Via Edgar

December 7, 2010

Jeffrey Riedler, Assistant Director
Securities and Exchange Commission
100 F Street, N.E.
Washington D.C. 20549

Re: Bacterin International Holdings, Inc.
Registration Statement on Form S-1
Filed September 23, 2010
File No. 333-169620

Form 10-K
Filed March 30, 2010
File No. 333-158426

Dear Mr. Riedler:

This letter is in response to your comment letter dated October 26, 2010 to our Registration Statement on Form S-1 filed September 28, 2010 ("Registration Statement") and our Form 10-K filed on March 30, 2010. For your convenience, your questions and comments are restated below in italics, followed by our response. The numbering corresponds with the comments in your letter.

We have concurrently filed via Edgar Amendment No. 1 to our Registration Statement, which includes revisions to our Registration Statement based on your comment letter, as well as other updated information.

General

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

Response: Comment Noted.

Cover Page

2. We note that Greenberg Traurig, LLP is no longer the company's outside counsel. Please revise the cover page of your filing to state your current outside counsel's contact information.

Response: We have revised our cover page to state our current outside counsel's contact information.

Bacterin International Holdings, Inc., page 1

3. Please delete the word "leader" from your statement, "We develop, manufacture and market biologics products to domestic and international markets through our biologics division and believe we are emerging into a leader in the field of biomaterials research, device development and commercialization," in this section and elsewhere as applicable. Alternatively, provide us with the information justifying the characterization of your company as an emerging leader.

Response: We have deleted the word "leader" throughout our registration statement.

4. Please disclose the reasonable basis for the characterization of your products as set forth in the following statements:

- *"Our proprietary methods optimize the growth factors in human allografts to create the ideal stem cell scaffold and promote bone and other tissue growth;"*
- *"Such coatings contain active agents and provide our products with several potential advantages oer traditional medical devices. They offer a means of protecting the surface of a medical device from contamination by pathogenic organisms, thereby minimizing the potential for infection;" and*
- *"Other coatings can serve as a reserve for local delivery of active agents, enhancing a variety of biological functions such as bone growth and pain management."*

Alternatively, delete these statements from this section and elsewhere as applicable.

Response: We have deleted the statements indicated in Comment 4.

Recent Developments, page 1

5. We 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 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 11,352,479 shares (including 3,751,621 shares issuable upon the exercise of warrants) were placed with the selling stockholders.

Response: We have revised our disclosure to clarify when, and in what transactions, the shares being registered were placed with the selling stockholders. We have also revised the number of shares being registered to 11,250,597 (including 4,126,630 shares issuable upon the exercise of warrants).

Risk Factors
Our success will depend on our ability to engage and retain….. page 5

6. To the extent you have experienced problems engaging and retaining qualified technical personnel in the recent past, please revise your disclosure to describe these problems. Additionally, if any key technical personnel have plans to leave your company in the near future, please revise the discussion to disclose this information.

Response: We have not had any specific problems engaging and retaining qualified technical personnel. This risk factor is included as a general risk factor for our industry and is not related to any specific incidence that we have recently experienced. Also, we are not aware of any key technical personnel who have plans to leave our company in the near future.

Loss of key member of our management who we need to succeed….. page 5

7. To the extent that you have experienced problems attracting and retaining qualified key members of your management team in the recent past, please revise your disclosure to describe these problems. Additionally, if any key member of your management team has plans to leave your company in the near future, please revise the discussion to disclose this information.

Response: We have not experienced problems attracting and retaining qualified key members of our management team in the recent past. Also, we are not aware of any key member of management who plans to leave our company in the near future.

We are highly dependent on the continued availability of our facilities….. page 5

8. Please disclose your level of business interruption insurance coverage and the cost to you of such coverage, if material.

Response: We carry $1 million of business interruption insurance per location as part of an overall multi-peril policy, and we have added the disclosure to this risk factor.

