



DIVISION OF  
CORPORATION FINANCE

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

Mail Stop 4720

September 2, 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 August 25, 2010 and have the following comments.

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. Please amend your Form S-1 with the proposed disclosure provided in your response dated July 30, 2010, updated to reflect the reduced number of shares being registered, as well as any additional supplemental information provided in your response letter dated August 25.
2. We note your response to prior comment three. Since the Demand Note transaction and the Revolving Note/Replacement Note transaction were not securities transactions between you and a selling stockholder, please remove both transactions from each table.

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.

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