of Nasdaq Listing Rule 5635(c)(4).

Types of Awards

The Amended 2013 Plan authorizes the grant of the following types of awards: stock options, SARs, restricted stock, restricted stock unit awards ("RSUs"), and performance compensation awards. Awards may be granted to employees, officers, non-employee board members, consultants and other service providers of us and our affiliates. However, incentive stock options ("ISOs") may be granted only to employees, including officers.

Inducement awards that may be granted under the Amended 2013 Plan may include: (i) non-qualified stock options ("NSOs"), (ii) SARs, and (iii) Restricted Awards. Inducement awards may only be granted to individuals who satisfy the standards for inducement grants under Nasdaq Listing Rule 5635(c)(4) and the related guidance under Nasdaq IM 5635-1.

Shares Available for Awards

Under the Amended 2013 Plan, subject to certain changes in our capitalization, the aggregate number of shares of common stock that may be issued pursuant to awards from and after June 28, 2018 (the date of stockholder approval of the Amended 2013 Plan), will not exceed 264,098 (the "Share Reserve") on a post-Reverse Split basis which is the sum of (1) 146,667 new post-Reverse Split shares, plus (2) the 117,431 post-Reverse Split shares originally authorized for issuance under the 2013 Plan which were previously approved by the board of directors and stockholders, plus (3) any shares underlying outstanding awards that were granted under the Amended 2013 Plan or 2007 Plan that become available for issuance again from time to time under the Amended 2013 Plan because the awards are forfeited, terminated or expire, as further described below, excluding (4) 11,111 post-Reverse Split shares that may be issued solely pursuant to inducement awards.

Shares subject to awards that have been cancelled, expired unexercised, or are forfeited do not count as shares issued and therefore will again to that extent become available for issuance under the Amended 2013 Plan. However, shares in the following categories may not again be made available for issuance under the Amended 2013 Plan: (i) shares of common stock used to pay the exercise or purchase price of an award, including as a result of the net exercise of outstanding stock options, (ii) shares of common stock used to pay withholding taxes related to awards, (iii) shares of common stock covered by a stock-settled SAR that were not issued upon settlement of the SAR or (iv) shares of common stock repurchased by us on the open market with the proceeds of the exercise or purchase price of an award.

Eligibility

All of our 87 employees, 6 non-employee directors and 14 consultants as of January 25, 2019 are eligible to participate in the Amended 2013 Plan and may receive all types of awards other than ISOs. ISOs may be granted under the Amended 2013 Plan only to our employees (including officers) and employees of our affiliates.

The only persons eligible to receive grants of inducement awards under the Amended 2013 Plan are individuals who satisfy the standards for inducement grants under Nasdaq Listing Rule 5635(c)(4) and the related guidance under Nasdaq IM 5635-1. A person who previously served as an employee or director will not be eligible to receive inducement awards under the Amended 2013 Plan, other than following a bona fide period of non-employment.

We refer to eligible individuals who receive awards under the Amended 2013 Plan as "participants."

Administration

The Amended 2013 Plan will be administered by our compensation committee. The compensation committee has the discretion to determine the individuals to whom awards may be granted under the Amended 2013 Plan, the number of shares of our common stock subject to each award, the type of award, the manner in which such awards will vest and the other conditions applicable to awards. The compensation committee is authorized to interpret the Amended 2013 Plan, to establish, amend and rescind any rules and regulations relating to the Amended 2013 Plan and to make any other determinations that it deems necessary or desirable for the administration of the Amended 2013 Plan. All decisions, determinations and interpretations by the compensation committee, and any rules and regulations under the Amended 2013 Plan and the terms and conditions of or operation of any award, are final and binding on all participants.

Notwithstanding the foregoing, the board of directors also has authority to take action expressly or implicitly in the capacity of the administrator of the Amended 2013 Plan, and the board of directors also may delegate, to the extent allowed under Delaware law and subject to Nasdaq Listing Rule 5635(c)(4) and the related guidance under Nasdaq IM 5635-1with regard to inducement awards, its authority to one or more members of the board of directors with respect to awards that do not involve "insiders" within the meaning of Section 16 of the Exchange Act.

The compensation committee, the board of directors and any authorized member of the board of directors authorized to administer the Amended 2013 Plan is considered to be the "Plan Administrator."

Inducement Awards

On July 25, 2016, the board of directors approved an amendment to the 2013 Plan to reserve 11,111 shares of our common stock to be used exclusively for the grant of inducement awards in compliance with Nasdaq Listing Rule 5635(c)(4). Under the Amended 2013 Plan, an inducement award may be granted only to an employee who has not previously been an employee or a director of us or an affiliate, or following a bona fide period of non-employment, as an inducement material to the individual's entering into employment with us within the meaning of Nasdaq Listing Rule 5635(c)(4). In addition, all such inducement awards must be granted by a committee consisting of the majority of our independent directors or our independent compensation committee, in either case in accordance with Nasdaq Listing Rule 5635(c)(4).

Repricing; Cancellation and Re-Grant of Stock Awards

Under the Amended 2013 Plan, the Plan Administrator does not have the authority to reprice any outstanding stock option or SAR by reducing the exercise or strike price of the stock option or SAR or to cancel any outstanding stock option or SAR that has an exercise or strike price greater than the then-current fair market value of our common stock in exchange for cash or other stock awards without obtaining the approval of the stockholders. Such approval must be obtained within 12 months prior to such repricing or cancellation and re-grant event.

Minimum Vesting Requirements

Under the Amended 2013 Plan, except with respect to inducement awards and subject to the provisions of the Amended 2013 Plan relating to treatment of stock awards in connection with a change in control, no stock option or SAR (including a stock option or SAR that that is a performance compensation award or otherwise vests based on performance goals) will vest (or, if applicable, be exercisable) until at least 12 months following the date of grant of the award; provided, however, that up to 5% of the Share Reserve (excluding inducement shares) may be subject to stock options or SARs which do not meet such vesting (and, if applicable, exercisability) requirements.

Stock Options

Stock options may be granted under the Amended 2013 Plan pursuant to stock option award agreements. The Amended 2013 Plan permits the grant of stock options that are intended to qualify as ISOs and NSOs.

The exercise price of a stock option granted under the Amended 2013 Plan may generally not be less than 100% of the fair market value of our common stock subject to the stock option on the date of grant and, in some cases (see "Limitations on Incentive Stock Options" below), may not be less than 110% of such fair market value.

The term of stock options granted under the Amended 2013 Plan may not exceed ten years and, in some cases (see "Limitations on Incentive Stock Options" below), may not exceed five years. Except as otherwise provided in a participant's stock option award agreement or in an employment agreement with us or one of our affiliates, if a participant's service relationship with us or any of our affiliates ("continuous service") terminates (other than for cause and other than upon the participant's death or disability), the participant may exercise any vested stock options for up to three months following the participant's termination of continuous service. Except as otherwise provided in a participant's stock option award agreement or employment agreement with us or one of our affiliates, if a participant's continuous service terminates due to the participant's disability or death, the participant, or his or her beneficiary, as applicable, may exercise any vested stock options for up to 12 months following the participant's termination. Except as explicitly provided otherwise in a participant's stock option award agreement or employment agreement with us or one of our affiliates, if a participant's continuous service is terminated for cause (as defined in the Amended 2013 Plan), all stock options held by the participant will terminate upon the participant's termination of continuous service and the participant will be prohibited from exercising any stock option from and after such termination date. A participant's stock option award agreement may provide that the term of a stock option shall be extended if the exercise of the stock option following the participant's termination of continuous service for any reason would violate the registration requirements under the Securities Act or any other state or federal securities law or rules of any securities exchange or interdealer quotation system. In no event, however, may a stock option be exercised after its original expiration date.

A participant may exercise a stock option by written notice and payment of the exercise price in cash or by check, or in the discretion of the Plan Administrator, in the form of an irrevocable commitment by a broker to pay over the net proceeds from a sale of the shares issuable under an option, the delivery of previously owned shares and/or withholding of shares deliverable upon exercise, net-exercise, or any combination of these methods, or in any other form of legal consideration that may be acceptable to the Plan Administrator.

Subject to certain minimum vesting requirements (see "Minimum Vesting Requirements" above), stock options granted under the Amended 2013 Plan may become exercisable in cumulative increments, or "vest," as determined by the Plan Administrator at the rate specified in the stock option agreement. Shares covered by different stock options granted under the Amended 2013 Plan may be subject to different vesting schedules as the Plan Administrator may determine.

The Plan Administrator may impose limitations on the transferability of stock options granted under the Amended 2013 Plan in its discretion. Generally, a participant may not transfer a stock option granted under the Amended 2013 Plan other than by will or the laws of descent and distribution. However, ISOs can be transferred pursuant to a qualified domestic relations order and, subject to approval by the Plan Administrator, NSOs can be transferred without consideration to certain family members and other permitted transferees not prohibited by applicable tax and securities laws.

Limitations on Incentive Stock Options

The aggregate fair market value, determined at the time of grant, of shares of our common stock with respect to ISOs that are exercisable for the first time by a participant during any calendar year under all of our stock plans may not exceed $100,000. The stock options or portions of stock options that exceed this limit or otherwise fail to qualify as ISOs are treated as NSOs. No ISO may be granted to any person who, at the time of grant, owns or is deemed to own stock possessing more than 10% of our total combined voting power or that of any affiliate unless the following conditions are satisfied:

- the exercise price of the ISO must be at least 110% of the fair market value of the common stock subject to the ISO on the date of grant; and
- The term of the ISO must not exceed five years from the date of grant.

Subject to adjustment for certain changes in our capitalization, the aggregate maximum number of shares of our common stock that may be issued pursuant to the exercise of ISOs under the Amended 2013 Plan is 264,098 shares. The aggregate maximum number of shares of common stock that may be issued pursuant to the exercise of ISOs granted under the Amended 2013 Plan is the number of shares subject to the Amended 2013 Plan's Share Reserve not including the inducement grant pool.

Stock Appreciation Rights

SARs may be granted under the Amended 2013 Plan pursuant to SAR award agreements. Each SAR is denominated in common stock share equivalents. The strike price of each SAR will be determined by the Plan Administrator but will generally not be less than 100% of the fair market value of the common stock subject to the SAR on the date of grant. Subject to certain minimum vesting requirements (see "Minimum Vesting Requirements" above), the Plan Administrator may also impose restrictions or conditions upon the vesting of SARs that it deems appropriate. The appreciation distribution payable upon exercise of a SAR may be paid in shares of our common stock, in cash, in a combination of cash and stock, or in any other form of consideration determined by the Plan Administrator. Generally, the treatment of a SAR upon termination of a participant's continuous service and restrictions on transfer of a SAR will be determined by the Plan Administrator and set forth in the SAR award agreement.

Restricted Stock Awards

Restricted stock awards may be granted under the Amended 2013 Plan pursuant to restricted stock award agreements. A restricted stock award may be granted in consideration for cash, the participant's past services performed for us or any of our affiliates, or future services to be performed for us or any of our affiliates, subject to applicable law and if permitted by the Plan Administrator. Shares of our common stock acquired under a restricted stock award may be subject to forfeiture to or repurchase by us in accordance with a vesting schedule to be determined by the Plan Administrator, which may include performance-based conditions. Rights to acquire shares of our common stock under a restricted stock award may be transferred only upon such terms and conditions as are set forth in the restricted stock award agreement. Subject to the terms of the restricted stock award agreement, dividends paid on restricted stock generally will be subject to the same vesting conditions as apply to the shares subject to the restricted stock award. Generally, the treatment of a restricted stock award upon termination of a participant's continuous service will be determined by the Plan Administrator and set forth in the restricted stock award agreement.

Restricted Stock Unit Awards

RSU awards may be granted under the Amended 2013 Plan pursuant to RSU award agreements. A RSU may be settled by the delivery of shares of our common stock, in cash, in a combination of cash and stock, or in any other form of consideration determined by the Plan Administrator and set forth in the RSU award agreement. RSUs may be subject to vesting in accordance with a vesting schedule to be determined by the Plan Administrator, which may include performance-based conditions. Subject to the terms of the RSU award agreement, dividend equivalents generally may be credited in respect of shares of our common stock covered by a RSU, provided that any additional shares credited by reason of such dividend equivalents will be subject to all of the same terms and conditions of the underlying RSU. The treatment of a RSU upon termination of a participant's continuous service will be determined by the Plan Administrator and set forth in the RSU award agreement.

Performance Compensation Awards

The Amended 2013 Plan allows us to grant performance compensation awards, which are awards denominated in shares of our common stock, cash or a combination thereof, which are earned during a specified performance period subject to the attainment of performance criteria.

Vesting of performance compensation awards may be subject to a requirement of continuous service and/or the satisfaction of one or more performance goals. The performance goals may vary from participant to participant, group to group, and period to period. Performance goals may be weighted for different factors and measures. The length of any performance period, the performance goals to be achieved during the performance period, and the measure of whether and to what degree such performance goals have been attained will be determined by the Plan Administrator.

Performance goals under the Amended 2013 Plan will be based on any one or more of the following performance criteria: (a) net earnings or net income (before or after taxes); (b) basic or diluted earnings per share (before or after taxes); (c) net revenue or net revenue growth; (d) gross revenue; (e) gross profit or gross profit growth; (f) net operating profit (before or after taxes); (g) return on assets, capital, invested capital, equity, or sales; (h) cash flow (including, but not limited to, operating cash flow, free cash flow, and cash flow return on capital); (i) earnings before or after taxes, interest, depreciation and/or amortization; (j) gross or operating margins; (k) improvements in capital structure; (l) budget and expense management; (m) productivity ratios; (n) economic value added or other value added measurements; (o) share price (including, but not limited to, stock price growth measures and total stockholder return); (p) expense targets; (q) margins; (r) operating efficiency; (s) working capital targets; (t) enterprise value; (u) safety record; (v) regulatory milestones; (w) scientific milestones; (x) customer acquisition; (y) completion of partnering agreement; (z) workforce retention; (aa) completion of acquisitions or business expansion; and (bb) individual business objectives.

Performance goals may be based on a Biocept, Inc. or affiliate-wide basis, with respect to one or more business units, divisions, or our operational units or an affiliate or any combination thereof, and in either absolute terms or relative to the performance of one or more comparable companies or the performance of one or more relevant indices. Our compensation committee or other authorized committee or the Plan Administrator is authorized to make appropriate adjustments in the method of calculating the attainment of performance goals for a performance period based on the following events: (a) asset write-downs; (b) litigation or claim judgments or settlements; (c) the effect of changes in tax laws, accounting principles, or other laws or regulatory rules affecting reported results; (d) any reorganization and restructuring programs; (e) extraordinary nonrecurring items as described in Accounting Principles Board Opinion No. 30 (or any successor or pronouncement thereto) and/or in management's discussion and analysis of financial condition and results of operations appearing in our annual report to stockholders for the applicable year; (f) acquisitions or divestitures; (g) any other specific unusual or nonrecurring events, or objectively determinable category thereof; (h) foreign exchange gains and losses; and (i) a change in our fiscal year.

Transferability

Awards granted under the Amended 2013 Plan generally may not be transferred in any manner other than by will or by the laws of descent and distribution and awards generally may not be transferred if the participant is to receive consideration in connection with the transfer. Stock options may be transferred in the limited circumstances described above under the section entitled "Stock Options."

Clawback Policy

The Amended 2013 Plan provides that rights, payments and benefits with respect to an award granted under the Amended 2013 Plan will be subject to reduction, cancellation forfeiture or recoupment in recovery under any law, government regulation or listing requirement as well as any clawback policy that we adopt pursuant to such laws, regulations or requirements.

Changes to Capital Structure

In the event of certain capitalization adjustments, the Plan Administrator will appropriately adjust: (i) the class(es) and maximum number of securities subject to the Amended 2013 Plan; (ii) the class(es) and maximum number of securities that may be issued pursuant to the exercise of ISOs; (iii) the class(es) and number of securities and price per share of stock subject to outstanding stock awards; and (iv) the class(es) and maximum number of securities that may be issued pursuant to inducement awards.

Change in Control

In the event of a change in control of us (as defined in the Amended 2013 Plan and described below) in which the surviving corporation or acquiring corporation (or its parent company) does not assume or continue outstanding awards under the Amended 2013 Plan or substitute similar stock awards for such outstanding awards, then the Plan Administrator may, in its discretion and upon at least 10 days' advance notice to the affected persons, accelerate the vesting (and exercisability, as applicable) of outstanding awards under the Amended 2013 Plan in full or in part to a date prior to the effective time of the change in control transaction and, to the extent not exercised (if applicable) at or prior to the effective time of the transaction, cancel all outstanding awards upon or immediately before the change in control and pay to the holders thereof, in cash or stock, or any combination thereof, the value of such awards (including, at the Plan Administrator's discretion, any unvested portion of the award) based upon the value per share of common stock received or to be received or deemed received by our other stockholders in the transaction. In the case of any stock option or SAR with an exercise price that equals or exceeds the price paid for a share of common stock in connection with the change in control, the Plan Administrator may cancel the option or SAR without the payment of consideration therefor.

In addition, in the event of a participant's termination of continuous service without cause or resignation for good reason during the 10 day period before a change in control or during the 12 month period following a change in control, all stock options and SARs under the Amended 2013 Plan will become immediately exercisable with respect to 100% of the shares subject to such stock options or SARs, and/or the restricted period will expire immediately with respect to 100% of the shares of restricted stock or RSUs as of the date of the participant's termination or resignation.

With respect to performance compensation awards, in the event of a change in control, all incomplete performance periods in respect of such award in effect on the date the change in control occurs will end on the date of such change in control and the Plan Administrator will (i) determine the extent to which performance goals with respect to each such performance period have been met based upon such audited or unaudited financial information then available as it deems relevant and (ii) cause to be paid to the applicable participant partial or full awards with respect to performance goals for each such performance period based upon the Plan Administrator's determination of the degree of attainment of performance goals or, if not determinable, assuming that the applicable "target" levels of performance have been attained, or on such other basis determined by the Plan Administrator.

For purposes of the Amended 2013 Plan, a change in control generally will be deemed to occur in the event: (i) the direct or indirect sale, transfer, conveyance or other disposition (other than by way of a merger or consolidation) of all or substantially all of the properties or our assets and our subsidiaries, to any person or group that is not one of our subsidiaries; (ii) the "incumbent directors" (as described below) cease to constitute at least a majority of the board of directors; (iii) a person, entity or group acquires beneficial ownership of 50% or more of either our then outstanding shares of common stock or of the combined voting power of our then outstanding securities; (iv) there is a consummated reorganization, merger, consolidation, statutory share exchange or similar form of corporate transaction involving us that requires our stockholder approval. Certain acquisitions and other transactions are exempted from the definition of a change in control, as further described in the Amended 2013 Plan, including a transaction where (a) immediately after such transaction more than 50% of the total voting power of the resulting entity is represented by the combined voting power of our outstanding voting securities immediately before the transaction in substantially the same proportions as their ownership of our outstanding voting securities immediately prior to such transaction, (b) no person or group or any employee benefit plan sponsored or maintained by the surviving entity is the beneficial owner of 50% or more of the total voting power of the parent company of the surviving entity in the transaction and (c) at least a majority of the members of the board of directors of the parent company of the surviving entity were members of our board of directors at the time of approval of the initial agreement providing for such transaction. "Incumbent directors" for purposes of the definition of "change in control" means the individuals who are on the board of directors as of the original effective date of the 2013 Plan (July 31, 2013) or individuals whose nomination or election was approved by a vote of at least two-thirds of the incumbent directors then still on the board of directors.

Plan Amendments and Termination

The Plan Administrator will have the authority to amend or terminate the Amended 2013 Plan at any time. However, except as otherwise provided in the Amended 2013 Plan or an award agreement, no amendment or termination of the Amended 2013 Plan may materially impair a participant's rights under his or her outstanding awards without the participant's consent. We will obtain stockholder approval of any amendment to the Amended 2013 Plan as required by applicable law and listing requirements. No ISOs may be granted under the Amended 2013 Plan after May 7, 2028.

U.S. Federal Income Tax Consequences Associated with the Amended 2013 Plan

The following is a general summary of the principal United States federal income taxation consequences to participants and us under current law with respect to participation in the Amended 2013 Plan. This summary is not intended to be exhaustive and does not discuss the income tax laws of any city, state or foreign jurisdiction in which a participant may reside or the rules applicable to deferred compensation under Section 409A of the Code. Our ability to realize the benefit of any tax deductions described below depends on our generation of taxable income as well as the requirement of reasonableness, the provisions of Section 162(m) of the Code and the satisfaction of our tax reporting obligations.

Non-Statutory Stock Options. Generally, there is no taxation upon the grant of an NSO if the stock option is granted with an exercise price equal to the fair market value of the underlying stock on the grant date. On exercise of an NSO the participant will recognize ordinary income in an amount equal to the excess, if any, of the fair market value of the shares on the date each such stock option is exercised over the stock option exercise price. The participant's basis for the stock for purposes of determining gain or loss on subsequent disposition of such shares generally will be the fair market value of the common stock on the date the participant exercises such stock option. Any subsequent gain or loss will be generally taxable as capital gains or losses. Subject to certain restrictions and limitations, we will generally be entitled to a tax deduction equal to the taxable ordinary income realized by the participant.

Incentive Stock Options. Generally, a participant is not subject to ordinary income tax upon the grant or exercise of an ISO, although the amount by which the fair market value of a share of stock acquired on exercise of an ISO exceeds the exercise price of the ISO generally will be an adjustment included in the participant's alternative minimum taxable income for the year in which the ISO is exercised. If a participant holds a share received on exercise of an ISO for more than two years from the date the stock option was granted and more than one year from the date the stock option was exercised, which is referred to as the required holding period, the difference, if any, between the amount realized on a sale or other taxable disposition of that share and the participant's tax basis in that share will be long-term capital gain or loss.

If, however, a participant disposes of a share acquired on exercise of an ISO before the end of the required holding period, which is referred to as a disqualifying disposition, the participant generally will recognize ordinary income in the year of the disqualifying disposition equal to the excess, if any, of the fair market value of the share on the date the ISO was exercised over the exercise price. However, if the sales proceeds are less than the fair market value of the share on the date of exercise of the ISO, the amount of ordinary income recognized by the participant will not exceed the gain, if any, realized on the sale. If the amount realized on a disqualifying disposition exceeds the fair market value of the share on the date of exercise of the ISO, that excess will be short-term or long-term capital gain, depending on whether the holding period for the share exceeds one year.

Upon a disqualifying disposition of shares in the year in which the stock option is exercised, there will be no adjustment for alternative minimum tax purposes with respect to those shares. In computing alternative minimum taxable income, the tax basis of a share acquired on exercise of an ISO is increased by the amount of the adjustment taken into account with respect to that share for alternative minimum tax purposes in the year the stock option is exercised.

We are not allowed an income tax deduction with respect to the grant or exercise of an ISO or the disposition of a share acquired on an exercise of an ISO after the required holding period. If there is a disqualifying disposition of a share, however, we are allowed a deduction in an amount equal to the ordinary income includible in income by the participant, subject to Section 162(m) of the Code and provided that amount constitutes an ordinary and necessary business expense for us and is reasonable in amount, and either the participant includes that amount in income or we timely satisfy our reporting requirements with respect to that amount.

An ISO exercised more than three months after a participant terminates employment, other than by reason of death or disability, will be taxed as a NSO, and the participant will have been deemed to have received income on the exercise taxable at ordinary income rates. We will be entitled to a tax deduction equal to the participant's ordinary income, if any.

SARs. In general, the tax treatment of a SAR is similar to that of a NSO.

Restricted Stock Awards. Generally, the recipient of a restricted stock award will recognize ordinary income at the time the shares are received equal to the excess, if any, of the fair market value of the shares received over any amount paid by the recipient for the shares. If a share is not vested when it is received, the participant generally will not recognize income until the share becomes vested, at which time the participant will recognize ordinary income equal to the excess, if any, of the fair market value of the share on the date it becomes vested over any amount paid by the participant in exchange for the share. A participant may file an election with the Internal Revenue Service, within 30 days following his or her receipt of the restricted stock award, to recognize ordinary income, as of the date the participant receives the award, equal to the excess, if any, of the fair market value of the share on the date the award is granted over any amount paid by the participant for the share. The participant's basis for the determination of gain or loss upon the subsequent disposition of shares acquired from restricted stock awards will be the amount paid for such shares plus any ordinary income recognized either when the share is received or when the share becomes vested.

Subject to the satisfaction of certain reporting requirements and other conditions as described above, we will generally be entitled to a tax deduction equal to the taxable ordinary income realized by the participant.

RSU Awards. Generally, a participant who receives a RSU structured to either comply with or be exempt from the requirements of Section 409A of the Code will recognize ordinary income at the time the shares of our common stock are delivered equal to the excess, if any, of the fair market value of the shares of our common stock received over any amount paid by the participant in exchange for the shares of our common stock. The participant's basis in the shares will be the amount paid plus any ordinary income recognized when the shares are delivered. Subject to the satisfaction of certain reporting requirements and other conditions as described above, we will generally be entitled to a tax deduction equal to the taxable ordinary income realized by the participant.

Dividend Equivalents. A participant who receives a dividend equivalent with respect to an award generally will not recognize taxable income at the time of grant, and we will not be entitled to a deduction at that time. When a dividend equivalent is paid, the participant generally will recognize ordinary income. Subject to the satisfaction of certain reporting requirements and other conditions as described above, we will generally be entitled to a tax deduction equal to the taxable ordinary income realized by the participant.

Performance Compensation Awards. A participant who has been granted a performance compensation award generally will not recognize taxable income at the time of grant, and we will not be entitled to a deduction at that time. When an award is paid, whether in cash or common stock, the participant generally will recognize ordinary income. Subject to the satisfaction of certain reporting requirements and other conditions as described above, we will generally be entitled to a tax deduction equal to the taxable ordinary income realized by the participant.

Impact of Section 409A of the Code. As amended, the Amended 2013 Plan provides for the grant of various types of awards which may not be exempt from Section 409A of the Code. If an award is subject to Section 409A of the Code, and if the requirements of Section 409A of the Code are not met, the taxable events as described above could apply earlier than described and also could result in the imposition of additional taxes and penalties.

Section 162 Limitations

Compensation of persons who are "covered employees" of the Company is subject to the tax deduction limits of Section 162(m) of the Code. The exemption from Section 162(m)'s deduction limit for performance-based compensation has been repealed, effective for taxable years beginning after December 31, 2017, such that compensation paid to our covered employees in excess of $1 million will not be deductible unless it qualifies for transition relief applicable to certain arrangements in place as of November 2, 2017.

CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS

Other than compensation arrangements for named executive officers and directors, we describe below each transaction and series of similar transactions, since January 1, 2016, to which we were a party or will be a party, in which the amount exceeds $120,000 (or, if less, 1% of the average of our total assets amounts at December 31, 2017 and 2018) and in which any related person had or will have a direct or indirect material interest.

Compensation arrangements for our named executive officers and directors are described in the section entitled "*Executive Compensation*."

Claire K. T. Reiss

From time to time, Claire K. T. Reiss, who until the closing of our public offering on October 19, 2016 was a beneficial owner of more than 10% of our common stock and was also a director of Biocept, individually and through entities affiliated with her has loaned us operating funds through various convertible and non-convertible debt instruments. These entities consist of Reisung Enterprises, Inc., of which Mrs. Reiss is the owner and president, and family trusts of which Mrs. Reiss is the trustee. Mrs. Reiss resigned from the board of directors on August 14, 2013.

One of Mrs. Reiss' family trusts participated in our May 2016 public offering, purchasing 6,825 shares of our common stock and warrants to purchase up to 4,777 shares of our common stock for total proceeds of $614,273. The warrants purchased in this public offering are exercisable at a per share price of $117.00 until May 2021.

One of Mrs. Reiss' family trusts participated in our October 2016 public offering, purchasing 7,575 shares of our common stock and warrants to purchase up to 7,575 shares of our common stock for total proceeds of $250,000. The warrants purchased in this public offering are exercisable at a per share price of $33.00 until October 2021.

Edward Neff

Edward Neff, who was a member of our board of directors until September 8, 2017, is an uncle of Mr. Nall and is the chief executive officer and owner of Systems, Machines, Automation Components Corporation (SMAC), a company which had loaned us operating funds under convertible debt arrangements and provided financing for certain fixed asset purchases prior to our initial public offering in February 2014.

Mr. Neff participated in our May 2016 public offering, purchasing 1,111 shares of our common stock and warrants to purchase up to 777 shares of our common stock for total proceeds of $100,000. The warrants purchased in this public offering are exercisable at a per share price of $117.00 until May 2021.

SMAC participated in our October 2016 public offering, purchasing 7,575 shares of our common stock and warrants to purchase up to 7,575 shares of our common stock for total proceeds of $250,000. The warrants purchased in this public offering are exercisable at a per share price of $33.00 until October 2021.