We will be required to invest in facilities and equipment….. page 6

9. To the extent practicable, please provide the amounts, in this risk factor, that you have currently budgeted or anticipate spending to increase, expand or update your capabilities and facilities during the next five years and the extent to which you have identified sources of funding for this increase, expansion or update. In addition, please address this comment in more detail in the section entitled "Cash Requirements" in your Management's Discussion and Analysis.

Response: We anticipate that we will need to spend $4 to $5 million over the next five years in order to increase, expand or update our existing facilities to meet our expected growth over that period. We have not yet identified sources of funding for this increase, expansion or update. However, we have revised our risk factor to include the anticipated amounts, and we have addressed this comment in more detail in the section entitled "Cash Requirements" in our Management's Discussion and Analysis.

Future revenue will depend on our ability to develop new sales channels…. Page 6

10. We note that you are engaging in a major initiative to build and further expand your direct sales force and that this effort will have significant costs. Please expand your disclosure in this risk factor to quantify, to the extent practicable, the amount of funds you will need to build and 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.

Response: We have expanded our disclosure in this risk factor to quantify, to the extent practicable, the amount of funds we will need to build and further expand our direct sales force. More specifically, we incurred sales and marketing expense of approximately $8 million for 2010. We have also quantified our funding requirements and sources of funding in greater detail in the section entitled "Cash Requirements" in our Management's Discussion and Analysis.

Our revenues will depend upon prompt and adequate reimbursement from . . . . . page 6

11. Please disclose any problems you have experienced with prompt and adequate reimbursement from public and private insurers and national health systems and quantify reimbursement from public and private insurers and national health systems and quantify the effects of such problems on your company, if material.

Response: We have not yet experienced payment problems that we would consider material; however, the industry generally has a slow payment process, which affects our ability to receive prompt payment. In general, we are paid by hospitals, which in turn seek reimbursement from patients, their insurance companies, Medicare and Medicaid. We did revise this risk factor slightly to clarify that the third party reimbursement mentioned in this risk factor is paid to hospitals, not to the Company.

We may be subject to future product liability litigation….. page 7

12. Please disclose the level of insurance coverage that you carry relating to the product liability claims and the cost to you of such coverage, if material.

Response: We currently carry product liability insurance of up to $10 million at an annual premium cost of approximately $140,000, and we have revised this risk factor to include these amounts.

13. Please disclose the level of reserves you maintain for product liability disbursements.

Response: We do not currently maintain any reserves for product liability disbursements, and we have revised this risk factor to state that "our insurance coverage and any reserves we may maintain in the future . . . may not be adequate." As noted in the response to comment 12 above, we also added the details of our insurance coverage related to this risk factor.

We may not be able to obtain or protect our proprietary rights….. page 10

14. We note in your "Legal proceedings" section that you have served complaints to Allosource and Advanced Biologics, Inc. Please discuss these claims and potential consequences in this risk factor discussion.

Response: In response to your request, we have expanded this risk factor to include a discussion of the Allosource and Advanced Biologics claims, including potential consequences.

If we do not timely file and have declared effective the registration statement….. page 11

15. We note that you entered into a registration rights agreement where you "agreed to file and have declared effective this registration statement by a certain date." Please disclose the date that you agreed to file and have this registration statement declared effective.

Response: We agreed to file this registration statement by September 28, 2010 and if it is not effective by December 27, 2010, we are obligated to pay 1% of the aggregate investment amount per month, subject to a maximum limit of 12% of the aggregate investment amount. We added the dates to this risk factor in response to your comment.

Management's Discussion and Analysis of Financial Condition and Results of Operations, page 16
Comparison of Twelve Months Ended December 31, 2009 and December 31, 2008….. page 18 Revenue, page 19

16. We note that the cost of tissue sales as a percentage to the tissue sales temporarily increased from 18% during the six months ended June 30, 2009 to 48% during the six months ended December 31, 2009, then decreased to 19% during the six months ended June 30, 2010. Please revise your discussion to identify which product temporarily increased demand and why. Quantify the sales volume and revenue by product to supplement your discussion.

