



DIVISION OF
CORPORATION FINANCE

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

May 3, 2012

Via E-mail

Panna L. Sharma
Chief Executive Officer
Cancer Genetics, Inc.
201 Route 17 North, 2nd Floor
Rutherford, NJ 07070

**Re: Cancer Genetics, Inc.
Amendment No. 5 to Registration Statement on Form S-1
Filed April 30, 2012
File No. 333-178836**

Dear Mr. Sharma:

We have reviewed your amended registration statement and have the following comments. In some of our comments, we may ask you to provide us with information so we may better understand your disclosure.

Please respond to this letter by amending your registration statement and providing the requested information. If you do not believe our comments apply to your facts and circumstances or do not believe an amendment is appropriate, please tell us why in your response.

After reviewing any amendment to your registration statement and the information you provide in response to these comments, we may have additional comments.

Management's Discussion and Analysis..., page 47

1. We note your revised disclosure on pages 13 and 47 regarding two entities that each accounted for over 10% of your revenues. We also note that you deleted the last sentence in the penultimate paragraph on page 47 and your disclosure on page F-38 that the loss of test ordering sites may adversely affect your results of operations. Given these changes and your February 14, 2012 response to comment 12 in our January 25, 2012 letter, please revise Business or where appropriate to identify the referenced entities. Refer to Item 101(c)(vii) of Regulation S-K.
2. We note the revised disclosure on page 53 that you "lowered [the] expected IPO price." It is unclear why you do not disclose the expected price range in the prospectus. Please revise or advise.

3. We note your revised disclosure on page 54 regarding the results for the period ended March 31, 2012, including the discussion of direct bill test volume. You disclose that the 34% decrease in average test revenue was “principally” due to an increase in direct bill test volume, and you indicate that revenue from direct bill customers increased 123% compared to the quarter ended March 31, 2011. As direct bill test volume decreased as a percentage of total revenues for the years ended December 31, 2011 and 2010, it is unclear why you do not provide further narrative explanation for the recent change. Please revise or advise.
4. We also note the statement on page 47 that you expect average revenue per test “will increase over the long term as our customer mix shifts away from direct bill customers and towards private payors.” Please revise to clarify in light of the revised disclosure on page 54.

Legal Proceedings, page 97

5. Please revise the last paragraph on page 98 to identify clearly the lawsuit that was voluntarily dismissed by Louis Maione.

Exhibit 5.1

6. We note your response to prior comment four. Please file a signed legality opinion before requesting acceleration of the effective date of the registration statement.

We urge all persons who are responsible for the accuracy and adequacy of the disclosure in the filing to be certain that the filing includes the information the Securities Act of 1933 and all applicable Securities Act rules require. Since the company and its management are in possession of all facts relating to a company’s disclosure, they are responsible for the accuracy and adequacy of the disclosures they have made.

Notwithstanding our comments, in the event you request acceleration of the effective date of the pending registration statement please provide a written statement from the company acknowledging that:

- should the Commission or the staff, acting pursuant to delegated authority, declare the filing effective, it does not foreclose the Commission from taking any action with respect to the filing;
- the action of the Commission or the staff, acting pursuant to delegated authority, in declaring the filing effective, does not relieve the company from its full responsibility for the adequacy and accuracy of the disclosure in the filing; and
- the company may not assert staff comments and the declaration of effectiveness as a defense in any proceeding initiated by the Commission or any person under the federal securities laws of the United States.

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Please refer to Rules 460 and 461 regarding requests for acceleration. We will consider a written request for acceleration of the effective date of the registration statement as confirmation of the fact that those requesting acceleration are aware of their respective responsibilities under the Securities Act of 1933 and the Securities Exchange Act of 1934 as they relate to the proposed public offering of the securities specified in the above registration statement. Please allow adequate time for us to review any amendment prior to the requested effective date of the registration statement.

You may contact Joanna Lam, Staff Accountant, at (202) 551-3476 or John Archfield, Senior Staff Accountant, at (202) 551-3315 if you have questions regarding comments on the financial statements and related matters. Please contact Ruairi Regan at (202) 551-3269 or James Lopez, Branch Chief, at (202) 551-3536 with any other questions.

Sincerely,

/s/ James Lopez (for)

John Reynolds
Assistant Director

cc (via e-mail): Alan Wovsaniker, Esq.
Lowenstein Sandler PC