Mail Stop 6010 June 8, 2006

C. Randall Mills, Ph.D.
President and Chief Executive Officer
Osiris Therapeutics, Inc.
2001 Aliceanna Street
Baltimore, MD 21231

Re: Osiris Therapeutics, Inc.
File No. 333-134037
Filed May 12, 2006

Dear Dr. Mills:

We have reviewed your filing and have the following 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 supplemental information so we may better understand your disclosure. After reviewing this information, we may or may not 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 on any other aspect of our review. Feel free to call us at the telephone numbers listed at the end of this letter.

General

1. Please note that where we provide examples to illustrate what we mean by our comments, they are examples and not exhaustive lists. If our comments are applicable to portions of the filing that we have not cited as examples, make the appropriate changes in accordance with our comments.

2. In your response letter, please state our comment and then explain each change that has been made in response to a comment. In addition, you should also reference each page number in which disclosure has been revised in response to a comment so that we can easily place your revised disclosure in its proper context.

3. Please file as promptly as possible all exhibits required by the Exhibit Table provided in Item 601(a) of Regulation S-K. We note, for example, that you have not filed the opinion or consent of your legal counsel, along with other exhibits. Please note that we may have comments on these materials once they are filed.

4. Please complete all of the blank sections of your filing prior to filing the next amendment. In particular, we note that you have left the Use of Proceeds sections with blanks, which makes it difficult for us to comment on your disclosure.

5. Please provide us proofs of all graphic, visual or photographic information you will provide in the printed prospectus prior to its use, for example in a preliminary prospectus. Please note we may have comments regarding this material.

6. Please note that when you file a pre-effective amendment containing pricing-related information, we may have additional comments. As you are likely aware, you must file this amendment prior to circulating the prospectus.

7. Please note that when you file a pre-effective amendment that includes your price range, it must be bone fide. We interpret this to mean that your range may not exceed $2 if you price below $20 and 10% if you price above $20.

8. Throughout the registration statement, you cite various estimates, statistics and facts and figures. Where you provide your own estimates, please explain how you arrived at those estimates and disclose any third-party sources you relied upon. For all other figures, please identify your sources in the registration statement. Set forth below is an illustrative and not exhaustive list of statements that should be supported:
    - "patients who have had this procedure are 10 to 15 times more likely to develop osteoarthritis…," p.2, 49
    - "…approximately 800,000 people have surgery to remove damaged or torn meniscus," p.2, 49
    - "700,000 people experience their first heart attack…" p. 2, 50
    - "20% of these patients suffer extensive damage...within six years," p. 50
    - "each year in the United States over 900,000 surgical procedures are performed…," p.52
    - "60% of Crohn's disease patients require at least one surgery…500,000 cases of diagnosed Crohn's…10% have a severe exacerbation…50%....relapse within a year…recurrence rates…85%," p. 56

Risk Factors, p. 8
"If the potential of our stem cell therapies…, " p. 9

9. We note your statement that your therapies are subject to various risks, including the impact of possible side effects, unintended immune system responses and inadequate efficacy. In each case, if there are facts or circumstances which would indicate that any of these risks may come to fruition, you should disclose those facts specifically rather than referring to these risks generically.

"There are no FDA approved treatments…, " p. 10

10. Please explain what you mean by "efficacy endpoints." Also explain the concept of "statistical significance."

11. In addition, expand your disclosure relating to the "graveness of the underlying disease and dire prognosis." Specifically, explain how the graveness of the disease makes it more difficult to show efficacy of the product.

"Our dependence on a limited supply of adult marrow…, " p. 12

12. Please disclose whether you have experienced supply problems in the past and how those problems, if any, affected your revenues.

"We use third party collaborators…," p. 14

13. It appears that your agreement with Blackstone Medical is a material contract. Please file it as an exhibit to the registration statement.

