

CANCER GENETICS, INC
Form 424B5
August 16, 2017

Filed Pursuant to Rule 424(b)(5)
Registration No. 333-218229
PROSPECTUS SUPPLEMENT
(To Prospectus dated June 5, 2017)

\$16 million
plus 320,000 Commitment Shares

Common Stock

Pursuant to this prospectus supplement and the accompanying prospectus, we are offering up to \$16 million of Purchase Shares plus 320,000 Commitment Shares of our common stock, par value \$0.0001 per share (“Common Stock”), to Aspire Capital Fund, LLC under a Common Stock Purchase Agreement entered into on August 14, 2017 (the “Purchase Agreement”).

The shares offered include (i) 320,000 shares of Common Stock to be issued to Aspire Capital Fund, LLC in consideration for entering into the Common Stock Purchase Agreement and (ii) additional shares of Common Stock in an aggregate amount of up to \$16 million, which may be sold from time to time to Aspire Capital Fund, LLC over the 24-month term of the Purchase Agreement. The Purchase Agreement provides for a purchase price for the additional shares of stock of \$3.00 per share.

Our Common Stock is listed on The NASDAQ Capital Market under the symbol “CGIX.” On August 15, 2017, the last reported sale price of our common stock was \$3.10 per share.

Our business and an investment in our common stock involve significant risks. See “Risk Factors” beginning on page S-6 of this prospectus supplement and page 4 of the accompanying prospectus to read about factors that you should consider before making an investment decision.

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

The date of this prospectus supplement is August 16, 2017

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ABOUT THIS PROSPECTUS SUPPLEMENT

This document is in two parts. The first part is this prospectus supplement, which describes the specific terms of the offering and also adds to and updates information contained in the accompanying prospectus and the documents incorporated by reference into this prospectus supplement and the accompanying prospectus. The second part, the accompanying prospectus dated June 5, 2017, including the documents incorporated by reference, provides more general information. Generally, when we refer to this prospectus, we are referring to both parts of this document combined. To the extent there is a conflict between the information contained in this prospectus supplement, on the one hand, and the information contained in the accompanying prospectus or in any document incorporated by reference that was filed with the Securities and Exchange Commission, or SEC, before the date of this prospectus supplement, on the other hand, you should rely on the information in this prospectus supplement. If any statement in one of these documents is inconsistent with a statement in another document having a later date - for example, a document incorporated by reference in the accompanying prospectus - the statement in the document having the later date modifies or supersedes the earlier statement. You should read this prospectus supplement and the accompanying prospectus, including the information incorporated by reference and any free writing prospectus that we have authorized for use in connection with this offering, in their entirety before making an investment decision.

You should rely only on the information contained or incorporated by reference in this prospectus supplement and the accompanying prospectus, along with the information contained in any free writing prospectus that we have authorized for use in connection with this offering. If the description of the offering varies between this prospectus supplement and the accompanying prospectus, you should rely on the information in this prospectus supplement. We have not authorized anyone to provide you with different or additional information. You should assume that the information appearing in this prospectus supplement, the accompanying prospectus, the documents incorporated by reference in this prospectus supplement and the accompanying prospectus, and in any free writing prospectus that we have authorized for use in connection with this offering is accurate only as of the respective dates of those documents. Our business, financial condition, results of operations and prospects may have changed since those dates.

We further note that the representations, warranties and covenants made by us in any agreement that is filed as an exhibit to any document that is incorporated by reference in this prospectus supplement or the accompanying prospectus 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 and covenants were accurate only as of the date when made; therefore, such representations, warranties and covenants should not be relied on as accurate representations of the current state of our affairs.

Unless we have indicated otherwise, or the context otherwise requires, references in this prospectus supplement and the accompanying prospectus to the “Company,” “we,” “us,” “our” or similar terms refer to Cancer Genetics, Inc. and its wholly owned subsidiaries: Cancer Genetics Italia, S.r.l., Gentriss, LLC and BioServe Biotechnologies (India) Private Limited.

This prospectus supplement, the accompanying prospectus and the information incorporated by reference includes trademarks, service marks and trade names owned by us or other companies. All trademarks, service marks and trade names included or incorporated by reference into this prospectus supplement or the accompanying prospectus are the property of their respective owners.

PROSPECTUS SUPPLEMENT SUMMARY

This summary highlights certain information about us, this offering and information appearing elsewhere in this prospectus supplement, in the accompanying prospectus and in the documents we incorporate by reference. This summary is not complete and does not contain all of the information that you should consider before making an investment decision. To fully understand this offering and its consequences to you, you should read this entire prospectus supplement and the accompanying prospectus carefully, including the factors described under the heading “Risk Factors” in this prospectus supplement beginning on page S-6 and page 4 of the accompanying prospectus, together with any free writing prospectus we have authorized for use in connection with this offering and the financial statements and all other information incorporated by reference in this prospectus supplement and the accompanying prospectus. When used in this prospectus supplement and the accompanying prospectus, except where the context otherwise requires, the terms the “Company,” “we,” “us,” “our” or similar terms refer to Cancer Genetics, Inc. and its wholly owned subsidiaries: Cancer Genetics Italia, S.r.l., Gentris, LLC and BioServe Biotechnologies (India) Private Limited.

About Cancer Genetics

We are an emerging leader in the field of precision medicine, enabling individualized therapies in the field of oncology through our diagnostic products and services and molecular markers. We develop, commercialize and provide molecular- and biomarker-based tests and services that enable physicians to personalize the clinical management of each individual patient by providing genomic information to better diagnose, monitor and inform cancer treatment and that enable biotech and pharmaceutical companies engaged in oncology trials to better select candidate populations and reduce adverse drug reactions by providing information regarding genomic factors influencing subject responses to therapeutics. We have a comprehensive, disease-focused oncology testing portfolio. Our tests and techniques target a wide range of cancers, covering nine of the top ten cancers in prevalence in the United States, with additional unique capabilities offered by our FDA-cleared Tissue of Origin® test for identifying difficult to diagnose tumor types or poorly differentiated metastatic disease.

Our vision is to expand our oncology diagnostics partnerships with pharmaceutical and biotech companies and clinicians by participating in the entire care continuum from bench to bedside. We believe the oncology industry is undergoing a rapid evolution in its approach to diagnostic, prognostic and treatment outcomes (theranostic) testing, embracing precision medicine and individualized testing as a means to drive higher standards of patient treatment and disease management. Similarly, pharmaceutical and biotech companies are increasingly working with precision diagnostic and molecular technology providers such as CGI to provide molecular profiles on clinical trial participants. These profiles may help identify biomarker and genomic variations that may be responsible for differing responses to oncology therapies, thereby increasing the efficiency of trials while lowering costs. We believe tailored and combination therapies can revolutionize oncology care through molecular- and biomarker-based testing services, enabling physicians and researchers to target the factors that make each patient and disease unique.

We believe the next wave in cancer management will bring together testing capabilities for germline, or inherited mutations, and somatic mutations that arise in tissues over the course of a lifetime. We have created a unique position in the industry by providing both targeted somatic analysis of tumor sample cells alongside germline analysis of an individual's non-cancerous cells' molecular profile as we attempt to continue achieving milestones in precision medicine.

Cancer is genetically-driven and constitutes a diverse class of diseases with various causes, each characterized by uncontrollable cell growth. Many cancers are becoming increasingly understood at a molecular level and it is possible to attribute specific cancers to identifiable genetic changes in unhealthy cells. Cancer cells contain modified genetic material compared to normal human cells. Common genetic abnormalities correlated to cancer include gains or losses of genetic material on specific chromosomal regions (loci) or changes in specific genes (mutations) that ultimately result in detrimental cellular changes followed by cancerous or pre-cancerous conditions. Understanding the differences in these molecular changes helps clinicians to identify and stratify different forms of cancer in order to optimize patient treatment and patient management. Therefore, understanding and analysis of cancer at the molecular level is not only useful for diagnostic purposes, but we also believe it can play an important role in prognosis and disease management. We believe technology that can apply predictive information has the potential to dramatically improve treatment outcomes for patients living with cancer. Our molecular- and biomarker-based tests for cancer aim

to remove subjectivity

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from the diagnostic phase, and add prognostic information, thus enabling personalized treatments based on cancer analysis at its most basic level.

Our business is based on demand for molecular- and biomarker-based diagnostic services from three main sectors, including cancer centers and hospitals, biotechnology and pharmaceutical companies, and the research community. Clinicians and oncologists in cancer centers and hospitals seek testing since these methods often produce higher value and more accurate cancer diagnostic information than traditional analytical methods. Our proprietary and disease-focused tests aim to provide actionable information that can guide patient management decisions, potentially resulting in decreased costs for care providers and patients while streamlining therapy selection. Our services are also sought by biotechnology and pharmaceutical companies engaged in designing and running clinical trials to determine the value and efficacy of oncology treatments and therapeutics. We believe trial participants' likelihood of experiencing either favorable or adverse responses to the trial treatment may be influenced or dependent on genomic factors. Our testing services may increase trial efficiency, subject safety and trial success rates. Our services are also sought by researchers and research groups seeking to identify biomarkers and develop methods for diagnostic technologies and tests for disease. We aggressively pursue the strategy of trying to demonstrate increased value and efficacy with payors who are trying to contain costs and academic collaborators seeking to develop new insights and cures.

Our market strategy is organized to align with the three aforementioned industry segments. We utilize relatively the same technologies across each of these businesses to deliver results-oriented information which we believe is or will become important to cancer treatment and patient management. Our tests address the limitations of traditional cancer diagnostic approaches, including reliance on human inspection of specimens and interpretation of clinical measurements, and inter-institutional variability. Our suite of clinical and biopharma services aim to remove subjectivity from diagnoses and additionally provide information that may influence treatment selection that cannot be obtained from anatomic pathology and staining techniques alone. We believe the level of personalized treatment required to optimize a patient's treatment regimen and to maximize clinical trial success rates may be significantly improved through the use of molecular- and biomarker-based cancer characterization.

