

Mail Stop 4720

April 6, 2010

Peter J. Langecker, M.D., Ph.D.  
Chief Executive Officer  
OXiGENE, Inc.  
701 Gateway Blvd., Suite 210  
South San Francisco, CA 94080

**Re: OXiGENE, Inc.  
Registration Statement on Form S-3  
Filed March 31, 2010  
File No. 333-165826**

Dear Dr. Langecker:

We have limited our review of your filing to those issues we have addressed in our comments. Where indicated, we think you should revise your document in response to these comments. If you disagree, we will consider your explanation as to why our comment is inapplicable or a revision is unnecessary. Please be as detailed as necessary in your explanation. In some of our comments, we may ask you to provide us with information so we may better understand your disclosure. After reviewing this information, 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 filing. 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.

General

1. You are seeking to register the resale of your Series A Warrants and Series C Warrants, but not the resale of your Series B Warrants and Series D Warrants. Please tell us why you are not seeking to register the resale of your Series B Warrants and Series D Warrants.
2. Your legal opinion states, "Series C Warrants have been duly authorized and reserved for issuance, and, when issued upon exercise of the Series B Warrants in accordance with their terms, will be validly issued and constitute legal, valid and

binding agreements of the Company.” Since your Series C Warrants will not be issued until the Series B Warrants are exercised, it is premature to register the resale of the Series C warrants and the shares underlying the Series C warrants at this time. Please revise your registration statement to remove from registration the Series C Warrants and the shares of common stock underlying these Series C Warrants. Please also revise your disclosure to clarify that these Series C Warrants are not outstanding and are not being registered for resale.

3. You are seeking to register the resale of the shares of common stock underlying some of the Series A Warrants, Series B Warrants, Series C Warrants and Series D Warrants, but not all the shares of common stock underlying these warrants. Please revise your disclosure throughout your registration statement, including your registration fee table and selling securityholder table, to clearly state the number of shares of common underlying your Series A Warrants that are registered for resale on this registration statement. Similar disclosure should be made for the shares of common stock underlying your Series B Warrants and Series D Warrants.

Private Placement of Common Shares and Warrants, page 5

4. In connection with your Series B Warrants, Series C Warrants and Series D Warrants you refer to “the date on which [your] stockholders approve the issuance of shares in the transaction.” In each instance, please revise your disclosure to clarify whether you are seeking to have your stockholders approve the exercise of the respective warrants or the private placement that occurred on March 12, 2010. Please also disclose why you are seeking to have your stockholders approve the issuance of shares. For example, are you seeking this approval in connection with a stock exchange rule and/or a change of control provision?
5. You disclose that your Series B Warrants and Series C Warrants are exercisable upon the earlier of the six month anniversary of the closing date or the date on which your stockholders approve the transaction. Since these warrants may be exercisable prior to date upon which your stockholders approve the transaction, please expand your disclosure to disclose the consequences if the shares of common stock underlying the warrants are issued without stockholder approval.

Incorporation of Certain Documents by Reference, page 24

6. We note that your registration statement incorporates by reference materials from your Annual Report on Form 10-K for the year ended December 31, 2009. This filing does not contain information in Part III that is required by Form 10-K. Please amend your filing to include Part III information, or file a proxy statement to incorporate this information into your filing by reference. Your filing must be complete before we take final action on the registration statement.

7. Please revise your filing to incorporate by reference your Form 8-K filed on April 5, 2010. See Question 123.05 of the Securities Act Forms Compliance and Disclosure Interpretations.

Exhibit 5.1

8. Please revise your legal opinion to include all securities which you are seeking to register on your registration statement. For example, it does not appear that you have included your 6,578,945 Series A Warrants to purchase common stock or the Rights to purchase common stock in this legal opinion.

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As appropriate, please amend your registration statement in response to these comments. You may wish to provide us with marked copies of the amendment to expedite our review. Please furnish a cover letter with your amendment that keys your responses to our comments and provides any requested information. Detailed cover letters greatly facilitate our review. Please understand that we may have additional comments after reviewing your amendment and 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 Act of 1933 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.

Notwithstanding our comments, in the event the company requests acceleration of the effective date of the pending registration statement, it should furnish a letter, at the time of such request, 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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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 connection with our review of your filing or in response to our comments on your filing.

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. We will act on the request and, pursuant to delegated authority, grant acceleration of the effective date.

We direct your attention to Rules 460 and 461 regarding requesting acceleration of a registration statement. Please allow adequate time after the filing of any amendment for further review before submitting a request for acceleration. Please provide this request at least two business days in advance of the requested effective date.

Please contact Jennifer Riegel at (202) 551-3575, Suzanne Hayes at (202) 551-3675 or me at (202) 551-3715 with any questions.

Sincerely,

Jeffrey Riedler  
Assistant Director

cc: Jonathan L. Kravetz, Esq.  
Megan N. Gates, Esq.  
Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, P.C.  
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