Response: We have modified our discussion in response to your comment.

17. We note that your largest customer accounted for 12% and 37% of the total consolidated revenues for the years ended 2009 and 2008, respectively. We also note that the relationship with the customer is governed by a contract, which identifies prices for the services to be rendered and payments to be made by the customer, that expires in February 2011. Please disclose the name of this customer and describe, in the "Business" section, the material terms of the agreement including the pricing and payment, term and termination and any other material provisions of the agreement. Please note that the termination date should also include the day on which the contract terminates. Also, please file the contract as an exhibit, or alternatively, tell us the basis for your belief that you are not required to file the agreement pursuant to Item 601(b)(10)(ii)(B) of Regulation S-K.

Response: We have revised our disclosure to disclose the names of the customers described in this comment. However, upon further review, we discovered that the contracts with these customers were terminated in the third quarter of 2009 when the Company migrated to a direct sales model from a distributor based model. We revised our disclosure accordingly; however, since we no longer have contracts with these customers, we did not add this discussion to the Business section and have not attached the contracts as exhibits.

Business, page 23
Overview of Our Business, page 23

18. We note that you will continue to use the proceeds from prior financings and the private placements to expand your direct sales network and your production capacity. To the extent practicable, please disclose the amount of funds you will allocate to each. Also, with respect to expanding your production capacity, please clarify whether you intend to use funds to open new facilities, increase the capacity of your current facility or both. If you intend to increase your current capacity and open new facilities, clarify the portion of funds you expect to allocate to each and indicate where you expect to open new facilities.

Response: We have revised our disclosure to disclose amounts incurred for expansion of our direct sales force and amounts we anticipate that we will need to increase, expand or update our existing facilities over the next five years. Also, in response to the first part of your comment, we have deleted "and our production capacity" from the sentence regarding the use of funds from our bridge financing and private placement.

19. Please provide the basis for your statement that the Center for Biofilm Engineering at Montana State is "internationally acclaimed."

Response: We have deleted this statement in response to your comment.

20. We note that you generate revenue from a number of revenue sources including the following: license fees and royalties from collaborative product development efforts, sales from products developed and manufactured by you under your own label and contract revenue from analytical testing and development services provided to medical device manufacturer clients, which tailor your coating process to the client's specific product/medical application. Please disclose whether you have entered into any license or collaboration agreements or contracts with respect to these revenue generating sources and describe the material terms of these agreements or contracts including the obligations of the parties, term and termination, royalty rate and any other material provisions of the agreements or contracts. Also, please file the agreements or contracts as exhibits, or alternatively, tell us the basis for your belief that you are not required to file the agreements or contracts pursuant to Item 601(b)(10(ii)(B) or Regulation S-K.

Response: We have revised our disclosure in response to your comment to indicate that revenues from license fees and royalties have not been material and occur to a much lesser extent than other sources of revenue. We do not believe we are required to file any of these agreements because the revenue generated from these sources is not material.

Products and Services, page 24

21. We note that your discussion on products and services distinguishes between your Biologics Division and your Medical Device Products. However, we also note that products such as your OsteoSelect DBM putty appear in both sections. Please clarify which of your products are regulated as HCT and which are regulated as medical devices.

Response: In general, the products in our biologics division are composed of tissue that is minimally processed, while our medical device products are not considered minimally processed. Although we thought it was accurate to classify OsteoSelect DBM putty as both a tissue and a medical device because it is regulated as a combination product, in response to your comment, we have moved the discussion of OsteoSelect DBM putty to the medical device section.

22. We note that you are beginning trials to establish the ability to market OsteoSponge SC as a cartilage re-generation scaffold, and that you are also initiating clinical studies to further support BacFast's effectiveness. Please specify in your disclosure what you and the FDA will have to do and, if applicable, have already done prior to clinically testing the products, and what you and the FDA will have to do to commercially market the products.

