



UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

DIVISION OF
CORPORATION FINANCE

December 20, 2010

John P. Gandolfo
Chief Financial Officer
600 Cruiser Lane
Belgrade, Montana 59714

**Re: Bacterin International Holdings, Inc.
Registration Statement on Form S-1/A
Filed December 7, 2010
File No. 333-169620**

Dear Mr. Gandolfo:

We have reviewed your registration statement on Form S-1/A filed on December 7, 2010 and have the following comments. In some of our comments, we may ask you to provide us with information so we may better understand your disclosure.

Please respond to this letter by amending your registration statement and providing the requested information. If you do not believe our comments apply to your facts and circumstances or do not believe an amendment is appropriate, please tell us why in your response.

After reviewing any amendment to your registration statement and the information you provide in response to these comments, we may have additional comments.

Bacterin International Holdings, Inc., page 1

1. We note your response to our prior comment 3. However, the word "leader" still appears in the same context on page F-21 of your notes to the financial statements. Please revise your disclosure there to delete the word.
2. We note your response to our prior comment 4. The statement in the first bullet still appears on page F-21 and the statements in the second and third bullet still appear on page 26. Please delete those statements and confirm that you have deleted these statements elsewhere as applicable.

Recent Developments, page 1

3. We note your response to prior comment 5. We also note that the private placements through which the selling stockholders acquired the shares being registered are described on page 2 of the filing; however, it still does not appear that the share amounts mentioned add up to the amount being registered through this registration statement. Please revise

your disclosure to clarify when, and in what transactions, the entirety of the 11,250,597 shares (including 4,126,630 shares issuable upon the exercise of warrants) were placed with the selling stockholders.

Risk Factors

Future revenue will depend on our ability to develop new sales channels...., page 6

4. We note your response to prior comment 10 where you included the \$8 million you incurred for sales and marketing expense in 2010. However, we also note that you will continue to expand your sales force in the future. Please expand your disclosure in this risk factor to quantify, to the extent practicable, the amount of funds you will need to further expand your direct sales force. In addition, please quantify your funding requirements and sources of funding in greater detail in the section entitled "Cash Requirements" in your Management's Discussion and Analysis.

Results of Operations

Comparison of Nine Months Ended September 30, 2010 and September 30, 2009

Cost of tissue sales, page 18

5. Please revise the discussion you provided in response to comment 16 to explain why you adjusted biologics inventories in the amount of \$669,000 during 2009. In addition, please revise your statement that this inventory adjustment offset the cost increase relating to the higher sales, since both of these factors would increase the cost of sales. Furthermore, please also revise the discussion that is provided on page 20 as applicable.

Change in Warrant Derivative Liability, page 18

6. Please revise your discussion to explain why there was such a significant increase in the value of warrant derivatives during the three months ended September 30, 2010.

Business, page 23

Overview of Our Business, page 23

7. We note your response to prior comment 18 that you have revised your disclosure to disclose amounts incurred for expansion of your direct sales force and amounts you anticipate that you will need to increase, expand or update your existing facilities over the next five years. To the extent practicable, please disclose the amount of funds you will allocate to the future expansion of your sales force.

Products and Services, page 24

8. We note your response to prior comment 22. Please expand your disclosure to clarify that the FDA will have to approve OsteoSponge SC as a cartilage re-generation scaffold

before you can start marketing the product for that indication.

9. We note your response to prior comment 24. Please revise your disclosure to clarify that the reference to “certain of our products” is a reference to OsteoSponge SC.
10. We note your response to prior comment 26 that you do not believe that the contract with RyMed Technologies, Inc. is material to your business or operations. Please provide us with a detailed analysis supporting your belief that the agreement is not material and that you are not substantially dependant on it. For example, please provide information regarding the amount of revenues generated from the agreement with RyMed for the periods covered by your registration statement.

Financial Statements for the Quarterly Period Ended September 30, 2010

(12) Stock-Based Compensation, page F-11

11. Please tell us how the warrant issuances described in the narrative on page F-13 reconciles to the roll-forward of the warrant activities table. In addition, please revise your disclosure to describe the method you utilized to fair value the warrants and how you accounted for the warrants issued during 2010. If any were accounted for as a derivative, describe the feature that triggered the derivative accounting.

Financial Statements for the Year Ended December 31, 2009

(1) Business Description and Summary of Significant Accounting Policies
Grants, page F-22

12. Please revise your disclosure to quantify the amount of grants you provided and received during the periods presented. If no amount was given or received, disclose that fact.

Revenue Recognition, page F-23

13. We acknowledge your response to comment 29. However, you continue to mention that you earn revenues from licensing on pages 16, 24, and F-5. Please revise your discussions throughout your document to be consistent with your response.

(8) Convertible Notes Payable, page F-26

14. Refer to your response to comment 41. While you state that the ratchet provision of the conversion rate helps maintain the clear and close relationship of the risks between the conversion feature and the host contract, it is unclear to us how the market risk that the conversion feature will continue to have, even in the event of a conversion price adjustment, are clearly and closely related to a debt instrument. Furthermore, since the economic characteristic of the embedded instrument is equity (i.e. the host instrument is convertible into an equity instrument), the embedded instrument does not appear to be clearly and closely related to the host instrument (debt). Please provide us a scope

Mr. John P. Gandolfo
Bacterin International Holdings, Inc.
December 20, 2010
Page 4

analyses under ASC 815-40-15 and ASC 815-40-25 as originally requested in our comment to support your accounting.

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You may contact Keira Ino at (202) 551-3659 or Lisa Vanjoske at (202) 551-3614 if you have questions regarding comments on the financial statements and related matters. Please contact Johnny Gharib at (202) 551-3170 or Sebastian Gomez Abero at (202) 551- 3578 with any other questions.

Sincerely,

Jeffrey Riedler
Assistant Director