The following table lists our market strategy by customer category:

Customer Category	Types of Customers	Nature of Services
Clinical Services	Hospitals Cancer Centers Clinics	Clinical services provide information on diagnosis, prognosis and predicting treatment outcomes (theragnosis) of cancers to guide patient management.
Biopharma Services	Pharmaceutical and Biotech companies performing clinical trials	Biopharma services provide companies with customized solutions for patient stratification and treatment selection through an extensive suite of molecular- and biomarker-based testing services, customized assay development and trial design consultation.
Discovery Services	Pharmaceutical and Biotech companies Academic Institutions Government-Sponsored Research Institutions	Discovery services provide the tools and testing methods for companies and researchers seeking to identify new molecular-based biomarkers for disease.

In 2016, we generated approximately 57% of our revenue from Biopharma Services, approximately 39% from Clinical Services and approximately 4% from Discovery Services. In 2015, we generated approximately 64% of our revenue from Biopharma Services, approximately 31% from Clinical Services and approximately 5% from Discovery Services.

We utilize relatively the same proprietary and nonproprietary molecular diagnostic tests and technologies across all of our service offerings to deliver results-oriented information important to cancer treatment and patient management. Our portfolio primarily includes comparative genomic hybridization (CGH) microarrays, gene expression tests, next generation sequencing (NGS) panels, and DNA fluorescent in situ hybridization (FISH) probes. We provide our testing services from our Clinical Laboratory Improvement Amendments (“CLIA”)—certified and College of American Pathologists (“CAP”)—accredited laboratories in Rutherford, NJ, Los Angeles, CA, and Raleigh, NC, as well as our NABL and GMP-certified laboratories in Hyderabad, India and Shanghai, China.

Cancer Genetics Corporate Information

Our principal executive offices are located at 201 Route 17 North, 2nd Floor, Rutherford, New Jersey 07070, and our telephone number is (201) 528-9200. Our common stock is currently traded on The NASDAQ Capital Market under the symbol “CGIX.” We maintain a corporate website at www.cancer-genetics.com. The contents of our website are not incorporated by reference into this prospectus and should not be considered to be a part of this prospectus or relied upon in connection herewith.

Cancer Genetics, Inc. was incorporated under the laws of the State of Delaware in April 1999. On July 16, 2014 we purchased substantially all of the assets of Gentriss Corporation (“Gentriss”), a laboratory specializing in pharmacogenomics profiling for therapeutic development, companion diagnostics and clinical trials. On August 18, 2014 we entered into two agreements by which we acquired BioServe Biotechnologies (India) Pvt. Ltd. (“BioServe”), a premier genomics services provider serving both the research and clinical markets in India, and as a result of the acquisition, BioServe became a subsidiary of ours. On October 9, 2015, Cancer Genetics acquired substantially all the assets and assumed certain liabilities of Response Genetics, Inc. (“Response Genetics”). Unless otherwise stated, all references to “us,” “our,” “Cancer Genetics,” “we,” the “Company” and similar designations refer to Cancer Genetics, Inc. and its wholly-owned subsidiaries.

THE OFFERING

On August 14, 2017, we entered into a Common Stock Purchase Agreement (the “Purchase Agreement”) with Aspire Capital Fund, LLC, an Illinois limited liability company (“Aspire Capital”), which provides that, upon the terms and subject to the conditions and limitations set forth therein, Aspire Capital is committed to purchase up to an aggregate of \$16 million of our common stock at a purchase price of \$3.00 per share (the “Purchase Shares”) from time to time over the term of the Purchase Agreement. As consideration for entering into the Purchase Agreement, we agreed to issue 320,000 shares of our common stock to Aspire Capital (the “Commitment Shares”). In addition, on August 16, 2017, Aspire Capital made an initial purchase (the “Initial Purchase”) of 1,000,000 Purchase Shares (the “Initial Purchase Shares”) at a purchase price of \$3.00 per share, pursuant to the Purchase Agreement.

We are filing this prospectus supplement with regard to the offering of our common stock consisting of (i) the Commitment Shares and (ii) additional shares of our common stock in an aggregate amount of up to \$16 million that we may sell to Aspire Capital pursuant to the Purchase Agreement.

On August 16, 2017, the conditions necessary for purchases under the Purchase Agreement to commence were satisfied. On any business day over the 24-month term of the Purchase Agreement, we have the right, in our sole discretion, to present Aspire Capital with a purchase notice (each, a “Purchase Notice”) directing Aspire Capital to purchase up to 33,333 Purchase Shares per business day, provided that Aspire Capital will not be required to buy Purchase Shares pursuant to a Purchase Notice that was received by Aspire Capital on any business day on which the last closing trade price of our common stock on the NASDAQ Capital Market (or alternative national exchange in accordance with the Purchase Agreement) is below \$3.00 (the “Floor Price”). We and Aspire Capital also may mutually agree to increase the number of shares that may be sold to as much as an additional 2,000,000 Purchase Shares per business day. The Purchase Agreement provides for a purchase price per Purchase Share (the “Purchase Price”) of \$3.00.

The number of Purchase Shares covered by and timing of each Purchase Notice are determined by the Company, at our sole discretion. The aggregate number of shares that we can sell to Aspire Capital under the Purchase Agreement may in no case exceed 3,938,213 shares of our common stock (which is equal to approximately 19.9% of the common stock outstanding on the date of the Purchase Agreement), including the 320,000 Commitment Shares and the 1,000,000 Initial Purchase Shares (the “Exchange Cap”), unless shareholder approval is obtained to issue more, in which case the Exchange Cap will not apply; provided that at no time shall Aspire Capital (together with its affiliates) beneficially own more than 19.9% of our common stock. Except for the Initial Purchase, Aspire Capital has no right to require any sales by us, but is obligated to make purchases from us as we direct in accordance with the Purchase Agreement. There are no limitations on use of proceeds, financial or business covenants, restrictions on future fundings, rights of first refusal, participation rights, penalties or liquidated damages in the Purchase Agreement. We did not pay any additional amounts to reimburse or otherwise compensate Aspire Capital in connection with the transaction. The Purchase Agreement may be terminated by us at any time, at our discretion, without any penalty or cost to us.

Our net proceeds will depend on several factors, including the frequency of our sales of Purchase Shares to Aspire Capital and the frequency at which the last closing trade price of our common stock is below the Floor Price, subject to a maximum of \$16.0 million in gross proceeds, including the Initial Purchase. Our delivery of Purchase Notices will be made subject to market conditions, in light of our capital needs from time to time. We currently intend to use the net proceeds from sales of Purchase Shares for working capital and other general corporate purposes. See “Use of Proceeds” on page S-11 of this prospectus supplement.

RISK FACTORS

Investing in our common stock involves a high degree of risk. This prospectus supplement does not describe all of those risks. You should consider the risk factors described in this prospectus under the caption “Risks Related to This Offering and Our Securities” below, as well as the those described under the caption “Risk Factors” in the documents incorporated by reference herein, including our Annual Report on Form 10-K for the fiscal year ended December 31, 2016 filed with the SEC on March 23, 2017, together with the other information contained or incorporated by reference in this prospectus supplement and the accompanying prospectus, and in any free writing prospectus that we have authorized for use in connection with this offering, before making an investment decision.

If any of the these risks occur, our business, financial condition, results of operations and future prospects would likely be materially and adversely affected. In these circumstances, the market price of our common stock would likely decline and you may lose all or part of your investment. Share information set forth in these risk factors is as of the dates set forth herein or therein and unless otherwise indicated, does not give effect to the issuance of the securities in connection with this offering.

Risks Related to This Offering and Our Securities

Sales of our common stock to Aspire Capital may cause substantial dilution to our existing stockholders and the sale of the shares of our common stock acquired by Aspire Capital could cause the price of our common stock to decline. This prospectus supplement relates to the 320,000 Commitment Shares and an aggregate amount of up to \$16 million of shares of common stock that we may issue and sell to Aspire Capital from time to time pursuant to the Purchase Agreement, which provides for a purchase price of \$3.00 per share, including the Initial Purchase. It is anticipated that shares offered to Aspire Capital in this offering will be sold over a period of up to 24 months from the date of this prospectus supplement. The number of shares ultimately offered for sale to Aspire Capital under this prospectus supplement is dependent upon the number of shares we elect to sell to Aspire Capital under the Purchase Agreement. Depending upon market liquidity at the time, sales of shares of our common stock under the Purchase Agreement may cause the trading price of our common stock to decline.

Aspire Capital may ultimately purchase all, some or none of the 4,333,333 shares of common stock remaining after the 1,000,000 shares sold in the Initial Purchase that, together with the 320,000 Commitment Shares and the shares sold in the Initial Purchase, is the subject of this prospectus supplement. After Aspire Capital has acquired shares under the Purchase Agreement, it may sell all, some or none of those shares. Sales to Aspire Capital by us pursuant to the Purchase Agreement under this prospectus supplement may result in substantial dilution to the interests of other holders of our common stock. The sale of a substantial number of shares of our common stock to Aspire Capital in this offering, or anticipation of such sales, could 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 wish to effect sales. However, we have the right to control the timing and amount of any sales of our shares to Aspire Capital and the Purchase Agreement may be terminated by us at any time at our discretion without any cost to us.

We have a right to sell up to a maximum of 33,333 Purchase Shares per day under our Purchase Agreement with Aspire Capital, which total may be increased by mutual agreement up to an additional 2,000,000 Purchase Shares per day. The extent to which we rely on Aspire Capital as a source of funding will depend on a number of factors, including the prevailing market price of our common stock and the extent to which we are able to secure working capital from other sources. The aggregate number of shares that we can sell to Aspire Capital under the Purchase Agreement may in no case exceed 3,938,213 shares of our common stock (which is equal to approximately 19.9% of the common stock outstanding on the date of the Purchase Agreement), including the 320,000 Commitment Shares and the 1,000,000 Initial Purchase Shares (the “Exchange Cap”), unless shareholder approval is obtained to issue more, in which case the Exchange Cap will not apply.

Management will have broad discretion as to the use of the proceeds from this offering, and we may not use the proceeds effectively.

Our management will have broad discretion in the application of the proceeds from sales of our common stock to Aspire Capital offered by this prospectus supplement, and could spend the proceeds in ways that do not improve our results of operations or enhance the value of our common stock. Our failure to apply these funds effectively could have a material adverse effect on our business, delay the development of our product candidates and cause the price of our common stock to decline.

Future sales of a significant number of our shares of common stock in the public markets, or the perception that such sales could occur, could depress the market price of our shares of common stock.