Response: We have a letter from the FDA which outlines the marketing claims we are currently allowed to make and we are conducting clinical trials in an effort to expand the claims to include cartilage re-generation.

23. We note that you are using part of the proceeds of the private placements to fund your clinical trials for OsteoSponge SC and BacFast. To the extent practicable, please disclose the amount of funds you will allocate to the trials for each product.

Response: We have allocated approximately $750,000 of the proceeds from our private placement for the clinical trials of OsteoSponge SC and approximately $100,000 for the trial of BacFast.

24. We note that you are hoping to expand your product definition for certain of your products to claim cartilage regeneration capability. We also note that 15 patients have undergone knee, foot or ankle surgery for the purposes of the trial to make such claims, and that you plan to have 200 patients in the trial by year end. Lastly, we note that one of these products is OsteoSponge SC. Please disclose the other products for which you are hoping to expand your product definition to claim cartilage regeneration capability. Additionally, please disclose whether you are conducting trials for these products as well. If you are conducting trials for your other products, please specify in your disclosure what you and the FDA will have to do and, if applicable, have already done prior to clinically testing the products, and what you and the FDA will have to do to commercially market the products.

Response: The only product for which we are currently seeking to expand our product definition to claim cartilage regeneration capability is OsteoSponge SC.

25. Please provide the basis for your statement "We believe that the ultimate size of the market for wound drains is $80 million per year." Alternatively, delete these statements from this section and elsewhere as applicable.

Response: We have deleted this statement in response to your comment.

26. We note that in a joint development project between RyMed and your company, the In Vision-Plus CS is treated with your patented antimicrobial technology. We also note that you will receive a royalty on all devices treated for RyMed. Please disclose whether you have entered into a collaboration agreement with RyMed and describe the material terms of the agreement including the obligations of the parties, term and termination, royalty rate and any other material provisions of the agreement. Also, please file the agreement as an exhibit, or alternatively, tell us the basis for your belief that you are not required to file the agreement pursuant to Item 601(b)(10)(ii)(B) of Regulation S-K.

Response: In November of 2006, we entered into an agreement with RyMed Technologies, Inc. to develop an antimicrobial coating to be incorporated into RyMed's Needle-free Injection Port Device. On August 10, 2010 we announced that the FDA cleared RyMed's InVision-Plus CS needleless IV connector for commercialization. At this point in time, we do not consider this contract material to our business or operations.

Technology and Intellectual Property, page 26

27. We note your table containing your patent information. Under the section for your in-licensed intellectual property, please disclose the expiration date for these patents and the jurisdictions in which they were granted.

Response: The patents in the last 2 entries in the table containing our patent information expire in April 2011 and we have added that information to our table.

Sales and Marketing, page 30

28. Please disclose the material terms of the contract with Broadlane, Inc., including the term and termination provisions, and file the contract as an exhibit, or alternatively, tell us the basis for your belief that you are not required to file the contract pursuant to Item 601(b)(10)(ii)(B) of Regulation S-K.

Response: We have disclosed the material terms of our contract with Broadlane, Inc., including the term and termination provisions, and we have attached the contract as an exhibit.

Legal Proceedings, pages 32-33

29. Please disclose the relief sought in your lawsuits with Yanaki and Activatek, Allosource and minSURG.

Response: We have added disclosure of the relief sought in our lawsuits with Yanaki and Activatek, Allosource and minSURG.

Potential Payments Upon termination of Change-in-Control, page 40

30. We note that you state, "Except for Mr. Gandolfo's employment agreement described below, we currently have no employment agreements with any of our named executive officers…" However, on page 38 of your filing, you state that you intend to keep the current employment agreements between Bacterin and Guy Cook, Mitchell Godfrey, Jesus Hernandez and Darrel Holmes, and that these employment agreements are set forth as exhibits to the registration statement. Please revise your disclosure to reconcile this apparent discrepancy.

