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**UNITED STATES  
SECURITIES AND EXCHANGE COMMISSION**

Washington, D.C. 20549

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**FORM S-8**  
REGISTRATION STATEMENT  
UNDER  
THE SECURITIES ACT OF 1933

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**BACTERIN INTERNATIONAL HOLDINGS, INC.**

(Exact name of registrant as specified in its charter)

Delaware  
(State or other jurisdiction of  
incorporation or organization)

20-5313323  
(I.R.S. Employer  
Identification No.)

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664 Cruiser Lane  
Belgrade, Montana 59714  
(Address of Principal Executive Offices, Including Zip Code)

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Amended and Restated Bacterin International Equity Incentive Plan  
(Full title of the plan)

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John Gandolfo  
Chief Financial Officer  
Bacterin International Holdings, Inc.  
664 Cruiser Lane  
Belgrade, Montana 59714  
(Name and address of agent for service)

(406) 388-0480  
(Telephone number, including area code, of agent for service)

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*Copies to:*  
Jill Gilpin  
VP & Legal Counsel  
664 Cruiser Lane  
Belgrade, Montana 59714  
(406) 388-0480

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Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a smaller reporting company. See the definitions of "large accelerated filer," "accelerated filer" and "smaller reporting company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer	<input type="radio"/>	Accelerated filer	<input type="radio"/>
Non-accelerated filer	<input type="radio"/> (Do not check if a smaller reporting company.)	Smaller reporting company	<input checked="" type="radio"/>

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**CALCULATION OF REGISTRATION FEE**

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<b>Title of securities to be registered</b>	<b>Amount to be Registered (1)</b>	<b>Proposed maximum offering price per share</b>	<b>Proposed maximum aggregate offering price(2)</b>	<b>Amount of registration fee</b>
Common Stock, par value \$0.000001 per share	3,000,000(2)	\$0.85 (3)	\$2,550,000 (3)	\$347.82

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- (1) Pursuant to Rule 416 under the Securities Act of 1933, as amended (the "Securities Act"), this registration statement also covers any additional shares of the common stock of Bacterin International Holdings, Inc. (the "Company"), par value \$0.000001 (the "Common Stock"), that become issuable under the Amended and Restated Bacterin International Equity Incentive Plan (the "Amended and Restated Plan") by reason of any stock dividend, stock split, recapitalization or other similar transaction.
  - (2) The Company previously registered 6,000,000 shares of Common Stock that may be issued under the Bacterin International Equity Incentive Plan (the "Plan"). This filing is made to register an additional 3,000,000 shares that may be issued under the Amended and Restated Plan.
  - (3) Estimated pursuant to Rules 457(c) and 457(h) under the Securities Act solely for the purpose of calculating the registration fee, based on the average of the high and low prices per share of Common Stock as reported by the NYSE MKT on March 25, 2013 (which is within five business days of the filing hereof).
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**EXPLANATORY NOTE**

This registration statement is being filed pursuant to General Instruction E to Form S-8 to register 3,000,000 additional shares of Common Stock which may be issued under the Amended and Restated Plan following the amendment of the Plan to increase the number of authorized shares from 6,000,000 to 9,000,000. The contents of the Registration Statement on Form S-8 (File No. 333-172891) previously filed by the Company on March 17, 2011 to register 6,000,000 shares of Common Stock which may be issued under the Plan are hereby incorporated by reference into this Registration Statement in accordance with General Instruction E to Form S-8.

**PART II  
INFORMATION REQUIRED IN THE REGISTRATION STATEMENT****Item 3. Incorporation of Documents by Reference.**

The following documents filed with the Commission are incorporated herein by reference:

1. The Company's Annual Report on Form 10-K for the fiscal year ended December 31, 2012 (the "Annual Report"), filed with the Commission on March 27, 2013.
2. All other reports filed pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended (the "Exchange Act") since the end of the fiscal year covered by the Annual Report.
3. The description of the Company's common stock contained in the Registration Statement on Form 8-A filed with the Commission on November 5, 2010, as amended by Form 8-A/A, filed on March 4, 2011 pursuant to Section 12 of the Exchange Act.

All documents filed by the Company pursuant to Sections 13(a), 13(c), 14 and 15(d) of the Exchange Act after the date of this Registration Statement, and prior to the filing of a post-effective amendment which indicates that all shares of Common Stock offered hereby have been sold or which deregisters all shares of Common Stock then remaining unsold, shall be deemed to be incorporated by reference in this Registration Statement and to be a part hereof from the date of filing of such documents; *provided, however*, that documents or information deemed to have been furnished and not filed in accordance with the rules of the Commission shall not be deemed incorporated by reference into this Registration Statement.

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Any statement contained in a document incorporated or deemed to be incorporated by reference herein shall be deemed to be modified or superseded for purposes of this Registration Statement to the extent that a statement contained in this Registration Statement, or in any other subsequently filed document which also is or is deemed to be incorporated by reference in this Registration Statement, modifies or supersedes such statement. Any such statement so modified or superseded shall not be deemed, except as so modified or superseded, to constitute a part of this Registration Statement.

**Item 8. Exhibits.**

The exhibits listed under the caption "Exhibits Index" of this Registration Statement are incorporated by reference herein.

**SIGNATURES**

Pursuant to the requirements of the Securities Act of 1933, as amended, the Company certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-8 and has duly caused this Registration Statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Belgrade, State of Montana, on this 27th day of March, 2013.