Sales of a substantial number of our shares of common stock in the public markets, or the perception that such sales could occur, could depress the market price of our shares of common stock and impair our ability to raise capital through the sale of additional equity securities. A substantial number of shares of common stock are being offered by this prospectus supplement, and we cannot predict if and when Aspire Capital may sell such shares in the public markets. We cannot predict the number of these shares that might be sold nor the effect that future sales of our shares of common stock would have on the market price of our shares of common stock.

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USE OF PROCEEDS

We currently intend to use the net proceeds of this offering for working capital and other general corporate purposes. As of the date of this prospectus supplement and except as explicitly set forth herein, we cannot specify with certainty all of the particular uses of the proceeds from this offering. Accordingly, we will retain broad discretion over the use of such proceeds. Pending use of the net proceeds of this offering received from time to time in connection with purchases under the Purchase Agreement described above, we intend to invest such net proceeds in short-term interest-bearing investment grade instruments.

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THE ASPIRE TRANSACTION

General

On August 14, 2017, we entered into a Common Stock Purchase Agreement (the “Purchase Agreement”) with Aspire Capital Fund, LLC, an Illinois limited liability company (“Aspire Capital”), which provides that, upon the terms and subject to the conditions and limitations set forth therein, Aspire Capital is committed to purchase up to an aggregate of \$16 million of shares of our common stock (the “Purchase Shares”) from time to time over the term of the Purchase Agreement. As consideration for entering into the Purchase Agreement, we agreed to issue 320,000 shares of our common stock to Aspire Capital (the “Commitment Shares”). In addition, on August 16, 2017, Aspire Capital made an initial purchase (the “Initial Purchase”) of 1,000,000 Purchase Shares (the “Initial Purchase Shares”) at a purchase price of \$3.00 per share, pursuant to the Purchase Agreement.

We are filing this prospectus supplement with regard to the offering of our common stock consisting of (i) the Commitment Shares and (ii) additional shares of our common stock in an aggregate amount of up to \$16 million of shares of our common stock that we may sell to Aspire Capital pursuant to the Purchase Agreement.

Purchase of Shares under the Purchase Agreement

On August 16, 2017, the conditions necessary for purchases under the Purchase Agreement to commence were satisfied. On any business day over the 24-month term of the Purchase Agreement, we have the right, in our sole discretion, to present Aspire Capital with a purchase notice (each, a “Purchase Notice”) directing Aspire Capital to purchase up to 33,333 Purchase Shares per business day, provided that Aspire Capital will not be required to buy Purchase Shares pursuant to a Purchase Notice that was received by Aspire Capital on any business day on which the last closing trade price of our common stock on the NASDAQ Capital Market (or alternative national exchange in accordance with the Purchase Agreement) is below \$3.00 (the “Floor Price”). We and Aspire Capital also may mutually agree to increase the number of shares that may be sold to as much as an additional 2,000,000 Purchase Shares per business day. The Purchase Agreement provides for a purchase price per Purchase Share (the “Purchase Price”) of \$3.00.

The number of Purchase Shares covered by and timing of each Purchase Notice are determined by the Company, at our sole discretion. The aggregate number of shares that we can sell to Aspire Capital under the Purchase Agreement may in no case exceed 3,938,213 shares of our common stock (which is equal to approximately 19.9% of the common stock outstanding on the date of the Purchase Agreement), including the 320,000 Commitment Shares and the 1,000,000 Initial Purchase Shares (the “Exchange Cap”), unless shareholder approval is obtained to issue more, in which case the Exchange Cap will not apply; provided that at no time shall Aspire Capital (together with its affiliates) beneficially own more than 19.9% of our common stock. Except for the Initial Purchase, Aspire Capital has no right to require any sales by us, but is obligated to make purchases from us as we direct in accordance with the Purchase Agreement. There are no limitations on use of proceeds, financial or business covenants, restrictions on future fundings, rights of first refusal, participation rights, penalties or liquidated damages in the Purchase Agreement. We did not pay any additional amounts to reimburse or otherwise compensate Aspire Capital in connection with the transaction. The Purchase Agreement may be terminated by us at any time, at our discretion, without any penalty or cost to us.

Events of Default

Aspire Capital may terminate the Purchase Agreement upon the occurrence of any of the following events of default: the effectiveness of any registration statement that is required to be maintained effective pursuant to the terms of the registration rights agreement between us and Aspire Capital lapses for any reason (including, without limitation, the issuance of a stop order) or is unavailable for sale of our shares of Common Stock in accordance with the terms of the registration rights agreement, and such lapse or unavailability continues for a period of ten consecutive business days or for more than an aggregate of 30 business days in any 365-day period, which is not in connection with a post-effective amendment to any such registration statement or the filing of a new registration statement; provided, however, that in connection with any post-effective amendment to such registration statement or filing

of a new registration statement that is required to be declared effective by the SEC, such lapse or unavailability may continue for a period of no more than 30 consecutive business days, which such period shall be extended for an additional 30 business days if the Company receives a comment letter from the SEC in connection therewith; the suspension from trading or failure of our Common Stock to be listed on our principal market for a period of three consecutive business days;

the delisting of our Common Stock from our principal market, provided our Common Stock is not immediately thereafter trading on the New York Stock Exchange, the NYSE MKT, the NASDAQ Global Select Market, the NASDAQ Global Market, the NASDAQ Capital Market, the OTC Bulletin Board or the OTCQB marketplace or OTCQX marketplace of the OTC Markets Group;

our transfer agent's failure to issue to Aspire Capital shares of our Common Stock which Aspire Capital is entitled to receive under the Purchase Agreement within five business days after an applicable purchase date;

any breach by us of the representations or warranties or covenants contained in the Purchase Agreement or any related agreements which could have a material adverse effect on us, Aspire Capital or the value of the common stock, subject to a cure period of five business days;

if we become insolvent; and

any participation or threatened participation in insolvency or bankruptcy proceedings by or against us.

Our Termination Rights

We may terminate the Purchase Agreement at any time, in our discretion, without any cost or penalty.

No Short-Selling or Hedging by Aspire Capital

Aspire Capital has agreed that neither it nor any of its agents, representatives and affiliates shall engage in any direct or indirect short-selling or hedging of our Common Stock during any time prior to the termination of the Purchase Agreement.

Effect of Performance of the Purchase Agreement on Our Stockholders

The Purchase Agreement does not limit the ability of Aspire Capital to sell any or all of the shares it currently owns or receives in this offering. It is anticipated that shares sold to Aspire Capital in this offering will be sold to Aspire Capital over a period of up to 24 months from the date of the Purchase Agreement. The subsequent resale by Aspire Capital of our Common Stock may cause the market price of our Common Stock to decline or to be highly volatile. Aspire Capital may ultimately purchase all, some or none of the 4,333,333 shares of common stock remaining after the 1,000,000 Initial Purchase Shares that, together with the 320,000 Commitment Shares and the Initial Purchase Shares, is the subject of this prospectus supplement. Aspire Capital may resell all, some or none of the Commitment Shares and any Purchase Shares it acquires. Therefore, sales to Aspire Capital by us pursuant to the Purchase Agreement and this prospectus supplement also may result in substantial dilution to the interests of other holders of our Common Stock. However, we have the right to control the timing and amount of any sales of our shares to Aspire Capital and the Purchase Agreement may be terminated by us at any time at our discretion without any cost to us.

Amount of Potential Proceeds to be Received under the Purchase Agreement

Under the Purchase Agreement, we may sell Purchase Shares having an aggregate offering price of up to \$16.0 million to Aspire Capital from time to time, including the Initial Purchase. The number of shares ultimately offered for sale to Aspire Capital in this offering in addition to the shares sold in the Initial Purchase is dependent upon the number of shares we elect to sell to Aspire Capital under the Purchase Agreement. In addition, Aspire Capital will not be required to buy Purchase Shares pursuant to a Purchase Notice that was received by Aspire Capital on any business day on which the last closing trade price of our common stock on the NASDAQ Capital Market (or alternative national exchange in accordance with the Purchase Agreement) is below \$3.00. Therefore, the frequency at which the last closing trade price

of our common stock is below the Floor Price will have an impact on the total proceeds we will receive under the Purchase Agreement.

Information with Respect to Aspire Capital

Aspire Capital Partners, LLC is the managing member of Aspire Capital Fund, LLC. SGM Holdings Corp. is the managing member of Aspire Capital Partners, LLC. Steven G. Martin is the president and sole shareholder of SGM Holdings Corp. Erik J. Brown is a principal of Aspire Capital Partners, LLC. Christos Komissopoulos is a principal of Aspire Capital Partners, LLC. Each may be deemed to have shared voting and investment power over shares owned by Aspire Capital Fund, LLC. Each of Aspire Capital Partners, LLC, SGM Holdings Corp., Mr. Martin, Mr. Brown and Mr. Komissopoulos disclaim beneficial ownership of the shares of common stock held by Aspire Capital Fund, LLC. Aspire Capital is not a licensed broker dealer or an affiliate of a licensed broker dealer.

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DILUTION

Our net tangible book value as of June 30, 2017 was approximately \$4.9 million, or \$0.25 per share of common stock. Net tangible book value per share of common stock is calculated by subtracting our total liabilities from our total tangible assets, which is total assets less intangible assets, and dividing this amount by the number of shares of common stock outstanding.

After giving effect to (i) the issuance of 320,000 Commitment Shares and (ii) the sale of 5,333,333 shares of Common Stock at a price of \$3.00 per share (which assumes, for purposes of this calculation, the non-applicability of the 19.9% Exchange Cap limitation), and after deducting the estimated offering expenses payable by us, our as adjusted net tangible book value as of June 30, 2017 would have been approximately \$20.8 million, or \$0.82 per share of Common Stock. This represents an immediate increase in net tangible book value of \$0.57 per share to existing stockholders and immediate dilution in net tangible book value of \$2.18 per share to investors participating in this offering. The following table illustrates this dilution on a per share basis:

Assumed public offering price per share	\$3.00
Historical net tangible book value per share as of June 30, 2017	\$0.25
Increase per share attributable to investors participating in this offering	\$0.57
As adjusted net tangible book value per share after this offering	\$0.82
Dilution per share to investors participating in this offering	\$2.18

The above discussion and table are based on approximately 19,785,000 shares of common stock outstanding as of the close of business on June 30, 2017. This number excludes the following:

- options representing the right to purchase a total of 2,578,000 shares of common stock at a weighted average exercise price of \$7.46 per share;

- 814,393 shares of common stock which were reserved for future equity awards that may be granted in the future under our equity incentive plans;

- warrants representing the right to purchase a total of 6,598,998 shares of common stock at a weighted average exercise price of \$4.92 per share;

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. Our loan agreements prohibit us from paying cash dividends on our common stock and the terms of any future loan agreement we enter into or any debt securities we may issue are likely to contain similar restrictions on the payment of dividends. 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.