David F. Hale

Pursuant to a sublease agreement dated March 30, 2015, we subleased 9,849 square feet, plus free use of an additional area, of our San Diego facility to an entity affiliated with Mr. Hale for $12,804 per month, with a refundable security deposit of $12,804 received from the subtenant. The initial term of the sublease expired on July 31, 2015 and was subject to renewal on a month-to-month basis thereafter. On February 1, 2017, we received notice from the subtenant terminating the sublease effective March 31, 2017. During the three months ended September 30, 2017, the total amount of the $12,804 security deposit previously received from the subtenant was applied against approximately $16,000 in additional rents owed as a result of the subtenant continuing to occupy the subleased areas beyond March 31, 2017, and the balance of approximately $3,200 due to us was waived. A total of $153,648 and $51,216 in rental income was recorded to other income/(expense) in our unaudited condensed statements of operations and comprehensive loss during the years ended December 31, 2016 and 2017, respectively.

A retirement account of Mr. Hale participated in our May 2016 public offering, purchasing 555 shares of our common stock and warrants to purchase up to 388 shares of our common stock for total proceeds of $50,000. The warrants purchased in this public offering are exercisable at a per share price of $117.00 until May 2021.

Hale BioPharma Ventures LLC participated in our October 2016 public offering, purchasing 3,003 shares of our common stock and warrants to purchase up to 3,030 shares of our common stock for total proceeds of $100,000. The warrants purchased in this public offering are exercisable at a per share price of $33.00 until October 2021.

M. Faye Wilson

Ms. Wilson participated in our October 2016 public offering, purchasing 454 shares of our common stock and warrants to purchase up to 454 shares of our common stock for total proceeds of $15,000. The warrants purchased in this public offering are exercisable at a per share price of $33.00 until October 2021.

Bruce E. Gerhardt

Mr. Gerhardt participated in our May 2016 public offering, purchasing 277 shares of our common stock and warrants to purchase up to 194 shares of our common stock for total proceeds of $25,000. The warrants purchased in this public offering are exercisable at a per share price of $117.00 until May 2021.

Mr. Gerhardt participated in our October 2016 public offering, purchasing 1,666 shares of our common stock and warrants to purchase up to 1,666 shares of our common stock for total proceeds of $55,000. The warrants purchased in this public offering are exercisable at a per share price of $33.00 until October 2021.

Bruce A. Huebner

Mr. Huebner participated in our October 2016 public offering, purchasing 666 shares of our common stock and warrants to purchase up to 666 shares of our common stock for total proceeds of $22,000. The warrants purchased in this public offering are exercisable at a per share price of $33.00 until October 2021.

Marsha A. Chandler

Dr. Chandler participated in our October 2016 public offering, purchasing 151 shares of our common stock and warrants to purchase up to 1,212 shares of our common stock for total proceeds of $5,000. The warrants purchased in this public offering are exercisable at a per share price of $33.00 until October 2021.

Michael W. Nall

A family trust of Mr. Nall’s participated in our October 2016 public offering, purchasing 1,212 shares of our common stock and warrants to purchase up to 1,212 shares of our common stock for total proceeds of $40,000. The warrants purchased in this public offering are exercisable at a per share price of $33.00 until October 2021.

Timothy C. Kennedy

Mr. Kennedy participated in our October 2016 public offering, purchasing 1,212 shares of our common stock and warrants to purchase up to 1,212 shares of our common stock for total proceeds of $40,000. The warrants purchased in this public offering are exercisable at a per share price of $33.00 until October 2021.

Lyle J. Arnold

Lyle J. Arnold, Ph.D., our Senior Vice-President of Research and Development and Chief Scientific Officer, is the controlling person of Aegea Biotechnologies, Inc. On June 2, 2012, we entered into an Assignment and Exclusive Cross-License Agreement, or the Cross-License Agremeent, with Aegea regarding the Target-Selector technology. Under the Agreement, each party has an undivided joint ownership interest in all of the patents and other intellectual property rights for such technology. We obtained an exclusive, worldwide, royalty-free, fully-paid, irrevocable, sublicensable license for all applications in the fields of oncology clinical testing and oncology diagnostics (including both laboratory developed tests and IVD tests as applied to the oncology field) and oncology basic and clinical research that is performed internally by us, as a service offered by us, or in a bona fide collaboration between us and one or more third parties (where the sample types tested are tissue, whole blood, bone marrow, cerebrospinal fluid or derivatives of any of such sample types); provided that any such collaboration must not be solely or primarily directed to providing research reagents or research technologies to such collaborator, and must not involve the sale or resale of patented research reagents or the licensing of technologies for patented research applications by such collaborator to third parties. Under the Agreement’s license, we are free of any obligation to obtain further consent from Aegea or to account to Aegea. Aegea obtained an exclusive, worldwide, royalty-free, fully-paid, irrevocable sublicensable license for all applications in all other fields, without any obligation to obtain further

consent from us or to account to us. We were given responsibility for prosecuting some of the relevant patent applications, and Aegea was given responsibility for prosecuting others, but the two parties will share all patent prosecution and maintenance costs equally. We received payments totaling $25,763, $19,047 and $15,325 during the years ended December 31, 2015, 2016, and 2017, respectively, from Aegea as reimbursements for shared patent costs under the Cross-License Agreement.

Dr. Arnold participated in our October 2016 public offering, purchasing 1,500 shares of our common stock and warrants to purchase up to 1,500 shares of our common stock for total proceeds of $49,500. The warrants purchased in this public offering are exercisable at a per share price of $33.00 until October 2021.

Veena Singh, M.D.

Dr. Singh, our former Senior Medical Director, participated in our October 2016 public offering, purchasing 333 shares of our common stock and warrants to purchase up to 333 shares of our common stock for total proceeds of $11,000. The warrants purchased in this public offering are exercisable at a per share price of $33.00 until October 2021.

Indemnification Agreements

We have entered into indemnification agreements with each of our current directors and executive officers. These agreements will require us to indemnify these individuals to the fullest extent permitted under Delaware law against liabilities that may arise by reason of their service to us and to advance expenses incurred as a result of any proceeding against them as to which they could be indemnified. We also intend to enter into indemnification agreements with our future directors and executive officers. In addition, our predecessor company Biocept, Inc., a California corporation, entered into indemnification agreements with certain of our current directors and executive officers and certain prior directors and executive officers. These agreements will require us to indemnify these individuals to the fullest extent permitted under California law against liabilities that may arise by reason of their service to us, and to advance expenses incurred as a result of any proceeding against them as to which they could be indemnified.

Policies and Procedures for Related Party Transactions

We adopted a policy that our executive officers, directors, nominees for election as a director, beneficial owners of more than 5% of any class of our common stock, any members of the immediate family of any of the foregoing persons and any firms, corporations or other entities in which any of the foregoing persons is employed or is a partner or principal or in a similar position or in which such person has a 5% or greater beneficial ownership interest, collectively, related parties, are not permitted to enter into a transaction with us without the prior consent of our board of directors acting through the audit committee. Any request for us to enter into a transaction with a related party in which the amount involved exceeds $120,000, and in which such related party would have a direct or indirect interest, must first be presented to our audit committee for review, consideration and approval. In approving or rejecting any such proposal, our audit committee is to consider the material facts of the transaction, including, but not limited to, whether the transaction is on terms no less favorable than terms generally available to an unaffiliated third party under the same or similar circumstances, the extent of the benefits to us, the availability of other sources of comparable products or services and the extent of the related person’s interest in the transaction.

Equity Awards

We have granted stock options and RSUs to our executive officers and directors. For additional information, see “Executive Compensation—Outstanding Equity Awards.”

PRINCIPAL SHAREHOLDERS

The following table sets forth the beneficial ownership of our common stock as of January 25, 2019 by:

- each person, or group of affiliated persons, whom we know to beneficially own more than 5% of our common stock;
- each of our named executive officers;
- each of our directors and director nominees; and
- all of our executive officers and directors as a group.

We have determined beneficial ownership in accordance with the rules of the SEC. These rules generally attribute beneficial ownership of securities to persons who possess sole or shared voting power or investment power with respect to those securities. In addition, the rules include shares of common stock issuable pursuant to the exercise of stock options or warrants that are either immediately exercisable or exercisable on or before March 26, 2019, which is 60 days after January 25, 2019. These shares are deemed to be outstanding and beneficially owned by the person holding those options or warrants for the purpose of computing the percentage ownership of that person, but they are not treated as outstanding for the purpose of computing the percentage ownership of any other person. Unless otherwise indicated, the persons or entities identified in this table have sole voting and investment power with respect to all shares shown as beneficially owned by them, subject to applicable community property laws.

Except as otherwise noted below, the address for persons listed in the table is c/o Biocept, Inc., 5810 Nancy Ridge Drive, San Diego, California 92121.

Name of Beneficial Owner	Number of Shares Beneficially Owned	Percentage of Shares Beneficially Owned
5% Stockholders		
Lincoln Park Capital, LLC(1)	394,263	6.89%
Empery Asset Management, LP(2)	330,000	5.77%
Sabby Volatility Warrant Master Fund, Ltd.(3)	330,000	5.77%
Named Executive Officers and Directors:		
David F. Hale(4)	12,145	*%
Marsha A. Chandler, Ph. D.(5)	1,659	*%
Bruce E. Gerhardt, CPA(6)	7,137	*%
Bruce A. Huebner(7)	2,818	*%
Michael W. Nall(8)	14,441	*%
Ivor Royston, M.D.(9)	1,808	*%
M. Faye Wilson, MBA(10)	2,638	*%
Timothy C. Kennedy(11)	6,880	*%
Lyle J. Arnold, Ph. D.(12)	8,263	*%
All Executive Officers and Directors as a group (11 persons)(13)	58,573	1%

* denotes less than 1%.

(1) Includes 41,850 shares of common stock issuable upon exercise of pre-funded warrants held by Lincoln Park Capital Fund, LLC, pursuant to the September 2018 public offering and according to a Schedule 13D filed with the SEC on September 20, 2018 by (i) Lincoln Park Capital Fund, LLC, (ii) Lincoln Park Capital, LLC, (iii) Rockledge Capital Corporation, (iv) Joshua b. Scheinfeld, (v) Alex Noah Investors, Inc., (vi) Jonathan I. Cope (Lincoln Park Capital Fund, Lincoln Park Capital, Rockledge Capital Corporation, Mr. Scheinfeld and Alex Noah collectively being referred to as the "Reporting Persons"). The address of the principal business and principal office of each of the Reporting Persons is 440 North Wells, Suite 410, Chicago, Illinois 60654.

(2) Based on a Schedule 13D filed with the SEC on January 24, 2019 by (i) Empery Asset Management, LP, (ii) Ryan M. Lane, (iii) Martin D. Hoe (Empery Asset Management, LP, Ryan M. Lane, Martin D. Hoe collectively being referred to as the "Reporting Persons"). The address of the principal business and principal office of each of the Reporting Persons is 1 Rockefeller Plaza, Suite 1205, New York, New York, 10020.

(3) Based on a Schedule 13D filed with the SEC on January 18, 2019 by (i) Sabby Healthcare Master Fund, Ltd., (ii) Sabby Volatility Warrant Master Fund, Ltd., (iii) Sabby Management, LLC, (iv) Hal Mintz (Sabby Healthcare Master Fund, Ltd.,

Sabby Volatility Warrant Master Fund, Ltd., Sabby Management, LLC, and Hal Mintz, collectively being referred to as the "Reporting Persons"). The address of the principal business and principal office of Sabby Healthcare Master Fund, Ltd. and Sabby Volatility Warrant Master Fund, Ltd. is 89 Nexus Way, Camana Bay, Grand Cayman KY1-9007, Cayman Islands. The address of the principal business and principal office of Sabby Management, LLC. and Hal Mintz is 10 Mountainview Road, Suite 205,Upper Saddle River, New Jersey 07458.

(4) Includes 2,420 shares of common stock underlying stock options. Includes shares held by Mr. Hale's individual retirement account, shares held by Hale BioPharma Ventures LLC, which is controlled by Mr. Hale, and shares held by the Hale Family Trust, which is controlled by Mr. Hale as co-trustee. The calculation of the percentage of shares beneficially owned also includes 264 shares, 444 shares, and 3,030 shares for which common stock warrants held by Hale BioPharma Ventures LLC are exercisable at per share prices of $900.00, $140.40, and $33.00, respectively, according to prices set in our initial, February 2015, and October 2016 public offerings. The calculation of the percentage of shares beneficially owned also includes 388 shares for which common stock warrants held by Mr. Hale's individual retirement account are exercisable at a price of $117.00 per share, according to the price set in our May 2016 public offering.

(5) Includes 1,229 shares of common stock underlying stock options. The number of shares beneficially owned also includes outstanding shares held by a family trust affiliated with Dr. Chandler. The calculation of the percentage of shares beneficially owned includes 27 shares, 22 shares, and 151 shares for which common stock warrants held by Dr. Chandler are exercisable at per share prices of $900.00, $140.40 and $33.00, respectively, according to prices set in our initial, February 2015, and October 2016 public offerings.

(6) Includes 1,060 shares of common stock underlying stock options. The calculation of the percentage of shares beneficially owned also includes 5 shares, 222 shares, 194 shares, and 1,666 shares for which common stock warrants held by Mr. Gerhardt are exercisable at per share prices of $900.00, $140.40, $117.00, and $33.00, respectively, according to prices set in our initial, February 2015, May 2016, and October 2016 public offerings.

(7) Includes 1,218 shares of common stock underlying stock options. The calculation of the percentage of shares beneficially owned also includes 133 shares and 666 shares for which common stock warrants held by Mr. Huebner are exercisable at per share prices of $140.40 and $33.00, respectively, according to the prices set in our February 2015 and October 2016 public offerings.

(8) Includes 8,944 shares of common stock underlying stock options. Includes outstanding shares held by a family trust. The calculation of the percentage of shares beneficially owned also includes 133 shares for which common stock warrants held by Mr. Nall are exercisable at a price of $140.40 per share, according to the price set in our February 2015 public offering. The calculation of the percentage of shares beneficially owned also includes 1,212 shares for which common stock warrants held by a family trust are exercisable at a price of $33.00 per share, according to the price set in our October 2016 public offering.

(9) Includes 1,099 shares of common stock underlying stock options. Includes shares owned by Dr. Royston's individual retirement account, a family trust and an individual trust account. The calculation of the percentage of shares beneficially owned also includes 133 shares for which common stock warrants held by Dr. Royston's individual retirement account are exercisable at a price of $140.40 per share according to the price set in our February 2015 public offering.

(10) Includes 1,371 shares of common stock underlying stock options. Includes shares held by Ms. Wilson's individual retirement account as well as Wilson Boyles & Co., LLC, a company controlled by Ms. Wilson. The calculation of the percentage of shares beneficially owned also includes 13 shares, 44 shares, and 454 shares for which common stock warrants held by Ms. Wilson are exercisable at per share prices of $900.00, $140.40, and $33.00, respectively, according to prices set in our initial, February 2015, and October 2016 public offerings.

(11) Includes 2,790 shares of common stock underlying stock options. The calculation of percentage of shares beneficially owned also includes warrants to purchase up to 1,212 shares of common stock exercisable at $33.00 per share, according to the price set in our October 2016 public offering.

(12) Includes 3,756 shares of common stock underlying stock options. The calculation of percentage of shares beneficially owned also includes warrants to purchase up to 1,500 shares of common stock exercisable at $33.00 per share, according to the price set in our October 2016 public offering.

(13) Includes 96 shares of common stock, 868 shares of common stock underlying stock options for executive officers not named in the table above.

PRICE RANGE OF OUR COMMON STOCK

On February 7, 2019, the closing price for our common stock as reported on The Nasdaq Capital Market was $2.03 per share. The following table sets forth the ranges of high and low sales prices per share of our common stock as reported on The Nasdaq Capital Market for the periods indicated. Such quotations represent inter-dealer prices without retail markup, markdown or commission and may not necessarily represent actual transactions.

	Common Stock	
	High	**Low**
Fiscal Year Ended December 31, 2019		
First Quarter (through February 7, 2019)	$3.72	$0.84
Fiscal Year Ended December 31, 2018		
Fourth Quarter	$ 2.95	$ 0.66
Third quarter	$ 12.15	$ 2.59
Second quarter	$ 9.30	$ 5.10
First quarter	$ 24.60	$ 7.50
Fiscal Year Ended December 31, 2017		
Fourth quarter	$ 40.50	$18.00
Third quarter	$ 49.20	$33.30
Second quarter	$ 67.80	$37.20
First quarter	$101.70	$23.40

As of the date of this prospectus, our amended certificate of incorporation authorizes us to issue 150,000,000 shares of common stock, par value $0.0001 per share, and 5,000,000 shares of preferred stock, par value $0.0001 per share. As of January 25, 2019, there were 44 stockholders of record of our common stock, which excludes stockholders whose shares were held in nominee or street name by brokers. The actual number of common stockholders is greater than the number of record holders, and includes stockholders who are beneficial owners, but whose shares are held in street name by brokers and other nominees. This number of holders of record also does not include stockholders whose shares may be held in trust by other entities.

DILUTION

If you purchase shares of our common stock in this offering, you may experience dilution to the extent of the difference between the combined public offering price per share and related warrant in this offering and our as adjusted net tangible book value per share immediately after this offering assuming no value is attributed to the warrants, and such warrants are accounted for and classified as equity. Net tangible book value per share is equal to the amount of our total tangible assets, less total liabilities, divided by the number of outstanding shares of our common stock. As of September 30, 2018, our net tangible book value was approximately $8.9 million, or approximately $2.27 per share.

After giving effect to the sale by us of 6,250,000 shares of our common stock and warrants to purchase up to 6,250,000 shares of our common stock in this offering at a combined public offering price of $1.20 per share and related warrant, after deducting the underwriting discounts and commissions and estimated offering expenses payable by us, our as adjusted net tangible book value as of September 30, 2018 would have been approximately $15.7 million, or approximately $1.54 per share. This represents an immediate decrease in net tangible book value of $0.73 per share to existing stockholders and an immediate increase in net tangible book value of $0.34 per share to new investors purchasing shares of our common stock and related warrants in this offering, attributing none of the combined public offering price to the warrants offered hereby. The following table illustrates this per share dilution:

Combined public offering price per share and related warrant		$1.20
Net tangible book value per share as of September 30, 2018	$2.27	
Decrease in net tangible book value per share after this offering	(0.73)	
As adjusted net tangible book value per share after this offering		1.54
Dilution per share to new investors		$(0.34)

The discussion and table above assumes (i) no exercise of the underwriters' option to purchase up to an additional 937,500 shares of common stock and/or warrants to purchase 937,500 shares of common stock, (ii) no exercise of warrants offered in this offering, and (iii) no receipt of cash upon the exercise of such warrants. Upon the exercise of such warrants, if any, holders of such warrants will experience additional dilution.

The foregoing discussion and table do not take into account further dilution to new investors that could occur upon the exercise of outstanding options or warrants having a per share exercise price less than the per share offering price to the public in this offering. In addition, we may choose to raise additional capital due to market conditions or strategic considerations even if we believe we have sufficient funds for our current or future operating plans. To the extent that additional capital is raised through the sale of equity or convertible debt securities, the issuance of these securities could result in further dilution to our stockholders.

The table and discussion above are based on 3,937,226 shares of our common stock outstanding as of September 30, 2018 and excludes as of such date:

- up to 1,548,105 shares of common stock issuable upon the conversion of Series A Convertible Preferred Stock outstanding as of September 30, 2018;
- 114,641 shares of our common stock issuable upon the exercise of stock options, with a weighted-average exercise price of $72.02 per share;
- 360 shares of our common stock issuable upon the settlement of outstanding restricted stock units;
- 4,814,927 shares of our common stock issuable upon the exercise of outstanding warrants, with a weighted-average exercise price of $5.44 per share; and
- 194,649 other shares of our common stock reserved for future issuance under our 2013 Amended and Restated Equity Incentive Plan.

DESCRIPTION OF THE SECURITIES WE ARE OFFERING

As of the date of this prospectus, our amended certificate of incorporation authorizes us to issue 150,000,000 shares of common stock, par value $0.0001 per share, and 5,000,000 shares of preferred stock, par value $0.0001 per share.

We are offering 6,250,000 shares of our common stock together with warrants to purchase up to an aggregate of 6,250,000 shares of our common stock. Each share of our common stock is being sold together with a warrant to purchase one share of common stock. The shares of our common stock and related warrants will be issued separately. We are also registering the shares of our common stock issuable from time to time upon exercise of the warrants offered hereby.

The following description of our capital stock is not complete and is subject to and qualified in its entirety by our amended certificate of incorporation and amended and restated bylaws, which are filed as exhibits to the registration statement of which this prospectus is a part, and by the relevant provisions of the Delaware General Corporation Law.

Common Stock

The holders of our common stock are entitled to the following rights:

Voting Rights. Holders of our common stock are entitled to one vote per share in the election of directors and on all other matters on which stockholders are entitled or permitted to vote. Holders of our common stock are not entitled to cumulative voting rights.

Dividend Rights. Subject to the terms of any then outstanding series of preferred stock, the holders of our common stock are entitled to dividends in the amounts and at times as may be declared by the board of directors out of funds legally available therefor.

Liquidation Rights. Upon liquidation or dissolution, holders of our common stock are entitled to share ratably in all net assets available for distribution to stockholders after we have paid, or provided for payment of, all of our debts and liabilities, and after payment of any liquidation preferences to holders of any then outstanding shares of preferred stock.

Other Matters. Holders of our common stock have no redemption, conversion or preemptive rights pursuant to our amended certificate of incorporation or amended and restated bylaws. There are no sinking fund provisions applicable to our common stock. The rights, preferences and privileges of the holders of our common stock are subject to the rights of the holders of shares of any series of preferred stock that we may issue in the future.

Outstanding Registration Rights. Under the terms of the warrants issued to certain designees of the representative of the underwriters in connection with our initial public offering, the holders have the right to include its shares of common stock in any registration statement we file. If we register any securities for public sale, the holder will have the right to include its shares of common stock in the registration statement, provided that the underwriters of any such underwritten offering will have the right to limit the number of shares to be included in the registration statement. These piggyback registration rights expire on February 4, 2021.

All of our outstanding shares of common stock are fully paid and nonassessable.

Our common stock is listed on Nasdaq under the symbol “BIOC.”

Anti-Takeover Effects of Delaware Law and Our Certificate of Incorporation and Bylaws

The provisions of Delaware law, our certificate of incorporation and our bylaws described below may have the effect of delaying, deferring or discouraging another party from acquiring control of us.

Section 203 of the Delaware General Corporation Law

We are subject to Section 203 of the Delaware General Corporation Law, which prohibits a Delaware corporation from engaging in any business combination with any interested stockholder for a period of three years after the date that such stockholder became an interested stockholder, with the following exceptions:

- before such date, the board of directors of the corporation approved either the business combination or the transaction that resulted in the stockholder becoming an interested stockholder;

- upon completion of the transaction that resulted in the stockholder becoming an interested stockholder, the interested stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction began, excluding for purposes of determining the voting stock outstanding (but not the outstanding voting stock owned by the interested stockholder) those shares owned (i) by persons who are directors and also officers and (ii) employee stock plans in which employee participants do not have the right to determine confidentially whether shares held subject to the plan will be tendered in a tender or exchange offer; or
- on or after such date, the business combination is approved by the board of directors and authorized at an annual or special meeting of the stockholders, and not by written consent, by the affirmative vote of at least 66 $^{2}/_{3}$% of the outstanding voting stock that is not owned by the interested stockholder.

In general, Section 203 defines business combination to include the following:

- any merger or consolidation involving the corporation and the interested stockholder;
- any sale, transfer, pledge or other disposition of 10% or more of the assets of the corporation involving the interested stockholder;
- subject to certain exceptions, any transaction that results in the issuance or transfer by the corporation of any stock of the corporation to the interested stockholder;
- any transaction involving the corporation that has the effect of increasing the proportionate share of the stock or any class or series of the corporation beneficially owned by the interested stockholder; or
- the receipt by the interested stockholder of the benefit of any loss, advances, guarantees, pledges or other financial benefits by or through the corporation.

In general, Section 203 defines an “interested stockholder” as an entity or person who, together with the person’s affiliates and associates, beneficially owns, or within three years before the time of determination of interested stockholder status did own, 15% or more of the outstanding voting stock of the corporation.

Certificate of Incorporation and Bylaws

Our certificate of incorporation and/or bylaws provide that:

- our board of directors is classified into three classes of equal (or roughly equal) size, with all directors serving for a three-year term and the directors of only one class being elected at each annual meeting of stockholders, so that the terms of the classes of directors are “staggered”;
- the authorized number of directors can be changed only by resolution of our board of directors;
- our bylaws may be amended or repealed by our board of directors or our stockholders;
- no action can be taken by stockholders except at an annual or special meeting of the stockholders called in accordance with our bylaws, and stockholders may not act by written consent, unless the stockholders amend the certificate of incorporation to provide otherwise;
- stockholders may not call special meetings of the stockholders or fill vacancies on the board;
- our board of directors will be authorized to issue, without stockholder approval, preferred stock, the rights of which will be determined at the discretion of the board of directors and that, if issued, could operate as a “poison pill” to dilute the stock ownership of a potential hostile acquirer to prevent an acquisition that our board of directors does not approve;
- our stockholders do not have cumulative voting rights, and therefore our stockholders holding a majority of the shares of common stock outstanding will be able to elect all of our directors; and
- our stockholders must comply with advance notice provisions to bring business before or nominate directors for election at a stockholder meeting.

Potential Effects of Authorized but Unissued Stock

We have shares of common stock and preferred stock available for future issuance without stockholder approval. We may utilize these additional shares for a variety of corporate purposes, including future public offerings to raise additional capital, to facilitate corporate acquisitions or payment as a dividend on the capital stock.

The existence of unissued and unreserved common stock and preferred stock may enable our board of directors to issue shares to persons friendly to current management or to issue preferred stock with terms that could render more difficult or discourage a third-party attempt to obtain control of us by means of a merger, tender offer, proxy contest or otherwise, thereby protecting the continuity of our management. In addition, the board of directors has the discretion to determine designations, rights, preferences, privileges and restrictions, including voting rights, dividend rights, conversion rights, redemption privileges and liquidation preferences of each series of preferred stock, all to the fullest extent permissible under the Delaware General Corporation Law and subject to any limitations set forth in our certificate of incorporation. The purpose of authorizing the board of directors to issue preferred stock and to determine the rights and preferences applicable to such preferred stock is to eliminate delays associated with a stockholder vote on specific issuances. The issuance of preferred stock, while providing desirable flexibility in connection with possible financings, acquisitions and other corporate purposes, could have the effect of making it more difficult for a third-party to acquire, or could discourage a third-party from acquiring, a majority of our outstanding voting stock.

Warrants

The following summary of certain terms and provisions of the warrants offered hereby is not complete and is subject to, and qualified in its entirety by, the provisions of the warrant, the form of which has been filed as an exhibit to the registration statement of which this prospectus is a part. Prospective investors should carefully review the terms and provisions of the form of warrant for a complete description of the terms and conditions of the warrants.

Form. The warrants will be issued as individual warrant agreements to the investors.

Exercisability. The warrants are exercisable at any time after their original issuance, expected to be February 12, 2019, and at any time up to the date that is five years after their original issuance. The warrants will be exercisable, at the option of each holder, in whole or in part by delivering to us a duly executed exercise notice and, at any time a registration statement registering the issuance of the shares of common stock underlying the warrants under the Securities Act is effective and available for the issuance of such shares, or an exemption from registration under the Securities Act is available for the issuance of such shares, by payment in full in immediately available funds for the number of shares of common stock purchased upon such exercise. If a registration statement registering the issuance of the shares of common stock underlying the warrants under the Securities Act is not effective or available and an exemption from registration under the Securities Act is not available for the issuance of such shares, the holder may, in its sole discretion, elect to exercise the warrant through a cashless exercise, in which case the holder would receive upon such exercise the net number of shares of common stock determined according to the formula set forth in the warrant. No fractional shares of common stock will be issued in connection with the exercise of a warrant. In lieu of fractional shares, we will pay the holder an amount in cash equal to the fractional amount multiplied by the exercise price.

Exercise Limitation. A holder will not have the right to exercise any portion of the warrant if the holder (together with its affiliates) would beneficially own in excess of 4.99% (or, upon election of the holder, 9.99%) of the number of shares of our common stock outstanding immediately after giving effect to the exercise, as such percentage ownership is determined in accordance with the terms of the warrants. However, any holder may increase or decrease such percentage, provided that any increase will not be effective until the 61st day after such election.

Exercise Price. The warrants will have an exercise price of $1.20 per share. The exercise price is subject to appropriate adjustment in the event of certain stock dividends and distributions, stock splits, stock combinations, reclassifications or similar events affecting our common stock and also upon any distributions of assets, including cash, stock or other property to our stockholders.

Transferability. Subject to applicable laws, the warrants may be offered for sale, sold, transferred or assigned without our consent.

