

Mail Stop 3561

December 31, 2008

Thomas A. Bologna, Chief Executive Officer
Orchid Cellmark, Inc.
4390 US Route One
Princeton, NJ 08540

RE: Orchid Cellmark, Inc.
Form 10-K for Fiscal Year Ended December 31, 2008
Schedule DEFR 14A for June 5, 2008
10-Q for Period Ended March 31, 2008
10-Q for Period Ended June 30, 2008
10-Q for Period Ended September 30, 2008

Dear Mr. Bologna:

We have reviewed your filing and have the following comments. If you disagree, we will consider your explanation as to why our comments are inapplicable. Please be as detailed as necessary in your explanation. In some of our comments, we ask you to provide us with information so we may better understand your disclosure. After reviewing this information, we may raise additional comments. You should comply with the remaining comments in all future filings, as applicable. Please confirm in writing that you will do so and also explain to us how you intend to comply, within the time frame set below. Please understand that after our review of your response, we may raise additional comments.

Please understand that the purpose of our review process is to assist you in your compliance with the applicable disclosure requirements and to enhance the overall disclosure in your filings. We look forward to working with you in these respects. We welcome any questions you may have about our comments or any other aspect of our review. Feel free to call us at the telephone numbers listed at the end of this letter.

Form 10-K for the Year Ended December 31, 2007

Item 9A. Controls and Procedures

Disclosure Controls and Procedures, page 68

1. We note your disclosure that your principal executive officer and principal financial officer have concluded as of December 31, 2007 that your disclosure controls and procedures were adequate and effective. We also note similar disclosure in your quarterly reports for the periods ended March 31, 2008, June

30, 2008 and September 30, 2008. Please explain to us the meaning of adequate and effective. It is not clear that your certifying officers have reached a conclusion that your disclosure controls and procedures are effective or ineffective.

Management's Report on Internal Control over Financial Reporting

Limitations on the Effectiveness of Controls, page 69

2. We note your statement that "a control system, no matter how well conceived and operated, can provide only reasonable, not absolute, assurance that the objectives of the control system are met." We also note similar statements in your quarterly reports for the periods ended March 31, 2008, June 30, 2008 and September 30, 2008. Please confirm that in future filings you will state clearly, if true, that your disclosure controls and procedures are *designed* to provide reasonable assurance of achieving their objectives and that your principal executive officer and principal financial officer concluded that your disclosure controls and procedures are effective at that reasonable assurance level. As an alternative, you may remove the reference to the level of assurance of your disclosure controls and procedures.

Consolidated Financial Statements

Notes to Consolidated Financial Statements

Note 2 – Acquisition of ReliaGene Technologies Inc., page 50

3. We note your disclosure on page 51 and on page 59 that you use independent experts (i) to assist you in the determination of the fair value of acquired long-lived tangible and intangible assets and (ii) to assess the remaining exposure on positions taken in your tax returns respectively. Given your references to the use of such experts, please confirm that you will revise your disclosure in future Exchange Act filings to name each expert and file the appropriate consents. As an alternative, you may delete all references to the use of independent experts in future Exchange Act filings.

Schedule DEFR 14A for June 5, 2008

Annual Bonus, page 16

4. You have not provided a quantitative discussion of all of the terms of the necessary targets to be achieved for your named executive officers to earn their annual performance-based cash bonus. In future filings, please disclose the

specific performance targets used to determine the annual cash bonus or provide a supplemental analysis as to why it is appropriate to omit these targets pursuant to Instruction 4 to Item 402(b) of Regulation S-K. To the extent that it is appropriate to omit specific targets, please provide the disclosure pursuant to Instruction 4 to Item 402(b). General statements regarding the level of difficulty, or ease, associated with achieving performance goals either corporately or individually are not sufficient. In discussing how likely it will be for the company to achieve the target levels or other factors, provide as much detail as necessary without providing information that poses a reasonable risk of competitive harm.

Long-Term Equity Incentive Compensation, page 17

5. In future filings, please disclose how the company determines the amount of stock option awards and stock awards to the company's named executive officers.

Closing Comments

As appropriate, please respond to these comments within 10 business days or tell us when you will provide us with a response. Please understand that we may have additional comments after reviewing your responses to our comments.

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 all information required under the Securities Exchange Act of 1934 and that they have provided all information investors require for an informed investment decision. 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.

In connection with responding to our comments, please provide, in writing, a statement from the company acknowledging that:

- the company is responsible for the adequacy and accuracy of the disclosure in the filing;
- staff comments or changes to disclosure in response to staff comments do not foreclose the Commission from taking any action with respect to the filing; and
- the company may not assert staff comments as a defense in any proceeding initiated by the Commission or any person under the federal securities laws of the United States.

In addition, please be advised that the Division of Enforcement has access to all information you provide to the staff of the Division of Corporation Finance in our review of your filing or in response to our comments on your filing.

Thomas A. Bologna, Chief Executive Officer
Orchid Cellmark, Inc.
December 31, 2008
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You may contact Ethan Horowitz at (202) 551-3311 or Raj Rajan at (202) 551-3388 if you have questions regarding comments on the financial statements and related matters. Please contact Susann Reilly at (202) 551-3236 or David Link at (202) 551-3356 with other questions.

Sincerely,

John Reynolds
Assistant Director
Office of Beverages, Apparel and
Health Care Services

Thomas A. Bologna
Fax: 609-750-6405