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

DIVISION OF
CORPORATION FINANCE

January 25, 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.
Registration Statement on Form S-1
Filed December 30, 2011
File No. 333-178836

Dear Mr. Sharma:

We have reviewed your 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.

Summary, page 1

1. Please provide us with support for your claim that you are the first oncology microarray to be approved by the New York State Department of Health.

2. Please revise references on page one and elsewhere to the "significant unmet need" and your "differentiate[d]" approach to reconcile with the discussion of significant and established competitors in the risk factor on page 12.

3. Similarly, please revise to reconcile the statement that MatBA is "the first oncology microarray to be approved by the New York State Department of Health" with your risk factor disclosure. We also note the statement on page 88 that, although MatBA is a relatively new test, some third-party payors have established coverage and reimbursement policies set "for similar tests." Please revise accordingly.

4. Please revise to further clarify any differences between the terms "test," "microarray test," "oncology microarray," "probe," "DNA microarrays and probes" and "molecular diagnostic tests." It is unclear to what extent you use these terms interchangeably. We note, in this regard, the reference on page 68 to "two types of DNA-based genomic tests: microarrays and probes." Similarly, please revise to clarify if and how these terms are different from your "panel of laboratory services."

5. We note references to your laboratory being accredited and your tests being validated. You also use the term "internally clinically" validated. Please revise here and where appropriate to identify the entities that conferred these titles on you and your tests. Your revised disclosure should clarify the relevant purposes and significance of attaining these attributes.

6. You discuss your strategy of obtaining FDA clearance or approval on page three. You also state on page 47 that your overall growth plan is "predicated on our ability to develop and commercialize our proprietary tests outside of our clinical laboratory." Please revise to summarize, with more detailed information appearing in Business or where appropriate, your approximate, estimated timeline for submitting to FDA for approval and for commercialization.

7. Please revise "Risks That We Face" on page four to provide more concrete and quantified disclosure where appropriate. As non-exclusive examples, it is unclear why you do not

   - Quantify your approximately $40 million accumulated deficit in the first bullet point on your "history of losses,"

   - Clarify the extent to which your revenues are substantially dependent on one or small number of your "new and still evolving" tests and services, and

   - Quantify the approximate percentage of your revenues that are reimbursements from governmental payors, which appears to be approximately 24%.

   It is also unclear why you do not address your significant indebtedness. Please revise accordingly.

Risk Factors page 9

Our rights to use technologies licensed from third parties, page 28

8. Please identify your tests or services that are subject to the licenses referenced in this risk factor, and advise us if you identify the "third parties" elsewhere in your disclosure.

Risks Relating to Our Common Stock and This Offering, page 30

If we are unable to favorably assess the effectiveness of our internal control over financial reporting…, page 33

9. We note the material weaknesses in your internal control over financial reporting that were identified by your independent registered public accounting firm. Please further describe to us the material weaknesses identified, their impact on your financial statements, if any, and the steps you have taken to remediate the material weaknesses.

10. Please revise Business or where appropriate to provide further background information regarding the measures you have taken and the status of your efforts to remediate the material weaknesses identified on page 33.

Use of Proceeds, page 38

11. Please revise to disclose the current interest rate on the DAM indebtedness to be repaid with the proceeds. In this regard, we note the reference to a different interest rate on the DAM debt if certain maturity events do not occur by January 1, 2012. In addition, we note the broad discretion in the application of the proceeds. Please revise to further clarify the related contingencies and alternatives. See Instruction 7 to Item 504 of Regulation S-K.

Management's Discussion and Analysis, page 47

12. We note disclosure on pages 13 and 47 regarding three entities that each accounted for over 10% of your revenues. Please revise Business or where appropriate to identify the entities or provide an analysis under Item 101(c)(vii) of Regulation S-K.

Cost of Revenues, Expenses page 48

13. Please revise to clarify the extent to which third party supplies and manufacturing, as discussed on pages 83-84 are material components of your expenses.

