CAMB 546 – Seminar in Medical Virology (revised 8/17/2010)
Spring Semester 2010
Thursday 3-5 pm
Room – 501 Johnson
First date: 1/13/2010
Last date: 4/22/2010
Holidays: 3/11/2010 (break)
14 classes total

A. Title - Seminar in Medical Virology: HIV Pathogenesis

B. Description: This course will introduce students to basic principles of viral pathogenesis, using HIV as a model. The focus will be on illustrating specific elements that relate to disease development, emphasizing (a) molecular virology, (b) pathogenesis, (c) immunology, (d) vaccine development. Offered spring semester

C. Course Directors (team-taught):

Drew Weissman  dreww@mail.med.upenn.edu  215-614-0291
Ron Collman  collmanr@mail.med.upenn.edu  215-898-0913
Rick Bushman  bushman@mail.med.upenn.edu  215-573-8732
Luis Montaner  montaner@wistar.upenn.edu  215-898-9143

D. Students:
E. Plan: One two-hour class weekly for the course of the semester. The first class will be an organizational class, where students select dates/seminars and reading material is distributed, and an introductory lecture. The seminars will begin in week 2.

For each class, one student will present a brief (~20 minute) background presentation of the topic chosen, followed by presentation and discussion of one to two related articles. The student should meet with the course director assigned to each topic in preparation for their session (likely several times), to provide additional papers for background, to assist in focusing the student’s introductory presentation, and in helping analyze the articles. The articles should be distributed by the student via E-mail one week before they are to be discussed. The other students are expected to read the papers in advance and be prepared to participate in the discussion.

To aid in the understanding of the papers and to develop the ability to think beyond the papers, we ask that each student should prepare a short written description of the next hypothesis and experiments that is suggested by the paper. With this, we would like the students to develop the ability to synthesize the data and hypotheses within the paper and develop in their own mind the ability to look beyond the trees and see the forest. Students are encouraged to meet with the course directors if they are having problems reading and understanding the papers or developing what to do next ideas. Of note, if the discussion of the paper says, we will do these experiments in vivo next, we do not want you to simply repeat that back.

F. Prerequisites: A strong background in cell biology, immunology or virology is needed, but specific particular prerequisite courses are not necessarily required. This background could be provided by previous BGS courses for 1st year CAMB students or Module 1 of the medical school curriculum for combined degree students. Alternatively, a very strong undergraduate program could also provide sufficient background. BGS students from grad groups other than CAMB and any others not included in the above two groups need permission of the course director to enroll.

Students who need permission of the course director should contact him prior to the first class to determine if their background is appropriate. The course will be offered spring semester (a fall semester offering would not be suitable as first year students would likely not have sufficient background at that point).

G. Ensuring preparation and participation: Preparation and participation by all students is critical for the class to be interesting and successful. The grade is determined by both the presentation that each student does and the weekly participation by each student in the discussions. Students who feel they have difficulty talking in class or becoming part of a discussion are encouraged to talk to the course directors and will likely be approached by the course directors. The instructors will provide mid-course feedback to each student to help guide class participation in discussions.
H. **Basis for grades:** Grades will be based on (a) weekly preparation and participation in class discussions, (b) student seminar presentations, (c) weekly hypothesis write up, and (d) improvement over the course of the semester. The designated faculty member should meet with the student presenter after their presentation to provide feedback in real-time. In addition, mid-course feedback will be provided to each student regarding their preparation and participation in discussions.

I. **Introductory handout topics:**

- Viral entry
- HIV dynamics
- Reservoirs
- HIV integration & novel drug targets
- Vif & innate antiviral resistance
- Pathogenic & nonpathogenic infection
- Budding and maturation
- Reverse transcription

J. **Schedule & Seminar Topics (3-5 pm on Thursdays):**

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<thead>
<tr>
<th>Spring 2005</th>
<th>Topic</th>
<th>Instructor</th>
<th>Student</th>
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<tr>
<td>14-Jan</td>
<td>Organizational</td>
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<td>21-Jan</td>
<td>Intro lectures</td>
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<td>28-Jan</td>
<td>Entry and drug resistance</td>
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<td>4-Feb</td>
<td>Reverse transcription</td>
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<td>11-Feb</td>
<td>HIV integration</td>
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<td>18-Feb</td>
<td>Innate anti-viral response</td>
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<td>25-Feb</td>
<td>Humoral immunity</td>
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<td>5-Mar</td>
<td>Cellular immunity</td>
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<td>19-Mar</td>
<td>Transmission</td>
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<td>26-Mar</td>
<td>Pathogenic versus nonpathogenic infection</td>
<td>Mirko</td>
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<td>1-Apr</td>
<td>GALT and in vivo targets</td>
<td>Mirko</td>
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<td>8-Apr</td>
<td>Cell-cell transmission</td>
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<td>15-Apr</td>
<td>Vaccines</td>
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<td>22-Apr</td>
<td>Negative regulation of immune responses</td>
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K. Topics and articles (subject to modification)

1. Entry and drug resistance Collman

2. Reverse transcription Bushman

3. Humoral immunity Weissman

4. HIV integration Bushman
   b. Hazuda et al., 2004. PNAS. A naphthyridine carboxamide provides evidence for discordant resistance between mechanistically identical inhibitors of HIV integrase. 101, 11233-11238.

5. Innate anti-viral response Montaner


6. Cellular immunity

Weissman


b. Jinghe Huang1, James J. Goedert2, Eric J. Sundberg3, Thai Duong Hong Cung1, Patrick S. Burke1, Maureen P. Martin4, Liliana Preiss6, Jeffrey Lifson5, Mathias Lichterfeld7, Mary Carrington4, and Xu G. Yu. HLA-B*35-Px–mediated acceleration of HIV-1 infection by increased inhibitory immunoregulatory impulses. 2009 J Exp Med.

7. Transmission

Montaner


8. GALT and in vivo targets

Collman


9. Pathogenic versus nonpathogenic infection Montaner


10. Cell-cell transmission Collman


11. Negative regulation of immune responses Weissman


12. Vaccines


b. Supachai Rerks-Ngarm, M.D., Punnee Pitisuttithum, M.D., D.T.M.H., Sorachai Nitayaphan, M.D., Ph.D., Jaranit Kaewkungwal, Ph.D., Joseph Chiu, M.D., Robert Paris, M.D., Nakorn PremSri, M.D., Chawetsan Namwat, M.D., Mark de Souza, Ph.D., Elizabeth Adams, M.D., Michael Benenson, M.D., Sanjay Gurunathan, M.D., Jim Tartaglia, Ph.D., John G. McNeil, M.D., Donald P. Francis, M.D., D.Sc., Donald Stablein, Ph.D., Deborah L. Birx, M.D., Supamit Chunsuttiwat, M.D., Chirasak Khamboonruang, M.D., Prasert Thongcharoen, M.D., Ph.D., Merlin L. Robb, M.D., Nelson L. Michael, M.D., Ph.D., Prayura Kunasol, M.D., and Jerome H. Kim, M.D. 2009 Vaccination with ALVAC and AIDSVAX to Prevent HIV-1 Infection in Thailand. NEJM 361:2209.