Exchange Listing. There is no established trading market for the warrants and we do not expect a market to develop. In addition, we do not intend to apply for the listing of the warrants on any national securities exchange or other trading market. Without an active trading market, the liquidity of the warrants will be limited.

Fundamental Transactions. If a fundamental transaction occurs, then the successor entity will succeed to, and be substituted for us, and may exercise every right and power that we may exercise and will assume all of our obligations under the warrants with the same effect as if such successor entity had been named in the warrant itself. If holders of our common stock are given a choice as to the securities, cash or property to be received in a fundamental transaction, then the holder shall be given the same choice as to the consideration it receives upon any exercise of the warrant following such fundamental transaction.

Rights as a Stockholder. Except as otherwise provided in the warrants or by virtue of such holder's ownership of shares of our common stock, the holder of a warrant does not have the rights or privileges of a holder of our common stock, including any voting rights, until the holder exercises the warrant.

Transfer Agent

The transfer agent of our common stock being offered hereby is Continental Stock Transfer & Trust Company.

UNDERWRITING

We have entered into an underwriting agreement with the underwriters named below with respect to the shares of our common stock and related warrants subject to this offering. Subject to certain conditions, we have agreed to sell to the underwriters, and the underwriters have agreed to purchase, the number of shares of our common stock and corresponding warrants provided below opposite each underwriter's name. Maxim Group LLC and Dawson James Securities, Inc. are acting as the representatives of the underwriters.

Underwriter	Number of Shares	Number of Warrants
Maxim Group LLC	5,000,000	5,000,000
Dawson James Securities, Inc.	1,250,000	1,250,000
Total	6,250,000	6,250,000

The underwriters are offering the shares of our common stock and related warrants subject to their acceptance of our common stock and the warrants from us and subject to prior sale. The underwriting agreement provides that the obligations of the underwriters to pay for and accept delivery of the shares of our common stock and related warrants offered by this prospectus are subject to the approval of certain legal matters by their counsel and to certain other conditions. The underwriters are obligated to take and pay for all of the shares of our common stock and related warrants if any such shares of our common stock and related warrants are taken.

We have granted the underwriters an option for a period of 45 days from the date of this prospectus to purchase up to an additional shares of common stock and/or warrants to purchase 937,500 shares of common stock at the public offering price, less the underwriting discount.

Underwriter Compensation

We have agreed to pay the underwriters an aggregate fee equal to 7.0% of the gross proceeds of this offering and expect the net proceeds from this offering to be approximately $6.8 million after deducting $525,000 in underwriting commissions and $200,000 in our other estimated offering expenses. We have also agreed to pay the underwriters an accountable expense allowance for certain of the underwriters' expenses relating to the offering up to a maximum aggregate amount of $85,000, including the underwriters' legal fees incurred in this offering.

We have paid an expense deposit of $25,000 to Maxim which will be applied against actual, out-of-pocket accountable expenses that will be paid by us to the underwriters in connection with this offering. Any portion of the $25,000 expense deposit paid to Maxim will be returned to us to the extent that offering expenses are not actually incurred by the underwriters in compliance with FINRA Rule 5110(f)(2)(C).

Discounts and Expenses

The underwriters have advised us that they propose to offer the shares of our common stock and related warrants to the public at the respective public offering price set forth on the cover page of this prospectus and to certain dealers at that price less a concession not in excess of $0.0504 per share of our common stock and related warrant. After this offering, the public offering price and concession to dealers may be changed by the representative. No such change shall change the amount of proceeds to be received by us as set forth on the cover page of this prospectus. The shares of our common stock and related warrants are offered by the underwriters as stated herein, subject to receipt and acceptance by them and subject to their right to reject any order in whole or in part. The underwriters have informed us that they do not intend to confirm sales to any accounts over which they exercise discretionary authority.

The following table shows the public offering price, underwriting discount payable to the underwriters by us and proceeds before expenses to us, assuming both no exercise and full exercise of the underwriters' option to purchase additional shares of

common stock and/or warrants. The underwriting commissions are equal to the combined public offering price per share and related warrants, less the amount per share the underwriters pay us for the shares of common stock and warrants:

	Per Share and Warrant	Total (No Exercise)	Total (Full Exercise)
Public offering price	$ 1.200	$ 7,500,000	$ 8,625,000
Underwriting discounts and commissions	$ 0.084	$ 525,000	$ 603,750
Proceeds, before expenses, to us	$ 1.116	$ 6,975,000	$ 8,021,250

In addition, we have agreed to reimburse the underwriters for reasonable out-of-pocket expenses not to exceed $85,000 in the aggregate. We will also pay $45,000 to Chardan Capital Markets, LLC for financial advisory services in connection with this offering. Chardan will not participate in the selling efforts for this offering. We estimate that total expenses payable by us in connection with this offering, other than the underwriting discount referred to above, will be approximately $200,000.

Indemnification

We have agreed to indemnify the underwriters against certain liabilities, including liabilities under the Securities Act.

Lock-up Agreements

We have agreed, subject to limited exceptions, for a period of 75 days after the closing of this offering, and our officers and directors have agreed, subject to limited exceptions, for a period of 90 days after the closing of this offering, not to offer, sell, contract to sell, pledge, grant any option to purchase, make any short sale or otherwise dispose of, directly or indirectly any shares of common stock or any securities convertible into or exchangeable for our common stock either owned as of the date of the underwriting agreement or thereafter acquired without the prior written consent of Maxim Group LLC and Dawson James Securities, Inc. Maxim Group LLC and Dawson James Securities, Inc. may, in their sole discretion and at any time or from time to time before the termination of the lock-up period, without notice, release all or any portion of the securities subject to lock-up agreements.

Price Stabilization, Short Positions and Penalty Bids

In connection with the offering the underwriters may engage in stabilizing transactions, over-allotment transactions, syndicate covering transactions and penalty bids in accordance with Regulation M under the Exchange Act:

- Stabilizing transactions permit bids to purchase the underlying security so long as the stabilizing bids do not exceed a specified maximum.
- Over-allotment involves sales by the underwriters of shares in excess of the number of shares the underwriters are obligated to purchase, which creates a syndicate short position. The short position may be either a covered short position or a naked short position. In a covered short position, the number of shares over-allotted by the underwriters is not greater than the number of shares that they may purchase in the over-allotment option. In a naked short position, the number of shares involved is greater than the number of shares in the over-allotment option. The underwriters may close out any covered short position by either exercising their over-allotment option and/or purchasing shares in the open market.
- Syndicate covering transactions involve purchases of the common stock in the open market after the distribution has been completed in order to cover syndicate short positions. In determining the source of shares to close out the short position, the underwriters will consider, among other things, the price of shares available for purchase in the open market as compared to the price at which they may purchase shares through the over-allotment option. A naked short position occurs if the underwriters sell more shares than could be covered by the over-allotment option. This position can only be closed out by buying shares in the open market. A naked short position is more likely to be created if the underwriters are concerned that there could be downward pressure on the price of the shares in the open market after pricing that could adversely affect investors who purchase in the offering.
- Penalty bids permit the underwriters to reclaim a selling concession from a syndicate member when the common stock originally sold by the syndicate member is purchased in a stabilizing or syndicate covering transaction to cover syndicate short positions.

These stabilizing transactions, syndicate covering transactions and penalty bids may have the effect of raising or maintaining the market price of our common stock or preventing or retarding a decline in the market price of the common stock. As a

result, the price of our common stock may be higher than the price that might otherwise exist in the open market. These transactions may be discontinued at any time.

Neither we nor the underwriters make any representation or prediction as to the direction or magnitude of any effect that the transactions described above may have on the price of our shares of common stock. In addition, neither we nor the underwriters make any representation that the underwriters will engage in these transactions or that any transaction, if commenced, will not be discontinued without notice.

Electronic Distribution

This prospectus in electronic format may be made available on websites or through other online services maintained by the underwriters, or by their affiliates. Other than this prospectus in electronic format, the information on the underwriters' websites and any information contained in any other websites maintained by the underwriters is not part of this prospectus or the registration statement of which this prospectus forms a part, has not been approved and/or endorsed by us or the underwriters in their capacity as underwriters, and should not be relied upon by investors.

Other

From time to time, the underwriters and/or their affiliates have provided, and may in the future provide, various investment banking and other financial services for us for which services it has received and, may in the future receive, customary fees.

Except for the services provided in connection with this offering and other than as described below, the underwriters have not provided any investment banking or other financial services during the 180-day period preceding the date of this prospectus.

On September 20, 2018, the Company completed an offering of 642,438 shares of the Company's common stock and pre-funded warrants to purchase up to an aggregate of 120,000 shares of its common stock. The shares were sold at a purchase price of $3.285 per share and the pre-funded warrants were sold at a purchase price of $3.275 per pre-funded warrant which represents the per share purchase price for the shares less the $0.01 per share exercise price for each such pre-funded warrant. In addition, in a concurrent private placement, the Company issued to purchasers a warrant to purchase one share of the Company's common stock for each share and pre-funded warrant purchased for cash in the offering. All warrants issued in the offering have an exercise price of $3.16 per share, are exercisable upon the six-month anniversary of issuance and expire five years from such date. Maxim Group LLC and Dawson James Securities, Inc. acted as placement agents in connection with such offering (the "September 2018 Offering").

In connection with the September 2018 Offering, we agreed, for a period of twelve months following the commencement of sales of such offering, to grant Maxim Group LLC the right of first refusal to act as lead managing underwriter and book runner and/or lead placement agent, with at least eighty percent of the economics, and to grant Dawson James Securities, Inc. the right of first refusal to act as a co-placement agent or underwriter or co-manager, with at least twenty percent of the economics, for any and all future equity, equity-linked or debt offerings undertaken by us during such period.

On January 18, 2019, the Company entered into a Securities Purchase Agreement with certain purchasers pursuant to which the Company sold to such purchasers, in a registered direct offering, an aggregate of 990,000 shares of common stock at a negotiated purchase price of $2.25 per share for aggregate net proceeds to the Company of approximately $2.0 million. Maxim Group LLC and Dawson James Securities, Inc. acted as placement agents in connection with such offering.

Notice to Prospective Investors in Canada

This prospectus constitutes an "exempt offering document" as defined in and for the purposes of applicable Canadian securities laws. No prospectus has been filed with any securities commission or similar regulatory authority in Canada in connection with the offer and sale of the securities. No securities commission or similar regulatory authority in Canada has reviewed or in any way passed upon this prospectus or on the merits of the securities and any representation to the contrary is an offence.

Canadian investors are advised that this prospectus has been prepared in reliance on section 3A.3 of National Instrument 33-105 *Underwriting Conflicts* ("NI 33-105"). Pursuant to section 3A.3 of NI 33-105, this prospectus is exempt from the requirement that the Company and the underwriter(s) provide Canadian investors with certain conflicts of interest disclosure pertaining to "connected issuer" and/or "related issuer" relationships that may exist between the Company and the underwriter(s) as would otherwise be required pursuant to subsection 2.1(1) of NI 33-105.

Resale Restrictions

The offer and sale of the securities in Canada is being made on a private placement basis only and is exempt from the requirement that the Company prepares and files a prospectus under applicable Canadian securities laws. Any resale of securities acquired by a Canadian investor in this offering must be made in accordance with applicable Canadian securities laws, which may vary depending on the relevant jurisdiction, and which may require resales to be made in accordance with Canadian prospectus requirements, pursuant to a statutory exemption from the prospectus requirements, in a transaction exempt from the prospectus requirements or otherwise under a discretionary exemption from the prospectus requirements granted by the applicable local Canadian securities regulatory authority. These resale restrictions may under certain circumstances apply to resales of the securities outside of Canada.

Representations of Purchasers

Each Canadian investor who purchases securities will be deemed to have represented to the Company, the underwriters and to each dealer from whom a purchase confirmation is received, as applicable, that the investor is (i) purchasing as principal, or is deemed to be purchasing as principal in accordance with applicable Canadian securities laws, for investment only and not with a view to resale or redistribution; (ii) an "accredited investor" as such term is defined in section 1.1 of National Instrument 45-106 *Prospectus Exemptions* or, in Ontario, as such term is defined in section 73.3(1) of the *Securities Act* (Ontario); and (iii) is a "permitted client" as such term is defined in section 1.1 of National Instrument 31-103 *Registration Requirements, Exemptions and Ongoing Registrant Obligations*.

Taxation and Eligibility for Investment

Any discussion of taxation and related matters contained in this prospectus does not purport to be a comprehensive description of all of the tax considerations that may be relevant to a Canadian investor when deciding to purchase the securities and, in particular, does not address any Canadian tax considerations. No representation or warranty is hereby made as to the tax consequences to a resident, or deemed resident, of Canada of an investment in the securities or with respect to the eligibility of the securities for investment by such investor under relevant Canadian federal and provincial legislation and regulations.

Rights of Action for Damages or Rescission

Securities legislation in certain of the Canadian jurisdictions provides certain purchasers of securities pursuant to an offering memorandum (such as this prospectus), including where the distribution involves an "eligible foreign security" as such term is defined in Ontario Securities Commission Rule 45-501 *Ontario Prospectus and Registration Exemptions* and in Multilateral Instrument 45-107 *Listing Representation and Statutory Rights of Action Disclosure Exemptions*, as applicable, with a remedy for damages or rescission, or both, in addition to any other rights they may have at law, where the offering memorandum, or other offering document that constitutes an offering memorandum, and any amendment thereto, contains a "misrepresentation" as defined under applicable Canadian securities laws. These remedies, or notice with respect to these remedies, must be exercised or delivered, as the case may be, by the purchaser within the time limits prescribed under, and are subject to limitations and defenses under, applicable Canadian securities legislation. In addition, these remedies are in addition to and without derogation from any other right or remedy available at law to the investor.

Language of Documents

Upon receipt of this document, each Canadian investor hereby confirms that it has expressly requested that all documents evidencing or relating in any way to the sale of the securities described herein (including for greater certainty any purchase confirmation or any notice) be drawn up in the English language only. *Par la réception de ce document, chaque investisseur canadien confirme par les présentes qu'il a expressément exigé que tous les documents faisant foi ou se rapportant de quelque manière que ce soit à la vente des valeurs mobilières décrites aux présentes (incluant, pour plus de certitude, toute confirmation d'achat ou tout avis) soient rédigés en anglais seulement.*

Offers Outside the United States

Other than in the United States, no action has been taken by us or the underwriters that would permit a public offering of the securities offered by this prospectus in any jurisdiction where action for that purpose is required. The securities offered by this prospectus may not be offered or sold, directly or indirectly, nor may this prospectus or any other offering material or advertisements in connection with the offer and sale of any such securities be distributed or published in any jurisdiction, except under circumstances that will result in compliance with the applicable rules and regulations of that jurisdiction. Persons into whose possession this prospectus comes are advised to inform themselves about and to observe any restrictions relating to the offering and the distribution of this prospectus. This prospectus does not constitute an offer to sell or a solicitation of an offer to buy any securities offered by this prospectus in any jurisdiction in which such an offer or a solicitation is unlawful.

LEGAL MATTERS

The validity of the shares of common stock and warrants being offered by this prospectus has been passed upon for us by Cooley LLP, San Diego, California. The underwriters are being represented by Ellenoff Grossman & Schole LLP, New York, New York.

EXPERTS

Mayer Hoffman McCann P.C., our independent registered public accounting firm, has audited our balance sheets as of December 31, 2016 and 2017, and the related statements of operations and comprehensive loss, changes in shareholders' equity and cash flows for each of the two years in the period ended December 31, 2017, as set forth in their report, which report expresses an unqualified opinion and includes an explanatory paragraph relating to the uncertainty of our ability to continue as a going concern. We have included such financial statements in this prospectus and in this registration statement in reliance on the report of Mayer Hoffman McCann P.C. given on their authority as experts in accounting and auditing.

MARKET AND INDUSTRY DATA

Unless otherwise indicated, information contained in this prospectus concerning the pharmaceutical industry, including our market opportunity, is based on information from independent industry analysts, third-party sources and management estimates. Management estimates are derived from publicly-available information released by independent industry analysts and third-party sources, as well as data from our internal research, and are based on assumptions made by us based on such data and our knowledge of such industry and market, which we believe to be reasonable. In addition, while we believe the market opportunity information included in this prospectus is generally reliable and is based on reasonable assumptions, such data involves risks and uncertainties and are subject to change based on various factors, including those discussed under the heading "Risk Factors."

WHERE YOU CAN FIND MORE INFORMATION

We have filed with the SEC a registration statement on Form S-1 under the Securities Act with respect to the shares of common stock being offered by this prospectus. This prospectus does not contain all of the information in the registration statement and its exhibits. For further information with respect to us and the common stock offered by this prospectus, we refer you to the registration statement and its exhibits. Statements contained in this prospectus as to the contents of any contract or any other document referred to are not necessarily complete, and in each instance, we refer you to the copy of the contract or other document filed as an exhibit to the registration statement. Each of these statements is qualified in all respects by this reference.

You can read our SEC filings, including the registration statement, over the Internet at the SEC's website at www.sec.gov. You may also read and copy any document we file with the SEC at its public reference facilities at 100 F Street NE, Washington, D.C. 20549. You may also obtain copies of these documents at prescribed rates by writing to the Public Reference Section of the SEC at 100 F Street N.E., Washington, D.C. 20549. Please call the SEC at 1-800-SEC-0330 for further information on the operation of the public reference facilities. You may also request a copy of these filings, at no cost, by writing us at 5810 Nancy Ridge Drive, San Diego, California 92121 or telephoning us at (858) 320-8200.

We are subject to the information and periodic reporting requirements of the Exchange Act, and we file periodic reports, proxy statements and other information with the SEC. These periodic reports, proxy statements and other information are available for inspection and copying at the public reference room and website of the SEC referred to above. We maintain a website at http://www.biocept.com. You may access 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 Section 13(a) or 15(d) of the Exchange Act with the SEC free of charge at our website as soon as reasonably practicable after such material is electronically filed with, or furnished to, the SEC. The information contained in, or that can be accessed through, our website is not incorporated by reference in, and is not part of, this prospectus.

BIOCEPT, INC.

FINANCIAL STATEMENTS
Index to Financial Statements

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Board of Directors and Shareholders of **Biocept, Inc.**

Opinion on the Financial Statements

We have audited the accompanying balance sheets of **Biocept, Inc.** ("Company") as of December 31, 2017 and 2016, and the related statements of operations and comprehensive loss, shareholders' equity and cash flows for each of the two years in the period ended December 31, 2017, 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, 2017 and 2016, and the results of its operations and its cash flows for each of the two years in the period ended December 31, 2017, in conformity with accounting principles generally accepted in the United States of America.

Going Concern Uncertainty

The accompanying financial statements have been prepared assuming that the Company will continue as a going concern. As discussed in Note 2 to the financial statements, the Company has incurred recurring losses from operations and is dependent on future financings to fund operations. These conditions raise substantial doubt about its ability to continue as a going concern. Management's plan regarding these matters is also described in Note 2. The financial statements do not include any adjustments that might result from the outcome of this uncertainty.

Basis for Opinion

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

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

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

We have served as the Company's auditor since 2005.

/s/ Mayer Hoffman McCann P.C.

San Diego, California
March 28, 2018 (except for subsequent events noted in Note 18, and the effects of the reverse stock split as described in Note 1, as to which the date is January 29, 2019)

Biocept, Inc.

Balance Sheets

	December 31, 2016	December 31, 2017
Current assets:		
Cash	$4,609,332	$2,146,611
Accounts receivable, net	128,969	1,193,426
Inventories, net	549,045	498,702
Prepaid expenses and other current assets	484,649	416,600
Total current assets	5,771,995	4,255,339
Fixed assets, net	1,806,331	3,123,567
Total assets	$7,578,326	$7,378,906
Current liabilities:		
Accounts payable	$960,486	$1,269,953
Accrued liabilities	1,160,036	1,752,363
Supplier financings	75,691	61,226
Current portion of equipment financings	262,674	408,992
Current portion of credit facility, net	1,934,665	1,168,811
Total current liabilities	4,393,552	4,661,345
Non-current portion of equipment financings	778,643	1,150,063
Non-current portion of credit facility, net	1,123,001	—
Non-current portion of interest payable	227,177	—
Non-current portion of deferred rent	397,292	271,464
Total liabilities	6,919,665	6,082,872
Commitments and contingencies (see Note 16)		
Shareholders' equity:		
Preferred stock, $0.0001 par value, 5,000,000 shares authorized; no shares issued and outstanding at December 31, 2016 and 2017.	—	—
Common stock, $0.0001 par value, 150,000,000 shares authorized; 583,313 shares issued and outstanding at December 31, 2016; 1,181,179 shares issued and outstanding at December 31, 2017.	58	118
Additional paid-in capital	174,294,473	196,545,523
Accumulated deficit	(173,635,870)	(195,249,607)
Total shareholders' equity	658,661	1,296,034
Total liabilities and shareholders' equity	$7,578,326	$7,378,906

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

Biocept, Inc.

Statements of Operations and Comprehensive Loss

	For the year ended December 31,	
	2016	**2017**
Net revenues	$3,223,096	$5,068,663
Costs and expenses:		
Cost of revenues	6,920,111	9,345,122
Research and development expenses	2,713,367	3,364,747
General and administrative expenses	6,560,425	7,189,529
Sales and marketing expenses	5,054,230	6,343,971
Total costs and expenses	21,248,133	26,243,369
Loss from operations	(18,025,037)	(21,174,706)
Other income/(expense):		
Interest expense, net	(525,880)	(482,623)
Other income	153,648	51,216
Total other income/(expense):	(372,232)	(431,407)
Loss before income taxes	(18,397,269)	(21,606,113)
Income tax expense	(2,053)	(7,624)
Net loss and comprehensive loss	$(18,399,322)	$(21,613,737)
Weighted-average shares outstanding used in computing net loss per share attributable to common shareholders:		
Basic	319,276	916,599
Diluted	319,276	916,599
Net loss per common share:		
Basic	$(57.63)	$(23.58)
Diluted	$(57.63)	$(23.58)

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

Biocept, Inc.

Statements of Shareholders' Equity

	Common Stock		Additional	Accumulated	
	Shares	Amount	Paid-in Capital	Deficit	Total
Balance at December 31, 2015	218,556	$21	$158,929,262	$(155,236,548)	$3,692,735
Stock-based compensation expense	—	—	1,593,947	—	1,593,947
Shares issued for restricted stock units	148	—	—	—	—
Shares and warrants issued for May 2016 public offering, net of issuance costs	55,406	5	4,333,278	—	4,333,283
Shares and warrants issued for October 2016 public offering, net of issuance costs	303,333	30	8,972,695	—	8,972,725
Shares issued pursuant to stock purchase agreement, net of issuance costs	5,772	—	465,293	—	465,293
Fractional shares issued upon one-for-three reverse stock split	98	—	—	—	—
Net loss	—	—	—	(18,399,322)	(18,399,322)
Balance at December 31, 2016	583,313	58	174,294,473	(173,635,870)	658,661
Stock-based compensation expense	—	—	1,247,481	—	1,247,481
Shares issued for restricted stock units	5,194	—	—	—	—
Shares issued upon exercise of common stock warrants	227,228	23	7,498,512	—	7,498,535
Shares and warrants issued for March 2017 registered direct offering, net of issuance costs	144,000	15	8,559,944	—	8,559,959
Shares and warrant issued for August 2017 private placement, net of issuance costs	48,889	5	2,023,934	—	2,023,939
Shares issued for December 2017 registered direct offering, net of issuance costs	164,167	16	2,921,180	—	2,921,196
Fractional shares issued upon one-for-thirty reverse stock split	8,388	1	(1)	—	—
Net loss	—	—	—	(21,613,737)	(21,613,737)
Balance at December 31, 2017	1,181,179	$118	$196,545,523	$(195,249,607)	$1,296,034

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

Biocept, Inc.

Statements of Cash Flows

	For the year ended December 31,	
	2016	**2017**
Cash Flows from Operating Activities		
Net loss	$(18,399,322)	$(21,613,737)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation and amortization	322,029	575,717
Inventory reserve	(31,659)	(50,532)
Stock-based compensation	1,593,947	1,247,481
Non-cash interest expense related to credit facility and other financing activities	100,005	45,788
Gain on sale of fixed assets	(30,662)	—
Increase/(decrease) in cash resulting from changes in:		
Accounts receivable, net	(94,769)	(1,064,457)
Inventory	(168,115)	100,875
Prepaid expenses and other current assets	494,734	518,863
Accounts payable	332,732	349,932
Accrued liabilities	165,543	236,927
Accrued interest	55,444	78,649
Deferred rent	(36,965)	(76,232)
Net cash used in operating activities	(15,697,058)	(19,650,726)
Cash Flows from Investing Activities:		
Proceeds from sale of fixed assets	30,662	—
Purchases of fixed assets	(482,065)	(1,400,180)
Net cash used in investing activities	(451,403)	(1,400,180)
Cash Flows from Financing Activities:		
Net proceeds from issuance of common stock and warrants	13,771,301	13,505,094
Proceeds from exercise of common stock warrants	—	7,498,535
Net proceeds from sale-leaseback transaction	—	150,848
Payments on equipment financings	(86,227)	(166,348)
Payments on supplier and other third-party financings	(510,123)	(465,279)
Payments on credit facility	(1,238,487)	(1,934,665)
Net cash provided by financing activities	11,936,464	18,588,185
Net decrease in Cash	(4,211,997)	(2,462,721)
Cash at Beginning of Period	8,821,329	4,609,332
Cash at End of Period	$4,609,332	$2,146,611
Supplemental Disclosures of Cash Flow Information:		
Cash paid during the period for:		
Interest	$358,632	$358,471
Income taxes	$2,053	$5,273

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

Non-cash Investing and Financing Activities:

During the years ended December 31, 2016 and 2017, Biocept, Inc., or the Company, financed insurance premiums of approximately $547,000 and $451,000, respectively, through third-party financings (see Note 9). During the year ended December 31, 2016, the Company received a partial refund of $3,933 related to an insurance premium previously financed.

Fixed assets purchased totaling approximately $975,000 and $719,000 during the years ended December 31, 2016 and 2017, respectively, were recorded as equipment financing obligations and were excluded from cash purchases in the Company's statements of cash flows (see Note 8). During the year ended December 31, 2016, fixed assets with an aggregate net book value of approximately $270,000, which had previously been recorded as equipment financing obligations with remaining outstanding balances owed totaling approximately $240,000, were effectively disposed of and replaced with upgraded equipment recorded as equipment financing obligations. During the year ended December 31, 2017, fixed assets with an aggregate net book value of approximately $34,000 were exchanged with a lender as partial payment on an outstanding equipment financing obligation balance.

The amount of unpaid fixed asset purchases excluded from cash purchases in the Company's statements of cash flows decreased from approximately $64,000 at December 31, 2015 to $58,000 at December 31, 2016 to $31,000 at December 31, 2017.

An offering of Company's common stock and warrants to purchase its common stock closed on May 4, 2016 (see Note 4). In connection with the closing of this offering, warrants were issued to purchase up to an aggregate of 38,784 shares of common stock at an exercise price of $117.00 per share with a term of five years and an estimated grant date fair value of approximately $2.0 million, which was recorded as an offset to additional paid-in capital (see Note 5). Additionally, approximately $653,000 of fees and costs directly associated with this offering were recorded as an offset to additional paid-in capital in accordance with applicable accounting guidance.

An offering of the Company's common stock and warrants to purchase its common stock closed on October 19, 2016 (see Note 4). In connection with the closing of this offering, warrants to purchase up to an aggregate of 303,333 shares of common stock with estimated grant date fair value of approximately $17.10 per share were issued (see Note 5). Additionally, the underwriters were granted a 30-day option to purchase up to 45,500 additional shares of common stock at a price of $30.99 per share, net of the underwriting discount, and/or additional warrants to purchase up to 45,500 shares of common stock at a price of $0.027 per warrant to cover overallotments, if any (see Note 5). The estimated aggregate grant date fair value of the overallotment options and warrants of approximately $0.8 million, as well as an additional $1.04 million of fees and costs directly associated with this offering, were recorded as an offset to additional paid-in capital in accordance with applicable accounting guidance.

An offering of the Company's common stock and warrants to purchase its common stock occurred on March 31, 2017 (see Note 4). In the offering, warrants were issued to purchase up to an aggregate of 72,000 shares of common stock at an exercise price of $75.00 per share with a term of five years and an estimated aggregate grant date fair value of approximately $2.8 million, which was recorded as an offset to additional paid-in capital (see Note 5). Additionally, approximately $728,000 of fees and costs directly associated with this offering were recorded as an offset to additional paid-in capital in accordance with applicable accounting guidance.

An offering of the Company's common stock and a warrant to purchase its common stock occurred on August 9, 2017 (see Note 4). In the offering, a warrant was issued to purchase up to 47,821 shares of common stock at an exercise price of $45.00 per share with a term of five years and an estimated grant date fair value of approximately $1.5 million, which was recorded as an offset to additional paid-in capital (see Note 5). Additionally, approximately $176,000 of fees and costs directly associated with this offering were recorded as an offset to additional paid-in capital in accordance with applicable accounting guidance.