Response: We have revised our disclosure to clarify that Mr. Gandolfo is the only named executive officer who has an employment agreement that provides for payment in the event of a change in control. Although the other named executives do have employment agreements, which we have attached as exhibits, their agreements do not provide for payment in the event of a change in control.

Director Independence, page 41

31. We note your statement that during the year ended December 31, 2009, you did not have any independent directors on your board. However, in your discussion on board committees, for example, you list Mr. Swanson as a member of your audit committee and compensation committee and state that he is an independent director of your company under Nasdaq listing standards as well as under rules adopted by the SEC. Mr. Swanson was a director as of the your ended December 31, 2009. Please revise your disclosure to reconcile this apparent discrepancy to explain whether you did or did not have any independent directors on your board during the year ended December 31, 2009.

Response: You are correct, we did have an independent director on our board during the year ended December 31, 2009, and we have revised our disclosure to state that Mr. Swanson was the only independent director on our board during the year ended December 31, 2009.

Selling Stockholders, page 45

32. Please revise your disclosure to indicate the nature of any position, office or other material relationship which the selling security holders have had within the past three years with the company or any of its predecessors or affiliates. Please refer to Item 507 of Regulation S-K for guidance.

Response: We have revised our disclosure to indicate the material relationships we have had with the selling security holders.

Other Rights To Acquire Our common Stock, page 57

33. We note that you are contractually obligated to issue shares of your common stock to one of your stockholders. Pease disclose the name of such stockholder and file as an exhibit the contract underlying such obligation or alternatively, tell us the basis for your belief that you are not required to file the agreement pursuant to Item 601(b)(10) of Regulation S-K.

Response: Instruction 10(i) to the Exhibit Table in Item 601of Regulation S-K requires a company to file as an exhibit any agreement that is material to a company. Such a determination by a company must be based on a facts-and-circumstances basis from the perspective of a reasonable investor in light of established standards of materiality. While we are contractually obligated to issue the shares described in this comment to Harborview Advisors, LLC, we do not believe the underlying contract is material to us because the obligation is contingent on several factors (including the performance of our stock 7 months and 13 months from the closing date of our reverse merger). In addition, the shares we may be required to issue, if all of the contingencies are satisfied, would only constitute approximately 1.5% of our current issued and outstanding shares, or approximately 1% on a fully diluted basis. We therefore believe that, based on the facts and circumstances, the agreement is immaterial and is therefore not required to be filed as an exhibit to the registration statement.

Legal Matters, page 58

34. We note that Greenberg Traurig, LLP is no longer your outside legal counsel. Please revise your disclosure to state who will pass a legal opinion regarding the validity of the securities in this offering.

Response: We have revised our disclosure in response to your comment.

Financial Statements for the Quarterly Period Ended June 30, 2010
(1) Business Description and Summary of Significant Accounting Policies
Reverse Merger Transaction, page F-8

35. Please revise your disclosure to describe what happened to the operations of K-Kitz. If K-Kitz's operations were terminated (e.g. through sales or discontinuation), also disclose the timing of termination. If K-Kitz's operations were not terminated prior to or at the time of your reverse merger, please explain to us why you qualify for the recapitalization accounting.

Response: K-Kitz's operations were terminated at the time of the reverse merger.

Financial Statements for the Year Ended December 31, 2009
General

36. Your "de facto one-for-two reverse stock split" effective June 30, 2010 should be retroactively reflected throughout your document, including your financial statements for the year ended December 31, 2009. Please revise your document to discuss share counts and per share pricing information in a consistent manner.

Response: We have revised our document to in response to your comment.

Statement of Operations, page F-22

37. Your operating expense captions on the 2009 and 2010 statements of operation are not the same and do not allow for comparability. Please revise to use the same captions for all periods. If the caption "Stock options compensation expense" is retained, disclose on the face of the statement of operations which other captions each amount would be included in if it were non-stock compensation. Disclose why depreciation is not included in cost of sales or parenthetically disclose in the caption "cost of sales" that that caption excludes depreciation presented below.