Critical Accounting Policies and Significant Judgments and Estimates, page 48

Stock-Based Compensation Expense, page 49

14. We note on page 50 that in absence of a public trading market, you determined a reasonable estimate of the then-current fair value of your common stock for purposes of granting stock-based compensation based on multiple criteria; and that you determined the fair value of your common stock utilizing methodologies, approaches and assumptions consistent with the AICPA Practice Aid, *"Valuation of Privately-Held-Company Equity Securities Issued as Compensation"*. Please revise to provide a detailed discussion of how you determined the fair value of your common stock on each stock

option grant date during fiscal 2010 and 2011. We believe the following information should be included in your revised disclosure:

a) A list of all grants during fiscal 2010 and 2011, along with information about the exercise prices and the estimated fair values as of each grant date;

b) The method(s) used to estimated the fair value of the underlying common stock at each grant date, along with the key assumptions, judgments and various objective and subjective factors considered when estimating the fair value of the underlying common stock;

c) Whether the valuations were contemporaneous or retrospective, and whether you engaged any independent third-party valuation specialists to assist in the determination of the estimated fair value of your common stock; and

d) A discussion of each significant factor contributing to the changes in the fair value of the underlying common stock between each grant date and up through the estimated IPO price range, when established.

Warrant Liability, page 51

15. We note that you measure the fair value of the warrants using the lattice-based binomial valuation model, using similar assumptions to those described in the section entitled "Stock-Based Compensation Expense," and that the key component in the value of the warrant liability is your stock price. We further note the assumed Company stock prices at each reporting date on page F-17 and F-43. Please revise to provide a detailed discussion of how you determined the fair value of your common stock for purposes of measuring the fair value of the warrants as of each reporting date presented in your filing. Include the information requested in the comment directly above in your revised disclosure, as applicable.

Results of Operations, page 51

Nine Months Ended September 30, 2011 and 2010, page 51

Revenues, page 52

16. We note on page one that during the first quarter of 2011, you commercially launched MatBA™-CLL, your first proprietary microarray test for chronic lymphocytic leukemia ("CLL"). We further note the 34% increase in your revenue for the nine months ended September 30, 2011 compared to the nine months ended September 30, 2010 was principally due to a change in mix of tests sold and a reduction in price of one of your tests. Please revise to further discuss the change in mix of tests sold, including the effects of MatBA™-CLL on your revenues for the nine months ended September 30, 2011 and

how the price reduction in one of your tests resulted in an increase in revenue. Also revise to clearly describe the composition of your revenue in periods prior to the commercial launch of MatBA™-CLL. Refer to Item 303(a)(3)(iii) of Regulation S-K.

17. We note your disclosure of revenue by payor type on pages F-11 and F-32. Please revise your discussion of revenue changes for each comparable period to also include quantitative and qualitative disclosure of any significant year-to-year variations in revenue by payor type.

Operating Expenses, page 52

18. We note the bad debt expense of $341,000 for the nine months ended September 30, 2011 was due to a write-down in receivables resulting from a changeover in your billing providers and resulting collection problems during the third quarter of 2011. Please further describe to us how the changeover in your billing providers resulted in collection problems during the third quarter of 2011. Also tell us whether you reasonably expect any continuing collection problems in the future, as a result of this changeover.

Years Ended December 31, 2010 and 2009

Revenue, page 53

19. Please revise to provide quantitative and qualitative disclosure of the extent to which the fiscal 2010 increase in revenues was attributable to changes in prices, volume or mix of products.

Therapeutic Discovery Project Grant

20. Please revise to include a discussion of the Therapeutic Discovery Project grant income that is recorded in other income, along with the reason(s) for the increase in fiscal 2010. Also confirm our understanding that these represent grants in lieu of federal income tax credits and, if so, tell us why you label these as tax credits on page 53.

Liquidity and Capital Resources, page 55

Cash Flows, page 57

21. Please revise to include a more detailed analysis that quantitatively and qualitatively explains the significant year-to-year variations in the individual line items of your statements of cash flows, and the resulting impact on your capital position in each period for which financial statements are provided. For example, your liquidity section should include a discussion of the changes in your working capital accounts such as why other current assets decreased and accounts payable increased during the nine months ended September 30, 2011.