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CAPITALIZATION

The following table sets forth our capitalization as of June 30, 2017:

on an actual basis, without giving effect to this offering and the use of net proceeds as discussed in "Use of Proceeds"; on an as adjusted basis to reflect the (i) issuance of the 320,000 Commitment Shares and (ii) the sale of 5,333,333 shares of Common Stock at a price of \$3.00 per share (which assumes, for purposes of this calculation, the non-applicability of the 19.9% Exchange Cap limitation), and after deducting estimated offering expenses payable by us.

This capitalization table should be read in conjunction with management's discussion and analysis of results of operations and our consolidated financial statements and related notes included in our annual report on Form 10-K for the year ended December 31, 2016 and in our Quarterly Report on Form 10-Q for the quarter ended June 30, 2017, and the other financial information included and incorporated by reference in this prospectus supplement.

	(in thousands)	
	As of June 30, 2017	
	Actual	Pro Forma, As Adjusted
Cash and Cash Equivalents	\$6,170	\$22,020
Shareholder's equity:		
Preferred stock, authorized 9,764 shares, \$0.0001 par value, none issued	\$-	\$-
Common stock, authorized 100,000 shares, \$0.0001 par value, 19,785 shares issued and outstanding at June 30, 2017 ⁽¹⁾	\$2	\$3
Additional paid in capital	\$144,923	\$160,772
Accumulated deficit	\$(126,300)	\$(126,300)
Total shareholders' equity	\$18,625	\$34,475

⁽¹⁾ Outstanding shares of common stock as of June 30, 2017 excludes:

options representing the right to purchase a total of 2,578,000 shares of common stock at a weighted average exercise price of \$7.46 per share;

- 814,393 shares of common stock which were reserved for future equity awards that may be granted in the future under our equity incentive plans;

warrants representing the right to purchase a total of 6,598,998 shares of common stock at a weighted average exercise price of \$4.92 per share;

PLAN OF DISTRIBUTION

We entered into the Purchase Agreement with Aspire Capital on August 14, 2017. In consideration for entering into the Purchase Agreement, we will issue 320,000 shares of Common Stock to Aspire Capital. The Purchase Agreement provides that, upon the terms and subject to the conditions set forth therein, Aspire Capital is irrevocably committed to purchase up to an aggregate of an aggregate amount of up to \$16 million of shares of our Common Stock over the approximately 24-month term of the Purchase Agreement. In addition, on August 16, 2017, Aspire Capital made an initial purchase (the “Initial Purchase”) of 1,000,000 Purchase Shares (the “Initial Purchase Shares”) at a purchase price of \$3.00 per share, pursuant to the Purchase Agreement.

On August 16, 2017, the conditions necessary for purchases under the Purchase Agreement to commence were satisfied. On any business day over the 24-month term of the Purchase Agreement, we have the right, in our sole discretion, to present Aspire Capital with a purchase notice (each, a “Purchase Notice”) directing Aspire Capital to purchase up to 33,333 Purchase Shares per business day, provided that Aspire Capital will not be required to buy Purchase Shares pursuant to a Purchase Notice that was received by Aspire Capital on any business day on which the last closing trade price of our common stock on the NASDAQ Capital Market (or alternative national exchange in accordance with the Purchase Agreement) is below \$3.00 (the “Floor Price”). We and Aspire Capital also may mutually agree to increase the number of shares that may be sold to as much as an additional 2,000,000 Purchase Shares per business day. The Purchase Agreement provides for a purchase price per Purchase Share (the “Purchase Price”) of \$3.00.

The number of Purchase Shares covered by and timing of each Purchase Notice are determined by the Company, at our sole discretion. The aggregate number of shares that we can sell to Aspire Capital under the Purchase Agreement may in no case exceed 3,938,213 shares of our common stock (which is equal to approximately 19.9% of the common stock outstanding on the date of the Purchase Agreement), including the 320,000 Commitment Shares and the 1,000,000 Initial Purchase Shares (the “Exchange Cap”), unless shareholder approval is obtained to issue more, in which case the Exchange Cap will not apply; provided that at no time shall Aspire Capital (together with its affiliates) beneficially own more than 19.9% of our common stock. Except for the Initial Purchase, Aspire Capital has no right to require any sales by us, but is obligated to make purchases from us as we direct in accordance with the Purchase Agreement. There are no limitations on use of proceeds, financial or business covenants, restrictions on future fundings, rights of first refusal, participation rights, penalties or liquidated damages in the Purchase Agreement. We did not pay any additional amounts to reimburse or otherwise compensate Aspire Capital in connection with the transaction. The Purchase Agreement may be terminated by us at any time, at our discretion, without any penalty or cost to us.

Aspire Capital may be an “underwriter” within the meaning of the Securities Act.

Neither we nor Aspire Capital can presently estimate the amount of compensation that any agent will receive. We know of no existing arrangements between Aspire Capital, any other shareholder, broker, dealer, underwriter, or agent relating to the sale or distribution of the shares offered by this prospectus supplement. At the time a particular offer of shares is made, a prospectus supplement, if required, will be distributed that will set forth the names of any agents, underwriters, or dealers and any other required information.

We will pay all of the expenses incident to the registration, offering, and sale of the shares to Aspire Capital. We have agreed to indemnify Aspire Capital and certain other persons against certain liabilities in connection with the offering of shares of common stock offered hereby, including liabilities arising under the Securities Act or, if such indemnity is unavailable, to contribute amounts required to be paid in respect of such liabilities. Aspire Capital has agreed to indemnify us against liabilities under the Securities Act that may arise from certain written information furnished to us by Aspire Capital specifically for use in this prospectus or, if such indemnity is unavailable, to contribute amounts required to be paid in respect of such liabilities.

Aspire Capital and its affiliates have agreed not to engage in any direct or indirect short selling or hedging of our common stock during the term of the Purchase Agreement.

We have advised Aspire Capital that it is required to comply with Regulation M promulgated under the Securities Exchange Act of 1934, as amended. With certain exceptions, Regulation M precludes the selling shareholder, any

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affiliated purchasers, and any broker-dealer or other person who participates in the distribution from bidding for or purchasing, or attempting to induce any person to bid for or purchase any security which is the subject of the distribution until the entire distribution is complete. Regulation M also prohibits any bids or purchases made in order to stabilize the price of a security in connection with the distribution of that security. All of the foregoing may affect the marketability of the shares offered hereby this prospectus.

We may suspend the sale of shares to Aspire Capital pursuant to this prospectus for certain periods of time for certain reasons, including if the prospectus is required to be supplemented or amended to include additional material information.

This offering will terminate on the date that all shares offered by this prospectus have been sold to Aspire Capital.

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LEGAL MATTERS

Lowenstein Sandler LLP, Roseland, New Jersey will pass upon the validity of the issuance of the securities offered by this prospectus supplement and the accompanying prospectus.

EXPERTS

The consolidated financial statements as of and for the years ended December 31, 2016 and 2015, incorporated in this prospectus supplement and elsewhere in the registration statement of which this prospectus supplement forms a part, by reference from the Company's Annual Report on Form 10-K for the year ended December 31, 2016, have been audited by RSM US LLP, an independent registered public accounting firm, as stated in their report, which is incorporated herein by reference. Such consolidated financial statements have been so incorporated in reliance upon the report of such firm given upon their authority as experts in accounting and auditing.

WHERE YOU CAN FIND MORE INFORMATION

This prospectus supplement is part of a registration statement on Form S-3 that we filed with the SEC. The registration statement that contains this prospectus supplement, including the exhibits to the registration statement, contains additional information about us and the common stock offered by this prospectus supplement.

We file annual, quarterly and special reports, proxy statements and other information with the SEC. You may read and copy any document we file with the SEC at the SEC's Public Reference Room at 100 F Street, N.E. Washington, D.C. 20549. Please call the SEC at 1-800-SEC-0330 for further information on the Public Reference Room. Our public filings, including reports, proxy and information statements, are also available on the SEC's web site at <http://www.sec.gov>.

INCORPORATION OF CERTAIN DOCUMENTS BY REFERENCE

The SEC allows us to "incorporate by reference" the information contained in documents that we file with them, which means that we can disclose important information to you by referring to those documents. The information incorporated by reference is considered to be part of this prospectus supplement. Information in this prospectus supplement modifies or supersedes information incorporated by reference that we filed with the SEC prior to the date of this prospectus supplement, and information that we file later with the SEC also will automatically update and supersede this information.

We incorporated by reference into this prospectus, the documents listed below and any documents that we file in the future with the SEC under Sections 13(a), 13(c), 14 or 15(d) of the Securities Exchange Act of 1934, as amended, after the date of this prospectus supplement and before the completion of the offering:

• Our Annual Report on Form 10-K for the fiscal year ended December 31, 2016, filed with the SEC on March 23, 2017;

• Our Proxy Statement on Schedule 14A for our 2017 Annual Meeting of Stockholders, filed with the SEC on April 21, 2017;

• Our Quarterly Reports on Form 10-Q for the quarterly periods ended March 31, 2017 and June 30, 2017, filed with the SEC on May 12, 2017 and August 14, 2017, respectively;

• Our Current Reports on Form 8-K and amendments thereto, filed with the SEC on January 6, February 16, February 22, March 23, March 24, May 12, June 7, 2017, August 14, 2017 and August 16, 2017(excluding any information deemed furnished pursuant to Item 2.02 or Item 7.01 of any such Current Report on Form 8-K); and

• Description of our common stock contained in the Registration Statement on Form 8-A, declared effective on August 12, 2013 (including any amendment or report filed with the SEC for the purpose of updating such description).

To the extent that any statement in this prospectus supplement is inconsistent with any statement that is incorporated by reference and that was made on or before the date of this prospectus supplement, the statement in this prospectus supplement shall supersede such incorporated statement. The incorporated statement shall not be deemed, except as modified or superseded, to constitute a part of this prospectus supplement, the accompanying prospectus or the registration statement. Statements contained in this prospectus supplement as to the contents of any contract or other document are not necessarily complete and, in each instance, we refer you to the copy of each contract or document filed as an exhibit to the registration statement.