Response: We have revised our captions to allow for comparability.

(1) Business Description and Summary of Significant Accounting Policies
Grants, page F-26

38. Please quantify the amount of grants you awarded and received during the periods presented. In addition, please revise your disclosure to describe how you account for the grants you awarded and received.

Response: The Company has not received any grant income for the periods presented.

Revenue Recgnition, page F-27

39. On page F-25, you disclose that you principally derive revenues from sale or license of medical products, coatings and device implants. Since your obligations may be different under sales and license transactions, please disclose your accounting policy separately and disclose the line item under which the license revenues are presented on your statements of operations. If you recognize revenues from licenses upon delivery, rather than over the license term, provide additional discussion to support your accounting.

Response: We have deleted "or license" from the statement you reference that was formerly on page F-25, as our revenue from licensing is not material.

Net Income (Loss) Per Share, page F-27

40. Please disclose the number of common stock equivalents that were excluded in the calculation of earnings per share for the reason that they were anti-dilutive.

Response: We have disclosed the number of common stock equivalents that were excluded in the calculation of earnings per share for the reason that they were anti-dilutive.

(8) Convertible Notes Payable, page F-30

41. The conversion price of your notes appears adjustable based on your future qualified financing. Please tell us how you have accounted for the conversion feature and provide us a scope analysis under ASC 815-40-15. If the conversion feature is included within the scope of ASC 815-40, please also provide us an analysis under ASC 815-40-25 to support your accounting.

Response: Here is our analysis:

Evaluation of Conversion Feature in accordance with ASC 815

ASC 815-15-25-1 states "an embedded derivative shall be separated from the host contract and accounted for as a derivative instrument pursuant to Subtopic 815-10 if and only if all of the following criteria are met"

a. The economic characteristics and risks of the embedded derivative are not clearly and closely related to the economic characteristics and risks of the host contract. [FAS 133, paragraph 12]]

b. The **hybrid instrument** is not remeasured at **fair value** under otherwise applicable generally accepted accounting principles (GAAP) with changes in fair value reported in earnings as they occur. [FAS 133, paragraph 12]]

c. A separate instrument with the same terms as the embedded derivative would, pursuant to Section 815-10-15, be a derivative instrument subject to the requirements of this Subtopic. [FAS 133, paragraph 12]] [(The initial net investment for the hybrid instrument shall not be considered to be the initial net investment for the embedded derivative.) [FAS 133, paragraph 12]]

a. Are the economic characteristics and risks of the conversion feature clearly and closely related to the economic characteristics and risk of the host contract (conventional debt instrument)? The conversion feature bears market risk while the host contract bears interest rate risk; however, due to the ratchet provision of the conversion feature the market risk has been significantly reduced. 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. The interest rate risk of the host contract has been preserved along with the principal amount of convertible debt instrument. Because the risk of the conversion feature and the host instrument are clearly and closely related it would not be separated from the host contract and accounted for pursuant Subtopic 815-10.

ASC 815-40-15-2 states “The guidance in this Subtopic applies to freestanding contracts that are indexed to, and potentially settled in, and entity’s own stock”

Because the embedded conversion feature is not considered a freestanding instrument per ASC 815-15-25-1 it is not within the scope of ASC 815-40-15

Exhibits

42. Please file your remaining exhibits, including the legal opinion, as soon as practicable. We will need time to review these exhibits prior to granting effectiveness of the registration statement.

Response: We have filed our remaining exhibits.

* * * * *

Should you have any questions or comments regarding our responses to your comment letter or Amendment No. 1 to our Registration Statement, please do not hesitate to call me at (406) 388-0480.

Very truly yours,

Bacterin International Holdings, Inc.

By: /s/ John P. Gandolfo
Name: John P. Gandolfo
Title: Chief Financial Officer