22. Please revise the page 58 discussion of your liquidity requirements and "cash resources" to further address, in quantified terms, your sources of cash, indebtedness and cash requirements, and your belief that you have sufficient liquidity without the proceeds of this offering. We note your cash and cash equivalents of $193,000 as of September 30, 2011, and the significantly larger principal, interest and other payments coming due in the near future.

23. In this regard, please revise to address your liquidity requirements on both a short-term (12 months) and long-term basis. See Instruction 5 of Item 303(a) of Regulation S-K. Also see footnote 43 in Securities Act Release No. 8350.

Description of Business, page 61

24. Please revise the list at the bottom of page 75 to clarify the approximate amounts of your revenues attributed to the principal tests and services you offer. For example, it appears that a significant amount of your revenues since the period ending September 30, 2011 is related to your MatBA test. Please revise Summary consistent with your revisions here.

Management, page 96

25. It is unclear why you do not provide management and remuneration disclosure for your controller referenced on page 52 or other executive officers. Please revise or advise.

Director Independence, page 100

26. We note the disclosure regarding consulting fees and option awards to Messrs Cannon, Thompson and Kaufman on page 112. Please advise us to what extent you considered such relationships when you determined that these directors are independent within the meaning of Rule 10A-3 of the Securities Exchange Act.

Executive Compensation Table, page 106

27. Please tell us the legal basis on which you rely to exclude the $80,124 referenced in footnote 4 from the table. Also, please update the table for the 2011 year.

Director Compensation, page 112

28. Please clarify the reasons for the option award to Robert Kaufman disclosed in this section.

Certain Relationships and Related Party Transactions, page 119

29. Please clarify the total amounts paid to Equity Dynamics since you entered into the August 2010 agreement.

December 2011 Financing Transaction, page 119

30. Please identify all material terms of the December 21, 2011 Credit Agreement, including an explanation of when or what determines when the lenders will receive the warrants referenced in the third paragraph.

Principal Stockholders, page 123

31. We note numerous references to options and warrants exercisable before December 30, 2011 in the footnotes to the table. Please note that your disclosure should reflect beneficial ownership as defined in Securities Exchange Act Rule 13d-3(d). Please revise or advise.

September 30, 2011 Financial Statements, page F-2

Financial Statement Updating

32. Please update your financial statements, as applicable, pursuant to Rule 3-12 of Regulation S-X.

Notes to Unaudited Consolidated Financial Statements, page F-8

Related Party Transactions

33. Please revise to provide disclosure of related party transactions in the footnotes to your September 30, 2011 interim financial statements, or tell us why you believe that such disclosure is not required.

Note 2. Significant Accounting Policies, page F-8

Segments

34. We note on page 94 that you operate in one reportable business segment. Please advise us of the following:

    a. tell us the operating segment(s) that you have identified in accordance with FASB ASC 280-10-50-1;

    b. tell us how you considered the requirement to report separately information about each operating segment that meets both of the criteria in FASB ASC 280-10-50-10; and

    c. to the extent that you have aggregated multiple operating segments, provide an analysis of how you concluded that the operating segments have similar economic

characteristics and discuss how they meet the aggregation criteria in ASC 280-10-50-11.

Also revise to clearly disclose your basis of organization, including whether multiple operating segments have been aggregated. Refer to ASC 280-10-50-21.

Registration Rights

35. We note your registration rights disclosure on pages 132-133. Please revise to provide ASC 825-20-50 registration payment arrangements disclosures, as applicable.

Note 5. Business Lines of Credit, page F-11

36. We note on page 39, F-12 and F-35 that the DAM debt bears an initial annual interest at a rate of 3.0%, payable in equal monthly installments; and if certain maturity events, as defined in the credit agreement, do not occur prior to January 1, 2012, then the interest rate on the DAM debt will increase to 10% per annum. Please revise to update the referenced disclosures in your Form S-1/A1, as necessary.

December 31, 2010 Financial Statements, page F-21

37. We note on page six that you anticipate effecting a stock split prior to the completion of the offering, and that the prospectus does not reflect the effects of this stock split. Please tell us when the stock split will become effective, and how you considered the guidance within SAB Topic 4C with respect to the presentation of the stock split.