We will furnish without charge to you, upon written or oral request, a copy of any or all of the documents incorporated by reference, including exhibits to these documents. You should direct any requests for documents to: Cancer Genetics, Inc.

201 Route 17 North, 2nd Floor

Rutherford, NJ 07070

(201) 528-9200

Attention: Corporate Secretary

Exhibits to the filings will not be sent, however, unless those exhibits have specifically been incorporated by reference in this document.

PROSPECTUS

\$100,000,000

CANCER GENETICS, INC.

Common Stock

Preferred Stock

Warrants

Overallotment Purchase Rights

Units

We may from time to time offer and sell common stock, preferred stock, warrants, overallotment purchase rights and units, having an aggregate offering price of up to \$100,000,000. We may offer and sell these securities separately or together in any combination. The preferred stock, warrants and overallotment purchase rights may be convertible into, or exercisable or exchangeable for, common or preferred stock or other securities of ours. The units may consist of any combination of the securities listed above. We may offer and sell these securities to or through underwriters, directly to investors or through agents. We will specify the terms of the securities, and the names of any underwriters or agents and their respective compensation, in supplements to this prospectus.

Our common stock is listed on the on The NASDAQ Capital Market and traded under the symbol "CGIX." The last reported sales price of our common stock on The NASDAQ Capital Market on May 23, 2017 was \$4.05 per share. We have no preferred stock, warrants, overallotment purchase rights or units listed on any market. Each prospectus supplement will indicate if the securities offered thereby will be listed on any securities exchange.

Investing in our securities involves risks. See "Risk Factors" at page 4 of this prospectus.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or passed upon the accuracy or adequacy of this prospectus. Any representation to the contrary is a criminal offense.

This prospectus may not be used to consummate sales of securities unless it is accompanied by a prospectus supplement.

The date of this prospectus is June 5, 2017.

No dealer, salesperson or other person has been authorized to give any information or to make any representations other than those contained or incorporated by reference in this prospectus or any accompanying prospectus supplement in connection with the offer made by this prospectus or any accompanying prospectus supplement and, if given or made, such information or representations must not be relied upon as having been authorized by Cancer Genetics, Inc. or any such person. Neither the delivery of this prospectus or any accompanying prospectus supplement nor any sale made hereunder and thereunder shall under any circumstances create an implication that there has been no change in the affairs of Cancer Genetics, Inc. since the date hereof. This prospectus or any accompanying prospectus supplement does not constitute an offer or solicitation by anyone in any state in which such offer or solicitation is not authorized or in which the person making such offer or solicitation is not qualified to do so or to anyone to whom it is unlawful to make such offer or solicitation.

ABOUT THIS PROSPECTUS

This prospectus is part of a registration statement that we filed with the Securities and Exchange Commission, or the SEC, using a "shelf" registration process. Under this shelf process, we may sell any combination of the securities described in this prospectus in one or more offerings up to a total dollar amount of \$100,000,000. We have provided to you in this prospectus a general description of the securities we may offer. Each time we sell securities under this shelf registration process, we will provide a prospectus supplement that will contain specific information about the terms of the offering. We may also add, update or change in the prospectus supplement or any "free writing prospectus" we may authorize to be delivered to you any of the information contained in this prospectus. To the extent there is a conflict between the information contained in this prospectus and the prospectus supplement or any free writing prospectus we may authorize to be delivered to you, you should rely on the information in the prospectus supplement or free writing prospectus, as the case may be, provided that if any statement in one of these documents is inconsistent with a statement in another document having a later date-for example, a document incorporated by reference in this prospectus or any prospectus supplement-the statement in the document having the later date modifies or supersedes the earlier statement. This prospectus, together with the applicable prospectus supplements and any free writing prospectus we may authorize to be delivered to you, includes all material information relating to this offering.

An investment in our securities involves certain risks that should be carefully considered by prospective investors. See "Risk Factors."

You should read this prospectus and any prospectus supplement as well as additional information described under "Incorporation of Certain Documents by Reference" and "Where You Can Find More Information" on pages 14 and 15, respectively.

ABOUT CANCER GENETICS

Overview

We are an emerging leader in the field of precision medicine, enabling individualized therapies in the field of oncology through our diagnostic products and services and molecular markers. We develop, commercialize and provide molecular- and biomarker-based tests and services that enable physicians to personalize the clinical management of each individual patient by providing genomic information to better diagnose, monitor and inform cancer treatment and that enable biotech and pharmaceutical companies engaged in oncology trials to better select candidate populations and reduce adverse drug reactions by providing information regarding genomic factors influencing subject responses to therapeutics. We have a comprehensive, disease-focused oncology testing portfolio. Our tests and techniques target a wide range of cancers, covering nine of the top ten cancers in prevalence in the United States, with additional unique capabilities offered by our FDA-cleared Tissue of Origin® test for identifying difficult to diagnose tumor types or poorly differentiated metastatic disease.

Our vision is to become the oncology diagnostics partner for pharmaceutical and biotech companies and clinicians by participating in the entire care continuum from bench to bedside. We believe the oncology industry is undergoing a rapid evolution in its approach to diagnostic, prognostic and treatment outcomes (theranostic) testing, embracing precision medicine and individualized testing as a means to drive higher standards of patient treatment and disease management. Similarly, pharmaceutical and biotech companies are increasingly working with precision diagnostic and molecular technology providers such as CGI to provide molecular profiles on clinical trial participants. These profiles may help identify biomarker and genomic variations that may be responsible for differing responses to oncology therapies, thereby increasing the efficiency of trials while lowering costs. We believe tailored and

combination therapies can revolutionize oncology care through molecular- and biomarker-based testing services, enabling physicians and researchers to target the factors that make each patient and disease unique.

We believe the next wave in cancer management will bring together testing capabilities for germline, or inherited mutations, and somatic mutations that arise in tissues over the course of a lifetime. We have created a unique position in the industry by providing both targeted somatic analysis of tumor sample cells alongside germline analysis of an individual's non-cancerous cells' molecular profile as we attempt to continue achieving milestones in precision medicine.

Cancer is genetically-driven and constitutes a diverse class of diseases with various causes, each characterized by uncontrollable cell growth. Many cancers are becoming increasingly understood at a molecular level and it is possible to attribute specific cancers to identifiable genetic changes in unhealthy cells. Cancer cells contain modified genetic material

compared to normal human cells. Common genetic abnormalities correlated to cancer include gains or losses of genetic material on specific chromosomal regions (loci) or changes in specific genes (mutations) that ultimately result in detrimental cellular changes followed by cancerous or pre-cancerous conditions. Understanding the differences in these molecular changes helps clinicians to identify and stratify different forms of cancer in order to optimize patient treatment and patient management. Therefore, understanding and analysis of cancer at the molecular level is not only useful for diagnostic purposes, but we also believe it can play an important role in prognosis and disease management. We believe technology that can apply predictive information has the potential to dramatically improve treatment outcomes for patients living with cancer. Our molecular- and biomarker-based tests for cancer aim to remove subjectivity from the diagnostic phase, and add prognostic information, thus enabling personalized treatments based on cancer analysis at its most basic level.

Our business is based on demand for molecular- and biomarker-based diagnostic services from three main sectors, including cancer centers and hospitals, biotechnology and pharmaceutical companies, and the research community. Clinicians and oncologists in cancer centers and hospitals seek testing since these methods often produce higher value and more accurate cancer diagnostic information than traditional analytical methods. Our proprietary and disease-focused tests aim to provide actionable information that can guide patient management decisions, potentially resulting in decreased costs for care providers and patients while streamlining therapy selection. Our services are also sought by biotechnology and pharmaceutical companies engaged in designing and running clinical trials to determine the value and efficacy of oncology treatments and therapeutics. We believe trial participants' likelihood of experiencing either favorable or adverse responses to the trial treatment may be influenced or dependent on genomic factors. Our testing services may increase trial efficiency, subject safety and trial success rates. Our services are also sought by researchers and research groups seeking to identify biomarkers and develop methods for diagnostic technologies and tests for disease. We aggressively pursue the strategy of trying to demonstrate increased value and efficacy with payors who are trying to contain costs and academic collaborators seeking to develop new insights and cures.

Our market strategy is organized to align with the three aforementioned industry segments. We utilize relatively the same technologies across each of these businesses to deliver results-oriented information which we believe is or will become important to cancer treatment and patient management. Our tests address the limitations of traditional cancer diagnostic approaches, including reliance on human inspection of specimens and interpretation of clinical measurements, and inter-institutional variability. Our suite of clinical and biopharma services aim to remove subjectivity from diagnoses and additionally provide information that may influence treatment selection that cannot be obtained from anatomic pathology and staining techniques alone. We believe the level of personalized treatment required to optimize a patient's treatment regimen and to maximize clinical trial success rates may be significantly improved through the use of molecular- and biomarker-based cancer characterization.

The following table lists our market strategy by customer category:

Customer Category	Types of Customers	Nature of Services
Clinical Services	Hospitals Cancer Centers Clinics	Clinical services provide information on diagnosis, prognosis and predicting treatment outcomes (theranosis) of cancers to guide patient management.
Biopharma Services	Pharmaceutical and Biotech companies performing clinical trials	Biopharma services provide companies with customized solutions for patient stratification and treatment selection through an extensive suite of molecular- and biomarker-based testing services, customized assay development and trial design consultation.
Discovery Services	Pharmaceutical and Biotech companies Academic Institutions Government-Sponsored Research Institutions	Discovery services provide the tools and testing methods for companies and researchers seeking to identify new molecular-based biomarkers for disease.

In 2016, we generated approximately 57% of our revenue from Biopharma Services, approximately 39% from Clinical Services and approximately 4% from Discovery Services. In 2015, we generated approximately 64% of our revenue from Biopharma Services, approximately 31% from Clinical Services and approximately 5% from Discovery Services.

We utilize relatively the same proprietary and nonproprietary molecular diagnostic tests and technologies across all of our service offerings to deliver results-oriented information important to cancer treatment and patient management. Our portfolio primarily includes comparative genomic hybridization (CGH) microarrays, gene expression tests, next generation sequencing (NGS) panels, and DNA fluorescent in situ hybridization (FISH) probes. We provide our testing services from our Clinical Laboratory Improvement Amendments ("CLIA")-certified and College of American Pathologists ("CAP")-accredited laboratories in Rutherford, NJ, Los Angeles, CA, and Raleigh, NC, as well as our NABL and GMP-certified laboratories in Hyderabad, India and Shanghai, China.

