

Mail Stop 6010

September 13, 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 4
Filed September 6, 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

Use of Proceeds, page 41

1. We note the net proceeds are anticipated to be \$46.9 million. You have stated uses for only \$30.1 million, and you state the balance will be “for general corporate purposes” Please specify uses for more of the proceeds, and state an approximate dollar amount for each.

Management's Discussion and Analysis of Financial Condition and Results of Operations, page 48

Financial Operations Overview, page 49

Stock-Based Compensation, page 50

2. Consistent our prior comment four in our August 15, 2007 comment letter, please expand your disclosure to qualitatively and quantitatively discuss each significant factor contributing to the difference between each valuation and the estimated IPO price. Your disclosure should also be updated to include any options granted up to the date of filing the amendment.

Consolidated Financial Statements, page F-1

3. Please have Grant Thornton LLP update their report and consent to remove the conditional language regarding the reverse stock split prior to going effective.

* * *

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

Sincerely,

Jeffrey Riedler
Assistant Director

William M. Pinon
Bioheart, Inc.
September 13, 2007
Page 3

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