Consolidated Statement of Operations, page F-23

38. We note on page F-37 that the Series A and Series B shares will automatically convert to common shares upon the closing of an underwritten public offering pursuant to an effective registration statement in connection with an initial public offering with gross proceeds of $25,000,000 or more and under certain other circumstances. Please tell us how you considered presenting pro forma financial information for this share conversion in connection with your planned initial public offering.

Notes to Consolidated Financial Statements, page F-27

Note 2. Significant Accounting Policies, page F-27

Revenue Recognition, page F-28

39. Please revise to describe your revenue recognition policy in greater detail, including your consideration of the criteria in ASC 605-10-S99. To the extent that there are differences

in your revenue recognition policies by payor type (e.g., Medicare, direct bill, grants and royalty and insurance carrier revenue), separately disclose each policy.

40. We note that you periodically adjust revenue to record differences between the Company's anticipated cash receipts from insurance carriers and Medicare and actual receipts from such payors. Please quantify for us the amount of adjustments that you recorded upon final settlement with insurance carriers and Medicare for each period presented. To the extent that such adjustments were significant, also tell us how you considered these adjustments in your determination that the fee is fixed and determinable and collectability is reasonably assured.

41. Please revise to disclose whether you bill your customers for shipping and handling fees and if you include such amounts in net sales. Also disclose whether you present any taxes collected from customers on a gross basis or net basis.

Qualifying Therapeutic Discover Project grant

42. We note your fiscal 2010 other income of $733,438 for the Therapeutic Discovery Project grant income. Please revise to describe your accounting policy for the Therapeutic Discovery Project grant and the authoritative literature that supports your accounting treatment. Also tell us the criteria to be met for the recognition of such income, the basis upon which you recognize in the income statement (e.g., systematic or other method) and the basis for presenting as other income instead of a reduction in the related research and development expenses.

Research and Development, page F-30

43. Please tell us if your research and development expenses include an allocation of indirect costs such as depreciation, telephone, rent, supplies, insurance or repairs and maintenance and, if so, revise your disclosures accordingly.

Note 10. Income Taxes, page F-36

44. We note on page F-37 the significant increase in your unrecognized tax benefits during fiscal 2010 for tax positions related to the current year. Please revise to disclose the nature of the event(s) that occurred that caused this increase. Also tell us whether it is reasonably possible that the total amounts of unrecognized tax benefits as of December 31, 2010 will significantly increase or decrease during fiscal 2011 and, if so, tell us how you considered the requirements of ASC 740-10-50-15(d).

Note 12. Stock Option Plan, page F-38

45. We note your summary of stock option activity for the year ended December 31, 2010. Please revise to provide a summary of stock option activity for each period presented.

46. Please revise to disclose the weighted-average grant date fair value of options granted and the total intrinsic value of options exercised during each period presented, as applicable. Refer to ASC 718-10-50-2(d).

Note 18. Subsequent Events, page F-47

47. Please disclose the date through which you have evaluated subsequent events for the annual and interim financial statements presented, and whether that date is either the date the financial statements were issued or available to be issued. Refer to ASC 855-10-50-1.

Exhibits and Financial Statement Schedules

48. Please file your consulting agreement with Equity Dynamics referenced on page 121 and F- 47 as an exhibit.

49. Similarly, please file your agreements with Agilent and Labomics S.A., as referenced on pages 18 and 84, or advise.

Recent Sales of Unregistered Securities, page II-2

50. Please expand your disclosure of the facts relied upon to make the exemptions relied upon available. It is not sufficient to state merely that the recipients represented their intention to acquire the securities "for investment only…" For example, you refer to certain classes of persons but do not clarify how many there were in each transaction.

Signatures, page II-6

51. Your registration statement should be signed by your controller or principal accounting officer and should indicate each capacity in which each person signs. Please revise.

Other

52. We note your use of numerous acronyms throughout your disclosure such as MCL, FL, DLBCL, CLL, LDT, CMS, CLIA and FISH. Please explain clearly what these terms mean where you first use them or provide a glossary or similar aide so investors may easily find the meanings of these terms.

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.

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