



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

DIVISION OF
CORPORATION FINANCE

Mail Stop 4720

October 7, 2010

Mr. Daniel Tassé
Chairman and Chief Executive Officer
Ikaria, Inc.
6 State Route 173
Clinton, New Jersey 08809

**Re: Ikaria, Inc.
Registration Statement on Form S-1
Amendment no. 3 filed September 29, 2010
File No. 333-166792**

Dear Mr. Tassé:

We have reviewed your amended registration statement and have the following comments.

Please respond to this letter by amending your registration statement and providing the requested information. If 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

Management's Discussion and Analysis of Financial Condition and Results of Operations

Research and Development Expenses, pages 62-65

1. Please refer to prior comment two. Please label the columns on page 64 for the six months ended June 30, 2010 and 2009 as unaudited.

Critical Accounting Policies and Estimates

Share-Based Compensation, page 69

2. Please refer to prior comment three. We will finalize our evaluation of the issues incorporated in this comment after the estimating offering price has been established and you have provided the requested disclosure.

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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.

You may contact Franklin Wyman at (202) 551-3660 or Mary Mast at (202) 551-3613 if you have questions regarding comments on the financial statements and related matters. Please contact John Krug, Senior Counsel, at (202) 551-3862, or me at (202) 551-3715 with any other questions.

Sincerely,

Jeffrey Riedler
Assistant Director

cc: Steven D. Singer, Esq.
Lia Der Marderosian, Esq.