Cancer Genetics Corporate Information

Our principal executive offices are located at 201 Route 17 North, 2nd Floor, Rutherford, New Jersey 07070, and our telephone number is (201) 528-9200. Our common stock is currently traded on The NASDAQ Capital Market under the symbol "CGIX." We maintain a corporate website at www.cancer-genetics.com. The contents of our website are not incorporated by reference into this prospectus and should not be considered to be a part of this prospectus or relied upon in connection herewith.

Cancer Genetics, Inc. was incorporated under the laws of the State of Delaware in April 1999. On July 16, 2014 we purchased substantially all of the assets of Gentriss Corporation ("Gentriss"), a laboratory specializing in pharmacogenomics profiling for therapeutic development, companion diagnostics and clinical trials. On August 18, 2014 we entered into two agreements by which we acquired BioServe Biotechnologies (India) Pvt. Ltd. ("BioServe"), a premier genomics services provider serving both the research and clinical markets in India, and as a result of the acquisition, BioServe became a subsidiary of ours. On October 9, 2015, Cancer Genetics acquired substantially all the assets and assumed certain liabilities of Response Genetics, Inc. ("Response Genetics") in connection with Response Genetics' filing of a chapter 11 petition for bankruptcy in the Delaware Bankruptcy Court for approximately \$12.9 million, comprised of \$7.5 million, in cash, and 788,584 shares of the Company's common stock, with the common

stock being valued at \$5.4 million. Unless otherwise stated, all references to "us," "our," "Cancer Genetics," "we," the "Company" and similar designations refer to Cancer Genetics, Inc. and its wholly-owned subsidiaries.

This prospectus and the information incorporated by reference include trademarks, service marks and trade names owned by us or other companies. All trademarks, service marks and trade names included or incorporated by reference into this prospectus are the property of their respective owners.

RISK FACTORS

Investing in our securities involves significant risks. Before making an investment decision, you should carefully consider the risks and other information we include or incorporate by reference in this prospectus and any prospectus supplement. In particular, you should consider the risk factors under the heading "Risk Factors" included in our most recent Annual Report on Form 10-K, as may be revised or supplemented by our subsequent Quarterly Reports on Form 10-Q or Current Reports on Form 8-K, each of which are on file with the SEC and are incorporated herein by reference, and which may be amended, supplemented or superseded from time to time by other reports we file with the SEC in the future. The risks and uncertainties we have described are not the only ones facing our company. Additional risks and uncertainties not currently known to us or that we currently deem immaterial may also affect our business operations. Additional risk factors may be included in a prospectus supplement relating to a particular offering of securities. Our business, financial condition or results of operations could be materially adversely affected by any of these risks. The trading price of our securities could decline due to any of these risks, and you may lose all or part of your investment. This prospectus is qualified in its entirety by these risk factors.

SPECIAL NOTE REGARDING FORWARD-LOOKING INFORMATION

This prospectus, any prospectus supplement and the documents we incorporate by reference in this prospectus contain forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended (the "Securities Act"), and Section 21E of the Securities Exchange Act of 1934, as amended (the "Exchange Act"). All statements, other than statements of historical facts, that we include in this prospectus, any prospectus supplement, and in the documents we incorporate by reference in this prospectus, may be deemed forward-looking statements for purposes of the Securities Act and the Exchange Act. We use the words "anticipate," "believe," "estimate," "expect," "intend," "may," "plan," "project," "would" and similar expressions to identify forward-looking statements, although not all forward-looking statements contain these identifying words. We cannot guarantee that we actually will achieve the plans, intentions or expectations disclosed in our forward-looking statements and, accordingly, you should not place undue reliance on our forward-looking statements. There are a number of important factors that could cause actual results or events to differ materially from the forward-looking statements that we make, including the factors included in the documents we incorporate by reference in this prospectus. You should read these factors and the other cautionary statements made in the documents we incorporate by reference as being applicable to all related forward-looking statements wherever they appear in this prospectus, any prospectus supplement, and any document incorporated by reference. We caution you that we do not undertake any obligation to update forward-looking statements made by us.

USE OF PROCEEDS

Unless otherwise provided in the applicable prospectus supplement, we intend to use the net proceeds from the sale of the securities under this prospectus for working capital and other general corporate purposes. We will set forth in the prospectus supplement our intended use for the net proceeds received from the sale of any securities. Pending the use

of the net proceeds, we may use the net proceeds to invest in investment-grade, interest-bearing securities.

DESCRIPTIONS OF THE SECURITIES WE MAY OFFER

The descriptions of the securities contained in this prospectus, together with the applicable prospectus supplements, summarize all the material terms and provisions of the various types of securities that we may offer. We will describe in the applicable prospectus supplement relating to any securities the particular terms of the securities offered by that prospectus supplement. If we indicate in the applicable prospectus supplement, the terms of the securities may differ from the terms we have summarized below. We will also include in the prospectus supplement information, where applicable,

about material United States federal income tax considerations relating to the securities, and the securities exchange, if any, on which the securities will be listed.

We may sell from time to time, in one or more offerings:

- common stock;
- preferred stock;
- warrants to purchase common stock or preferred stock;
- overallotment purchase rights to purchase shares of common stock, preferred stock or warrants; and
- units consisting of any combination of the securities listed above.

In this prospectus, we refer to the common stock, preferred stock, warrants, overallotment purchase rights and units collectively as "securities." The total dollar amount of all securities that we may sell will not exceed \$100,000,000.

This prospectus may not be used to consummate a sale of securities unless it is accompanied by a prospectus supplement.

DESCRIPTION OF COMMON STOCK

Our third amended and restated certificate of incorporation authorizes us to issue up to 100,000,000 shares of common stock, par value \$0.0001 per share. As of March 31, 2017, there were approximately 19,756,000 shares of common stock outstanding. All outstanding shares of our common stock are fully paid and non-assessable.

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 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 our preferred stock.

Other Matters

Holders of our common stock have no redemption, conversion or preemptive rights. 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.

Anti-Takeover Provisions

Our third amended and restated certificate of incorporation and bylaws contain some provisions that could make our acquisition by means of a tender or exchange offer, a proxy contest or otherwise more difficult. These provisions are summarized below.

Potential Effects of Authorized but Unissued Shares of Common Stock and Preferred 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.

Special Meetings. Stockholders cannot call special meetings of our stockholders. Our bylaws provide that special meetings of our stockholders may, unless otherwise prescribed by law, be called by our chairman of the board (if any), our board of directors or our chief executive officer and shall be held at such place, on such date and at such time as shall be fixed by our board of directors or the person calling the meeting. Business transacted at any special meeting shall be limited to matters relating to the purpose or purposes stated in the notice of the meeting.

Undesignated Preferred Stock. The ability to authorize undesignated preferred stock makes it possible for our board of directors to issue preferred stock with voting or other rights or preferences that could impede the success of any attempt to acquire us. The ability to issue preferred stock may have the effect of deferring hostile takeovers or delaying changes in control or management of our company.

Delaware Anti-Takeover Statute. We are subject to the provisions of Section 203 of the Delaware General Corporation Law regulating corporate takeovers. In general, Section 203 prohibits a publicly held Delaware corporation from engaging in a business combination with an interested stockholder for a period of three years following the date the person became an interested stockholder unless:

prior to the date of the transaction, the board of directors of the corporation approved either the business combination or the transaction which resulted in the stockholder becoming an interested stockholder;

upon completion of the transaction that resulted in the stockholder becoming an interested stockholder, the stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction commenced, excluding for purposes of determining the number of shares outstanding (1) shares owned by persons who are directors and also officers and (2) shares owned by employee stock plans in which employee participants do not have the right to determine confidentially whether shares held subject to the plan will be tendered in a tender or exchange offer; and

on or subsequent to the date of the transaction, the business combination is approved by the board and authorized at an annual or special meeting of stockholders, and not by written consent, by the affirmative vote of at least 66²/₃% of the outstanding voting stock which is not owned by the interested stockholder.

Generally, a business combination includes a merger, asset or stock sale, or other transaction resulting in a financial benefit to the interested stockholder. An interested stockholder is a person who, together with affiliates and associates, owns or, within three years prior to the determination of interested stockholder status, owned 15% or more of a corporation's outstanding voting securities. We expect the existence of this provision to have an anti-takeover effect with respect to transactions our board of directors does not approve in advance. We also anticipate that Section 203 may discourage attempted acquisitions that might result in a premium over the market price for the shares of our common stock held by stockholders.

The provisions of Delaware law, our third amended and restated certificate of incorporation and our bylaws could have the effect of discouraging others from attempting hostile takeovers and, as a consequence, they may also inhibit temporary fluctuations in the market price of our common stock that often result from actual or rumored hostile takeover attempts. These provisions may also have the effect of preventing changes in our management. It is possible that these provisions could make it more difficult to accomplish transactions that stockholders may otherwise deem to be in their best interests.

Transfer Agent

The transfer agent and registrar for our common stock is Continental Stock Transfer & Trust Company. Its address is 17 Battery Place, New York, New York, 10004 and its telephone number is (212) 509-4000.

NASDAQ Listing

Our common stock is traded on The NASDAQ Capital Market under the symbol "CGIX."

DESCRIPTION OF PREFERRED STOCK

Our third amended and restated certificate of incorporation authorizes us to issue up to 9,764,000 shares of preferred stock, par value \$0.0001 per share. At March 31, 2017, there were no shares of preferred stock outstanding.

Terms of the Preferred Stock That We May Offer and Sell to You

We summarize below some of the provisions that will apply to the preferred stock that we may offer to you unless the applicable prospectus supplement provides otherwise. This summary may not contain all information that is important to you. You should read the prospectus supplement, which will contain additional information and which may update or change some of the information below. Prior to the issuance of a new series of preferred stock, we will further amend our third amended and restated certificate of incorporation designating the stock of that series and the terms of that series. We will file a copy of the certificate of designation that contains the terms of each new series of preferred stock with the SEC each time we issue a new series of preferred stock. Each certificate of designation will establish the number of shares included in a designated series and fix the designation, powers, privileges, preferences and rights of the shares of each series as well as any applicable qualifications, limitations or restrictions. You should refer to the applicable certificate of designation as well as our third amended and restated certificate of incorporation before deciding to buy shares of our preferred stock as described in the applicable prospectus supplement.