An offering of the Company's common stock and a warrant to purchase its common stock occurred on December 8, 2017 (see Note 4). In the offering, a warrant was issued to the placement agent to purchase up to 8,208 shares of common stock at an exercise price of $25.50 per share that is first exercisable on June 5, 2018 with a term of five years expiring on December 5, 2022 and an estimated grant date fair value of approximately $0.1 million, which was recorded as an offset to additional paid-in capital (see Note 5). Additionally, approximately $428,000 of fees and costs directly associated with this offering were recorded as an offset to additional paid-in capital in accordance with applicable accounting guidance.

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

1. The Company and Business Activities

The Company was founded in California in May 1997 and is an early stage molecular oncology diagnostics company that develops and commercializes proprietary circulating tumor cell, or CTC, and circulating tumor DNA, or ctDNA, assays utilizing a standard blood sample, or liquid biopsy. The Company's current and planned assays are intended to provide information to aid healthcare providers to identify specific oncogenic alterations that may qualify a subset of cancer patients for targeted therapy at diagnosis, progression or for monitoring in order to identify specific resistance mechanisms. Sometimes traditional procedures, such as surgical tissue biopsies, result in tumor tissue that is insufficient and/or unable to provide the molecular subtype information necessary for clinical decisions. The Company's assays, performed on blood, have the potential to provide more contemporaneous information on the characteristics of a patient's disease when compared with tissue biopsy and radiographic imaging. Additionally, commencing in October 2017, the Company's pathology partnership program, Empower TC, provides the unique ability for pathologists to participate in the interpretation of liquid biopsy results and is available to pathology practices and hospital systems throughout the United States. Further, the Company's proprietary blood collection tubes, which allow for the intact transport of liquid biopsy samples for research use only from regions around the world, are anticipated to be sold to laboratory supply distributors commencing in 2018.

The Company operates a clinical laboratory that is CLIA-certified (under the Clinical Laboratory Improvement Amendment of 1988) and CAP-accredited (by the College of American Pathologists), and manufactures cell enrichment and extraction microfluidic channels, related equipment and certain reagents to perform the Company's diagnostic assays in a facility located in San Diego, California. CLIA certification and accreditation are required before any clinical laboratory may perform testing on human specimens for the purpose of obtaining information for the diagnosis, prevention, treatment of disease, or assessment of health. The assays the Company offers are classified as laboratory developed tests under the CLIA regulations.

In July 2013, the Company effected a reincorporation to Delaware by merging itself with and into Biocept, Inc., a Delaware corporation, which had been formed to be and was a wholly-owned subsidiary of the Company since July 23, 2013.

On July 6, 2018, the Company's stockholders approved, and the Company filed, an amendment to the Company's Certificate of Amendment of Certificate of Incorporation to effect a one-for-thirty reverse stock split of the Company's outstanding common stock. As such, all references to share and per share amounts in these unaudited condensed financial statements and accompanying notes have been retroactively restated to reflect the one-for-thirty reverse stock split, except for the authorized number of shares of the Company's common stock of 150,000,000 shares, which was not affected by the one-for-thirty reverse stock split.

2. Liquidity and Going Concern Uncertainty

As of December 31, 2017, cash totaled $2.1 million and the Company had an accumulated deficit of $195.2 million. For the years ended December 31, 2016 and 2017, the Company incurred net losses of $18.4 million and $21.6 million, respectively. At December 31, 2017, the Company had aggregate net interest-bearing indebtedness of approximately $3.1 million, of which approximately $2.0 million was due within one year, in addition to approximately $2.7 million of other non-interest bearing current liabilities. Additionally, in February 2016, the Company signed a firm, non-cancelable, and unconditional commitment in an aggregate amount of $1,062,500 with a vendor to purchase certain inventory items, payable in minimum quarterly amounts of $62,500 through May 2020, under which approximately $611,000 remained outstanding at December 31, 2017 (see Note 16). These factors raise substantial doubt about the Company's ability to continue as a going concern for the one-year period following the date that these financial statements were issued. The accompanying financial statements and notes have been prepared assuming that the Company will continue as a going concern. The accompanying financial statements and notes do not include any adjustments to reflect the possible future effects on the recoverability and classification of assets or the amounts and classification of liabilities that may result from the possible inability of the Company to continue as a going concern.

While the Company is currently in the commercialization stage of operations, the Company has not yet achieved profitability and anticipates that it will continue to incur net losses for the foreseeable future. Historically, the Company's principal sources of cash have included proceeds from the issuance of common and preferred stock, proceeds from the exercise of warrants to purchase common stock, proceeds from the issuance of debt, and revenues from laboratory services. The Company's principal uses of cash have included cash used in operations, payments relating to purchases of property and equipment and repayments of borrowings. The Company expects that the principal uses of cash in the future will be for continuing operations, hiring of sales and marketing personnel and increased sales and marketing activities, funding of research and development, capital expenditures, and general working capital requirements. The Company expects that, as revenues grow, sales and marketing and research and development expenses will continue to grow, albeit at a slower rate and, as a result, the Company will need to generate significant growth in net revenues to achieve and sustain income from operations.

In May 2015, the SEC declared effective a shelf registration statement filed by the Company, which expires in May 2018. The shelf registration statement allows the Company to issue any combination of its common stock, preferred stock, debt securities and warrants from time to time for an aggregate initial offering price of up to $50 million, subject to certain limitations for so long as its public float is less than $75 million. Pursuant to an exclusive placement agent agreement dated April 25, 2016 between the Company and H.C. Wainwright & Co., LLC, or Wainwright, and a securities purchase agreement dated April 29, 2016 between the Company and the purchasers signatory thereto, the Company received approximately $4.3 million of net cash proceeds upon the sale of its common stock and warrants to purchase its common stock. Subsequent to the closing of this offering on May 4, 2016, no warrants sold in this offering have been exercised, with approximately $4.5 million in gross warrant proceeds remaining outstanding and available to be exercised at $117.00 per share until their expiration in May 2021. Pursuant to an exclusive placement agent agreement dated March 28, 2017 between the Company and Roth Capital Partners, LLC as lead placement agent, and WestPark Capital and Chardan Capital as co-placement agents, a securities purchase agreement for an offering of 144,000 shares of the Company's common stock was effected under this registration statement at a per share price of $64.50. In a concurrent private placement, the Company sold unregistered warrants to purchase up to an aggregate of 72,000 shares of its common stock that closed concurrently with the offering common stock sold pursuant to this shelf registration statement, of which none have been subsequently exercised. All warrants sold in this offering have a per share exercise price of 75.00 and expire on October 1, 2022. The closing of the sale of these securities to the purchasers occurred on March 31, 2017, when the Company received approximately $8.6 million of net cash proceeds. Pursuant to an exclusive placement agent agreement dated December 5, 2017 between the Company and Dawson James Securities, Inc. as lead placement agent, and WestPark Capital as co-placement agent, a securities purchase agreement for a registered direct offering of 164,166 shares of the Company's common stock was effected under this registration statement at a per share price of $20.40. The placement agent was issued a warrant to purchase 8,208 shares of common stock at an exercise price of $25.50 per share, which is first exercisable on June 5, 2018 and expires on December 5, 2022. The closing of the sale of these securities occurred on December 8, 2017, when the Company received approximately $2.9 million of net cash proceeds. The specific terms of additional future offerings, if any, under this shelf registration statement would be established at the time of such offerings.

On October 19, 2016, the Company received net cash proceeds of approximately $9.0 million as a result of the closing of a follow-on public offering. Subsequent to the closing of this offering on October 19, 2016, the offering's underwriters exercised their overallotment option to purchase 20,904 option warrants for total proceeds of $564. Subsequent to the closing of this offering, approximately $7.5 million of additional cash proceeds had been received from the exercise of warrants sold in this offering, with approximately $3.2 million in gross warrant proceeds remaining outstanding and available to be exercised at $33.00 per share until their expiration in October 2021.

Pursuant to a common stock and warrant purchase agreement dated August 9, 2017, the Company received net cash proceeds of approximately $2.0 million as a result of the sale of its common stock and warrants. Subsequent to the closing of this offering, no additional cash proceeds had been received from the exercise of warrants sold in this offering, with approximately $2.2 million in gross warrant proceeds remaining outstanding and available to be exercised at $45.00 per share until their expiration in August 2022.

On January 30, 2018, the Company received net cash proceeds of approximately $13.3 million as a result of the closing of a follow-on public offering. Subsequent to the closing of this offering, no additional cash proceeds have been received from the exercise of warrants sold in this offering, with approximately $16.4 million in gross warrant proceeds remaining outstanding and available to be exercised at $15.00 per share, subject to down round adjustment, until their expiration in January 2023.

Management's Plan to Continue as a Going Concern

In order to continue as a going concern, the Company will need, among other things, additional capital resources. Until the Company can generate significant cash from operations, including assay revenues, management's plans to obtain such resources for the Company include proceeds from offerings of the Company's equity securities or debt, or transactions involving product development, technology licensing or collaboration. Management can provide no assurances that any sources of a sufficient amount of financing will be available to the Company on favorable terms, if at all.

3. Summary of Significant Accounting Policies

Basis of Presentation

The accompanying financial statements and notes are prepared in accordance with accounting principles generally accepted in the United States of America, or U.S. GAAP, and are prepared on the basis that the Company will continue as a going concern (see Note 2). The accompanying financial statements and notes do not include any adjustments to reflect the possible future effects on the recoverability and classification of assets or the amounts and classification of liabilities that may result from the possible inability of the Company to continue as a going concern.

On September 27, 2016, the Company's stockholders approved, and the Company filed, an amendment to the Company's amended and restated certificate of incorporation to effect a one-for-three reverse stock split of the Company's outstanding common stock, and to increase the authorized number of shares of the Company's common stock from 40,000,000 to 150,000,000 shares. The one-for-three reverse stock split was effected on September 29, 2016. As such, all references to share and per share amounts in these financial statements and accompanying notes have been retroactively restated to reflect the one-for-three reverse stock split, except for the authorized number of shares of the Company's common stock of 150,000,000 shares, which was not affected by the one-for-three reverse stock split.

Going Concern

The Company assesses and determines its ability to continue as a going concern in accordance with the provisions of ASC Topic 205-40, Presentation of Financial Statements-Going Concern, which requires the Company to evaluate whether there are conditions or events that raise substantial doubt about its ability to continue as a going concern within one year after the date that its annual and interim financial statements are issued (see Note 2). Certain additional financial statement disclosures are required if such conditions or events are identified. If and when an entity's liquidation becomes imminent, financial statements should be prepared under the liquidation basis of accounting. Determining the extent, if any, to which conditions or events raise substantial doubt about the Company's ability to continue as a going concern, or the extent to which mitigating plans sufficiently alleviate any such substantial doubt, as well as whether or not liquidation is imminent, requires significant judgment by management.

Use of Estimates

The preparation of financial statements requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements, and the reported amounts of revenues and expenses during the reporting period. On an ongoing basis, management evaluates these estimates and judgments, including those related to accounts receivable, inventories, long-lived assets, income taxes, revenues, stock-based compensation, and the determination of the Company's ability to continue as a going concern. The Company bases its estimates on various assumptions that it believes are reasonable under the circumstances. Actual results may differ from these estimates under different assumptions or conditions.

Revenue Recognition and Accounts Receivable

The Company's commercial revenues are generated from diagnostic services provided as delivered to physicians and billed to third-party insurance payers such as managed care organizations, Medicare and Medicaid and patients for any deductibles, coinsurance or copayments that may be due. Through December 31, 2017, the Company recognized revenue in accordance with the provision of Accounting Standards Codification, or ASC, 954-605, Health Care Entities-Revenue Recognition, which required that four basic criteria must be met prior to recognition of revenue: (1) persuasive evidence of an arrangement existed; (2) delivery had occurred and title and the risks and rewards of ownership had been transferred to the client or services had been rendered; (3) the price was fixed or determinable; and (4) collectability was reasonably assured. Commencing on March 31, 2017, the Company recognizes commercial revenue related to billings for assays delivered and billed to Medicare and other third-party payers on an accrual basis when amounts that will ultimately be realized can be estimated upon delivery, whereby prior to March 31, 2017, the Company recognized revenues for its commercial diagnostic services on a cash basis as collected because the amounts ultimately expected to be received could not be estimated upon delivery due to insufficient collection history experience. Commencing on January 1, 2018, the Company recognizes revenue in accordance with ASC 606, Revenue from Contracts with Customers, which requires that an entity recognize revenue when it transfers promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled to in exchange for those goods or services.

The Company bills third-party payers on a fee-for-service basis at the Company's list price and third-party commercial revenue is recorded net of contractual discounts, payer-specific allowances and other reserves. The Company's development services revenues are supported by contractual agreements and generated from assay development services provided to entities, as well as certain other diagnostic services provided to physicians. Diagnostic services are completed upon the delivery of assay results to the prescribing physician, at which time the Company bills for the service and revenue is recognized.

The Company's gross commercial revenues billed, and corresponding gross accounts receivable are subject to estimated deductions for such allowances and reserves to arrive at reported net revenues, which relate to differences between amounts billed and corresponding amounts estimated to be subsequently collected. These third-party payer discounts and sales allowances are estimated based on a number of assumptions and factors, including historical payment trends, seasonality associated with the annual reset of patient deductible limits on January 1 of each year, and current and estimated future payments. Specifically, the Company maintains four such reserves: the reserve for contractual discounts, the reserve for aged non-patient receivables, the reserve for estimated patient receivables, and the reserve for other payer-specific sales allowances. The reserve for contractual discounts relates to discounts to

gross amounts billed to Medicare and contracted third-party payers to arrive at the deemed "allowed expense" amount covered by that payer. The Company's contracted third-party commercial sales are recorded using an actual or contracted fee schedule at the time of delivery, while estimated fee schedules are maintained for each non-contracted payer separately as part of other payer-specific sales allowances. Contractual discounts are recorded at the transaction level at the time of delivery based on a fee schedule that is maintained for each contracted third-party payer. The Company periodically adjusts fee schedules for both contracted and non-contracted third-party payers based upon historical payment trends. The reserve for aged non-patient receivables reduces gross amounts billed to non-contracted third-party payers for amounts estimated to be collected according to the age of the outstanding balance. The reserve for estimated patient receivables reduces gross amounts billed to third-party payers for amounts estimated to be collected directly from individual patients, such as copayments, deductibles, or amounts otherwise designated as patient responsibility. The reserve for other payer-specific sales allowances relates to the amounts billed to non-contracted third-party payers that are estimated to not be covered by that specific payer's coverage policies, as well as estimated necessary adjustments to gross amounts billed based on historical collection experience for a particular third-party payer unrelated to the age of outstanding balances. Collection periods for billings on commercial revenues range from less than 30 days to several months, depending on the contracted or non-contracted nature of the payer, among other things.

The estimates of amounts that will ultimately be realized from commercial diagnostic services for non-contracted payers require significant judgment by management. Patients do not enter into direct agreements with the Company that commit them to pay any portion of the cost of the tests in the event that they have not met their annual deductible limit under their insurance policy, if any, or if their insurance otherwise declines to reimburse the Company. Adjustments to the estimated payment amounts are recorded at the time of final collection and settlement of each transaction as an adjustment to commercial revenue. Consideration associated with non-contracted commercial revenues is considered variable and constrained until fully adjudicated, with net revenues recorded to the extent that it is probable that a significant reversal will not occur. The estimation process used to determine third-party payer discounts and sales allowance has been applied on a consistent basis since March 31, 2017, and no significant subsequent adjustments have been necessary to increase or decrease these discounts and allowances as a result of changes in underlying estimates.

The composition of the Company's gross and net revenues recognized during the years ended December 31, 2016 and 2017 is as follows:

	For the year ended December 31,	
	2016	2017
Commercial revenues recognized upon delivery	$—	$15,685,069
Development services revenues recognized upon delivery	240,056	272,350
Commercial revenues recognized upon cash collection	2,983,040	1,225,976
Total gross revenues	3,223,096	17,183,395
Provisions for contractual discounts	—	(5,805,787)
Provisions for aged non-patient receivables	—	(735,709)
Provisions for estimated patient receivables	—	(169,479)
Provisions for other payer-specific sales allowances	—	(5,403,757)
Net revenues	$3,223,096	$5,068,663

During the year ended December 31, 2017, the Company recorded approximately $843,000 in nonrecurring net revenue as a result of recognizing revenue on an accrual basis commencing on March 31, 2017 associated with cases delivered on or prior to December 31, 2016, representing a corresponding decrease in net loss per common share of $0.90. The incremental net revenue as a result of recognizing revenue on an accrual basis commencing on March 31, 2017, or the total amount of net revenue recorded in excess of the amount of commercial cash collections, was approximately $1,139,000 during the year ended December 31, 2017, representing a corresponding decrease in net loss per common share of $1.20.

A summary of activity in the Company's gross and net accounts receivable balances, as well as corresponding reserves, during the year ended December 31, 2017 is as follows:

	Balance at December 31, 2016	Amounts Recognized Upon Delivery	Settlements Upon Adjudication	Balance at December 31, 2017
Accounts receivable, gross	$128,969	$15,957,419	$(9,149,325)	$6,937,063
Reserve for contractual discounts	—	(5,805,787)	3,830,938	(1,974,849)
Reserve for aged non-patient receivables	—	(735,709)	283,621	(452,088)
Reserve for estimated patient receivables	—	(169,479)	81,359	(88,120)
Reserve for other payer-specific sales allowances	—	(5,403,757)	2,175,177	(3,228,580)
Accounts receivable, net	$128,969	$3,842,687	$(2,778,230)	$1,193,426

Cash

The Company places its cash with reputable financial institutions that are insured by the Federal Deposit Insurance Corporation, or FDIC. At times, deposits held may exceed the amount of insurance provided by the FDIC. The Company has not experienced any losses in its cash and believes they are not exposed to any significant credit risk.

Fair Value Measurement

The Company uses a three-tier fair value hierarchy to prioritize the inputs used in the Company's fair value measurements. These tiers include: Level 1, defined as observable inputs such as quoted prices in active markets for identical assets; Level 2, defined as inputs other than quoted prices in active markets that are either directly or indirectly observable; and Level 3, defined as unobservable inputs in which little or no market data exists, therefore requiring an entity to develop its own assumptions. The Company believes the carrying amount of cash, accounts receivable, accounts payable and accrued expenses approximate their estimated fair values due to the short-term maturities of these financial instruments. See Note 5 for further details about the inputs and assumptions used to determine fair value measurements.

Concentration of Risk

Financial instruments that potentially subject the Company to concentrations of credit risk consist principally of temporary cash investments.

Concentrations of credit risk with respect to revenues are primarily limited to geographies to which the Company provides a significant volume of its services, and to specific third-party payers of the Company's services such as Medicare, insurance companies, and other third-party payers. The Company's client base consists of a large number of geographically dispersed clients diversified across various customer types.

The Company's third-party payers that represent more than 10% of total net revenues in any period presented, as well as their related net revenue amount as a percentage of total net revenues, during the years ended December 31, 2016 and 2017 were as follows:

	For the year ended December 31, 2016	2017
Medicare and Medicare Advantage	40%	39%
Blue Cross Blue Shield	11%	19%
United Healthcare	19%	12%

The Company's third-party payers that represent more than 10% of total net accounts receivable, and their related net accounts receivable balance as a percentage of total net accounts receivable, at December 31, 2017 were as follows:

Blue Cross Blue Shield	27%
Medicare and Medicare Advantage	21%
United Healthcare	15%

The Company operates in one reportable business segment and historically has derived most revenues only from within the United States.

Certain components used in the Company's current or planned products are currently sourced from one supplier, for which alternative suppliers exist but the Company has not validated the product(s) of such alternative supplier(s), and substitutes for these components may not be obtained easily or may require substantial design or manufacturing modifications.

Inventories

Inventories are valued at the lower of cost or net realizable value. Cost is determined by the average cost method. The Company records adjustments to its inventory for estimated obsolescence or diminution in net realizable value equal to the difference between the cost of the inventory and the estimated net realizable value. At the point of loss recognition, a new cost basis for that inventory is established, and subsequent changes in facts and circumstances do not result in the restoration or increase in that newly established cost basis. In addition, the Company records a liability for firm, non-cancelable, and unconditional purchase commitments with contract manufacturers and suppliers for quantities in excess of the Company's future demand forecasts consistent with its valuation of excess and obsolete inventory.

Fixed Assets

Fixed assets consist of machinery and equipment, furniture and fixtures, computer equipment and software, leasehold improvements, financed equipment and construction in-process. Fixed assets are stated at cost less accumulated depreciation and amortization. Additions, improvements, and major renewals are capitalized. Maintenance, repairs, and minor renewals are expensed as incurred. Depreciation and amortization are recorded using the straight-line method over the estimated useful lives of the assets, which range from three to seven years. Leasehold improvements are amortized over the life of the lease or the asset, whichever is shorter. Depreciation and amortization expense for the years ended December 31, 2016 and 2017 was approximately $322,000 and $576,000, respectively.

Upon sale or disposal of fixed assets, the accounts are relieved of the cost and the related accumulated depreciation or amortization with any gain or loss recorded to the statement of operations and comprehensive loss.

Fixed assets are reviewed for impairment whenever changes in circumstances indicate that the carrying amount of an asset may not be recoverable. These computations utilize judgments and assumptions inherent in the estimates of future cash flows to determine recoverability of these assets. If the assumptions about these assets were to change as a result of events or circumstances, the Company may be required to record an impairment loss.

Stock-based Compensation

The Company measures and recognizes compensation expense for all stock-based awards made to employees and directors based on their grant date fair values. The Company estimates the fair value of stock option awards on the date of grant using the Black-Scholes option pricing model, while the fair value of restricted stock unit awards, or RSUs, is determined by the Company's stock price on the date of grant. The value of the portion of the award that is ultimately expected to vest is recognized as expense over the requisite service periods using the straight-line method. Upon adoption of Accounting Standards Update 2016-09, Compensation—Stock Compensation on January 1, 2017, the Company estimates forfeitures at the time of grant and revises these estimates in subsequent periods if actual forfeitures differ from those estimates (see Note 10).

The Company determines the fair value of the stock-based compensation awards granted as either the fair value of the consideration received, or the fair value of the equity instruments issued, whichever is more reliably measurable. All issuances of equity instruments issued to non-employees as consideration for goods or services received by the Company are accounted for based on the fair value of the equity instruments issued. These awards are recorded in expense and additional paid-in capital in shareholders' equity over the applicable service periods based on the fair value of the options at the end of each period.

Calculating the fair value of stock-based awards requires the input of highly subjective assumptions into the Black-Scholes valuation model. Stock-based compensation expense is calculated using the Company's best estimates, which involves inherent uncertainties, and the application of management's judgment. Significant estimates include the expected life of the stock option, stock price volatility, risk-free interest rate and forfeiture rate.

Research and Development

Research and development costs are expensed as incurred. The amounts expensed in the years ended December 31, 2016 and 2017 were approximately $2,713,000 and $3,365,000, respectively, which includes salaries of research and development personnel.

Income Taxes

The Company provides for income taxes utilizing the liability method. Under the liability method, current income tax expense or benefit is the amount of income taxes expected to be payable or refundable for the current year. A deferred income tax asset or liability is computed for the expected future impact of differences between the financial reporting and tax bases of assets and liabilities and for the expected future tax benefit to be derived from tax credits. Tax rate changes are reflected in the computation of the income tax provision during the period such changes are enacted.

Deferred tax assets are reduced by a valuation allowance when, in management's opinion, it is more likely than not that some portion or all of the deferred tax assets will not be realized. The Company considers the scheduled reversal of deferred tax liabilities, projected future taxable income, and tax planning strategies in making this assessment. The Company's valuation allowance is based on available evidence, including its current year operating loss, evaluation of positive and negative evidence with respect to certain specific deferred tax assets including evaluation sources of future taxable income to support the realization of the deferred tax assets. The Company has established a full valuation allowance on the deferred tax assets as of December 31, 2016 and 2017, and therefore has not recognized any income tax benefit or expense in the periods presented.

A tax benefit from uncertain tax positions may be recognized by the Company when it is more-likely-than-not that the position will be sustained upon examination, including resolutions of any related appeals or litigation processes, based on the technical merits of the position. Income tax positions must meet a more-likely-than-not recognition threshold to be recognized.

The Company recognizes interest and/or penalties related to income tax matters in income tax expense. There is no accrual for interest or penalties for income taxes on the balance sheets at December 31, 2016 and 2017, and the Company has not recognized interest and/or penalties in the statements of operations and comprehensive loss for the years ended December 31, 2016 and 2017.

Recent Accounting Pronouncements

In May 2014, and as subsequently updated and amended from time to time, the Financial Accounting Standards Board, or FASB, issued authoritative guidance that requires entities to recognize revenue when it transfers promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled to in exchange for those goods or services. This guidance is effective for annual reporting periods beginning after December 15, 2017, including interim periods within that reporting period, and may be applied retrospectively to each prior period presented or retrospectively with the cumulative effect recognized as of the date of adoption. Earlier application is permitted only as of annual reporting periods beginning after December 15, 2016, including interim periods within that reporting period. The Company adopted the new standard for the fiscal year beginning January 1, 2018 using the modified retrospective application method. The Company has substantially completed its assessment of the new standard and the Company believes that there will not be a material impact on its financial statements or disclosures.

In July 2015, the FASB issued authoritative guidance requiring entities that do not measure inventory using the retail inventory method or on a last-in, first-out basis to record inventory at the lower of cost and net realizable value. Net realizable value is the estimated selling prices in the ordinary course of business, less reasonably predictable costs of completion, disposal, and transportation. This guidance is effective on a prospective basis for fiscal years beginning after December 15, 2016, including interim periods within those fiscal years. The Company adopted this guidance for the reporting period beginning January 1, 2017, which did not have a material impact on its financial statements or disclosures.

In January 2016, the FASB issued authoritative guidance requiring, among other things, that certain equity investments be measured at fair value with changes in fair value recognized in net income, that financial assets and financial liabilities be presented separately by measurement category and form of financial asset on the balance sheet or the accompanying notes to the financial statements, that the prior requirement to disclose the method(s) and significant assumptions used to estimate the fair value that is required to be disclosed for financial instruments measured at amortized cost on the balance sheet be eliminated, and that a reporting organization is to present separately in other comprehensive income the portion of the total change in the fair value of a liability resulting from a change in the instrument-specific credit risk when the organization has elected to measure the liability at fair value in accordance with the fair value option for financial instruments. This guidance is effective for fiscal years, and interim periods within those years, beginning after December 15, 2017. Early adoption of the instrument-specific credit risk amendment is permitted. The Company adopted this guidance for the fiscal year beginning on January 1, 2018, which did not have a material impact on its financial statements or disclosures.

In February 2016, the FASB issued authoritative guidance requiring, among other things, that entities recognize the assets and liabilities arising from leases on the balance sheet under revised criteria, while the classification criteria for distinguishing between finance leases and operating leases are substantially similar to the classification criteria in the previous leases guidance. In transition, lessees and lessors are required to recognize and measure leases at the beginning of the earliest period presented using a modified

retrospective approach. This guidance is effective for fiscal years beginning after December 15, 2018, including interim periods within those fiscal years. Early adoption is permitted. The Company anticipates that the adoption of this guidance will materially affect its statement of financial position and will require changes to its processes. The Company expects to adopt this guidance for the reporting period beginning on January 1, 2019 and has not yet made any decision on the method of adoption with respect to the optional practical expedients but expects to during 2018.

In March 2016, the FASB issued authoritative guidance clarifying that a change in the counterparty to a derivative instrument that has been designated as the hedging instrument does not necessarily require de-designation of that hedging relationship, provided that all other applicable hedge accounting criteria continue to be met. This guidance is effective on either a prospective basis or modified retrospective basis for fiscal years beginning after December 15, 2016, and interim periods within those fiscal years. The Company adopted this guidance for the reporting period beginning January 1, 2017, which did not have a material impact on its financial statements or disclosures.

In March 2016, the FASB issued authoritative guidance requiring entities to assess whether contingent call (put) options that can accelerate the payment of principal on debt instruments are clearly and closely related to their debt hosts, and clarifies what steps are required when assessing whether the economic characteristics and risks of call (put) options are clearly and closely related to the economic characteristics and risks of their debt hosts. This guidance is effective on a modified retrospective basis for fiscal years beginning after December 15, 2016, and interim periods within those fiscal years. Early adoption is permitted. The Company adopted this guidance for the reporting period beginning January 1, 2017, which did not have a material impact on its financial statements or disclosures.

In March 2016, the FASB issued authoritative guidance simplifying the accounting for stock compensation. This guidance, among other things, amends existing accounting and classification requirements primarily around income taxes, forfeitures, and cash payments associated with share-based payment awards to employees. This guidance is effective for fiscal years beginning after December 15, 2016, including interim periods within those fiscal years. Early adoption is permitted. The Company adopted this guidance for the reporting period beginning January 1, 2017, which did not have a material impact on its financial statements or disclosures.

