



DIVISION OF
CORPORATION FINANCE

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

Mail Stop 4720

July 20, 2010

Mark Selawski
Chief Financial Officer
AtheroNova Inc.
2301 Dupont Drive, Suite 535
Irvine, CA 92612

**Re: AtheroNova Inc.
Registration Statement on Form S-1
Filed June 29, 2010
File No. 333-167866**

Dear Mr. Selawski:

We have limited our review of your registration statement to those issues we have addressed in our 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. Where 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.

FORM S-1

General

1. We note that you are registering the resale of 4,304,318 shares, of which 3,817,596 represent shares underlying convertible notes. Given the size of the offering relative to the number of shares outstanding held by non-affiliates, the nature of the offering and the selling security holders, the transaction appears to be a primary offering. Because you are not eligible to conduct a primary offering on Form S-3 you are not eligible to conduct a primary at-the-market offering under Rule 415(a)(4).

If you disagree with our analysis, please advise the staff of the company's basis for determining that the transaction is appropriately characterized as a transaction that is eligible to be made under Rule 415(a)(1)(i). In your analysis, please address the following among any other relevant factors:

- The number of selling stockholders and the percentage of the overall offering made by each of the selling stockholders;
- The date on which and the manner in which the selling stockholders received the shares and/or the overlying securities;
- The relationship of each selling stockholder with the company, including an analysis of whether the selling stockholder is an affiliate of the company;
- Any relationships among the selling stockholders;
- The dollar value of the shares registered in relation to the proceeds that the company received from each selling stockholder for the securities, excluding amounts of proceeds that were returned (or will be returned) to the selling stockholder and/or its affiliates in fees or other payments;
- The discount at which the selling stockholders will purchase the common stock underlying the convertible notes upon conversion or exercise; and
- Whether or not the selling stockholders are in the business of buying and selling securities.

Dollar Value of Underlying Securities

2. Please provide us, with a view toward disclosure in the prospectus, with the total dollar value of the securities underlying the convertible notes that you have registered for resale (using the number of underlying securities that you have registered for resale and the market price per share for those securities on the date of the sale of the convertible notes).

Payments to the Investor and Affiliates

3. Please provide us, with a view toward disclosure in the prospectus, with tabular disclosure of the dollar amount of each payment (including the value of any payments to be made in common stock) in connection with the transaction that you have made or may be required to make to the selling stockholders, individually and as a group, any affiliate of a selling stockholder, or any person with whom any selling stockholder has a contractual relationship regarding the transaction (including any interest payments, liquidated damages, payments made to “finders” or “placement agents,” and any other payments or potential payments). Please provide footnote disclosure of the terms of each such payment. Please do not include any repayment of principal on the convertible notes in this disclosure.

Further, please provide us, with a view toward disclosure in the prospectus, with disclosure of the net proceeds to the issuer from the sale of the convertible notes and the total possible payments to the selling stockholders, individually and as a group, and any of their affiliates in the first year following the sale of the convertible notes.

Potential Profits on Conversion

4. Please provide us, with a view toward disclosure in the prospectus, with tabular disclosure of:
 - the total possible profit the selling stockholders, individually and as a group, could realize as a result of the conversion discount for the securities underlying the convertible notes, presented in a table with the following information disclosed separately:
 - the market price per share of the securities underlying the convertible notes on the date of the sale of the convertible notes;
 - the conversion price per share of the underlying securities on the date of the sale of the convertible notes, calculated as follows:
 - if the conversion price per share is set at a fixed price, use the price per share established in the purchase and sale agreement; and
 - if the conversion price per share is not set at a fixed price and, instead, is set at a floating rate in relationship to the market price of the underlying security, use the conversion discount rate and the market rate per share on the date of the sale of the convertible notes and determine the conversion price per share as of that date;
 - the total possible shares underlying the convertible notes (assuming no interest payments and complete conversion of the convertible notes);
 - the combined market price of the total number of shares underlying the convertible notes, calculated by using the market price per share on the date of the sale of the convertible notes and the total possible shares underlying the convertible notes;

- the total possible shares the selling stockholders, individually and as a group, may receive and the combined conversion price of the total number of shares underlying the convertible notes calculated by using the conversion price on the date of the sale of the convertible notes and the total possible number of shares the selling stockholders may receive; and
- the total possible discount to the market price as of the date of the sale of the convertible notes, calculated by subtracting the total conversion price on the date of the sale of the convertible notes from the combined market price of the total number of shares underlying convertible notes on that date.