BACTERININTERNATIONAL HOLDINGS, INC.

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

**POWER OF ATTORNEY**

We, the undersigned officers and directors of the Company, hereby severally constitute and appoint Guy Cook and John Gandolfo, and each of them individually, our true and lawful attorneys-in-fact with full power to them, and each of them singly, to sign for us and in our names in the capacities indicated below, to the Registration Statement on Form S-8 filed herewith and any and all subsequent amendments to said Registration Statement, and generally to do all such things in our names and behalf in our capacities as officers and directors to enable the Company to comply with all requirements of the Commission, hereby ratifying and confirming our signatures as they may be signed by said attorneys-in-fact, or any of them, to said Registration Statement and any and all amendments thereto.

Pursuant to the requirements of the Securities Act of 1933, as amended, this Registration Statement has been signed below by the following persons in the capacities indicated on March 27, 2013:

<u>Signature</u>	<u>Title</u>
<u>/s/ Guy S. Cook</u> Guy S. Cook	Chief Executive Officer, President and Chairman of the Board of Directors (Principal Executive Officer)
<u>/s/ John Gandolfo</u> John Gandolfo	Chief Financial Officer and Chief Accounting Officer (Principal Financial and Accounting Officer)
<u>/s/ Kent Swanson</u> Kent Swanson	Director
<u>/s/ Mitchell Godfrey</u> Mitchell Godfrey	Director
<u>/s/ Michael Lopach</u> Michael Lopach	Director
<u>/s/ Jon Wickwire</u> Jon Wickwire	Director
<u>/s/ John Deedrick</u> John Deedrick	Director

## EXHIBIT INDEX

<u>Exhibit Number</u>	<u>Description</u>
4.1	Form of Common Stock Certificate (incorporated by reference to Exhibit 4.2 to the Company's Form S-3 Registration Statement filed with the SEC on July 11, 2011)
5.1	Opinion of Counsel*
10.1	Amended and Restated Bacterin International Equity Incentive Plan (incorporated by reference to Appendix B of the Company's Proxy Statement filed with the SEC on June 11, 2011)
23.1	Consent of EKS&H LLLP*
23.2	Consent of Counsel (included in Exhibit 5.1)
24.1	Power of Attorney (included in the signature pages of this Registration Statement)

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\* Filed herewith

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March 27, 2013

Bacterin International Holdings, Inc.  
600 Cruiser Lane  
Belgrade, Montana 59714

Ladies and Gentlemen:

In my capacity as VP & Legal Counsel for Bacterin International Holdings, Inc., a Delaware corporation (the "Company"), I have assisted the Company in connection with the preparation of the Company's Registration Statement on Form S-8 (the "Registration Statement"), filed with the Securities and Exchange Commission (the "SEC") on March 27, 2013 under the Securities Act of 1933, as amended (the "Act"), relating to the registration of 3,000,000 additional shares of the Company's common stock, par value \$0.000001 per share (the "Additional Shares"), which may be issued pursuant to the Amended and Restated Bacterin International Equity Incentive Plan (the "Amended and Restated Plan") in addition to the 6,000,000 shares previously registered on Form S-8 (File No. 333-172891).

In connection with this opinion, I have reviewed such documents and made such examination of law as I have deemed appropriate to give the opinion expressed below. In connection with this opinion, I have assumed the legal capacity of all natural persons, the accuracy and completeness of all documents and records that I reviewed, the genuineness of all signatures, the authenticity of the documents submitted to me as originals and the conformity to authentic original documents of all documents submitted to me as copies.

The opinion expressed below is limited to the Delaware General Corporation Law (which includes judicial decisions interpreting the Delaware General Corporation Law), and I express no opinion as to the effect of the laws of any other jurisdiction.

Based on the foregoing, and subject to the assumptions and qualifications stated herein, I am of the opinion that the Additional Shares that may be issued under the Amended and Restated Plan will be, when issued in accordance with the terms of the Amended and Restated Plan and any agreement regarding a grant under the Amended and Restated Plan, validly issued, fully paid and non-assessable.

In rendering this opinion, I have assumed that each award under the Amended and Restated Plan will be approved by the Company's Board of Directors or an authorized committee of the Board of Directors, that any applicable exercise price will be paid prior to issuance, and that all vesting, tax withholding and other criteria required for issuance will be satisfied prior to issuance of any Additional Shares.

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This opinion is given as of the date hereof, and I assume no obligation to advise you after the date hereof of facts or circumstances that come to my attention or changes in law that occur which could affect the opinion contained herein. This opinion is being rendered for the benefit of the Company in connection with the matters addressed herein.

I hereby consent to the filing of this opinion as Exhibit 5.1 to the Registration Statement. In giving this consent, I do not thereby admit that I am included in the category of persons whose consent is required under Section 7 of the Act or the rules and regulations thereunder.

Very truly yours,

Bacterin International Holdings, Inc.

By: /s/ Jill Gilpin, VP & Legal Counsel

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**CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM**

We consent to the reference to our firm under the caption "Experts" in the Registration Statement (Form S-8) for the registration of 3,000,000 additional shares of common stock and the incorporation by reference therein of our report dated March 27, 2013, with respect to the consolidated financial statements of Bacterin International Holdings, Inc. included in its Annual Report on Form 10-K for the year ended December 31, 2012, filed with the Securities and Exchange Commission.

/s/ EKS&H LLLP

March 27, 2013  
Denver, Colorado

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