In August 2016, the FASB issued authoritative guidance clarifying the classification of certain cash receipts and cash payments in the statement of cash flows. This guidance is effective for fiscal years beginning after December 15, 2017, including interim periods within those fiscal years, on a retrospective transition method to each period presented. Early adoption is permitted. The Company adopted this guidance for the reporting period beginning January 1, 2018, which did not have a material impact on its financial statements or disclosures.

In January 2017, the FASB issued authoritative guidance clarifying the definition of a business when evaluating transactions involving acquisitions or disposals of assets or businesses. This guidance is effective for fiscal years beginning after December 15, 2017, including interim periods within those fiscal years. Certain applications of this guidance are permitted for early adoption. The Company adopted this guidance for the reporting period beginning January 1, 2018, which did not have a material impact on its financial statements or disclosures.

In January 2017, the FASB issued authoritative guidance eliminating the “Step 2” requirement for an entity to determine the fair value of its assets and liabilities for goodwill impairment testing in the same manner that would be required for those assumed in a business combination. Instead, the amended guidance allows an entity to perform goodwill impairment testing by comparing the fair value of a reporting unit with its carrying amount. This guidance is effective for any goodwill impairment tests in fiscal years beginning after December 15, 2019, including interim periods within those fiscal years. Early adoption is permitted. The Company currently intends to adopt this guidance for the fiscal year beginning January 1, 2020, and does not anticipate that the adoption of this guidance will have a material impact on its financial statements or disclosures because the Company does not currently have any recorded goodwill.

In February 2017, the FASB issued authoritative guidance clarifying the definition of the term “in substance nonfinancial asset” when accounting for transfers of financial and nonfinancial assets, and other matters concerning the transfer, sale and partial sale of nonfinancial assets to both consolidated entities and non-consolidated counterparties. This guidance is effective for fiscal years beginning after December 15, 2017, including interim periods within that reporting period. Early adoption is permitted. The Company adopted this guidance for the reporting period beginning January 1, 2018, which did not have a material impact on its financial statements or disclosures.

In March 2017, the FASB issued authoritative guidance shortening the amortization period to the earliest call date for certain purchased callable debt securities held at a premium. This guidance is effective for fiscal years beginning after December 15, 2018, including interim periods within those fiscal years. Early adoption is permitted. The Company currently intends to adopt this guidance

for the fiscal year beginning on January 1, 2019 and does not anticipate that the adoption of this guidance will have a material impact on its financial statements or disclosures because the Company does not currently hold any callable debt securities.

In May 2017, the FASB issued authoritative guidance clarifying what modifications to a share-based payment award may be considered substantive, and therefore requiring the application of modification accounting. This guidance is effective for fiscal years beginning after December 15, 2017, including interim periods within those fiscal years. Early adoption is permitted. The Company adopted this guidance for the reporting period beginning January 1, 2018, which did not have a material impact on its financial statements or disclosures.

In July 2017, the FASB issued authoritative guidance changing the classification analysis of certain equity-linked financial instruments (or embedded features) with down round features, whereby a down round feature no longer precludes equity classification when assessing whether the instrument is indexed to an entity's own stock, and also clarifying existing disclosure requirements for equity-classified instruments. This guidance is effective for fiscal years beginning after December 15, 2019, and interim periods within fiscal years beginning after December 15, 2020. Early adoption is permitted. The Company early adopted this guidance for the fiscal year beginning on January 1, 2018, which did not have a material impact on its financial statements or disclosures upon adoption, but did result in equity classification for the warrants issued on January 30, 2018, whereby liability classification may have occurred in the absence of the adoption of this guidance due to the existence of a down round feature associated with the exercise price of the warrants, which would have resulted in material impacts to the Company's financial statements and disclosures.

In August 2017, the FASB issued authoritative guidance that expands and refines hedge accounting for both nonfinancial and financial risk components and align the recognition and presentation of the effects of the hedging instrument and the hedged item in the financial statements. This guidance is effective for fiscal years beginning after December 15, 2018, and interim periods within those fiscal years. Early application is permitted. The Company currently intends to adopt this guidance for the fiscal year beginning on January 1, 2019 and does not anticipate that the adoption of this guidance will have a material impact on its financial statements or disclosures because the Company does not currently hold any financial instruments accounted for as a hedging activity.

In February 2018, the FASB issued authoritative guidance allowing a reclassification from accumulated other comprehensive income to retained earnings for stranded tax effects resulting from a tax bill, "H.R.1, An Act to Provide for Reconciliation Pursuant to Titles II and V of the Concurrent Resolution on the Budget for Fiscal Year 2018," or the Tax Cuts and Jobs Act, enacted on December 22, 2017. These amendments eliminate the stranded tax effects resulting from the Tax Cuts and Jobs Act. However, because these amendments only relate to the reclassification of the income tax effects of the Tax Cuts and Jobs Act, the underlying guidance that requires that the effect of a change in tax laws or rates be included in income from continuing operations is not affected. This guidance also requires certain disclosures about stranded tax effects. This guidance is effective for fiscal years beginning after December 15, 2018, and interim periods within those fiscal years. Early adoption is permitted. The Company currently intends to adopt this guidance for the fiscal year beginning on January 1, 2019 and does not anticipate that the adoption of this guidance will have a material impact on its financial statements or disclosures because the Company does not currently maintain any stranded tax effects in accumulated other comprehensive income.

4. Sales of Equity Securities

On December 21, 2015, the Company entered into a common stock purchase agreement with Aspire Capital Fund, LLC, or Aspire Capital, which committed to purchase up to an aggregate of $15.0 million of shares of the Company's common stock over the 30-month term of the common stock purchase agreement. On November 4, 2016, the Company voluntarily terminated this common stock purchase agreement. Upon execution of the common stock purchase agreement, the Company sold to Aspire Capital 6,944 shares of common stock at $144.00 per share for proceeds of $1,000,000, and concurrently also entered into a registration rights agreement with Aspire Capital, pursuant to which the Company filed a registration statement registering the sale of the shares of the Company's common stock that were issued to Aspire Capital under the common stock purchase agreement. In consideration for entering into, and concurrently with the execution of, the common stock purchase agreement, the Company issued to Aspire Capital 1,833 shares of its common stock. The proceeds received by the Company under the common stock purchase agreement were used for working capital and general corporate purposes. During the year ended December 31, 2016, the Company submitted purchase notices to Aspire Capital for an aggregate of 5,771 shares of common stock for gross proceeds of approximately $544,000. Costs associated with this offering of approximately $42,000 and $79,000 during the years ended December 31, 2015 and 2016, respectively, were also recorded as an offset to additional paid-in capital under applicable accounting guidance, and as such, the total net increase in capital related to these transactions was approximately $1.4 million.

In May 2015, the SEC declared effective a shelf registration statement filed by the Company, which expires in May 2018. The shelf registration statement allows the Company to issue any combination of its common stock, preferred stock, debt securities and warrants from time to time for an aggregate initial offering price of up to $50 million, subject to certain limitations for so long as the Company's public float is less than $75 million. Pursuant to an exclusive placement agent agreement dated April 25, 2016 between the

Company and H.C. Wainwright & Co., LLC, and a securities purchase agreement dated April 29, 2016 between the Company and the purchasers signatory thereto, a public offering of 55,406 shares of the Company's common stock and warrants to purchase up to an aggregate of 38,784 shares of common stock was effected under this registration statement at a combined offering price of $90.00. All warrants sold in this offering have a per share exercise price of $117.00, are exercisable immediately and expire five years from the date of issuance. The estimated grant date fair value of these warrants of approximately $2.0 million was recorded as an offset to additional paid-in capital upon the closing of this offering (see Note 5). The closing of the sale of these securities to the purchasers occurred on May 4, 2016, pursuant to which the Company received, after deducting $0.7 million of costs directly associated with the offering that were recorded as an offset to additional paid-in capital under applicable accounting guidance, approximately $4.3 million of net cash proceeds. Subsequent to the closing of this offering on May 4, 2016, no warrants sold in this offering have been exercised, with approximately $4.5 million in gross warrant proceeds remaining outstanding and available to be exercised at $117.00 per share until their expiration in May 2021. Pursuant to an exclusive placement agent agreement dated March 28, 2017 between the Company and Roth Capital Partners, LLC as lead placement agent, and WestPark Capital and Chardan Capital as co-placement agents, a securities purchase agreement for a second offering of 144,000 shares of the Company's common stock was effected under this registration statement at a per share price of $64.50, which closed on March 31, 2017. In a concurrent private placement, the Company sold unregistered warrants to purchase up to an aggregate of 72,000 shares of the Company's common stock that closed concurrently with the March 2017 offering of common stock sold pursuant the shelf registration statement, of which none have been subsequently exercised. All warrants sold in this offering have a per share exercise price of $75.00 and expire on October 1, 2022. The estimated grant date fair value of these warrants of approximately $2.8 million was recorded as an offset to additional paid-in capital upon the closing of this offering (see Note 5). At the closing of these sales on March 31, 2017, the Company received, after deducting $0.7 million of costs directly associated with the offering that were recorded as an offset to additional paid-in capital under applicable accounting guidance, approximately $8.6 million of net cash proceeds. Pursuant to an exclusive placement agent agreement dated December 5, 2017 between the Company and Dawson James Securities, Inc. as lead placement agent, and WestPark Capital as co-placement agent, a securities purchase agreement for a registered direct offering of 164,166 shares of the Company's common stock was effected under this registration statement at a per share price of $20.40. The placement agent was issued a warrant to purchase 8,208 shares of common stock at an exercise price of $25.50 per share, which is first exercisable on June 5, 2018 and expires on December 5, 2022. The estimated grant date fair value of this warrant of approximately $0.1 million was recorded as an offset to additional paid-in capital upon the closing of this offering (see Note 5). The closing of the sale of these securities occurred on December 8, 2017, when the Company received approximately $2.9 million of net cash proceeds. The specific terms of additional future offerings, if any, under this shelf registration statement would be established at the time of such offerings.

Pursuant to a common stock and warrant purchase agreement dated August 9, 2017 between the Company and Ally Bridge LB Healthcare Master Fund Limited, or Ally Bridge, an offering of 48,888 shares of the Company's common stock and warrants to purchase up to an aggregate of 47,821 shares of common stock was effected at a combined offering price of $45.00 per unit for total gross proceeds to the Company of $2.2 million. All warrants sold in this offering have a per share exercise price of $45.00, are exercisable immediately and expire five years from the date of issuance. The estimated grant date fair value of this warrant of approximately $1.5 million was recorded as an offset to additional paid-in capital upon the closing of this offering (see Note 5). Subsequent to the closing of this offering, no additional cash proceeds had been received from the exercise of warrants sold in this offering. As such, the total increase in capital as a result of the sale of the common stock and warrants has been approximately $2.0 million after deducting $0.2 million of associated costs incurred, which were offset against these proceeds under applicable accounting guidance.

On January 30, 2018, the Company received net cash proceeds of approximately $13.3 million as a result of the closing of a follow-on public offering of 1,095,153 shares of its common stock and warrants to purchase up to an aggregate of 1,095,153 shares of its common stock at a combined offering price of $13.50 per unit. All warrants sold in this offering have an exercise price of $15.00 per share, subject to down round adjustment, are exercisable immediately and expire five years from the date of issuance. Subsequent to the closing of this offering, no additional cash proceeds have been received from the exercise of warrants sold in this offering (see Note 18).

5. Fair Value Measurement

The estimated nonrecurring fair value measurements associated with fixed asset purchases recorded as equipment financing obligations totaling approximately $975,000 and $719,000 during the years ended December 31, 2016 and 2017, respectively, were based on information provided by vendors, which involved the use of significant unobservable Level 3 inputs.

The estimated fair value of the terms of the credit facility entered into with Oxford Finance LLC in April 2014, or the April 2014 Credit Facility, at December 31, 2017 approximated its carrying value, which was determined using a discounted cash flow analysis. The analysis considered interest rates of instruments with similar maturity dates, which involved the use of significant unobservable Level 3 inputs.

Other Fair Value Measurements

As of the closing of the Company's May 2016 public offering, the estimated grant date fair value of $51.60 per share associated with the warrants to purchase 38,784 shares of common stock issued in this offering, or a total of approximately $2.0 million, was recorded as an offset to additional paid-in capital, and was estimated using a Black-Scholes valuation model with the following assumptions:

Stock price	$81.00
Exercise price	$117.00
Expected dividend yield	0.00%
Discount rate-bond equivalent yield	1.23%
Expected life (in years)	5.00
Expected volatility	90.0%

As of the closing of the Company's October 2016 public offering, the estimated grant date fair value of $17.10 per share associated with the warrants to purchase 303,333 shares of common stock issued in this offering, or a total of approximately $5.2 million, was recorded as an offset to additional paid-in capital. Additionally, the underwriters were granted a 30-day option to purchase up to 45,500 additional shares of common stock at a price of $30.993 per share, net of the underwriting discount, and/or additional warrants to purchase up to 45,500 shares of common stock at a price of $0.027 per warrant to cover overallotments, if any. The estimated fair value of the overallotment options of approximately $0.8 million was also recorded as an offset to additional paid-in capital. The fair values of these instruments were estimated using a Black-Scholes valuation model with the following assumptions:

	Overallotment Options	Warrants
Stock price	$27.90	$27.90
Exercise price	$30.993	$33.00
Expected dividend yield	0.00%	0.00%
Discount rate-bond equivalent yield	0.25%	1.24%
Expected life (in years)	0.08	5.00
Expected volatility	12.9%	80.0%

As of the closing of the Company's March 31, 2017 offering, the estimated grant date fair value of $39.30 per share associated with the warrants to purchase up to 72,000 shares of common stock issued in this offering, or a total of approximately $2.8 million, was recorded as an offset to additional paid-in capital, and was estimated using a Black-Scholes valuation model with the following assumptions:

Stock price	$63.90
Exercise price	$75.00
Expected dividend yield	0.00%
Discount rate-bond equivalent yield	1.93%
Expected life (in years)	5.00
Expected volatility	80.0%

As of the closing of the Company's August 9, 2017 offering, the estimated grant date fair value of $30.90 per share associated with the warrant to purchase up to 47,821 shares of common stock issued in this offering, or a total of approximately $1.5 million, was recorded as an offset to additional paid-in capital, and was estimated using a Black-Scholes valuation model with the following assumptions:

Stock price	$41.70
Exercise price	$45.00
Expected dividend yield	0.00%
Discount rate-bond equivalent yield	1.81%
Expected life (in years)	5.00
Expected volatility	100.0%

As of the closing of the Company's December 8, 2017 offering, the estimated grant date fair value of $15.60 per share associated with the warrant to purchase up to 8,208 shares of common stock issued to the placement agent in this offering, or a total of

approximately $0.1 million, was recorded as an offset to additional paid-in capital, and was estimated using a Black-Scholes valuation model with the following assumptions:

Stock price	$22.197
Exercise price	$25.50
Expected dividend yield	0.00%
Discount rate-bond equivalent yield	2.09%
Expected life (in years)	4.50
Expected volatility	100.0%

6. Balance Sheet Details

The following provides certain balance sheet details:

	December 31, 2016	December 31, 2017
Fixed Assets		
Machinery and equipment	$2,728,468	$2,841,388
Furniture and office equipment	143,726	147,976
Computer equipment and software	620,582	1,637,034
Leasehold improvements	517,968	553,529
Financed equipment	1,559,690	2,294,762
Construction in process	169,896	2,975
	5,740,330	7,477,664
Less accumulated depreciation and amortization	(3,933,999)	(4,354,097)
Total fixed assets, net	$1,806,331	$3,123,567
Accrued Liabilities		
Accrued interest	$20,776	$326,602
Accrued payroll	168,727	224,813
Accrued vacation	364,953	474,953
Accrued bonuses	422,868	375,000
Accrued sales commissions	77,844	104,509
Current portion of deferred rent	67,085	116,681
Accrued other	37,783	129,805
Total accrued liabilities	$1,160,036	$1,752,363

During the year ended December 31, 2016, non-financed equipment fixed assets with aggregate gross book values and corresponding accumulated depreciation amounts of approximately $77,000 were disposed of, with cash proceeds of approximately $31,000 received upon sale.

7. April 2014 Credit Facility

On April 30, 2014, the Company received net cash proceeds of approximately $4,898,000 pursuant to the execution of the April 2014 Credit Facility. Upon the entry into the April 2014 Credit Facility, the Company was required to pay the lender a facility fee of $50,000 in conjunction with the funding of the term loan. The April 2014 Credit Facility is secured by substantially all of the Company's personal property other than its intellectual property. Amounts due to Oxford Finance LLC under the April 2014 Credit Facility are callable before maturity by the lender under certain subjective acceleration clauses of the underlying agreement, including changes deemed to be materially adverse by the lender. The term loan under the April 2014 Credit Facility bears interest at an annual rate of 7.95%. The Company was required to make interest-only payments on the term loan through August 1, 2015. The outstanding term loan under the April 2014 Credit Facility began amortizing at the end of the applicable interest-only period, with monthly payments of principal and interest being made by the Company to the lender in consecutive monthly installments following such interest-only period. The term loan under the April 2014 Credit Facility matures on July 1, 2018. Under the original terms of the underlying agreement, the Company is also required to make a final payment to the lender equal to 5.5% of the original principal amount of the term loan funded. At its option, the Company may prepay the outstanding principal balance of the term loan in whole but not in part, subject to a prepayment fee of 1% of any amount prepaid.

On June 30, 2016, the Company entered into an amendment of the April 2014 Credit Facility. This amendment required the Company to make interest-only payments on the term loan from July 1, 2016 through September 30, 2016, and also requires an

additional final payment of $50,000 to the lender. The terms of the amendment require the amortization of the outstanding amount due under the term loan to commence at the end of the applicable interest-only period, with monthly payments of principal and interest, in arrears, being made by the Company to the lender in consecutive monthly installments following such interest-only period. Additionally, pursuant to the amendment the aggregate outstanding principal amount of the Company's permitted indebtedness, consisting of capitalized lease obligations and purchase money indebtedness outstanding at any time, was increased to $1.2 million. The June 30, 2016 amendment of the April 2014 Credit Facility was accounted for as a modification of debt under applicable accounting guidance. On June 28, 2017, the Company entered into an amendment of the April 2014 Credit Facility whereby the aggregate outstanding principal amount of the Company's permitted indebtedness was increased to $3.0 million.

The April 2014 Credit Facility includes affirmative and negative covenants applicable to the Company and any subsidiaries created in the future. The affirmative covenants include, among others, covenants requiring the Company to maintain its legal existence and governmental approvals, deliver certain financial reports and maintain insurance coverage. The negative covenants include, among others, restrictions on transferring collateral, incurring additional indebtedness, engaging in mergers or acquisitions, paying dividends or making other distributions, making investments, creating liens, selling assets, and suffering a change in control, in each case subject to certain exceptions. The April 2014 Credit Facility also includes events of default, the occurrence and continuation of which provide Oxford Finance LLC, as collateral agent, with the right to exercise remedies against the Company and the collateral securing the term loan under the April 2014 Credit Facility, including foreclosure against the Company's properties securing the April 2014 Credit Facility, including its cash. These events of default include, among other things, the Company's failure to pay any amounts due under the April 2014 Credit Facility, a breach of covenants under the April 2014 Credit Facility, insolvency, a material adverse change, the occurrence of any default under certain other indebtedness in an amount greater than $250,000, and a final judgment against the Company in an amount greater than $250,000.

A warrant to purchase up to 588 shares of the Company's common stock at an exercise price of $424.80 per share with a term of 10 years was issued to Oxford Finance LLC on April 30, 2014. Issuance costs of approximately $102,000 associated with the term loan under the April 2014 Credit Facility were recorded as a discount to outstanding debt as of the closing date, resulting in net proceeds of approximately $4,898,000. The estimated fair value of the warrant issued of approximately $233,000 was also recorded as a discount to outstanding debt as of the closing date. The discounts and other issuance costs are amortized to interest expense utilizing the effective interest method over the underlying term of the loan, with total unamortized discounts of approximately $78,000 and $33,000 remaining at December 31, 2016 and 2017, respectively. The effective annual interest rate associated with the April 2014 Credit Facility was 13.87% at both December 31, 2016 and 2017.

As of December 31, 2017, total remaining principal payments of approximately $1,201,000 were due under the April 2014 Credit Facility during the year ending December 31, 2018.

8. Equipment Financings

The Company leases certain laboratory equipment under arrangements accounted for as capital leases and classified as equipment financings. The financed equipment is depreciated on a straight-line basis over periods ranging from 5 to 7 years. The total gross value of fixed assets capitalized under such financing arrangements was approximately $1,560,000 and $2,295,000 at December 31, 2016 and 2017, respectively. Total accumulated depreciation related to financed equipment was approximately $525,000 and $759,000 at December 31, 2016 and 2017, respectively, and total depreciation expense was approximately $119,000 and $234,000, respectively. Fixed asset purchases totaling approximately $975,000 and $719,000 during the years ended December 31, 2016 and 2017, respectively, were recorded as equipment financings. During the year ended December 31, 2016, fixed assets with an aggregate net book value of approximately $270,000, which had previously been recorded as equipment financings with remaining outstanding balances owed totaling approximately $240,000, were effectively disposed of and replaced with upgraded equipment recorded as equipment financings.

On September 15, 2017, and as amended on October 17, 2017, the Company executed an equipment financing commitment with a third-party lender for total proceeds to the Company of approximately $151,000, which was funded by the lender on November 2, 2017. Under the terms of the amended equipment financing agreement, which was accounted for as a sale-leaseback transaction, fixed assets previously purchased by the Company with aggregate gross and net book values of approximately $167,000 and $162,000, respectively, were granted as a security interest to the third-party lender, with the principal balance plus interest to be repaid in 36 monthly installments of $4,884 totaling approximately $176,000 through October 2020.

During the year ended December 31, 2017, certain machinery and equipment with aggregate gross, accumulated depreciation, and net book values of approximately $189,000, $155,000 and $34,000, respectively, were exchanged with a lender as partial payment on an outstanding equipment financing obligation balance.

The following schedule sets forth the remaining future minimum lease payments outstanding under financed equipment arrangements, as well as corresponding remaining sales tax and maintenance obligation payments that are expensed and accrued as incurred and due within each respective year ending December 31, as well as the present value of the total amount of the remaining minimum lease payments as of December 31, 2017:

	Minimum Lease Payments	Maintenance and Sales Tax Obligation Payments
2018	$438,737	$63,602
2019	460,166	67,394
2020	406,868	55,205
2021	302,229	44,281
2022	268,018	38,479
Thereafter	253,951	39,881
Total payments	2,129,969	308,842
Less amount representing interest	570,914	—
Present value of payments	$1,559,055	$308,842

The aggregate weighted average effective annual interest rate related to the equipment financings was 13.18% and 13.51% at December 31, 2016 and 2017, respectively, and the maturity dates on such outstanding arrangements range from June 2018 to September 2024. During the years ended December 31, 2016 and 2017, total interest expense related to equipment financings of $49,000 and $171,000, respectively, was recorded to the Company's statement of operations and comprehensive loss. At December 31, 2017, the present value of minimum lease payments due within one year was approximately $409,000.

On January 26, 2018, the Company executed a lease agreement with a third-party lender to finance approximately $250,000 of planned fixed asset purchases. Under the terms of the lease agreement, upon lease commencement and repayment, which occurs once the Company has financed equipment purchases for the full amount available under the lease agreement, the Company is required to make 22 payments of $11,081 per month during the initial term of the agreement, subject to adjustment in the event of an increase in three-year Treasury note rates prior to lease commencement and repayment. Until lease commencement and repayment, the Company is required to pay pro-rated equipment rental charges of any equipment financed under this lease. The Company expects lease commencement and repayment to occur by June 30, 2018. Through the date that these financial statements were available to be issued, approximately $78,000 of equipment purchases had been financed under this lease agreement (see Note 18).

9. Supplier Financings

In 2016 and 2017, the Company obtained third-party financing for certain business insurance premiums. The 2016 and 2017 financings bear interest rates ranging from 3.75% to 5.70% per annum, and all financings are due within one year. The balances due under these annual financing arrangements were approximately $76,000 and $61,000 as of December 31, 2016 and 2017, respectively.

10. Stock-Based Compensation

Equity Incentive Plans

The Company maintains two equity incentive plans: The Amended and Restated 2013 Equity Incentive Plan, or the 2013 Plan, and the 2007 Equity Incentive Plan, or the 2007 Plan. The 2013 Plan includes a provision that shares available for grant under the Company's 2007 Plan become available for issuance under the 2013 Plan and are no longer available for issuance under the 2007 Plan. On July 25, 2016, the Company's Board of Directors approved an amendment to the 2013 Plan to reserve 33,333 shares on a pre-reverse stock split basis, or 11,111 shares on a post-reverse stock split basis, of the Company's common stock exclusively for the grant of stock awards to employees who have not previously been an employee or director of the Company, except following a bona fide period of non-employment, as an inducement material to the individual's entering into employment with the Company, as defined under applicable Nasdaq Listing Rules. In conjunction with the one-for-three reverse split of the Company's common stock effected on September 29, 2016, the number of non-inducement shares authorized under all plans decreased from 102,295 to 34,098 shares, and the number of inducement shares authorized under the 2013 Plan decreased from 33,333 shares to 11,111 shares. At the Company's annual meeting of stockholders held on May 2, 2017, the Company's stockholders approved amendments to the 2013 Plan, which included an increase in the number of non-inducement shares of common stock authorized for issuance under the 2013 Plan by 83,333. As of December 31, 2017, under all plans, a total of 117,431 non-inducement shares were authorized for issuance, 94,982 shares had been issued with 89,238 non-inducement stock options and restricted stock units, or RSUs, underlying outstanding

awards, and 22,499 non-inducement shares were available for grant. As of December 31, 2017, a total of 11,111 inducement shares were authorized for issuance, 5,268 inducement shares had been issued with 4,434 inducement stock options and RSUs underlying outstanding awards, and 5,842 inducement shares were available for grant under the 2013 Plan.

Stock Options

Non-performance options granted under either plan vest over a maximum period of four years and expire ten years from the date of grant. Non-performance options generally vest either (i) over four years, 25% on the one-year anniversary of the date of grant and monthly thereafter for the remaining three years; or (ii) over four years, monthly vesting beginning month-one after the grant and monthly thereafter.

The fair value of stock options is determined on the date of grant using the Black-Scholes valuation model. For non-performance awards, such value is recognized as expense over the requisite service period, net of estimated forfeitures, using the straight-line method. The amount and timing of compensation expense recognized for performance awards is based on management's estimate of the most likely outcome and when the achievement of the performance objectives is probable. The determination of the fair value of stock options is affected by the Company's stock price, as well as assumptions regarding a number of complex and subjective variables. The volatility assumption is based on a combination of the historical volatility of the Company's common stock and the volatilities of similar companies over a period of time equal to the expected term of the stock options. The volatilities of similar companies are used in conjunction with the Company's historical volatility because of the lack of sufficient relevant history for the Company's common stock equal to the expected term. The expected term of employee stock options represents the weighted-average period the stock options are expected to remain outstanding. The expected term assumption is estimated based primarily on the options' vesting terms and remaining contractual life and employees' expected exercise and post-vesting employment termination behavior. The risk-free interest rate assumption is based upon observed interest rates on the grant date appropriate for the term of the employee stock options. The dividend yield assumption is based on the expectation of no future dividend payouts by the Company.

The assumptions used in the Black-Scholes pricing model for options granted during the years ended December 31, 2016 and 2017 are as follows:

	2016	2017
Stock and exercise prices	$23.25 - $120.60	$20.817 - $63.90
Expected dividend yield	0.00%	0.00%
Discount rate-bond equivalent yield	0.99% - 2.11%	1.79% - 2.27%
Expected life (in years)	5.13 - 6.08	5.12 - 6.09
Expected volatility	80.0% - 90.0%	70.0% - 90.0%

Using the assumptions described above, with stock and exercise prices being equal on date of grant, the weighted-average estimated fair value of options granted in 2016 and 2017 were approximately $53.70 and $30.60 per share, respectively.

A summary of stock option activity for the years ended December 31, 2016 and 2017 is as follows:

	Number of Shares	Weighted Average Exercise Price Per Share	Weighted Average Remaining Contractual Term in Years
Outstanding at December 31, 2015	23,788	$330.90	8.8
Granted	9,679	$75.30	
Exercised	—	—	
Cancelled/forfeited/expired	(3,579)	$239.70	
Outstanding at December 31, 2016	29,888	$264.00	8.5
Granted	58,501	$44.70	
Exercised	—	—	
Cancelled/forfeited/expired	(6,746)	$143.10	
Outstanding at December 31, 2017	81,643	$113.70	8.8
Vested and unvested expected to vest, December 31, 2017	59,142	$140.10	8.6

The intrinsic values of options outstanding, options exercisable, and options vested and unvested expected to vest at December 31, 2016 and 2017 were each zero.

