



DIVISION OF  
CORPORATION FINANCE

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

Mail Stop 4720

August 16, 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 reviewed your response letter filed July 30, 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. 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**

1. We disagree with your analysis underlying your conclusion that the offering is a secondary offering eligible to be made on a shelf basis under Rule 415(a)(1)(i) based on our consideration of the following factors:
  - the large number of shares to be registered as compared to the number of shares outstanding held by non-affiliates;
  - the significant discount to the market price of the per share conversion price at which the selling stockholders will purchase the common stock underlying the convertible notes upon conversion or exercise; and
  - the selling stockholders' limited investment in the company prior to the Capital Raise Transaction and the limited time periods for which such prior investments were held.

Given these facts, we view the offering as 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). Accordingly, please:

- file a registration statement for the “resale” offering at the time of each conversion because you are not eligible to conduct the offering on a delayed or continuous basis under Rule 415(a)(1)(x);
  - register the transaction on the form you are eligible to use to register the transaction as a primary offering;
  - identify the selling stockholders as underwriters in the registration statement;
  - include the price at which the underwriters will sell the securities.
2. We note your disclosure in your response to prior comment three that no payments will be due to the selling stockholders in the first year following the sale of the Convertible Notes. Please expand your disclosure to include a discussion of the interest accrual terms of the Convertible Notes, as you have elsewhere in the registration statement, that result in no cash interest paid on the notes during that time period.
  3. We note your disclosure in response to prior comment seven. Please revise the tabular disclosure to include only prior securities transactions between you and each selling stockholder and provide such information for each selling stockholder individually rather than in the aggregate. Further, please reconcile your disclosure of outstanding common stock and outstanding non-affiliate public float with your statement in the registration statement that common stock outstanding as of June 23, 2010 was 22,680,927. Please update all other information included in the table to be consistent with any modifications.
  4. We note your response to prior comment nine. Please expand your disclosure to provide a discussion of the future prospects anticipated to materialize on account of the results of your initial study in vivo and the anticipated revenues from such future prospects upon which you based your conclusion that you will have the financial ability to make all payments on the Convertible Notes.

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.

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.

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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.  
Stubbs Alderton & Markiles, LLP  
15260 Ventura Boulevard, 20<sup>th</sup> Floor  
Sherman Oaks, CA 91403