

Mail Stop 6010

June 19, 2007

William M. Pinon
President and Chief Executive Officer
Bioheart, Inc.
13794 NW 4th Street, Suite 212
Sunrise, Florida 33325

**Re: Bioheart, Inc.
Registration Statement on Form S-1, Amendment 1
Filed June 5, 2007
File No. 333-140672**

Dear Mr. Pinon:

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 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.

FORM S-1

Prospectus Summary

MyoCell, page 1

1. Please file the agreement with Johnson & Johnson as an exhibit, and discuss its material terms in the Business section.

Risk Factors, page 3

2. We note you added this discussion in response to comment 15. Please disclose, as stated in a risk factor on page 14, that six patients have died in clinical trials. Also briefly discuss BlueCrest's security interest and other rights, as discussed in a risk factor on page 9.

Use of Proceeds, page 41

3. We note the revisions pursuant to comment 30. Since you plan to use funds "for the further development and clinical testing of [you] pipeline product candidates," the comment also applies to this use. With respect to any product candidates for which an IND has been filed, please identify the product candidate, and state the stage of development to which you anticipate the funds from this offering will carry the product candidate.
4. We note your response and revisions pursuant to comment 31.
 - Since you state that you plan to use some funds "for the repayment of certain debt obligations," please state the interest rate and maturity of the debt. Also, if the debt was incurred within the past year, describe the use of the proceeds of the debt. See Instruction 4 to Item 504 of Regulation S-K.
 - Please disclose in the filing, as you state in the response letter, that you currently do not have any agreements or understandings for acquisitions of technologies or businesses. Also state, if true, that you do not have any agreements or understandings for the establishment of partnerships and collaborations complementary to your business.

Management's Discussion and Analysis of Financial Condition and Results of Operations

Financial Operations Overview, page 48

Stock-Based Compensation, page 49

5. Refer to your response to comment 33. Please include in your revised disclosure all of the information requested in the previous comment. Include whether the valuations were performed contemporaneously and why this timing was appropriate. Also include why you decided to not enlist the help of a third party valuation expert in determining these fair values.

Consolidated Financial Statements – Years Ended December 31, 2006, page F-1

Notes to Consolidated Financial Statements, page F-7

7. Related Party Transactions, page F-15

Settlement Agreement With Officer Of The Company, page F-16

6. Refer to your response to Comment No. 39. We were unable to identify any significant changes to your prior disclosure. Please clarify in your disclosure which portion of this estimated \$3.5 million compensation was related to services in years prior to 2006. Provide to us supplementally a discussion of when this person was employed and the amounts, if any, of compensation paid to this individual between 2002 and 2006. If no compensation was paid or accrued between 2002 and 2005, tell us why.

8. Stockholders' Equity, page F-16

Warrants

7. Please provide a more robust and comprehensive summary discussion of Warrants issued to employees and non-employees. Include minimum disclosure requirements under the guidance of FAS 123(R). Refer to Appendix A paragraph A240.

* * *

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 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 Jim Peklenk at (202) 551-3661 or Jim Atkinson at (202) 551-3674 if you have questions regarding comments on the financial statements and related

William M. Pinon
Bioheart, Inc.
June 19, 2007
Page 4

matters. Please contact Greg Belliston at (202) 551-3861 or me at (202) 551-3715 with any other questions.

Sincerely,

Jeffrey Riedler
Assistant Director

cc: David E. Wells, Esq.
Hunton & Williams LLP
1111 Brickell Avenue, Suite 2500
Miami, Florida 33131