On August 31, 2015, the Company's Board of Directors approved the issuance of 1,111 performance stock options with an estimated grant date fair value of $132.00 per share and an exercise price of $180.90 per share to its Chief Executive Officer, or CEO, pursuant to the 2013 Plan. On February 29, 2016, the Company's Board of Directors approved the issuance of 1,111 performance stock options with an estimated grant date fair value of $86.10 per share and an exercise price of $120.60 per share to its CEO pursuant to the 2013 Plan. Vesting of these stock options was based on the Company's achievement of specified objectives by December 31, 2016 as determined by the Company's Board of Directors or the Compensation Committee of the Board of Directors. During the year ended December 31, 2017, 211 of the performance stock options granted on August 31, 2015 and 333 of the performance stock options granted on February 29, 2016 were declared vested by the Company's Board of Directors, and the remaining 1,677 shares underlying these awards were forfeited.

On July 25, 2016, the Company entered into an employment agreement with its new Chief Financial Officer, Senior Vice President of Operations and Secretary, or CFO. Pursuant to the terms of this employment agreement, on July 29, 2016 the CFO was granted inducement stock option awards with an exercise price of $58.50 per share to purchase up to (i) 2,222 shares of the Company's common stock with an estimated grant date fair value of $43.50 per share, 25% of which vested on the one-year anniversary of the commencement of the CFO's employment with the Company, and remainder of which will vest in equal monthly installments over the following three years, and (ii) 1,111 shares of the Company's common stock with an estimated grant date fair value of $37.80 per share, which vested upon the Company's achievement of specified corporate goals for 2016 and the consummation of a specified financing transaction. During the year ended December 31, 2017, 546 shares of the performance option award granted on July 29, 2016 were declared vested by the Company's Board of Directors, and the remaining 565 shares underlying this award were forfeited.

On May 2, 2017, the Company's Board of Directors approved the issuance of an aggregate of 18,333 performance stock options to be granted on May 31, 2017 to certain of the Company's employees and all of its executive officers pursuant to the 2013 Plan, of which 6,666 performance stock options were granted to the Company's CEO, 3,333 performance stock options were granted to its CFO, and 2,500 performance stock options were granted to each of its Chief Scientific Officer and Senior Medical Director. Each performance stock option granted on May 31, 2017 has an exercise price of $45.00 per share and an estimated grant date fair value of $29.70 per share. On July 6, 2017, the Company's Compensation Committee of the Board of Directors approved the issuance of an aggregate of 2,500 performance stock options to be granted on July 31, 2017 to certain of the Company's employees pursuant to the 2013 Plan, of which 83 performance stock options were forfeited by December 31, 2017. Each performance stock option granted on July 31, 2017 has an exercise price of $41.70 per share and an estimated grant date fair value of $24.90 per share. Each of the performance stock options granted during the year ended December 31, 2017 were subject to continuing service with vesting as determined by the Company's Board of Directors or Compensation Committee of the Board of Directors upon the Company's achievement of specified corporate goals for 2017. Subsequent to the year ended December 31, 2017, none of the performance option awards granted during the year ended December 31, 2017 were declared vested by the Company's Compensation Committee of the Board of Directors, and the 20,750 shares underlying the remaining outstanding performance stock option awards at December 31, 2017 were forfeited.

Restricted Stock

The fair value of RSUs awarded under either plan is determined by the closing price of the Company's common stock on the date of grant. For non-performance RSUs, such value is recognized as expense over the requisite service period, net of estimated forfeitures, using the straight-line method. The amount and timing of compensation expense recognized for RSUs is based on management's estimate of the most likely outcome and when the achievement of the performance objectives is probable.

A summary of RSU activity during 2016 and 2017 is as follows:

	Number of Shares	Weighted Average Grant Date Fair Value
Outstanding at December 31, 2015	858	$453.60
Granted	5,527	$58.80
Vested and issued	(148)	$481.50
Forfeited	(429)	$400.20
Outstanding at December 31, 2016	5,808	$80.40
Granted	11,666	$45.00
Vested and issued	(5,194)	$58.80
Forfeited	(250)	$63.60
Outstanding at December 31, 2017	12,030	$56.10
Vested and unvested expected to vest, December 31, 2017	6,197	$66.90

On June 12, 2014, the Company's Board of Directors approved the grant of 494 RSUs with a grant date fair value of $481.50 per share to its CEO pursuant to the 2013 Plan. Vesting of these RSUs was based on the Company's achievement of specified objectives by December 31, 2015 as determined by the Company's Board of Directors or the Compensation Committee of the Company's Board of Directors. During the year ended December 31, 2016, a total of 148.30 RSUs were declared vested by the Company's Board of Directors and issued to its CEO in satisfaction of the June 12, 2014 RSU award, and the remaining 346 shares underlying this award were forfeited.

The RSUs granted during the year ended December 31, 2016 vested fully on the one year anniversary of the date of grant, and was subject to continuing service by the holders of such RSUs. At December 31, 2017, the intrinsic values of RSUs outstanding and RSUs unvested and expected to vest were approximately $250,000 and $129,000, respectively.

On July 6, 2016, the Compensation Committee of the Company's Board of Directors approved retention RSUs for an aggregate of 1,944 shares of common stock to three of the Company's executive officers pursuant to the 2013 Plan, including retention RSUs for 833 shares of common stock to its CEO. Each of these retention RSUs has a grant date fair value of $55.80 per share for a grant date fair value of approximately $108,000 to all three officers, in aggregate. These retention RSUs vested fully on the one year anniversary of the date of grant, and were subject to continuing service by the holders of such RSUs.

Pursuant to the terms of the Company's employment agreement with its CFO dated July 25, 2016, the CFO was granted an inducement RSU award on July 29, 2016 covering 833 shares of the Company's common stock with a grant date fair value of $58.50 per share, 100% of which vested on the one-year anniversary of the commencement of the CFO's employment with the Company.

On May 2, 2017, the Company's Board of Directors approved the issuance of an aggregate of 5,833 time-based RSUs and 5,833 performance RSUs to be granted on May 31, 2017 to certain of the Company's employees and all of its executive officers pursuant to the 2013 Plan, of which 1,666 time-based RSUs and 833 performance RSUs were granted to its CEO, and 833 time-based RSUs and 833 performance RSUs were granted to certain other executive officers. Each RSU granted on May 31, 2017 has a grant date fair value of $45.00 per share. Vesting of the time-based RSUs granted on May 31, 2017 is subject to continuing service and occurs on the one year anniversary of the vesting commencement date, or May 2, 2018, while the performance RSUs were subject to continuous service and vesting was as determined by the Company's Board of Directors or its Compensation Committee of the Board of Directors upon the achievement of specified corporate goals for 2017. Subsequent to the year ended December 31, 2017, none of the performance RSUs granted on May 31, 2017 were declared vested by the Company's Compensation Committee of the Board of Directors, and the 5,833 shares underlying these awards were forfeited.

Stock-based Compensation Expense

The following table presents the effects of stock-based compensation related to equity awards to employees and nonemployees on the statement of operations during the periods presented:

	Years Ended December 31,	
	2016	2017
Stock Options		
Cost of revenues	$115,266	$142,400
Research and development expenses	123,330	143,300
General and administrative expenses	1,071,490	575,741
Sales and marketing expenses	142,741	68,381
Total expenses related to stock options	1,452,827	929,822
RSUs		
Cost of revenues	32,338	48,745
Research and development expenses	30,261	55,941
General and administrative expenses	38,274	160,937
Sales and marketing expenses	40,247	52,036
Total stock-based compensation	$1,593,947	$1,247,481

Stock-based compensation expense was recorded net of estimated forfeitures of 0%—8% per annum during the years ended December 31, 2016 and 2017. As of December 31, 2017, total unrecognized share-based compensation expense related to unvested stock options and RSUs, adjusted for estimated forfeitures, was approximately $1,586,000, and expected to be recognized over a weighted-average period of approximately 2.5 years.

11. Common Stock Warrants Outstanding

A summary of equity-classified common stock warrant activity, for warrants other than those underlying unexercised overallotment option warrants, during 2016 and 2017 is as follows:

	Number of Shares	Weighted Average Exercise Price Per Share	Average Remaining Contractual Term in Years
Outstanding at December 31, 2015	26,140	$335.40	3.8
Issued	363,021	$42.00	
Exercised	—	—	
Expired	(1,696)	$900.00	
Outstanding at December 31, 2016	387,465	$57.90	4.6
Issued	128,029	$60.60	
Exercised	(227,228)	$33.00	
Expired	—	—	
Outstanding at December 31, 2017	288,266	$78.90	4.0

Further information about equity-classified common stock warrants outstanding at December 31, 2017 is as follows:

Weighted Average Exercise Price	Total Shares Outstanding	Weighted Average Contractual Life (in years)
$25.50	8,208	4.9
$33.00	97,009	3.8
$45.00	47,821	4.6
$75.00	72,000	4.7
$117.00	38,784	3.3
$140.40	19,371	2.1
$891.60	5,071	1.7
	288,264	

All warrants outstanding at December 31, 2017 are exercisable, except for the 8,208 warrants issued on December 8, 2017, which are first exercisable on June 5, 2018 and expire on December 5, 2022.

The intrinsic value of equity-classified common stock warrants outstanding at December 31, 2017 was zero.

On January 30, 2018, the Company issued warrants to purchase up to an aggregate of 1,095,153 shares of its common stock, which have an exercise price of $15.00 per share, subject to down round adjustment, are exercisable immediately and expire five years from the date of issuance (see Note 18).

12. Net Loss per Common Share

Basic and diluted net loss per common share is determined by dividing net loss applicable to common shareholders by the weighted-average common shares outstanding during the period. Because there is a net loss attributable to common shareholders for the years ended December 31, 2016 and 2017, the outstanding RSUs, warrants, and common stock options have been excluded from the calculation of diluted loss per common share because their effect would be anti-dilutive. Therefore, the weighted-average shares used to calculate both basic and diluted loss per share are the same.

The following potentially dilutive securities have been excluded from the computations of diluted weighted-average shares outstanding for the periods presented, as they would be anti-dilutive:

	For the year ended December 31,	
	2016	2017
Preferred warrants outstanding (number of common stock equivalents)	17	17
Common warrants outstanding	387,465	288,266
RSUs outstanding	5,808	12,030
Common options outstanding	29,888	81,642
Total anti-dilutive common share equivalents	423,178	381,958

13. 401(k) Plan

The Company sponsors a 401(k) savings plan for all eligible employees. The Company may make discretionary matching contributions to the plan to be allocated to employee accounts based upon employee deferrals and compensation. During the years ended December 31, 2016 and 2017, the Company made zero and approximately $90,000, respectively, in matching contributions into the savings plan.

14. Income Taxes

On December 22, 2017, the President of the United States signed into law new legislation, or the Act, that significantly revises the Internal Revenue Code of 1986, as amended, or the Code. The Act amends the Code to reduce tax rates and modify policies, credits, and deductions for individuals and businesses. For businesses, the Act reduces the corporate tax rate from a maximum of 35%

to a flat 21% rate. The rate reduction is effective on January 1, 2018. As a result of the rate reduction, the Company has reduced the deferred tax asset balance as of December 31, 2017 by approximately $2.6 million. Due to the Company's full valuation allowance position, the Company has also reduced the valuation allowance by the same amount. Due to uncertainties which currently exist in the interpretation of the provisions of the Act regarding Code Section 162(m), the Company has not evaluated the potential impacts of Code Section 162(m) as amended by the Act on its financial statements.

On December 22, 2017, Staff Accounting Bulletin No. 118, or SAB 118, was issued to address the application of U.S. GAAP when a registrant does not have the necessary information available, prepared, or analyzed (including computations) in reasonable detail to complete the accounting for certain income tax effects of the Act. In accordance with SAB 118, the Company has determined that there is no deferred tax benefit or expense with respect to the remeasurement of certain deferred tax assets and liabilities due to the full valuation allowance against net deferred tax assets. Additional analysis of the law and the impact to the Company will be performed and any impact will be recorded in the respective quarter in 2018.

For the years ended December 31, 2016 and 2017, the provision for income taxes was calculated as follows:

	For the year ended December 31,	
	2016	2017
Current:		
Federal	$—	$—
State	2,053	7,624
Total	2,053	7,624
Deferred		
Federal	—	—
State	—	—
Total	—	—
Provision for income tax	$2,053	$7,624

The following table reconciles income taxes computed at the federal statutory rate and the Company's provision for income taxes:

	For the year ended December 31,	
	2016	2017
Income tax at statutory rate	$(6,255,072)	$(7,346,079)
Change in federal tax rate	—	2,621,803
State liability	(260,835)	(411,853)
Permanent items	67,151	214,313
Stock compensation	157,250	72,696
Nondeductible interest	21,548	15,568
Expiration of net operating losses	—	922,307
Research and development credit	(170,950)	(200,379)
State rate change	44,421	(18,026)
Estimated section 382 limitation	9,256,295	1,491,942
Return to provision	—	365,263
Other	96,406	488,264
Valuation allowance	(2,954,161)	1,791,805
Provision for income tax	$2,053	$7,624

Deferred income taxes are provided for temporary differences in recognizing certain income and expense items for financial and tax reporting purposes. The deferred tax assets consisted primarily of the income tax benefits from estimated net operating loss carryforwards, deferred rent, and estimated research and development credits. Valuation allowances have been recorded to fully offset deferred tax assets at December 31, 2016 and 2017, as it is more likely than not that the assets will not be utilized.

At December 31, 2017, the Company had estimated federal net operating loss carryforwards of approximately $13.6 million expiring beginning in 2035 and total estimated state net operating loss carryforwards of approximately $15.0 million expiring beginning in 2023. Additionally, at December 31, 2017, the Company had estimated research and development credits of

approximately $5,000 and $3,395,000 for federal and California purposes, respectively. The estimated federal research and development tax credits will begin to expire in 2035. The California research and development tax credits do not expire.

For the years ended December 31, 2016 and 2017, the Company has evaluated the various tax positions reflected in its income tax returns for both federal and state jurisdictions, to determine if the Company has any uncertain tax positions on the historical tax returns. The Company recognizes the impact of an uncertain tax position on an income tax return at the largest amount that the relevant taxing authority is more-likely-than not to sustain upon audit. The Company does not recognize uncertain income tax positions if they have less than 50 percent likelihood of being sustained. Based on this assessment, the Company believes there are no tax positions for which a liability for unrecognized tax benefits should be recorded as of December 31, 2016 or 2017. The Company is subject to U.S. federal income tax as well as income tax in multiple state jurisdictions. With few exceptions, the Company is no longer subject to U.S. federal income tax examinations for 2014 and before, state and local income tax examinations 2013 and before. However, to the extent allowed by law, the tax authorities may have the right to examine prior periods where net operating losses were generated and carried forward and make adjustments up to the amount of the net operating loss carry forward amount. The Company's policy is to recognize interest and penalties related to income tax matters in income tax expense. Due to the existence of the valuation allowance, future changes in unrecognized tax benefits will not impact the Company's effective tax rate. The Company is currently not under examination by any taxing authorities and does not believe its unrecognized tax benefits will significantly change in the next twelve months.

The tax effects of carryforwards and other temporary differences that give rise to deferred tax assets consist of the following:

	For the year ended December 31,	
	2016	2017
Estimated net operating loss carryforward	$2,218,618	$3,355,180
Estimated research and development credits	2,244,047	2,686,666
Accruals and other	2,273,838	2,560,417
Deferred rent	164,821	90,866
	6,901,324	8,693,129
Less valuation allowance	(6,901,324)	(8,693,129)
Net deferred tax assets	$—	$—

Utilization of the estimated domestic net operating loss and research and development credit carryforwards may be subject to a substantial annual limitation due to ownership change limitations that may have occurred or that could occur in the future, as required by Section 382 and 383 of the Code, as well as similar state provisions. These ownership changes may limit the amount of estimated net operating loss and research and development credit carryforwards that can be utilized annually to offset future taxable income and tax, respectively. In general, an "ownership change" as defined by Section 382 of the Code results from a transaction or series of transactions over a three-year period resulting in an ownership change of more than 50 percentage points of the outstanding stock of a company by certain stockholders. Since the Company's formation, the Company has raised capital through the issuance of capital stock on several occasions which on its own or combined with the purchasing stockholders' subsequent disposition of those shares, likely resulted in such an ownership change, or could result in an ownership change in the future.

Upon the occurrence of an ownership change under Section 382 of the Code as outlined above, utilization of the estimated net operating loss and research and development credit carryforwards are subject to an annual limitation under Section 382, which is determined by first multiplying the value of the Company's stock at the time of the ownership change by the applicable long-term, tax-exempt rate, which could be subject to additional adjustments, as required. Any limitation may result in expiration of a portion of the estimated net operating loss or research and development credit carryforwards before utilization. The Company has not yet completed an analysis to determine whether an ownership change has occurred, however, the Company believes ownership changes likely occurred in each year from 2015 through 2018. As a result, the Company has estimated that the use of its net operating loss is limited and has disclosed in the table above only the amounts it estimates could be used in the future, which remain fully offset by a valuation allowance to reduce the net asset to zero.

15. Related Party Transactions

Three members of the Company's Board of Directors participated in its public offering in May 2016, purchasing an aggregate of 1,944 shares of the Company's common stock and warrants to purchase up to an aggregate of 1,361 shares of its common stock for total gross proceeds to the Company of $175,000. Additionally, a trust affiliated with Claire K.T. Reiss, who at the time was the beneficial owner of more than 10% of the Company's outstanding common stock, participated in the Company's public offering in May 2016, purchasing 6,825 shares of its common stock and warrants to purchase up to 4,777 shares of its common stock for total gross proceeds to the Company of $614,273 (see Note 4).

Seven members of the Company's Board of Directors, including its CEO and all three of the Company's other executive officers, participated in the Company's public offering in October 2016, purchasing an aggregate of 17,802 shares of common stock and warrants to purchase up to an aggregate of 17,802 shares of common stock for total gross proceeds to the Company of approximately $587,000. Additionally, a trust affiliated with Claire K.T. Reiss, who at the time was the beneficial owner of more than 10% of the Company's outstanding common stock, participated in the Company's public offering in October 2016, purchasing 7,575 shares of its common stock and warrants to purchase up 7,575 shares of its common stock for total gross proceeds to the Company of approximately $250,000. Further, several of the Company's employees and one of its consultants participated in the Company's public offering in October 2016, purchasing an aggregate of 2,636 shares of its common stock and warrants to purchase up to an aggregate of 2,636 shares of its common stock for total aggregate gross proceeds to the Company of approximately $87,000.

A member of the Company's management is the controlling person of Aegea Biotechnologies, Inc., or Aegea. On September 2, 2012, the Company entered into an Assignment and Exclusive Cross-License Agreement, or the Cross-License Agreement, with Aegea. The Company received payments totaling approximately $19,000 and $15,000 during the years ended December 31, 2016 and 2017, respectively, from Aegea as reimbursements for shared patent costs under the Cross-License Agreement.

Pursuant to a sublease agreement dated March 30, 2015, the Company subleased 9,849 square feet, plus free use of an additional area, of its San Diego facility to an entity affiliated with the Company's non-executive Chairman for $12,804 per month, with a refundable security deposit of $12,804 received from the subtenant. The initial term of the sublease expired on July 31, 2015 and was subject to renewal on a month-to-month basis thereafter. On February 1, 2017, the Company received notice from the subtenant terminating the sublease effective March 31, 2017. During the year ended December 31, 2017, the total amount of the $12,804 security deposit previously received from the subtenant was applied against approximately $16,000 in additional rents owed as a result of the subtenant continuing to occupy the subleased areas beyond March 31, 2017, and the balance of approximately $3,200 due to the Company was waived. A total of approximately $154,000 and $51,000 in rental income was recorded to other income/(expense) in the Company's statement of operations and comprehensive loss during the years ended December 31, 2016 and 2017, respectively.

16. Commitments and Contingencies

Operating Leases

The Company leases office, laboratory, and warehouse space at its San Diego, California facility under a non-cancelable operating lease. The initial lease was for an eight-year term expiring in 2012. In November 2011, the Company extended the lease term through October 31, 2018 and expanded the original premises by 9,849 square feet. Under the amended lease, the landlord delivered the expanded premises in May 2013. In September 2013, the Company extended the lease term through July 31, 2020. The Company records rent expense on a straight-line basis over the life of the lease and records the excess of expense over the amounts paid as deferred rent. During each of the years ended December 31, 2016 and 2017, total rent expense recorded in the Company's statements of operations and comprehensive loss was approximately $1,272,000.

The future minimum lease payments under the amended lease agreement as December 31, 2017 are as follows:

2018	$1,388,705
2019	1,430,366
2020	855,136
Thereafter	—
Total	$3,674,207

Purchase Commitment

In February 2016, the Company signed a firm, non-cancelable, and unconditional commitment in an aggregate amount of $1,062,500 with a vendor to purchase certain inventory items, payable in minimum quarterly amounts of $62,500 through May 2020. At December 31, 2017, a total of approximately $611,000 remained outstanding under this purchase commitment.

Financed Equipment Maintenance and Sales Tax Obligations

During the years ended December 31, 2016 and 2017, total expense recorded in the Company's statement of operations and comprehensive loss for sales tax and maintenance obligations associated with equipment financing arrangements was approximately $32,000 and $79,000, respectively. At December 31, 2017, approximately $46,000 of such sales tax and maintenance obligations incurred but not paid were recorded in accrued other liabilities in the Company's balance sheet (see Note 6). Future payments totaling approximately $309,000 for sales tax and maintenance obligations associated with financed equipment were due under equipment financing arrangements at December 31, 2017, which will be expensed as incurred (see Note 8).

Legal Proceedings

In the normal course of business, the Company may be involved in legal proceedings or threatened legal proceedings. The Company is not party to any legal proceedings or aware of any threatened legal proceedings which are expected to have a material adverse effect on its financial condition, results of operations or liquidity.

17. Selected Quarterly Financial Data (Unaudited)

The following is selected quarterly financial data as of and for the periods ending:

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
December 31, 2016				
Balance sheet data:				
Cash	$4,572,750	$3,751,570	$678,855	$4,609,332
Total assets	6,780,830	6,303,153	3,282,549	7,578,326
Total non-current liabilities	3,132,372	3,134,593	2,793,258	2,526,113
Total shareholders' equity	(489,231)	(419,402)	(4,556,158)	658,661
Statement of operations and comprehensive loss data:				
Net revenues	$221,369	$662,860	$1,047,280	$1,291,587
Cost of revenues	1,474,790	1,669,571	1,876,288	1,899,462
Research and development expenses	728,076	716,279	600,613	668,399
General and administrative expenses	1,487,224	1,517,664	1,918,543	1,636,994
Sales and marketing expenses	1,304,899	1,291,709	1,278,455	1,179,167
Loss from operations	(4,773,620)	(4,532,363)	(4,626,619)	(4,092,435)
Net loss	$(4,875,198)	$(4,594,174)	$(4,743,076)	$(4,186,874)
Net loss per common share:[1]				
Basic	$(22.27)	$(17.89)	$(16.99)	$(8.04)
Diluted	$(22.27)	$(17.89)	$(16.99)	$(8.04)
Weighted-average shares outstanding used in computing net loss per share attributable to common shareholders:				
Basic	218,900	256,743	279,023	520,668
Diluted	218,900	256,743	279,023	520,668

[1] Basic and diluted net loss per common share are computed independently for each of the components and quarters presented. Therefore, the sum of quarterly basic and diluted per share information may not equal annual basic and diluted net loss per common share.

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
December 31, 2017				
Balance sheet data:				
Cash	$14,042,388	$10,000,155	$5,879,025	$2,146,611
Total assets	17,933,413	14,653,193	11,120,215	7,378,906
Total non-current liabilities	2,062,544	1,561,520	1,255,939	1,421,527
Total shareholders' equity	10,418,069	7,342,257	4,026,079	1,296,034

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
Statement of operations and comprehensive loss data:				
Net revenues	$1,683,065	$1,278,961	$1,111,411	$995,226
Cost of revenues	2,129,454	2,368,705	2,487,054	2,359,909
Research and development expenses	757,258	841,991	856,698	908,800
General and administrative expenses	1,906,635	1,798,026	1,834,771	1,650,097
Sales and marketing expenses	1,278,311	1,746,867	1,675,852	1,642,941
Loss from operations	(4,388,593)	(5,476,628)	(5,742,964)	(5,566,521)
Net loss	$(4,432,707)	$(5,693,151)	$(5,821,306)	$(5,666,573)
Net loss per common share:[1]				
Basic	$(6.27)	$(6.32)	$(5.85)	$(5.36)
Diluted	$(6.27)	$(6.32)	$(5.85)	$(5.36)
Weighted-average shares outstanding used in computing net loss per share attributable to common shareholders:				
Basic	707,389	901,007	995,254	1,058,055
Diluted	707,389	901,007	995,254	1,058,055

[1] Basic and diluted net loss per common share are computed independently for each of the components and quarters presented. Therefore, the sum of quarterly basic and diluted per share information may not equal annual basic and diluted net loss per common share.

18. Subsequent Events

On January 26, 2018, the Company executed a lease agreement with a third-party lender to finance approximately $250,000 of planned fixed asset purchases. Under the terms of the lease agreement, upon lease commencement and repayment, which occurs once the Company has financed equipment purchases for the full amount available under the lease agreement, the Company is required to make 22 payments of $11,081 per month during the initial term of the agreement, subject to adjustment in the event of an increase in three-year Treasury note rates prior to lease commencement and repayment. Until lease commencement and repayment, the Company is required to pay pro-rated equipment rental charges of any equipment financed under this lease. The Company expects lease commencement and repayment to occur by June 30, 2018. Through the date that these financial statements were available to be issued, approximately $78,000 of equipment purchases had been financed under this lease agreement.

On January 30, 2018, the Company received net cash proceeds of approximately $13.3 million as a result of the closing of a follow-on public offering of 1,095,153 shares of its common stock and warrants to purchase up to an aggregate of 1,095,153 shares of its common stock at a combined offering price of $13.50 per unit. All warrants sold in this offering have an exercise price of $15.00 per share, subject to down round adjustment, are exercisable immediately and expire five years from the date of issuance. Subsequent to the closing of this offering, no additional cash proceeds have been received from the exercise of warrants sold in this offering.

On July 6, 2018, the Company's stockholders approved, and the Company filed, an amendment to the Company's Certificate of Amendment of Certificate of Incorporation to effect a one-for-thirty reverse stock split of the Company's outstanding common stock. As such, all references to share and per share amounts in these financial statements and accompanying notes have been retroactively restated to reflect the one-for-thirty reverse stock split, except for the authorized number of shares of the Company's common stock of 150,000,000 shares, which was not affected by the one-for-thirty reverse stock split.

19. Event (Unaudited) Subsequent to the Date of the Independent Auditor's Report

On August 13, 2018, the Company received net cash proceeds of approximately $10.2 million from closing a rights offering pursuant to its effective registration statement on Form S-1, selling an aggregate of 11,587 units consisting of an aggregate of 11,587 shares of Series A Preferred Stock and 2,549,140 warrants. The warrants are exercisable for one share of our common stock at an exercise price of $4.53 per share, an aggregate estimated grant date fair value of $8.4 million and expire five years from the date of issuance. The Series A Preferred Stock is convertible into the Company's common stock at a conversion price of $4.53, includes a right to participate in subsequent right offerings and has a right to participate in stock dividends and splits, if any. Subsequent to the closing of this offering, no additional cash proceeds have been received from the exercise of warrants sold in this offering.

On September 20, 2018, the Company completed an offering of 642,438 shares of the Company's common stock and pre-funded warrants to purchase up to an aggregate of 120,000 shares of its common stock. The shares were sold at a purchase price of $3.285 per share and the pre-funded warrants were sold at a purchase price of $3.275 per pre-funded warrant which represents the per share purchase price for the shares less the $0.01 per share exercise price for each such pre-funded warrant. The net proceeds to the Company from this offering were approximately $2.2 million, after deducting expenses related to the offering including dealer-manager fees and expenses, and excluding any proceeds received upon exercise of any warrants. In addition, in a concurrent private placement, the Company issued to purchasers a warrant to purchase one share of the Company's common stock for each share and pre-funded warrant purchased for cash in the offering. All warrants issued in this offering have an exercise price of $3.16 per share, are exercisable upon the six-month anniversary of issuance and expire five years from such date.

On January 18, 2019, we entered into a Securities Purchase Agreement with certain purchasers pursuant to which we sold to such purchasers, in a registered direct offering, an aggregate of 990,000 shares of common stock at a negotiated purchase price of $2.25 per share for aggregate net proceeds to us of approximately $2.0 million.

Biocept, Inc.

