

InVivo Therapeutics Holdings Corp.
One Broadway, 14th Floor
Cambridge, Massachusetts 02142

April 20, 2012

BY EDGAR

Securities and Exchange Commission
100 F Street, N.E.
Washington, D.C. 20549

Attn: Russell Mancuso
Branch Chief

Re: InVivo Therapeutics Holdings Corp.
Post-Effective Amendment to Form S-1 on Form S-3
Filed March 15, 2012
File No. 333-171998

Dear Mr. Mancuso:

This letter is submitted on behalf of InVivo Therapeutics Holdings Corp. (the “Company”) in response to the comments of the staff of the Division of Corporation Finance (the “Staff”) of the Securities and Exchange Commission (the “Commission”) with respect to the Company’s Post-Effective Amendment to Form S-1 on Form S-3 filed on March 15, 2012, as set forth in your letter dated March 30, 2012 to Sean Moran (the “Comment Letter”).

For reference purposes, the text of the Staff comments contained in the Comment Letter has been reproduced herein with responses below each numbered comment. For your convenience, we have italicized the reproduced Staff comments from the Comment Letter and we have bolded the headings of our responses thereto.

Incorporation by Reference, page 14

Comment No. 1

Please file the information required by Part III of your Form 10-K. For guidance, please see the Division of Corporation Finance’s Securities Act Forms Compliance and Disclosure Interpretation 123.01 available on the Commission’s web site.

Response to Comment No. 1

On April 19, 2012, the Company filed its definitive proxy statement for its 2012 Annual Meeting of Stockholders. In accordance with General Instruction G(3) of Form 10-K, the information required by Part III of Form 10-K has been incorporated by reference from such definitive proxy statement into the Company's Annual Report on Form 10-K for the fiscal year ended December 31, 2011.

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If you should have any questions about this letter, please do not hesitate to call the undersigned at (617) 475-1520.

Sincerely,

/s/ Francis M. Reynolds

Francis M. Reynolds
Chief Executive Officer and Chief Financial Officer