"If we are not able to recruit and retain qualified management…" p. 16

14. Please expand the discussion to indicate the extent to which you have employment agreements with your key personnel.

Use of proceeds, p. 31

15. For each allocation you have disclosed, please also disclose the stage of completion that the proceeds will allow you to achieve. For example, if your allocation of proceeds will allow you to complete the development and approval of prochymal in its entirety, you should state this fact in this section.

Management's Discussion and Analysis of Financial Condition and Results of Operations, page 35
Research and Development Costs, pages 38 - 39

16. Please revise your disclosure and restate your financial statements to exclude the legal costs of pursuing patent protection for intellectual property from research and development expenses or tell us why your current presentation is considered appropriate. Please refer to paragraph 10 of SFAS 2.

17. While you do not account for all of your internal research and development costs on a project basis, please provide as much quantitative and qualitative disclosure as possible about the amount of costs, both internal and external, incurred during each period presented and incurred to date on each of your major research and development projects. In addition, please reconcile these amounts to the research and development expense reported on your statements of operations. To the extent that you can not attribute costs to each project, please explain why management does not maintain and evaluate those costs by project.

18. While you are unable to determine with certainty the duration and completion costs of your research and development projects, and do not know for certain when and to what extent future revenues will materialize, please provide as much estimated qualitative and quantitative disclosure as possible. We believe that including disclosures about estimated

future expenses related to your major research and development projects in the MD&A would be useful for investors. Please refer to the Division of Corporation Finance "Current Issues and Rulemaking Projects Quarterly Update" under section VIII – Industry Specific Issues – Accounting and Disclosure by Companies Engaged in Research and Development Activities. You can find it at the following website address: http://www.sec.gov/divisions/corpfin/cfcrq032001.htm. To the extent that information requested above is not estimable, disclose that fact and the reason why it is not estimable.

Liquidity and Capital Resources, page 44
Capital Resources, page 45

19. Please include a discussion of the historical and expected effects of material new contracts and the achievement of revenue recognition milestones on operations and financial position. Disclose the amount and timing of material up-front and milestone fees scheduled to be received and to be recognized as revenue from your collaborative agreements over each of the next five years. Discuss any material uncertainties affecting the future realization of revenues.

Business, p. 48

20. When you disclose the results of clinical trials, you should disclose whether your results are statistically significant. In addition, where you refer to statistical significance, please disclose the associated p-values. As noted above, the first time you refer to statistical significance, you should explain what statistical significance means so that investors can better understand your disclosure.

21. For each agreement you describe in this section, please make sure that you describe all material terms of the agreement, including consideration, term and termination provisions, and all other material rights and obligations. As one example only, we note that much of this information was not included in your discussion of the Blackstone Medical agreement.

Management, p. 73

22. We note that Mr. Moyes will serve as a director upon completion of the offering. Please provide the consent requested by Rule 438. The consent should include a reference to its use in connection with the original filing of this registration statement.

Certain relationships and related transactions, p. 80

23. Item 601(b)(10)of Regulation S-K requires that you file each agreement listed in this section as an exhibit to the registration statement. Please file these agreements.

Registration Rights, page 88

24. We note that you have a registration rights agreements relating to your convertible notes and preferred stock. Please include the registration rights agreement as an exhibit and

summarize in the filing the significant terms of the agreements. Please provide us an analysis of how you accounted for the warrants and registration rights agreement under EITF 00-19 and SFAS 133. We note that you do not have enough authorized shares for the underlying shares. Please address that fact, any liquidating damages that may result due to failure to comply with the registration rights agreement, and any other relevant terms discussed in EITF 00-19. Please also refer to the Division of Corporation Finance "Current Accounting and Disclosure Issues" Section II(B) - Classification and Measurement of Warrants and Embedded Conversion Features (New). You can find this at the following website: http://www.sec.gov/divisions/corpfin/acctdis120105.pdf. You may also refer to EITF 05-4 as applicable, which is currently being deliberated.