Condensed Balance Sheets

	December 31, 2017	September 30, 2018 (unaudited)
Current assets:		
Cash	$2,146,611	$8,956,200
Accounts receivable, net	1,193,426	1,476,454
Inventories, net	498,702	581,498
Prepaid expenses and other current assets	416,600	636,746
Total current assets	4,255,339	11,650,898
Fixed assets, net	3,123,567	2,900,994
Total assets	$7,378,906	$14,551,892
Current liabilities:		
Accounts payable	$1,269,953	$1,792,541
Accrued liabilities	1,425,761	1,953,970
Supplier financings	61,226	120,802
Interest payable	326,602	—
Current portion of equipment financings	408,992	571,774
Credit facility, net	1,168,811	—
Total current liabilities	4,661,345	4,439,087
Non-current portion of equipment financings	1,150,063	1,016,352
Non-current portion of deferred rent	271,464	158,045
Total liabilities	6,082,872	5,613,484
Commitments and contingencies (see Note 11)		
Shareholders' equity:		
Preferred stock, $0.0001 par value, 5,000,000 authorized; zero and 11,587 shares issued and outstanding at December 31, 2017 and September 30, 2018.	—	1
Common stock, $0.0001 par value, 150,000,000 authorized; 1,181,179 issued and outstanding at December 31, 2017; 3,937,226 issued and outstanding at September 30, 2018.	3,518	394
Additional paid-in capital	196,542,123	223,382,018
Accumulated deficit	(195,249,607)	(214,444,005)
Total shareholders' equity	1,296,034	8,938,408
Total liabilities and shareholders' equity	$7,378,906	$14,551,892

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

Biocept, Inc.

Condensed Statements of Operations and Comprehensive Loss

(Unaudited)

	For the three months ended September 30,		For the nine months ended September 30,	
	2017	2018	2017	2018
Net revenues	$1,111,411	$761,591	$4,073,437	$2,390,772
Costs and expenses:				
Cost of revenues	2,487,054	2,481,916	6,985,213	7,616,473
Research and development expenses	856,698	1,089,746	2,455,947	3,179,612
General and administrative expenses	1,834,771	1,793,720	5,539,432	5,441,354
Sales and marketing expenses	1,675,852	1,404,192	4,701,030	4,473,908
Total costs and expenses	6,854,375	6,769,574	19,681,622	20,711,347
Loss from operations	(5,742,964)	(6,007,983)	(15,608,185)	(18,320,575)
Other income/ (expense):				
Interest expense	(88,269)	(63,764)	(385,172)	(230,677)
Other income	12,804	23,963	51,216	(6,037)
Total other income/ (expense):	(75,465)	(39,801)	(333,956)	(236,714)
Loss before income taxes	(5,818,429)	(6,047,784)	(15,942,141)	(18,557,289)
Income tax expense	(2,877)	—	(5,023)	(739)
Net loss and comprehensive loss	$(5,821,306)	$(6,047,784)	$(15,947,164)	$(18,558,028)
Deemed dividend related to warrants down round provision	—	$(636,370)	—	$(636,370)
Net loss attributable to common shareholders	$(5,821,306)	$(6,684,154)	$(15,947,164)	$(19,194,398)
Weighted-average shares outstanding used in computing net loss per share attributable to common shareholders:				
Basic	986,865	2,767,440	860,539	2,322,749
Diluted	986,865	2,759,614	860,539	2,320,111
Net loss per common share:				
Basic	$(5.90)	$(2.42)	$(18.53)	$(8.26)
Diluted	$(5.90)	$(2.42)	$(18.53)	$(8.27)

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

Biocept, Inc.

Condensed Statements of Cash Flows

(Unaudited)

	For the nine months ended September 30,	
	2017	**2018**
Cash Flows from Operating Activities		
Net loss	$(15,947,164)	$(18,558,028)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation and amortization	394,708	580,366
Inventory reserve	(22,431)	(92,488)
Stock-based compensation	1,232,149	511,929
Non-cash interest expense related to credit facility and other financing activities	23,983	29,425
Increase/(decrease) in cash resulting from changes in:		
Accounts receivable, net	(1,004,403)	(283,028)
Inventory	(203,630)	9,692
Prepaid expenses and other current assets	431,355	277,720
Accounts payable	508,176	413,662
Accrued liabilities	671,407	497,119
Accrued interest	71,417	(241,034)
Deferred rent	(52,143)	(82,329)
Net cash used in operating activities	(13,896,576)	(16,936,994)
Cash Flows from Investing Activities:		
Purchases of fixed assets	(1,055,549)	(145,253)
Net cash used in investing activities	(1,055,549)	(145,253)
Cash Flows from Financing Activities:		
Net proceeds from issuance of common stock and warrants	10,583,898	25,688,205
Proceeds from exercise of common stock warrants	7,498,535	—
Payments on equipment financings	(109,811)	(160,111)
Payments on supplier and other third-party financings	(314,270)	(438,290)
Payments on credit facility	(1,436,534)	(1,197,968)
Net cash provided by financing activities	16,221,818	23,891,836
Net increase in Cash	1,269,693	6,809,589
Cash at Beginning of Period	4,609,332	2,146,611
Cash at End of Period	$5,879,025	$8,956,200
Supplemental Disclosures of Cash Flow Information:		
Cash paid during the period for:		
Interest	$285,260	$379,587
Income taxes	$5,023	$739

Non-cash Investing and Financing Activities:

During the nine months ended September 30, 2017 and 2018, Biocept, Inc., or the Company, financed insurance premiums of approximately $360,000 and $488,000, respectively, through third-party financings. During the nine months ended September 30, 2018, the Company cancelled insurance premiums previously financed through third-parties with an aggregate remaining principal balance outstanding of approximately $31,000.

Fixed assets purchased totaling approximately $363,000 and $270,000 during the nine months ended September 30, 2017 and 2018, respectively, were recorded as equipment financing obligations and were excluded from cash purchases in the Company's statements of cash flows (see Note 7).

The amount of unpaid fixed assets excluded from cash purchases in the Company's statements of cash flows increased from approximately $58,000 at December 31, 2016 to approximately $205,000 at September 30, 2017 and increased from approximately $31,000 at December 31, 2017 to approximately $55,000 at September 30, 2018.

An offering of the Company's common stock and warrants to purchase its common stock occurred on March 31, 2017. In the offering, warrants were issued to purchase up to an aggregate of 72,000 shares of common stock at an exercise price of $75.00 per share with a term of five years and an estimated aggregate grant date fair value of approximately $2.8 million. Additionally, approximately $728,000 of fees and costs directly associated with this offering were recorded as an offset to additional paid-in capital in accordance with applicable accounting guidance.

An offering of 1,095,153 shares of the Company's common stock and warrants to purchase up to an aggregate of 1,095,153 shares of its common stock at a combined offering price of $13.50 per unit occurred on January 30, 2018. All warrants sold in this offering have an exercise price of $4.53 per share, subject to down round adjustment, are exercisable immediately and expire five years from the date of issuance. The estimated aggregate grant date fair value of these warrants was approximately $9.7 million as of the closing of the Company's January 30, 2018 offering (see Note 4). Additionally, approximately $1.4 million of fees and costs directly associated with this offering were recorded as an offset to additional paid-in capital in accordance with applicable accounting guidance.

A rights offering for the Company's Series A preferred stock and warrants was completed on August 13, 2018. Pursuant to the rights offering the Company sold 11,587 units consisting of an aggregate of 11,587 shares of Series A Preferred Stock and 2,549,140 warrants, with each warrant exercisable for one share of Common Stock at an exercise price of $4.53 per share. The gross amount raised in the rights offering was $11.6 million. All warrants sold in this offering have an exercise price of $4.53 per share, are exercisable immediately and expire five years from the date of issuance. The estimated aggregate grant date fair value of these warrants was approximately $8.4 million as of the closing of the rights offering (see Note 4). Additionally, approximately $1.4 million of fees and costs directly associated with this offering were recorded as an offset to additional paid-in capital in accordance with applicable accounting guidance. During the three months ended September 30, 2018, 4,582 shares of Series A Preferred Stock were converted into 1,012,622 shares of common stock.

An offering of 642,438 shares of the Company's common stock and prefunded warrants to purchase up to an aggregate of 120,000 shares of its common stock occurred on September 20, 2018. The shares were sold at a purchase price of $3.285 per share and the pre-funded warrants were sold at a purchase price of $3.275 per pre-funded warrant which represents the per share purchase price for the shares less the $0.01 per share exercise price for each such pre-funded warrant. The aggregate gross proceeds from the offering were approximately $2.5 million. In addition, in a concurrent private placement, the Company issued to purchasers a warrant to purchase one share of the Company's common stock for each share and pre-funded warrant purchased for cash in the offering. All warrants issued in this offering have an exercise price of $3.16 per share, are exercisable upon the six-month anniversary of issuance and expire five years from such date. The estimated aggregate grant date fair value of these warrants was approximately $2.0 million as of the closing of the offering (see Note 4). Additionally, approximately $0.3 million of fees and costs directly associated with this offering were recorded as an offset to additional paid-in capital in accordance with applicable accounting guidance.

The issuance of warrants with an exercise price of $3.16 in the September 2018 financing transaction triggered the down round provision in the January 2018 warrants, resulting in recording a deemed dividend related to warrants down round provision in the amount of approximately $636,000 increasing the net loss attributable to common shareholders.

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

1. The Company, Business Activities and Basis of Presentation

The Company and Business Activities

The Company was founded in California in May 1997 and effected a reincorporation to Delaware in July 2013. The Company is an early stage molecular oncology diagnostics company that develops and commercializes proprietary circulating tumor cell, or CTC, and circulating tumor DNA, or ctDNA, assays utilizing a standard blood sample, or liquid biopsy. The Company's current and planned assays are intended to provide information to aid healthcare providers to identify specific oncogenic alterations that may qualify a subset of cancer patients for targeted therapy at diagnosis, progression or for monitoring in order to identify specific resistance mechanisms. Sometimes traditional procedures, such as surgical tissue biopsies, result in tumor tissue that is insufficient and/or unable to provide the molecular subtype information necessary for clinical decisions. The Company's assays, performed on blood, have the potential to provide more contemporaneous information on the characteristics of a patient's disease when compared with tissue biopsy and radiographic imaging. Additionally, commencing in October 2017, the Company's pathology partnership program, branded as Empower TC™, provides the unique ability for pathologists to participate in the interpretation of liquid biopsy results and is available to pathology practices and hospital systems throughout the United States. Further, sales to laboratory supply distributors of the Company's proprietary blood collection tubes commenced during the three months ending June 30, 2018, which allow for the intact transport of liquid biopsy samples for research use only from regions around the world.

The Company operates a clinical laboratory that is CLIA-certified (under the Clinical Laboratory Improvement Amendment of 1988) and CAP-accredited (by the College of American Pathologists), and manufactures cell enrichment and extraction microfluidic channels, related equipment and certain reagents to perform the Company's diagnostic assays in a facility located in San Diego, California. CLIA certification and accreditation are required before any clinical laboratory may perform testing on human specimens for the purpose of obtaining information for the diagnosis, prevention, treatment of disease, or assessment of health. The assays the Company offers are classified as laboratory developed tests under the CLIA regulations.

Basis of Presentation

The accompanying unaudited condensed financial statements and notes are prepared in accordance with accounting principles generally accepted in the United States of America, or GAAP, and on the basis that the Company will continue as a going concern (see Note 2). The accompanying unaudited condensed financial statements and notes do not include any adjustments to reflect the possible future effects on the recoverability and classification of assets or the amounts and classification of liabilities that may result from the possible inability of the Company to continue as a going concern.

The unaudited condensed financial statements included in this Form 10-Q have been prepared in accordance with the U.S. Securities and Exchange Commission, or SEC, instructions for Quarterly Reports on Form 10-Q. Accordingly, the condensed financial statements are unaudited and do not contain all the information required by GAAP to be included in a full set of financial statements. The balance sheet at December 31, 2017 has been derived from the audited financial statements at that date but does not include all of the information and footnotes required by GAAP for a complete set of financial statements. The audited financial statements for the year ended December 31, 2017, filed with the U.S. Securities and Exchange Commission, or SEC, with our Annual Report on Form 10-K on March 28, 2018 include a summary of our significant accounting policies and should be read in conjunction with this Form 10-Q. In the opinion of management, all material adjustments necessary to present fairly the results of operations for such periods have been included in this Form 10-Q. All such adjustments are of a normal recurring nature. The results of operations for interim periods are not necessarily indicative of the results of operations for the entire year.

On July 6, 2018, the Company's stockholders approved, and the Company filed, an amendment to the Company's Certificate of Amendment of Certificate of Incorporation to effect a one-for-thirty reverse stock split of the Company's outstanding common stock. As such, all references to share and per share amounts in these unaudited condensed financial statements and accompanying notes have been retroactively restated to reflect the one-for-thirty reverse stock split, except for the authorized number of shares of the Company's common stock of 150,000,000 shares, which was not affected by the one-for-thirty reverse stock split.

Certain prior period balances have been reclassified to conform to the current period presentation.

Revenue Recognition and Accounts Receivable

The Company's commercial revenues are generated from diagnostic services provided to patient's physicians and billed to third-party insurance payers such as managed care organizations, Medicare and Medicaid and patients for any deductibles, coinsurance or copayments that may be due. Through December 31, 2017, the Company recognized revenue in accordance with the provisions of Accounting Standards Codification, or ASC, 954-605, Health Care Entities-Revenue Recognition, which required that four basic criteria must be met prior to recognition of revenue: (1) persuasive evidence of an arrangement existed; (2) delivery had occurred and title and the risks and rewards of ownership had been transferred to the client or services had been rendered; (3) the price was fixed or determinable; and (4) collectability was reasonably assured. Commencing on March 31, 2017, the Company recognized commercial revenue related to billings for assays delivered and billed to Medicare and other third-party payers on an accrual basis when amounts that will ultimately be realized can be estimated upon delivery, whereby prior to March 31, 2017, the Company recognized revenues for its commercial diagnostic services on a cash basis as collected because the amounts ultimately expected to be received could not be estimated upon delivery due to insufficient collection history experience. Commencing on January 1, 2018, the Company recognizes revenue in accordance with ASC 606, Revenue from Contracts with Customers, or ASC 606, which requires that an entity recognize revenue when it transfers promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled to in exchange for those goods or services. The Company adopted the provisions of ASC 606 using the modified retrospective application method applied to all contracts, which did not impact amounts previously reported by the Company, nor did it require a cumulative effect adjustment upon adoption, as the Company's method of recognizing revenue under ASC 606 was analogous to the method utilized immediately prior to adoption. Accordingly, there is no need for the Company to disclose the amount by which each financial statement line item was affected as a result of applying the new standard and an explanation of significant changes.

Contracts

For its commercial revenues, while the Company markets directly to physicians, its customer is the patient. Patients do not enter into direct agreements with the Company that commit either them to pay any portion of the cost of the tests if they have not met their annual deductible limit under their insurance policy, if any, or if their insurance otherwise declines to reimburse the Company. Accordingly, the Company establishes a contract with a commercial patient in accordance with other customary business practices, as follows:

- Approval of a contract is established via the order and accession, which are submitted by the patient's physician.
- The Company is obligated to perform its diagnostic services upon receipt of a sample from a physician, and the patient and/or applicable payer are obligated to reimburse the Company for services rendered based on the patient's insurance benefits.
- Payment terms are a function of a patient's existing insurance benefits, including the impact of coverage decisions with CMS and applicable reimbursement contracts established between the Company and payers, unless the patient is a self-pay patient, whereby the Company bills the patient directly after the services are provided.
- Once the Company delivers a patient's assay result to the ordering physician, the contract with a patient has commercial substance, as the Company is legally able to collect payment and bill an insurer and/or patient, regardless of payer contract status or patient insurance benefit status.
- Consideration associated with commercial revenues is considered variable and constrained until fully adjudicated, with net revenues recorded to the extent that it is probable that a significant reversal will not occur.

The Company's development services revenues are supported by contractual agreements and generated from assay development services provided to entities, as well as certain other diagnostic services provided to physicians, and revenues are recognized upon delivery of the performance obligations in the contract.

Performance Obligations

A performance obligation is a promise in a contract to transfer a distinct good or service, or a bundle of goods or services, to the customer. For its commercial and development services revenues, the Company's contracts have a single performance obligation, which is satisfied upon rendering of services, which culminates in the delivery of a patient's assay result(s) to the ordering physician or entity. The duration of time between accession receipt and delivery of a valid assay result to the ordering physician or entity is typically less than two weeks. Accordingly, the Company elected the practical expedient and therefore, does not disclose the value of unsatisfied performance obligations.

Transaction Price

The transaction price is the amount of consideration that the Company expects to collect in exchange for transferring promised goods or services to a customer, excluding amounts collected on behalf of third parties, such as sales taxes. The consideration expected from a contract with a customer may include fixed amounts, variable amounts, or both. The Company's gross commercial revenues billed, and corresponding gross accounts receivable, are subject to estimated deductions for such allowances and reserves to arrive at reported net revenues, which relate to differences between amounts billed and corresponding amounts estimated to be subsequently collected and is deemed to be variable although the variability is not explicitly stated in any contract. Rather, the implied variability is due to several factors, such as the payment history or lack thereof for third-party payers, reimbursement rate changes for contracted and non-contracted payers, any patient co-payments, deductibles or compliance incentives, the existence of secondary payers and claim denials. The Company estimates the amount of variable consideration using the most likely amount approach to estimating variable consideration for third-party payers, including direct patient bills, whereby the estimated reimbursement for services are established by payment histories on CPT codes for each payer, or similar payer types. When no payment history is available, the value of the account is estimated at Medicare rates, with additional other payer-specific reserves taken as appropriate. Collection periods for billings on commercial revenues range from less than 30 days to several months, depending on the contracted or non-contracted nature of the payer, among other variables. The estimates of amounts that will ultimately be realized from commercial diagnostic services for non-contracted payers require significant judgment by management.

The Company limits the amount of variable consideration included in the transaction price to the unconstrained portion of such consideration. Revenue is recognized up to the amount of variable consideration that is not subject to a significant reversal until additional information is obtained or the uncertainty associated with the additional payments or refunds is subsequently resolved. Differences between original estimates and subsequent revisions, including final settlements, represent changes in the estimate of variable consideration and are included in the period in which such revisions are made. The Company monitors its estimates of transaction price to depict conditions that exist at each reporting date. If the Company subsequently determines that it will collect more consideration than it originally estimated for a contract with a customer, it will account for the change as an increase in the estimate of the transaction price in the period identified as an increase to revenue. Similarly, if the Company subsequently determines that the amount it expects to collect from a customer is less than it originally estimated, it will generally account for the change as a decrease in the estimate of the transaction price as a decrease to revenue, provided that such downward adjustment does not result in a significant reversal of cumulative revenue recognized. Revenue recognized from changes in transaction prices was not significant during the three and nine months ended September 30, 2018.

Allocate Transaction Price

For the Company's commercial revenues, the entire transaction price is allocated to the single performance obligation contained in a contract with a customer. For the Company's development services revenues, the contracted transaction price is allocated to each single performance obligation contained in a contract with a customer as performed.

Point-in-time Recognition

The Company's single performance obligation is satisfied at a point in time, and that point in time is defined as the date a patient's successful assay result is delivered to the patient's ordering physician or entity. The Company considers this date to be the time at which the patient obtains control of the promised diagnostic assay service.

Contract Balances

The timing of revenue recognition, billings and cash collections results in accounts receivable recorded in the Company's condensed balance sheets. Generally, billing occurs subsequent to delivery of a patient's test result to the ordering physician or entity, resulting in an account receivable.

Practical Expedients

The Company does not adjust the transaction price for the effects of a significant financing component, as at contract inception, the Company expects the collection cycle to be one year or less.

The Company expenses sales commissions when incurred because the amortization period is one year or less, which are recorded within sales and marketing expenses.

The Company incurs certain other costs that are incurred regardless of whether a contract is obtained. Such costs are primarily related to legal services and patient communications. These costs are expensed as incurred and recorded within general and administrative expenses.

Disaggregation of Revenue and Concentration of Risk

The composition of the Company's net revenues recognized during the three and nine months ended September 30, 2017 and 2018, disaggregated by source and nature, are as follows:

	For the three months ended September 30,		For the nine months ended September 30,	
	2017	2018	2017	2018
Net revenues from contracted payers*	$422,136	$325,097	$1,655,287	$1,019,857
Net revenues from non-contracted payers	621,881	373,018	2,206,414	1,211,309
Development services revenues	67,394	63,476	211,736	159,606
Total net revenues	$1,111,411	$761,591	$4,073,437	$2,390,772

* Includes Medicare and Medicare Advantage, as reimbursement amounts are fixed and miscellaneous income from CEE-Sure blood collection tubes.

	For the three months ended September 30,		For the nine months ended September 30,	
	2017	2018	2017	2018
Net commercial revenues recognized upon delivery	$941,783	$698,115	$2,703,424	$2,231,166
Development services revenues recognized upon delivery	67,394	63,476	211,736	159,606
Commercial revenues recognized upon cash collection	102,234	—	1,158,277	—
Total net revenues	$1,111,411	$761,591	$4,073,437	$2,390,772

The amount of nonrecurring net revenue recorded during the three and nine months ended September 30, 2017, had the Company commenced recognizing revenue for commercial diagnostic services upon delivery on or prior to December 31, 2016 instead of on March 31, 2017, was $102,000 and $839,000, respectively, and the corresponding decrease in net loss per common share was $0.10 and $0.97, respectively. The incremental net revenue and decrease in loss from operations as a result of recognizing revenue on an accrual basis commencing on March 31, 2017, or the total amount of net revenue recorded in excess of the amount of commercial cash collections, was $125,000 and $1,158,000 during the three and nine months ended September 30, 2017, respectively, and the corresponding decrease in net loss per common share was $0.13 and $1.35, respectively. For the nine months ended September 30, 2018 all revenues were recognized on an accrual basis.

Concentrations of credit risk with respect to revenues are primarily limited to geographies to which the Company provides a significant volume of its services, and to specific third-party payers of the Company's services such as Medicare, insurance companies, and other third-party payers. The Company's client base consists of many geographically dispersed clients diversified across various customer types.

The Company's third-party payers that represent more than 10% of total net revenues in any period presented, as well as their related net revenue amount as a percentage of total net revenues, during the three and nine months ended September 30, 2017 and 2018 were as follows:

	For the three months ended September 30,		For the nine months ended September 30,	
	2017	2018	2017	2018
Medicare and Medicare Advantage	45%	40%	41%	39%
Blue Cross Blue Shield	16%	9%	17%	14%
United Healthcare	14%	6%	12%	15%

The Company's third-party payers that represent more than 10% of total net accounts receivable, and their related net accounts receivable balance as a percentage of total net accounts receivable, at December 31, 2017 and September 30, 2018 were as follows:

	December 31, 2017	September 30, 2018
Blue Cross Blue Shield	27%	22%
Medicare and Medicare Advantage	21%	18%
United Healthcare	15%	11%

Recent Accounting Pronouncements

In May 2014, and as subsequently updated and amended from time to time, the Financial Accounting Standards Board, or FASB, issued authoritative guidance that requires entities to recognize revenue when it transfers promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled to in exchange for those goods or services. This guidance is effective for annual reporting periods beginning after December 15, 2017, including interim periods within that reporting period, and may be applied retrospectively to each prior period presented or retrospectively with the cumulative effect recognized as of the date of adoption. The Company adopted the new standard for the fiscal year beginning January 1, 2018 using the modified retrospective application method, which did not have a material impact on its financial statements or disclosures.

In January 2016, the FASB issued authoritative guidance requiring, among other things, that certain equity investments be measured at fair value with changes in fair value recognized in net income, that financial assets and financial liabilities be presented separately by measurement category and form of financial asset on the balance sheet or the accompanying notes to the financial statements, that the prior requirement to disclose the method(s) and significant assumptions used to estimate the fair value that is required to be disclosed for financial instruments measured at amortized cost on the balance sheet be eliminated, and that a reporting organization is to present separately in other comprehensive income the portion of the total change in the fair value of a liability resulting from a change in the instrument-specific credit risk when the organization has elected to measure the liability at fair value in accordance with the fair value option for financial instruments. This guidance is effective for fiscal years, and interim periods within those years, beginning after December 15, 2017. The Company adopted this guidance for the fiscal year beginning on January 1, 2018, which did not have a material impact on its financial statements or disclosures.

In February 2016, the FASB issued authoritative guidance requiring, among other things, that entities recognize the assets and liabilities arising from leases on the balance sheet under revised criteria, while the classification criteria for distinguishing between finance leases and operating leases are substantially similar to the classification criteria in the previous leases guidance. In transition, lessees and lessors are required to recognize and measure leases at the beginning of the earliest period presented using a modified retrospective approach. This guidance is effective for fiscal years beginning after December 15, 2018, including interim periods within those fiscal years. Early adoption is permitted. The Company anticipates that the adoption of this guidance will materially affect its statement of financial position and will require changes to its processes. The Company expects to adopt this guidance for the reporting period beginning on January 1, 2019 and has not yet made a decision on the method of adoption with respect to the optional practical expedients.

In August 2016, the FASB issued authoritative guidance clarifying the classification of certain cash receipts and cash payments in the statement of cash flows. This guidance is effective for fiscal years beginning after December 15, 2017, including interim periods within those fiscal years, on a retrospective transition method to each period presented. The Company adopted this guidance for the reporting period beginning January 1, 2018, which did not have a material impact on its financial statements or disclosures.

In January 2017, the FASB issued authoritative guidance clarifying the definition of a business when evaluating transactions involving acquisitions or disposals of assets or businesses. This guidance is effective for fiscal years beginning after December 15, 2017, including interim periods within those fiscal years. The Company adopted this guidance for the reporting period beginning January 1, 2018, which did not have a material impact on its financial statements or disclosures.

In July 2017, the FASB issued authoritative guidance changing the classification analysis of certain equity-linked financial instruments (or embedded features) with down round features, whereby a down round feature no longer precludes equity classification when assessing whether the instrument is indexed to an entity's own stock, and also clarifying existing disclosure requirements for equity-classified instruments. This guidance is effective for fiscal years beginning after December 15, 2019, and interim periods within fiscal years beginning after December 15, 2020. Early adoption is permitted. The Company early adopted this guidance for the fiscal year beginning on January 1, 2018, which did not have a material impact on its financial statements or disclosures upon adoption, but did result in equity classification for the warrants issued on January 30, 2018, whereby liability classification may have occurred in the absence of the adoption of this guidance due to the existence of a down round feature associated with the exercise price of the warrants, which would have resulted in material impacts to the Company's financial statements and disclosures.

In August 2017, the FASB issued authoritative guidance that expands and refines hedge accounting for both nonfinancial and financial risk components and align the recognition and presentation of the effects of the hedging instrument and the hedged item in the financial statements. This guidance is effective for fiscal years beginning after December 15, 2018, and interim periods within those fiscal years. Early application is permitted. The Company currently intends to adopt this guidance for the fiscal year beginning on January 1, 2019 and does not anticipate that the adoption of this guidance will have a material impact on its financial statements or disclosures because the Company does not currently hold any financial instruments accounted for as a hedging activity.

In February 2018, the FASB issued authoritative guidance allowing a reclassification from accumulated other comprehensive income to retained earnings for stranded tax effects resulting from a tax bill, "H.R.1, An Act to Provide for Reconciliation Pursuant to Titles II and V of the Concurrent Resolution on the Budget for Fiscal Year 2018," or the Tax Cuts and Jobs Act, enacted on December 22, 2017. These amendments eliminate the stranded tax effects resulting from the Tax Cuts and Jobs Act. However, because these amendments only relate to the reclassification of the income tax effects of the Tax Cuts and Jobs Act, the underlying guidance that requires that the effect of a change in tax laws or rates be included in income from continuing operations is not affected. This guidance also requires certain disclosures about stranded tax effects. This guidance is effective for fiscal years beginning after December 15, 2018, and interim periods within those fiscal years. Early adoption is permitted. The Company currently intends to adopt this guidance for the fiscal year beginning on January 1, 2019 and does not anticipate that the adoption of this guidance will have a material impact on its financial statements or disclosures because the Company does not currently maintain any stranded tax effects in accumulated other comprehensive income.

In February 2018, the FASB issued authoritative guidance concerning certain fair value option liabilities, equity securities without a readily determinable fair value, and certain equity investments. This guidance is effective for fiscal years beginning after December 15, 2017 and interim periods within those fiscal years beginning after June 15, 2018. Public entities with fiscal years beginning between December 15, 2017 and June 15, 2018 are not required to adopt these amendments until the interim period beginning after June 15, 2018. The Company adopted this guidance for the interim period beginning on July 1, 2018, which did not have a material impact on its financial statements or disclosures because the Company did not hold any fair value option liabilities, equity securities without a readily determinable fair value, or equity investments.