Our board of directors has the authority, without further action by the stockholders, to issue preferred stock in one or more series and to fix the number of shares, dividend rights, conversion rights, voting rights, redemption rights, liquidation preferences, sinking funds, and any other rights, preferences, privileges and restrictions applicable to each such series of preferred stock.

The issuance of any preferred stock could adversely affect the rights of the holders of common stock and, therefore, reduce the value of the common stock. The ability of our board of directors to issue preferred stock could discourage, delay or prevent a takeover or other corporate action.

The terms of any particular series of preferred stock will be described in the prospectus supplement relating to that particular series of preferred stock, including, where applicable:

- the designation, stated value and liquidation preference of such preferred stock;

- the number of shares within the series;

- the offering price;

- the dividend rate or rates (or method of calculation), the date or dates from which dividends shall accrue, and whether such dividends shall be cumulative or noncumulative and, if cumulative, the dates from which dividends shall commence to cumulate;

- any redemption or sinking fund provisions;

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the amount that shares of such series shall be entitled to receive in the event of our liquidation, dissolution or winding-up;

the terms and conditions, if any, on which shares of such series shall be convertible or exchangeable for shares of our stock of any other class or classes, or other series of the same class;

the voting rights, if any, of shares of such series; the status as to reissuance or sale of shares of such series redeemed, purchased or otherwise reacquired, or surrendered to us on conversion or exchange;

the conditions and restrictions, if any, on the payment of dividends or on the making of other distributions on, or the purchase, redemption or other acquisition by us or any subsidiary, of the common stock or of any other class of our shares ranking junior to the shares of such series as to dividends or upon liquidation;

the conditions and restrictions, if any, on the creation of indebtedness by us or by any subsidiary, or on the issuance of any additional stock ranking on a parity with or prior to the shares of such series as to dividends or upon liquidation; and

- any additional dividend, liquidation, redemption, sinking or retirement fund and other rights, preferences, privileges, limitations and restrictions of such preferred stock.

The description of the terms of a particular series of preferred stock in the applicable prospectus supplement will not be complete. You should refer to the applicable amendment to our third amended and restated certificate of incorporation for complete information regarding a series of preferred stock.

The preferred stock will, when issued against payment of the consideration payable therefor, be fully paid and nonassessable. Unless otherwise specified in the applicable prospectus supplement, each series of preferred stock will, upon issuance, rank senior to the common stock and on parity in all respects with each other outstanding series of preferred stock. The rights of the holders of our preferred stock will be subordinate to that of our general creditors.

DESCRIPTION OF WARRANTS

The following description, together with the additional information we may include in any applicable prospectus supplements, summarizes the material terms and provisions of the warrants that we may offer under this prospectus and the related warrant agreements and warrant certificates. While the terms summarized below will apply generally to any warrants that we may offer, we will describe the particular terms of any series of warrants in more detail in the applicable prospectus supplement. If we indicate in the prospectus supplement, the terms of any warrants offered under that prospectus supplement may differ from the terms described below. Specific warrant agreements will contain additional important terms and provisions and will be incorporated by reference as an exhibit to the registration statement that includes this prospectus.

General

We may issue warrants for the purchase of common stock or preferred stock in one or more series. We may issue warrants independently or together with common stock or preferred stock, and the warrants may be attached to or separate from these securities.

We will evidence each series of warrants by warrant certificates that we will issue under a separate agreement. We may enter into a warrant agreement with a warrant agent. We will indicate the name and address of the warrant agent in the applicable prospectus supplement relating to a particular series of warrants.

Before exercising their warrants, holders of warrants will not have any of the rights of holders of the securities purchasable upon such exercise, including in the case of warrants to purchase common stock or preferred stock, the right to receive dividends, if any, or, payments upon our liquidation, dissolution or winding up or to exercise voting rights, if any.

Additional Information

We will describe in the applicable prospectus supplement the terms of the series of warrants, including:

- the offering price and aggregate number of warrants offered;

- the currency for which the warrants may be purchased;

- if applicable, the designation and terms of the securities with which the warrants are issued and the number of warrants issued with each such security or each principal amount of such security;

- if applicable, the date on and after which the warrants and the related securities will be separately transferable;

- in the case of warrants to purchase common stock or preferred stock, the number of shares of common stock or preferred stock, as the case may be, purchasable upon the exercise of one warrant and the price at which these shares may be purchased upon such exercise;

- the effect of any merger, consolidation, sale or other disposition of our business on the warrant agreement and the warrants;

- the terms of any rights to redeem or call the warrants;

• any provisions for changes to or adjustments in the exercise price or number of securities issuable upon exercise of the warrants;

• the dates on which the right to exercise the warrants will commence and expire;

• the manner in which the warrant agreement and warrants may be modified;

• a discussion on any material or special United States federal income tax consequences of holding or exercising the warrants;

the terms of the securities issuable upon exercise of the warrants; and

any other specific terms, preferences, rights or limitations of or restrictions on the warrants.

Exercise of Warrants

Each warrant will entitle the holder to purchase the securities that we specify in the applicable prospectus supplement at the exercise price that we describe in the applicable prospectus supplement. Unless we otherwise specify in the applicable prospectus supplement, holders of the warrants may exercise the warrants at any time up to 5 p.m., Eastern time, on the expiration date that we set forth in the applicable prospectus supplement. After the close of business on the expiration date, unexercised warrants will become void.

Holders of the warrants may exercise the warrants by delivering the warrant certificate representing the warrants to be exercised together with specified information, and paying the required amount to the warrant agent in immediately available funds, as provided in the applicable prospectus supplement. We will set forth on the reverse side of the warrant certificate and in the applicable prospectus supplement the information that the holder of the warrant will be required to deliver to the warrant agent.

Upon receipt of the required payment and the warrant certificate properly completed and duly executed at the corporate trust office of the warrant agent or any other office indicated in the applicable prospectus supplement, we will issue and deliver the securities purchasable upon such exercise. If fewer than all of the warrants represented by the warrant certificate are exercised, then we will issue a new warrant certificate for the remaining amount of warrants. If we so indicate in the applicable prospectus supplement, holders of the warrants may surrender securities as all or part of the exercise price for warrants.

Enforceability of Rights by Holders of Warrants

Each warrant agent will act solely as our agent under the applicable warrant agreement and will not assume any obligation or relationship of agency or trust with any holder of any warrant. A single bank or trust company may act as warrant agent for more than one issue of warrants. A warrant agent will have no duty or responsibility in case of any default by us under the applicable warrant agreement or warrant, including any duty or responsibility to initiate any proceedings at law or otherwise, or to make any demand upon us. Any holder of a warrant may, without the consent of the related warrant agent or the holder of any other warrant, enforce by appropriate legal action its right to exercise, and receive the securities purchasable upon exercise of, its warrants.

DESCRIPTION OF OVERALLOTMENT PURCHASE RIGHTS

We summarize below some of the provisions that will apply to the over-allotment purchase rights unless the applicable prospectus supplement provides otherwise. This summary may not contain all information that is important to you. The complete terms of the over-allotment purchase rights will be contained in the applicable over-allotment purchase rights certificate and over-allotment purchase rights agreement. These documents have been or will be included or incorporated by reference as exhibits to the registration statement of which this prospectus is a part. You should read the over-allotment purchase rights certificate and the over-allotment purchase rights agreement. You should also read the prospectus supplement, which will contain additional information and which may update or change some of the information below.

General

We may issue, together with common or preferred stock or warrants as units or separately, overallotment purchase rights for the purchase of shares of our common or preferred stock or warrants. The terms of each overallotment purchase right will be discussed in the applicable prospectus supplement relating to the particular series of overallotment purchase rights. The form(s) of certificate representing the overallotment purchase rights and/or the overallotment purchase right agreement, will be, in each case, filed with the SEC as an exhibit to a document incorporated by reference in the registration statement of which this prospectus is a part on or prior to the date of any prospectus supplement relating to an offering of the particular overallotment purchase right. The following summary of material provisions of the overallotment purchase rights and the overallotment purchase right agreements is subject to, and qualified in their entirety

by reference to, all the provisions of the overallotment purchase rights agreement and overallotment purchase rights certificate applicable to a particular series of overallotment purchase rights.

The prospectus supplement relating to any series of overallotment purchase rights that are offered by this prospectus will describe, among other things, the following terms to the extent they are applicable to that series of overallotment purchase rights:

- the procedures and conditions relating to the exercise of the overallotment purchase rights;
- the number of shares of our common or preferred stock or warrants, if any, issued with the overallotment purchase rights;
- the date, if any, on and after which the overallotment purchase rights and any related shares of our common or preferred stock or warrants will be separately transferable;
- the offering price of the overallotment purchase rights, if any;
- the number of shares of our common or preferred stock or warrants which may be purchased upon exercise of the overallotment purchase rights and the price or prices at which the shares or warrants may be purchased upon exercise;
- the date on which the right to exercise the overallotment purchase rights will begin and the date on which the right will expire;
- a discussion of the material United States federal income tax considerations applicable to the exercise of the overallotment purchase rights;
- anti-dilution provisions of the overallotment purchase rights, if any;
- call provisions of the overallotment purchase rights, if any; and
- any other material terms of the overallotment purchase rights.

Each overallotment purchase right may entitle the holder to purchase for cash, or, in limited circumstances, by effecting a cashless exercise for, the number of shares of our common or preferred stock or warrants at the exercise price that is described in the applicable prospectus supplement. Overallotment purchase rights will be exercisable during the period of time described in the applicable prospectus supplement. After that period, unexercised overallotment purchase rights will be void. Overallotment purchase rights may be exercised in the manner described in the applicable prospectus supplement.

A holder of an overallotment purchase right will not have any of the rights of a holder of our common or preferred stock before the stock is purchased upon exercise of the overallotment purchase right. Therefore, before an overallotment purchase right is exercised, the holder of the overallotment purchase right will not be entitled to receive any dividend payments or exercise any voting or other rights associated with shares of our common or preferred stock which may be purchased when the overallotment purchase right is exercised.

Transfer Agent and Registrar

The transfer agent and registrar, if any, for any overallotment purchase rights will be set forth in the applicable prospectus supplement.