If there are provisions in the Securities Purchase Agreements that could result in a change in the price per share upon the occurrence of certain events, please provide additional tabular disclosure as appropriate. For example, if the conversion price per share is fixed unless and until the market price falls below a stated price, at which point the conversion price per share drops to a lower price, please provide additional disclosure.

Total Potential Profit from Other Securities

5. Please provide us, with a view toward disclosure in the prospectus, with tabular disclosure of:
- the total possible profit to be realized as a result of any conversion discounts for securities underlying any other warrants, options, notes, or other securities of the issuer that are held by the selling stockholders or any affiliate of a selling stockholder, presented in a table with the following information disclosed separately:
 - market price per share of the underlying securities on the date of the sale of that other security;
 - the conversion/exercise price per share as of the date of the sale of that other security, calculated as follows:
 - if the conversion/exercise price per share is set at a fixed price, use the price per share on the date of the sale of that other security; and
 - if the conversion/exercise price per share is not set at a fixed price and, instead, is set at a floating rate in relationship to the market price of the underlying security, use the conversion/exercise discount rate and the market rate per share on the date of the sale of that other security and determine the conversion price per share as of that date;
 - the total possible shares to be received under the particular securities (assuming complete conversion/exercise);

- the combined market price of the total number of underlying shares, calculated by using the market price per share on the date of the sale of that other security and the total possible shares to be received;
- the total possible shares to be received and the combined conversion price of the total number of shares underlying that other security calculated by using the conversion price on the date of the sale of that other security and the total possible number of underlying shares; and
- the total possible discount to the market price as of the date of the sale of that other security, calculated by subtracting the total conversion/exercise price on the date of the sale of that other security from the combined market price of the total number of underlying shares on that date.

Comparison of Issuer Proceeds to Potential Investor Profit

6. Please provide us, with a view toward disclosure in the prospectus, with tabular disclosure of:

- the gross proceeds paid or payable to the issuer in the Capital Raise Transaction;
- all payments that have been made or that may be required to be made by the issuer that are disclosed in response to comment three;
- the resulting net proceeds to the issuer; and
- the combined total possible profit to be realized as a result of any conversion discounts regarding the securities underlying the convertible notes and any other warrants, options, notes, or other securities of the issuer that are held by the selling stockholders or any affiliate of a selling stockholder that is disclosed in response to comments four and five.

Further, please provide us, with a view toward disclosure in the prospectus, with disclosure – as a percentage – of the total amount of all possible payments as disclosed in response to comment three and the total possible discount to the market price of the shares underlying the convertible notes as disclosed in response to comment four divided by the net proceeds to the issuer from the sale of the convertible notes, as well as the amount of that resulting percentage averaged over the term of the convertible notes.

Prior Transactions between the Issuer and the Selling Stockholder

7. Please provide us, with a view toward disclosure in the prospectus, with tabular disclosure of all prior securities transactions between the issuer (or any of its predecessors) and each selling stockholder, any affiliates of the selling stockholders, or any person with whom a selling stockholder has a contractual relationship regarding the transaction (or any predecessors of those persons), with the table including the following information disclosed separately for each transaction:
- the date of the transaction;
 - the number of shares of the class of securities subject to the transaction that were outstanding prior to the transaction;
 - the number of shares of the class of securities subject to the transaction that were outstanding prior to the transaction and held by persons other than the selling stockholders, affiliates of the company, or affiliates of the selling stockholders;
 - the number of shares of the class of securities subject to the transaction that were issued or issuable in connection with the transaction;
 - the percentage of total issued and outstanding securities that were issued or issuable in the transaction (assuming full issuance), with the percentage calculated by taking the number of shares issued and outstanding prior to the applicable transaction and held by persons other than the selling stockholders, affiliates of the company, or affiliates of the selling stockholders, and dividing that number by the number of shares issued or issuable in connection with the applicable transaction;
 - the market price per share of the class of securities subject to the transaction immediately prior to the transaction (reverse split adjusted, if necessary); and
 - the current market price per share of the class of securities subject to the transaction (reverse split adjusted, if necessary).