2. Liquidity and Going Concern Uncertainty

As of September 30, 2018, cash totaled $9.0 million and the Company had an accumulated deficit of $214.4 million. For the nine months ended September 30, 2018, the Company incurred a net loss of $18.6 million. At September 30, 2018, the Company had aggregate net interest-bearing indebtedness of $1.7 million, of which $693,000 was due within one year whereas at September 30, 2017, the Company had aggregate net interest-bearing indebtedness of $3.3 million, of which $2.4 million was due within one year in the absence of subjective acceleration of amounts due under a credit facility entered into in April 2014 with Oxford Finance LLC, or the April 2014 Credit Facility. Additionally, in February 2016, the Company signed a firm, non-cancelable, and unconditional commitment in an aggregate amount of $1,062,500 with a vendor to purchase certain inventory items, payable in minimum quarterly amounts of $62,500 through May 2020, under which $404,000 remained outstanding at September 30, 2018 (see Note 11). These factors raise substantial doubt about the Company's ability to continue as a going concern for the one-year period following the date that these financial statements were issued. The accompanying financial statements and notes have been prepared assuming that the Company will continue as a going concern. The accompanying financial statements and notes do not include any adjustments to reflect the possible future effects on the recoverability and classification of assets or the amounts and classification of liabilities that may result from the possible inability of the Company to continue as a going concern.

While the Company is currently in the commercialization stage of operations, the Company has not yet achieved profitability and anticipates that it will continue to incur net losses for the foreseeable future. Historically, the Company's principal sources of cash have included proceeds from the issuance of common and preferred stock, proceeds from the exercise of warrants to purchase common stock, proceeds from the issuance of debt, and revenues from laboratory services. The Company's principal uses of cash have included cash used in operations, payments relating to purchases of property and equipment and repayments of borrowings. The Company expects that the principal uses of cash in the future will be for continuing operations, hiring of sales and marketing personnel and increased sales and marketing activities, funding of research and development, capital expenditures, and general working capital requirements. The Company expects that, as revenues grow, sales and marketing and research and development expenses will continue to grow, albeit at a slower rate and, as a result, the Company will need to generate significant growth in net revenues to achieve and sustain income from operations.

On September 20, 2018, the Company completed an offering of 642,438 shares of the Company's common stock and pre-funded warrants to purchase up to an aggregate of 120,000 shares of its common stock. The shares were sold at a purchase price of $3.285 per share and the pre-funded warrants were sold at a purchase price of $3.275 per pre-funded warrant which represents the per share purchase price for the shares less the $0.01 per share exercise price for each such pre-funded warrant. The net proceeds to the Company from the offering were approximately $2.2 million, after deducting expenses related to the offering including dealer-

manager fees and expenses, and excluding any proceeds received upon exercise of any warrants. In addition, in a concurrent private placement, the Company issued to purchasers a warrant to purchase one share of the Company's common stock for each share and pre-funded warrant purchased for cash in the offering. All warrants issued in this offering have an exercise price of $3.16 per share, are exercisable upon the six-month anniversary of issuance and expire five years from such date.

On August 13, 2018, the Company completed a rights offering pursuant to an effective registration statement. Pursuant to the rights offering, the Company sold an aggregate of 11,587 units consisting of an aggregate of 11,587 shares of Series A Preferred Stock and 2,549,140 warrants, with each warrant exercisable for one share of its common stock at an exercise price of $4.53 per share, resulting in net proceeds to the Company of approximately $10.2 million, after deducting expenses relating to the rights offering, including dealer-manager fees and expenses, and excluding any proceeds received upon exercise of any warrants.

In May 2018, the SEC declared effective a shelf registration statement filed by the Company, which expires in May 2021. The shelf registration statement allows the Company to issue any combination of its common stock, preferred stock, debt securities and warrants from time to time for an aggregate initial offering price of up to $50 million, subject to certain limitations for so long as its public float is less than $75 million.

On January 30, 2018, the Company received net cash proceeds of approximately $13.3 million from the closing of a follow-on public offering of 1,095,153 shares of its common stock and warrants to purchase up to an aggregate of 1,095,153 shares of its common stock at a combined offering price of $13.50 per unit. Subsequent to the closing of this offering, no additional cash proceeds have been received from the exercise of warrants sold in this offering, with approximately $16.4 million in gross warrant proceeds remaining outstanding and available to be exercised at $15.00 per share, which is subject to down round adjustment, until their expiration in January 2023.

Pursuant to a common stock and warrant purchase agreement dated August 9, 2017 between the Company and Ally Bridge LB Healthcare Master Fund Limited, or Ally Bridge, the Company received net cash proceeds of approximately $2.0 million from the sale of its common stock and warrants. Subsequent to the closing of this offering, no additional cash proceeds had been received from the exercise of warrants sold in this offering, with approximately $2.2 million in gross warrant proceeds remaining outstanding and available to be exercised at $45.00 per share until their expiration in August 2022.

Management's Plan to Continue as a Going Concern

In order to continue as a going concern, the Company will need, among other things, additional capital resources. Until the Company can generate significant cash from operations, including assay revenues, management's plans to obtain such resources for the Company include proceeds from offerings of the Company's equity securities or debt, cash received from the exercise of outstanding common stock warrants, or transactions involving product development, technology licensing or collaboration. Management can provide no assurances that any sources of a sufficient amount of financing will be available to the Company on favorable terms, if at all.

3. Sales of Equity Securities

In May 2015, the SEC declared effective a shelf registration statement filed by the Company, which expired on May 21, 2018. The shelf registration statement allowed the Company to issue any combination of its common stock, preferred stock, debt securities and warrants from time to time for an aggregate initial offering price of up to $50 million, subject to certain limitations for so long as the Company's public float was less than $75 million. Pursuant to an exclusive placement agent agreement dated March 28, 2017 between the Company and Roth Capital Partners, LLC as lead placement agent, and WestPark Capital and Chardan Capital as co-placement agents, a securities purchase agreement for an offering of 144,000 shares of the Company's common stock was effected under this registration statement at a per share price of $64.50, which closed on March 31, 2017. In a concurrent private placement, the Company sold unregistered warrants to purchase up to an aggregate of 72,000 shares of the Company's common stock that closed concurrently with the March 2017 offering of common stock sold pursuant the shelf registration statement, of which none have been subsequently exercised. The warrants sold in this offering have a per share exercise price of $75.00, expire on October 1, 2022, and had an aggregate estimated fair value of approximately $2.8 million. At the closing of these sales on March 31, 2017, the Company received approximately $8.6 million of net cash proceeds after deducting $0.7 million of costs directly associated with the offering that were recorded as an offset to additional paid-in capital under applicable accounting guidance. Pursuant to an exclusive placement agent agreement dated December 5, 2017 between the Company and Dawson James Securities, Inc. as lead placement agent, and WestPark Capital as co-placement agent, a securities purchase agreement for a registered direct offering of 164,166 shares of the Company's common stock was effected under this registration statement at a per share price of $20.40. The placement agent was issued a warrant to purchase 8,208 shares of common stock at an exercise price of $25.50 per share with an estimated grant date fair value of approximately $0.1 million, which expires on December 5, 2022. The closing of the sale of these securities occurred on

December 8, 2017, when the Company received approximately $2.9 million of net cash proceeds after deducting $0.4 million of costs directly associated with the offering that were recorded as an offset to additional paid-in capital under applicable accounting guidance.

Pursuant to an exclusive placement agent agreement dated March 28, 2017 between the Company and Roth Capital Partners, LLC as lead placement agent, and WestPark Capital and Chardan Capital as co-placement agents, a securities purchase agreement for a second offering of 144,000 shares of the Company's common stock was effected under this registration statement at per share price of $64.50, which closed on March 31, 2017. In a concurrent private placement, the Company sold unregistered warrants to purchase up to an aggregate of 72,000 shares of the Company's common stock that closed concurrently with the March 2017 offering of common stock sold pursuant the shelf registration statement. All warrants sold in this offering have a per share exercise price of $75.00, are exercisable beginning on the six-month anniversary of the date of issuance and expire five years from the date first exercisable. The estimated grant date fair value of these warrants of approximately $2.8 million was recorded as an offset to additional paid-in capital upon the closing of this offering (see Note 4). At the closing of these sales on March 31, 2017, the Company received, after deducting $0.7 million of costs directly associated with the offering that were recorded as an offset to additional paid-in capital under applicable accounting guidance, approximately $8.6 million of net cash proceeds. The specific terms of additional future offerings, if any, under this shelf registration statement would be established at the time of such offerings.

Pursuant to a common stock and warrant purchase agreement dated August 9, 2017 between the Company and Ally Bridge, an offering of 48,888 shares of the Company's common stock and a warrant to purchase up to an aggregate of 47,821 shares of common stock was effected at a combined offering price of $45.00 per unit for total gross proceeds to the Company of $2.2 million. The warrant sold in this offering has an exercise price of $45.00 per share, an estimated grant date fair value of approximately $1.5 million, and expires five years from the date of issuance. Subsequent to the closing of this offering, no additional cash proceeds have been received from the exercise of the warrant sold in this offering. As such, the total increase in capital from the sale of the common stock and warrant has been approximately $2.0 million after deducting $0.2 million of associated costs incurred, which were offset against these proceeds under applicable accounting guidance.

On January 30, 2018, the Company received net cash proceeds of approximately $13.3 million from the closing of a follow-on public offering of 1,095,153 shares of its common stock and warrants to purchase up to an aggregate of 1,095,153 shares of its common stock at a combined offering price of $13.50 per unit, with $1.4 million of costs directly associated with the offering recorded as an offset to additional paid-in capital under applicable accounting guidance. The warrants sold in this offering have an exercise price of $4.53 per share, which is subject to down round adjustment, an aggregate estimated grant date fair value of $9.7 million (see Note 4) and expire five years from the date of issuance. Subsequent to the closing of this offering, no additional cash proceeds have been received from the exercise of warrants sold in this offering.

On August 13, 2018, the Company received net cash proceeds of approximately $10.2 million from closing a rights offering pursuant to its effective registration statement on Form S-1, selling an aggregate of 11,587 units consisting of an aggregate of 11,587 shares of Series A Preferred Stock and 2,549,140 warrants. The warrants are exercisable for one share of our common stock at an exercise price of $4.53 per share, an aggregate estimated grant date fair value of $8.4 million (see Note 4) and expire five years from the date of issuance. The Series A Preferred Stock is convertible to the Company's common stock at a conversion price of $4.53, includes a right to participate in subsequent right offerings and has a right to participate in stock dividends and splits, if any. Subsequent to the closing of this offering, no additional cash proceeds have been received from the exercise of warrants sold in this offering.

On September 20, 2018, the Company completed an offering of 642,438 shares of the Company's common stock and pre-funded warrants to purchase up to an aggregate of 120,000 shares of its common stock. The shares were sold at a purchase price of $3.285 per share and the pre-funded warrants were sold at a purchase price of $3.275 per pre-funded warrant which represents the per share purchase price for the shares less the $0.01 per share exercise price for each such pre-funded warrant. The net proceeds to the Company from this offering were approximately $2.2 million, after deducting expenses related to the offering including dealer-manager fees and expenses, and excluding any proceeds received upon exercise of any warrants. In addition, in a concurrent private placement, the Company issued to purchasers a warrant to purchase one share of the Company's common stock for each share and pre-funded warrant purchased for cash in the offering. All warrants issued in this offering have an exercise price of $3.16 per share, are exercisable upon the six-month anniversary of issuance and expire five years from such date.

4. Fair Value Measurement

The estimated nonrecurring fair value measurements associated with fixed asset purchases recorded as equipment financing obligations totaling approximately $274,000 during the nine months ended September 30, 2018 were based on information provided by vendors, which involved the use of significant unobservable Level 3 inputs.

Other Fair Value Measurements

As of the closing of the Company's January 30, 2018 offering, the grant date fair value of the warrants issued to purchase up to 1,095,153 shares of common stock were estimated to be approximately $8.82 per share, or a total of approximately $9.7 million. The warrants sold in this offering have an exercise price of $4.53 per share, which is subject to down round adjustment, and expire five years from the date of issuance. The fair value of the warrants was estimated using a Monte Carlo simulation valuation model using Geometric Brownian Motion, incorporating anticipated future financing events, with the following assumptions:

Beginning stock price	$10.17
Exercise price	$4.53
Expected dividend yield	0.00%
Discount rate-bond equivalent yield	2.48%
Expected life (in years)	5.00
Expected volatility	99.00%

As of the closing of the Company's August 13, 2018 rights offering, the grant date fair value of the warrants issued to purchase up to 2,549,140 shares of common stock were estimated to be approximately $3.30 per share, or a total of approximately $8.4 million. The warrants sold in this offering have an exercise price of $4.53 per share and expire five years from the date of issuance. The fair value of the warrants was estimated using a Black-Scholes model, incorporating the following assumptions:

Beginning stock price	$3.89
Exercise price	$4.53
Expected dividend yield	0.00%
Discount rate-bond equivalent yield	2.75%
Expected life (in years)	5.00
Expected volatility	128.69%

As of the closing of the Company's September 20, 2018 offering, the grant date fair value of the warrants issued to purchase up to 762,438 shares of common stock were estimated to be approximately $2.57 per share, or a total of approximately $2.0 million. The warrants sold in this offering have an exercise price of $3.16 per share, and expire five years from the initial exercise date, which is the six month anniversary of the date of issuance. The fair value of the warrants was estimated using a Black-Scholes model, incorporating the following assumptions:

Beginning stock price	$2.92
Exercise price	$3.16
Expected dividend yield	0.00%
Discount rate-bond equivalent yield	2.77%
Expected life (in years)	5.50
Expected volatility	130.7%

Also, included in the September 20, 2018 offering the Company issued 120,000 pre-funded warrants. The pre-funded warrants had an intrinsic value of $350,000.

5. Balance Sheet Details

The following provides certain balance sheet details:

	December 31, 2017	September 30, 2018
Fixed Assets		
Machinery and equipment	$2,841,388	$2,810,226
Furniture and office equipment	147,976	157,391
Computer equipment and software	1,637,034	1,430,669
Leasehold improvements	553,529	570,174
Financed equipment	2,294,762	2,526,081
Construction in process	2,975	128,377
Total fixed assets, gross	7,477,664	7,622,918
Less accumulated depreciation and amortization	(4,354,097)	(4,721,924)
Total fixed assets, net	$3,123,567	$2,900,994
Accrued Liabilities		
Accrued payroll	224,813	387,162
Accrued vacation	474,953	470,473
Accrued bonuses	375,000	804,281
Accrued sales commissions	104,509	42,168
Current portion of deferred rent	116,681	147,771
Accrued other	129,805	102,115
Total accrued liabilities	$1,425,761	$1,953,970

Depreciation expense for the nine-month period ended September 30, 2017 was $394,708 and for the nine months ended September 30, 2018 was $580,366. Depreciation expense for the three months ended September 30, 2017 was $159,552 and for the three-month period ended September 30, 2018 was $223,194.

6. April 2014 Credit Facility

On April 30, 2014, the Company received net cash proceeds of approximately $4,898,000 pursuant to the execution of the April 2014 Credit Facility. Upon entering into the April 2014 Credit Facility, the Company was required to pay the lender a facility fee of $50,000 in conjunction with the funding of the term loan. The April 2014 Credit Facility was secured by substantially all of the Company's personal property other than its intellectual property. The term loan under the April 2014 Credit Facility bore interest at an annual rate of 7.95%. The Company was required to make interest-only payments on the term loan through August 1, 2015. The outstanding term loan under the April 2014 Credit Facility began amortizing at the end of the applicable interest-only period, with monthly payments of principal and interest being made by the Company to the lender in consecutive monthly installments following such interest-only period. The term loan under the April 2014 Credit Facility matured on July 1, 2018. Under the original terms of the underlying agreement, the Company was also required to make a final payment to the lender equal to 5.5% of the original principal amount of the term loan funded.

A warrant to purchase up to 588 shares of the Company's common stock at an exercise price of $424.80 per share with a term of 10 years was issued to Oxford Finance LLC on April 30, 2014. Issuance costs of approximately $102,000 associated with the term loan under the April 2014 Credit Facility were recorded as a discount to outstanding debt as of the closing date, resulting in net proceeds of approximately $4,898,000. The estimated fair value of the warrant issued of approximately $233,000 was also recorded as a discount to outstanding debt as of the closing date. The discounts and other issuance costs were amortized to interest expense utilizing the effective interest method over the underlying term of the loan, with a total unamortized discount of approximately $33,000 at December 31, 2017. The effective annual interest rate associated with the April 2014 Credit Facility was 13.87% at both December 31, 2017 and June 30, 2018. A principal payment of approximately $175,000 remained outstanding at June 30, 2018 and was paid on July 1, 2018.

7. Equipment Financings

The Company leases certain laboratory equipment under arrangements accounted for as capital leases and classified as equipment financings. The financed equipment is depreciated on a straight-line basis over periods ranging from approximately 3 to 7

years. The total gross value of fixed assets capitalized under such financing arrangements was approximately $2,295,000 and $2,526,000 at December 31, 2017 and September 30, 2018, respectively. Total accumulated depreciation related to financed equipment was approximately $759,000 and $1,030,000 at December 31, 2017 and September 30, 2018, respectively. Total depreciation expense related to financed equipment during the three months ended September 30, 2017 and 2018 was approximately $52,000 and $115,000, respectively, and was approximately $160,000 and $271,000 during the nine months ended September 30, 2017 and 2018, respectively.

The following schedule sets forth the remaining future minimum lease payments outstanding under financed equipment arrangements, as well as corresponding remaining sales tax and maintenance obligation payments that are expensed as incurred and due within each respective year ending December 31, as well as the present value of the total amount of the remaining minimum lease payments, as of September 30, 2018:

	Minimum Lease Payments	Maintenance and Sales Tax Obligation Payments
2018 (remaining three months)	$154,538	$30,237
2019	613,448	88,599
2020	464,152	67,752
2021	303,228	53,252
2022	262,974	53,493
Thereafter	262,952	40,641
Total payments	2,061,292	333,974
Less amount representing interest	(473,166)	—
Present value of payments	$1,588,126	$333,974

The aggregate weighted average effective annual interest rate associated with equipment financings was 13.51% and 12.53% at December 31, 2017 and September 30, 2018, respectively, and the maturity dates on such outstanding arrangements range from

February 2019 to September 2024. During the three months ended September 30, 2017 and 2018, total interest expense related to equipment financings of approximately $38,000 and $60,000, respectively, was recorded to the Company’s unaudited condensed statements of operations and comprehensive loss, and approximately $118,000 and $168,000 was recorded during the nine months ended September 30, 2017 and 2018, respectively. At September 30, 2018, the present value of minimum lease payments due within one year was approximately $572,000.

8. Stock-Based Compensation

Equity Incentive Plans

The Company maintains two equity incentive plans: The Amended and Restated 2013 Equity Incentive Plan, or the 2013 Plan, and the 2007 Equity Incentive Plan, or the 2007 Plan. The 2013 Plan includes a provision that shares available for grant under the Company’s 2007 Plan become available for issuance under the 2013 Plan and are no longer available for issuance under the 2007 Plan. At the Company’s annual meeting of stockholders held on June 28, 2018, the Company’s stockholders approved amendments to the 2013 Plan, which included an increase in the number of non-inducement shares of common stock authorized for issuance under the 2013 Plan by 146,666 shares. As of September 30, 2018, 59,511 shares of the Company’s common stock were authorized exclusively for the issuance of stock awards to employees who have not previously been an employee or director of the Company, except following a bona fide period of non-employment, as an inducement material to the individual’s entering into employment with the Company, as defined under applicable Nasdaq Listing Rules. As of September 30, 2018, under all plans, a total of 264,098 non-inducement shares were authorized for issuance, 69,449 shares had been issued with 57,863 non-inducement stock options and restricted stock units, or RSUs, underlying outstanding awards, and 194,649 non-inducement shares were available for grant. As of September 30, 2018, 60,268 inducement shares had been issued under the 2013 Plan, with 59,434 inducement stock options and RSUs underlying outstanding awards and 0 inducement shares available for grant.

Stock Options

A summary of stock option activity for the nine months ended September 30, 2018 is as follows:

	Number of Shares	Weighted Average Exercise Price Per Share	Weighted Average Remaining Contractual Term in Years
Outstanding at December 31, 2017	81,482	$113.68	8.80
Granted	58,994	$2.96	7.43
Exercised	—	—	
Cancelled/forfeited/expired	(25,835)	$45.83	8.68
Outstanding at September 30, 2018	114,641	$72.02	8.79
Vested and unvested expected to vest at September 30, 2018	112,280	$73.23	8.77

The intrinsic values of options outstanding, options exercisable, and options vested and unvested expected to vest at December 31, 2017 and September 30, 2018 were each approximately zero.

The assumptions used in the Black-Scholes pricing model for stock options granted during the three and nine months ended September 30, 2018 were as follows:

Stock and exercise prices	$2.75 - $6.00
Expected dividend yield	0.00%
Discount rate-bond equivalent yield	2.73% - 2.97%
Expected life (in years)	5.00 - 5.96
Expected volatility	100% - 120%

On May 2, 2017, the Company's Board of Directors approved the issuance of an aggregate of 18,333 performance stock options to be granted on May 31, 2017 to certain of the Company's employees and all of its executive officers pursuant to the 2013 Plan, of which 6,666 performance stock options were granted to the Company's CEO, 3,333 performance stock options were granted to its CFO, and 2,500 performance stock options were granted to each of its Chief Scientific Officer and Senior Medical Director. Each performance stock option granted on May 31, 2017 had an exercise price of $45.00 per share and an estimated grant date fair value of $29.70 per share. On July 6, 2017, the Company's Compensation Committee of the Board of Directors approved the issuance of an aggregate of 2,500 performance stock options to be granted on July 31, 2017 to certain of the Company's employees pursuant to the 2013 Plan, of which 83 performance stock options were forfeited by December 31, 2017. Each performance stock option granted on July 31, 2017 had an exercise price of $41.70 per share and an estimated grant date fair value of $24.90 per share. The vesting of each of the performance stock options granted during the year ended December 31, 2017 was to be determined by the Company's Board of Directors or Compensation Committee of the Board of Directors upon the Company's achievement of specified corporate goals for 2017. During the nine months ended September 30, 2018, none of the performance option awards granted during the year ended December 31, 2017 were declared vested by the Company's Compensation Committee of the Board of Directors, and the 20,750 shares underlying the remaining outstanding performance stock option awards at December 31, 2017 were forfeited.

Restricted Stock

A summary of RSU activity for the nine months ended September 30, 2018 is as follows:

	Number of Shares	Weighted Average Grant Date Fair Value
Outstanding at December 31, 2017	12,026	$56.10
Granted	—	—
Vested and issued	(5,833)	$45.00
Forfeited	(5,833)	$45.00
Outstanding at September 30, 2018	360	$415.80
Vested and unvested expected to vest at September 30, 2018	360	$415.80

At September 30, 2018, the intrinsic values of RSUs outstanding and RSUs unvested and expected to vest were each approximately $1,000. Of the 360 RSUs outstanding at September 30, 2018, all were fully vested.

On May 2, 2017, the Company's Board of Directors approved the issuance of an aggregate of 5,833 time-based RSUs and 5,833 performance RSUs to be granted on May 31, 2017 to certain of the Company's employees and all of its executive officers pursuant to the 2013 Plan, of which 1,666 time-based RSUs and 833 performance RSUs were granted to its CEO, and 833 time-based RSUs and 833 performance RSUs were granted to each of its CFO, Chief Scientific Officer, and Senior Medical Director. Each RSU granted on May 31, 2017 had a grant date fair value of $45.00 per share. Vesting of the time-based RSUs granted on May 31, 2017 occurred on the one-year anniversary of the vesting commencement date, or May 2, 2018, while vesting of the performance RSUs was to be determined by the Company's Board of Directors or its Compensation Committee of the Board of Directors upon the achievement of specified corporate goals for 2017. During the nine months ended September 30, 2018, none of the performance RSUs granted on May 31, 2017 were declared vested by the Company's Compensation Committee of the Board of Directors, and the 1,666 shares underlying these awards were forfeited.

Stock-based Compensation Expense

The following table presents the effects of stock-based compensation related to equity awards to employees and nonemployees on the unaudited condensed statements of operations and comprehensive loss during the periods presented:

	For the three months ended September 30,		For the nine months ended September 30,	
	2017	2018	2017	2018
Stock Options				
Cost of revenues	$59,720	$10,150	$133,105	$37,150
Research and development expenses	53,405	30,247	121,834	103,267
General and administrative expenses	178,671	57,162	528,406	243,593
Sales and marketing expenses	40,181	15,440	100,327	63,494
Total expenses related to stock options	331,977	112,999	883,672	447,504
RSUs				
Cost of revenues	20,417	—	58,717	(18,802)
Research and development expenses	20,418	—	57,490	13,576
General and administrative expenses	74,521	—	160,927	54,303
Sales and marketing expenses	28,355	—	71,343	15,348
Total stock-based compensation	$475,688	$112,999	$1,232,149	$511,929

Stock-based compensation expense was recorded net of estimated forfeitures of 0%—8% per annum during each of the three and nine months ended September 30, 2017 and 2018. As of September 30, 2018, total unrecognized share-based compensation expense related to unvested stock options and RSUs, adjusted for estimated forfeitures, was approximately $900,474 and is expected to be recognized over a weighted-average period of approximately 2.4 years.

9. Common Stock Warrants Outstanding

A summary of equity-classified common stock warrant activity for the nine months ended September 30, 2018 is as follows:

	Number of Shares	Weighted Average Exercise Price Per Share	Average Remaining Contractual Term in Years
Outstanding at December 31, 2017	288,196	$78.86	4.0
Issued	4,406,731	$3.95	
Exercised	—	—	
Expired	—	—	
Outstanding at September 30, 2018	4,814,927	$5.44	4.7

10. Net Loss per Common Share

Basic and diluted net loss per common share is determined by dividing net loss applicable to common shareholders by the weighted-average common shares outstanding during the period. Because there is a net loss attributable to common shareholders for the three and nine months ended September 30, 2017 and 2018, the outstanding RSUs, warrants, and common stock options have been excluded from the calculation of diluted loss per common share because their effect would be anti-dilutive. Based on review of the applicable guidance, the 120,000 prefunded warrants that were issued in the September 20, 2018 registered direct offering with an exercise price of $0.01 are considered common stock equivalents and are included in the calculation of basic and diluted loss per share. In other periods presented, the weighted-average shares used to calculate both basic and diluted loss per share are the same.

The following potentially dilutive securities have been excluded from the computations of diluted weighted-average shares outstanding for the periods presented, as they would be anti-dilutive:

	For the three and nine months ended September 30,	
	2017	2018
Preferred warrants outstanding (number of common stock equivalents)	17	17
Common warrants outstanding	280,058	4,814,927
RSUs outstanding	12,030	360
Common options outstanding	82,810	114,641
Total anti-dilutive common share equivalents	374,915	4,929,945

11. Commitments and Contingencies

In the normal course of business, the Company may be involved in legal proceedings or threatened legal proceedings. The Company is not party to any legal proceedings or aware of any threatened legal proceedings that are expected to have a material adverse effect on its financial condition, results of operations or liquidity.

In February 2016, the Company signed a firm, non-cancelable, and unconditional commitment in an aggregate amount of $1,062,500 with a vendor to purchase certain inventory items, payable in minimum quarterly amounts of $62,500 through May 2020. At September 30, 2018, a balance of approximately $404,000 remained outstanding under this purchase commitment.

12. Related Party Transactions

A member of the Company's management is the controlling person of Aegea Biotechnologies, Inc., or Aegea. On September 2, 2012, the Company entered into an Assignment and Exclusive Cross-License Agreement, or the Cross-License Agreement, with Aegea. The Company received a payment of approximately $15,000 during the year ended December 31, 2017, as well as a payment of approximately $19,000 during the nine months ended September 30, 2018, from Aegea as reimbursements for shared patent costs under the Cross-License Agreement. There were no payments received on this arrangement during the quarter ended September 30, 2018.

Pursuant to a sublease agreement dated March 30, 2015, the Company subleased 9,849 square feet, plus free use of an additional area, of its San Diego facility to an entity affiliated with the Company's non-executive Chairman for $12,804 per month, with a refundable security deposit of $12,804 received from the subtenant. The initial term of the sublease expired on July 31, 2015 and was subject to renewal on a month-to-month basis thereafter. On February 1, 2017, the Company received notice from the subtenant terminating the sublease effective March 31, 2017. During the year ended December 31, 2017, the total amount of the $12,804 security deposit previously received from the subtenant was applied against approximately $16,000 in additional rents owed as a result of the subtenant continuing to occupy the subleased areas beyond March 31, 2017, and the balance of approximately $3,200 due to the Company was waived. A total of approximately $51,000 and $51,000 in rental income was recorded to other income/(expense) in the Company's statement of operations and comprehensive loss during the nine months ended September 30, 2017 and the year ended December 31, 2017, respectively. There was no income or expense recorded in the three and nine months ended September 30, 2018 related to this sublease.

6,250,000 Shares of Common Stock
Warrants to Purchase up to 6,250,000 Shares of Common Stock

PROSPECTUS

Book-Running Manager

Maxim Group LLC

Co-Manager

Dawson James Securities, Inc.

February 8, 2019