

Mail Stop 6010

January 24, 2006

David S. Barlow, Chairman
Molecular Insight Pharmaceuticals, Inc.
160 Second Street
Cambridge, Massachusetts 02142

**Re: Molecular Insight Pharmaceuticals, Inc.
Amendment No. 4 to Form S-1 Registration Statement
File No. 333-129570**

Dear Mr. Barlow:

We have reviewed your filing and have the following comments. Where indicated, we think you should revise your document in response to these comments. If you disagree, we will consider your explanation as to why our comment is inapplicable or a revision is unnecessary. Please be as detailed as necessary in your explanation. In some of our comments, we may ask you to provide us with supplemental information so we may better understand your disclosure. After reviewing this information, we may or may not raise additional comments.

Please understand that the purpose of our review process is to assist you in your compliance with the applicable disclosure requirements and to enhance the overall disclosure in your filing. We look forward to working with you in these respects. We welcome any questions you may have about our comments or on any other aspect of our review. Feel free to call us at the telephone numbers listed at the end of this letter.

License and Technology Transfer Agreement with Mallinckrodt, Inc., page 52

1. Please revise the description of the agreement to quantify the upfront payment you are obligated to pay under the agreement. Similarly, revise the description of the agreement on page 73.

License Agreement with Bayer Schering Pharma Aktiengesellschaft, page 52

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2. Please revise the description of the agreement to quantify the upfront payment. Similarly, revise the description of the agreement on page 73.

Solazed, page 64

3. Please revise the disclosure on page 64 to include the sources for the following statements:
 - “Melanin is over-expressed in approximately 40% of melanoma tumors.”
 - “The incidence of malignant melanoma is growing faster than any other cancer in the United States, with an estimated 62,000 people diagnosed annually.”
 - Globally, there are approximately 105,000 new cases per year with 33,000 annual deaths caused by melanoma of the skin.”
 - “Patients with malignant metastatic melanoma typically have a four to six month life expectancy.”
 - “There are approximately 7,500 advanced stage melanoma patients with melanin positive tumors in the United States.”

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As appropriate, please amend your registration statement in response to these comments. You may wish to provide us with marked copies of the amendment to expedite our review. Please furnish a cover letter with your amendment that keys your responses to our comments and provides any requested supplemental information. Detailed cover letters greatly facilitate our

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review. We may have additional comments after reviewing your amendment and responses to our comments.

You may contact Lisa Vanjoske at 202-551-3614 if you have questions regarding comments on the financial statements and related matters. Please contact Mary Fraser at 202-551-3609 or me at 202-551-3710 with any other questions.

Regards,

Jeffrey P. Riedler
Assistant Director

Cc: Gabor Garai, Esq.
Foley & Lardner LLP
111 Huntington Avenue
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