Financial Statements

25. Please provide updated interim financial information through the period ended March 31, 2006.

26. Disclose related party transactions on the face of the financial statements pursuant to Rule 4-08(k) of Regulation S-X.

1. Description of Business and Significant Accounting Policies, page F-8

27. Please revise your disclosure to include a description of the predecessor company and a description of the transaction that resulted in the current organizational structure.

Inventory, page F-9

28. We believe that excluding labor cost from inventory as described on page 38 under the caption Cost of Goods Sold has the effect of understating your inventory on the balance sheet and overstating gross profit reported in the statements of operations. Please restate your financial statements to include all costs of producing your inventory in the inventory balance and in cost of goods sold as appropriate.

Revenue Recognition, page F-10

29. Please tell us your basis for recognizing incidental assignment of technology rights as revenue at the time of receipt. Please clarify if the rights are from related parties.

Stock Based Compensation, page F-12

30. Please disclose in the financial statements, at a minimum, the following information for equity instruments granted during the 12 months prior to the date of the most recent balance sheet included in the filing:

- For each grant date, the number of options or shares granted, the exercise price, the fair value of the common stock, and the intrinsic value, if any, per option
- Whether or not the valuation used to determine the fair value of the equity instruments was contemporaneous or restrospective

- Whether or not the valuation specialist was a related party

31. Disclose in Management's Discussion and Analysis the intrinsic value of outstanding vested and unvested options based on the estimated IPO price and the options outstanding as of the most recent balance-sheet date presented.

32. If the valuation of equity instruments was not performed contemporaneously, please disclose in the Management's Discussion and Analysis the following information relating to your issuances of equity instruments:

- A discussion of significant factors, assumptions, and methodologies used in determining fair value
- A discussion of each significant factor contributing to the difference between the fair value as of the date of each grant and the estimated IPO price or if a contemporaneous valuation by an unrelated valuation specialist was obtained subsequent to the grants but prior to the IPO, the fair value as determined by that valuation
- The valuation alternative selected and the reason management chose not to obtain a contemporaneous valuation by an unrelated valuation specialist

3. Notes Payable and Capital Lease Obligations, pages F-16 – F-17

33. Please tell us and clarify in the filing how you determined the conversion rate of the loans from related parties to the company into Series D mandatorily redeemable convertible preferred stock.

34. Please disclose in Management's Discussion and Analysis the expected effect on your results of operations of recording the beneficial conversion feature for the convertible promissory notes of $19.8 million, $20.6 million and $2 million and provide us a calculation based on the estimated IPO price per share.

35. Please disclose all significant terms of the convertible promissory notes (i.e. the conversion rate of the $20.6 million convertible promissory notes).

36. Please disclose the redemption premium amounts recorded related to the $20.6 million convertible promissory note and the $2.0 million convertible promissory note and provide us a calculation.

4. Preferred Stock Rights and Preferences, page F-18

37. Please provide us an analysis of your consideration given to recording a beneficial conversion feature for your convertible and mandatorily redeemable convertible preferred stock issued. Refer to EITF 98-5 and 00-27.

Signatures, p. II-7

38. Please provide the signature of your Chief Accounting Officer or controller.

As appropriate, please amend your filing 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 supplemental information. Detailed cover letters greatly facilitate our review. Please file your cover letter on EDGAR under the form type label CORRESP. 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 filings reviewed by the staff to be certain that they have provided all information investors require for an informed 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 this action as 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 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 a 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.

You may contact Joe Roesler at (202) 551-3628 if you have questions regarding comments on the financial statements and related matters. Please contact Zafar Hasan at (202) 551-3653 or me at (202) 551-3715 with any other questions.

Sincerely,

Jeffrey Riedler
Assistant Director

cc: Justin Klein
Ballard Spahr Andrews & Ingersoll
300 East Lombard Street
18th Floor
Baltimore, MD 21202