DESCRIPTION OF UNITS

We may issue units comprised of one or more of the other securities described in this prospectus in any combination. Each unit will be issued so that the holder of the unit is also the holder of each security included in the unit. Thus, the holder of a unit will have the rights and obligations of a holder of each included security. The unit agreement under which a unit is issued may provide that the securities included in the unit may not be held or transferred separately, at any time or at any time before a specified date. The applicable prospectus supplement may describe:

• the designation and terms of the units and of the securities comprising the units, including whether and under what circumstances those securities may be held or transferred separately;

• any provisions for the issuance, payment, settlement, transfer or exchange of the units or of the securities comprising the units;

• the terms of the unit agreement governing the units;

• United States federal income tax considerations relevant to the units; and

• whether the units will be issued in fully registered global form.

This summary of certain general terms of units and any summary description of units in the applicable prospectus supplement do not purport to be complete and are qualified in their entirety by reference to all provisions of the applicable unit agreement. The forms of the unit agreements and other documents relating to a particular issue of units will be filed with the SEC each time we issue units, and you should read those documents for provisions that may be important to you.

PLAN OF DISTRIBUTION

We may sell the securities from time to time pursuant to underwritten public offerings, direct sales to the public, negotiated transactions, block trades or a combination of these methods. We may sell the securities to or through underwriters or dealers, through agents, or directly to one or more purchasers. We may distribute securities from time to time in one or more transactions:

• at a fixed price or prices, which may be changed;

• at market prices prevailing at the time of sale;

• at prices related to such prevailing market prices; or

• at negotiated prices.

A prospectus supplement or supplements (and any related free writing prospectus that we may authorize to be provided to you) will describe the terms of the offering of the securities, including, to the extent applicable:

• the name or names of the underwriters, if any;

• the purchase price of the securities or other consideration therefor, and the proceeds, if any, we will receive from the sale;

• any over-allotment options under which underwriters may purchase additional securities from us;

• any agency fees or underwriting discounts and other items constituting agents' or underwriters' compensation;

• any public offering price;

any discounts or concessions allowed or reallocated or paid to dealers; and

any securities exchange or market on which the securities may be listed.

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Only underwriters named in the prospectus supplement will be underwriters of the securities offered by the prospectus supplement.

If underwriters are used in the sale, they will acquire the securities for their own account and may resell the securities from time to time in one or more transactions at a fixed public offering price or at varying prices determined at the time of sale. The obligations of the underwriters to purchase the securities will be subject to the conditions set forth in the applicable underwriting agreement. We may offer the securities to the public through underwriting syndicates represented by managing underwriters or by underwriters without a syndicate. Subject to certain conditions, the underwriters will be

obligated to purchase all of the securities offered by the prospectus supplement, other than securities covered by any over-allotment option. Any public offering price and any discounts or concessions allowed or reallocated or paid to dealers may change from time to time. We may use underwriters with whom we have a material relationship. We will describe in the prospectus supplement, naming the underwriter, the nature of any such relationship.

We may sell securities directly or through agents we designate from time to time. We will name any agent involved in the offering and sale of securities and we will describe any commissions we will pay the agent in the prospectus supplement. Unless the prospectus supplement states otherwise, our agent will act on a best-efforts basis for the period of its appointment.

We may authorize agents or underwriters to solicit offers by certain types of institutional investors to purchase securities from us at the public offering price set forth in the prospectus supplement pursuant to delayed delivery contracts providing for payment and delivery on a specified date in the future. We will describe the conditions to these contracts and the commissions we must pay for solicitation of these contracts in the prospectus supplement.

We may provide agents and underwriters with indemnification against civil liabilities, including liabilities under the Securities Act, or contribution with respect to payments that the agents or underwriters may make with respect to these liabilities. Agents and underwriters may engage in transactions with, or perform services for, us in the ordinary course of business.

All securities we may offer, other than common stock, will be new issues of securities with no established trading market. Any underwriters may make a market in these securities, but will not be obligated to do so and may discontinue any market making at any time without notice. We cannot guarantee the liquidity of the trading markets for any securities.

Any underwriter may engage in over-allotment, stabilizing transactions, short-covering transactions and penalty bids in accordance with Regulation M under the Exchange Act. Over-allotment involves sales in excess of the offering size, which create a short position. Stabilizing transactions permit bids to purchase the underlying security so long as the stabilizing bids do not exceed a specified maximum price. Syndicate-covering or other short-covering transactions involve purchases of the securities, either through exercise of the over-allotment option or in the open market after the distribution is completed, to cover short positions. Penalty bids permit the underwriters to reclaim a selling concession from a dealer when the securities originally sold by the dealer are purchased in a stabilizing or covering transaction to cover short positions. Those activities may cause the price of the securities to be higher than it would otherwise be. If commenced, the underwriters may discontinue any of the activities at any time.

Any underwriters or agents that are qualified market makers on the NASDAQ Capital Market engage in passive market making transactions in the common stock on the NASDAQ Capital Market in accordance with Regulation M under the Exchange Act, during the business day prior to the pricing of the offering, before the commencement of offers or sales of the common stock. Passive market makers must comply with applicable volume and price limitations and must be identified as passive market makers. In general, a passive market maker must display its bid at a price not in excess of the highest independent bid for such security; if all independent bids are lowered below the passive market maker's bid, however, the passive market maker's bid must then be lowered when certain purchase limits are exceeded. Passive market making may stabilize the market price of the securities at a level above that which might otherwise prevail in the open market and, if commenced, may be discontinued at any time.

LEGAL MATTERS

Unless otherwise indicated in the applicable prospectus supplement, the validity of the issuance of the securities offered by this prospectus will be passed upon for us by Lowenstein Sandler LLP, Roseland, New Jersey. If the validity of the securities offered hereby in connection with offerings made pursuant to this prospectus are passed upon by counsel for the underwriters, dealers or agents, if any, such counsel will be named in the prospectus supplement relating to such offering.

EXPERTS

The consolidated financial statements as of and for the years ended December 31, 2016 and 2015, incorporated in this prospectus by reference from the Company's Annual Report on Form 10-K filed with the SEC on March 23, 2017, have

been audited by RSM US LLP, an independent registered public accounting firm, as stated in their report, which is incorporated herein by reference. Such consolidated financial statements have been so incorporated in reliance upon the report of such firm given upon their authority as experts in accounting and auditing.

INCORPORATION OF CERTAIN DOCUMENTS BY REFERENCE

The following documents previously filed by us with the SEC are incorporated in this prospectus by reference:

- (a) Our Annual Report on Form 10-K for the fiscal year ended December 31, 2016, filed with the SEC on March 23, 2017.
- (b) Our Proxy Statement on Schedule 14A for our 2017 Annual Meeting of Stockholders, filed with the SEC on April 21, 2017.
- (c) Our Quarterly Report on Form 10-Q for the quarterly period ended March 31, 2017 filed with the SEC on May 12, 2017.
- (d) Our Current Reports on Form 8-K and amendments thereto, filed with the SEC on January 6, February 16, February 22, March 23, March 24, and May 12, 2017, (excluding any information deemed furnished pursuant to Item 2.02 or Item 7.01 of any such Current Report on Form 8-K).
- (e) Description of our common stock contained in the Registration Statement on Form 8-A, declared effective on August 12, 2013 (including any amendment or report filed with the SEC for the purpose of updating such description).

All documents filed by us pursuant to Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act after the date of the initial registration statement and prior to effectiveness of the registration statement shall be deemed to be incorporated by reference in this prospectus and to be a part hereof from the date of filing of such reports and documents. All reports and other documents that we file pursuant to Section 13(a) and 13(c), 14 and 15(d) of the Exchange Act prior to the filing of a post-effective amendment which indicates that all securities offered hereunder have been sold or which deregisters all such securities then remaining unsold shall be deemed to be incorporated by reference in this prospectus and to be a part hereof from the date of filing of such reports and documents and will supersede the information herein; provided, however, that all reports that we "furnish" to the SEC will not be considered incorporated by reference into this prospectus.

We will provide to each person, including any beneficial owner, to whom a prospectus is delivered, copies of these filings, excluding all exhibits unless an exhibit has been specifically incorporated by reference in such filings, at no cost, upon written or oral request made to:

Cancer Genetics, Inc.
201 Route 17 North, 2nd Floor
Rutherford, NJ 07070
(201) 528-9200
Attention: Corporate Secretary

WHERE YOU CAN FIND MORE INFORMATION

We have filed a registration statement on Form S-3 with the Securities and Exchange Commission under the Securities Act of 1933. This prospectus omits some information and exhibits included in the registration statement,

copies of which may be obtained upon payment of a fee prescribed by the Commission or may be examined free of charge at the principal office of the SEC in Washington, D.C.

We are subject to the informational requirements of the Securities Exchange Act of 1934 and in accordance therewith file reports, proxy statements and other information with the SEC. The reports, proxy statements and other information filed by us with the SEC can be inspected and copied at the Public Reference Room maintained by the SEC at 100 Fifth Street, N.E., Washington, D.C. 20549. Copies of filings can be obtained from the Public Reference Room maintained by the SEC by calling the SEC at 1-800-SEC-0330. In addition, the Commission maintains a website that contains reports, proxy and informational statements and other information filed electronically with the SEC at <http://www.sec.gov>.

You may request, orally or in writing, a copy of these documents, which will be provided to you at no cost, by contacting our Corporate Secretary at Cancer Genetics, Inc., 201 Route 17 North, 2nd Floor, Rutherford, NJ 07070, telephone (201) 528-9200.

You should rely only on the information contained in this prospectus, including information incorporated by reference as described above, or any prospectus supplement that we have specifically referred you to. We have not authorized anyone else to provide you with different information. You should not assume that the information in this prospectus or any prospectus supplement is accurate as of any date other than the date on the front of those documents or that any document incorporated by reference is accurate as of any date other than its filing date. You should not consider this prospectus to be an offer or solicitation relating to the securities in any jurisdiction in which such an offer or solicitation relating to the securities is not authorized. Furthermore, you should not consider this prospectus to be an offer or solicitation relating to the securities if the person making the offer or solicitation is not qualified to do so, or if it is unlawful for you to receive such an offer or solicitation.

\$16,000,000
Plus 320,000 Commitment Shares

PROSPECTUS SUPPLEMENT

August 16, 2017