Comparison of Registered Shares to Outstanding Shares

8. Please provide us, with a view toward disclosure in the prospectus, with tabular disclosure comparing:
- the number of shares outstanding prior to the convertible note transaction that are held by persons other than the selling stockholders, affiliates of the company, and affiliates of the selling stockholders;

- the number of shares registered for resale by the selling stockholders, individually and as a group, or affiliates of the selling stockholders in prior registration statements;
- the number of shares registered for resale by the selling stockholders, individually and as a group, or affiliates of the selling stockholders that continue to be held by the selling stockholders or affiliates of the selling stockholders;
- the number of shares that have been sold in registered resale transactions by the selling stockholders, individually and as a group, or affiliates of the selling stockholders; and
- the number of shares registered for resale on behalf of the selling stockholders, individually and as a group, or affiliates of the selling stockholders in the current transaction.

In this analysis, the calculation of the number of outstanding shares should not include any securities underlying any outstanding convertible securities, options, or warrants.

Intention and Ability to Make All Note Payments and the Presence or Absence of Short Selling by the Stockholders

9. Please provide us, with a view toward disclosure in the prospectus, with the following information:
 - whether the issuer has the intention, and a reasonable basis to believe that it will have the financial ability, to make all payments on the overlying securities; and
 - whether – based on information obtained from the selling stockholders – any selling stockholder has an existing short position in the company's common stock and, if a selling stockholder has an existing short position in the company's stock, in each case, the following additional information:
 - the date on which the selling stockholder entered into that short position; and
 - the relationship of the date on which the selling stockholder entered into that short position to the date of the announcement of the convertible note transaction and the filing of the registration statement (*e.g.*, before or after the announcement of the convertible note transaction, before the filing or after the filing of the registration statement, etc.).

Relationships Between the Issuer and the Selling Stockholders

10. Please provide us, with a view toward disclosure in the prospectus, with:

- a materially complete description of the relationships and arrangements that have existed in the past three years or are to be performed in the future between the issuer (or any of its predecessors) and each selling stockholder, any affiliate of a selling stockholder, or any person with whom any selling stockholder has a contractual relationship regarding the transaction (or any predecessors of those persons) – the information provided should include, in reasonable detail, a complete description of the rights and obligations of the parties in connection with the sale of the convertible; and
- copies of all agreements between the issuer (or any of its predecessors) and each selling stockholder, any affiliate of a selling stockholder, or any person with whom any selling stockholder has a contractual relationship regarding the transaction (or any predecessors of those persons) in connection with the sale of convertible notes.

If it is your view that such a description of the relationships and arrangements between and among those parties already is presented in the prospectus and that all agreements between and/or among those parties are included as exhibits to the registration statement, please provide us with confirmation of your view in this regard.

The Method by which the Number of Registered Shares was Determined

11. Please provide us, with a view toward disclosure in the prospectus, with a description of the method by which the company determined the number of shares it seeks to register in connection with this registration statement. In this regard, please ensure that the number of shares registered in the fee table is consistent with the shares listed in the “Principal and Selling Stockholders” section of the prospectus.

Signatures

12. We note the filing does not include the signature of your controller or principal accounting officer. Please include this signature in an amended Form S-1. See Instructions 1 to the Signatures section of Form S-1.

We urge all persons who are responsible for the accuracy and adequacy of the disclosure in the filing to be certain that the filing includes the information the Securities Act of 1933 and all applicable Securities Act rules require. Since the company and its management are in possession of all facts relating to a company’s disclosure, they are responsible for the accuracy and adequacy of the disclosures they have made.

Notwithstanding our comments, in the event you request acceleration of the effective date of the pending registration statement please provide a written statement from the company acknowledging that:

- should the Commission or the staff, acting pursuant to delegated authority, declare the filing effective, it does not foreclose the Commission from taking any action with respect to the filing;
- the action of the Commission or the staff, acting pursuant to delegated authority, in declaring the filing effective, does not relieve the company from its full responsibility for the adequacy and accuracy of the disclosure in the filing; and
- the company may not assert staff comments and the declaration of effectiveness as a defense in any proceeding initiated by the Commission or any person under the federal securities laws of the United States.

Please refer to Rules 460 and 461 regarding requests for acceleration. We will consider a written request for acceleration of the effective date of the registration statement as confirmation of the fact that those requesting acceleration are aware of their respective responsibilities under the Securities Act of 1933 and the Securities Exchange Act of 1934 as they relate to the proposed public offering of the securities specified in the above registration statement. Please allow adequate time for us to review any amendment prior to the requested effective date of the registration statement.

You may contact Karen Ubell at (202) 551-3873, Dan Greenspan at (202) 551-3623 or me at (202) 551-3715 with any other questions.

Sincerely,

Jeffrey Riedler
Assistant Director

cc: Gregory Akselrud, Esq.
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