CAMB 546 – Seminar in Medical Virology
Spring Semester 2012
Wednesday 4-6 pm
Room – 501 Johnson
First date: 1/11/2012
Last date: 4/25/2015
Holidays: 3/07/2012 (break)
15 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):
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D. Students:
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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. The second class has introductory lectures. The seminars will begin in week 3.

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 (4-6 pm on Wednesdays):

<table>
<thead>
<tr>
<th>Spring 2012</th>
<th>Topic</th>
<th>Instructor</th>
<th>Student</th>
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</thead>
<tbody>
<tr>
<td>1/11</td>
<td>Organizational</td>
<td></td>
<td></td>
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<tr>
<td>1/18</td>
<td>Intro lectures</td>
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<tr>
<td>1/25</td>
<td>Reverse transcription &amp; innate cellular</td>
<td>Drew</td>
<td>Alex G</td>
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<tr>
<td>2/1</td>
<td>Entry – CCR5 knockout</td>
<td>Una</td>
<td>Alex K</td>
</tr>
<tr>
<td>2/8</td>
<td>Viral assembly &amp; innate cellular resistance</td>
<td>Ron</td>
<td>Shirpa</td>
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<tr>
<td>2/15</td>
<td>Epidemiology of transmission</td>
<td>Ron</td>
<td>Asu</td>
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<tr>
<td>2/22</td>
<td>NK biology &amp; function - Innate immunity</td>
<td>Drew</td>
<td>Alex K</td>
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<tr>
<td>2/29</td>
<td>Integration – Latency</td>
<td>Una</td>
<td>Nick</td>
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<tr>
<td>3/14</td>
<td>Origins of HIV &amp; SIV</td>
<td>Ron</td>
<td>Alex G</td>
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<td>3/21</td>
<td>Mucosal immunology</td>
<td>Drew</td>
<td>Lorenzo</td>
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<tr>
<td>3/28</td>
<td>Antibody structure &amp; function</td>
<td>Ron</td>
<td>Norbi</td>
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<td>4/4</td>
<td>T cell subsets – T cell Vaccines</td>
<td>Drew</td>
<td>Pam</td>
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<tr>
<td>4/11</td>
<td>CTL &amp; HLA - Immune control of HIV</td>
<td>Una</td>
<td>Shirpa</td>
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<tr>
<td>4/18</td>
<td>ART targets - Ongoing replication</td>
<td>Una</td>
<td>Adrienne</td>
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<tr>
<td>4/25</td>
<td>Negative regulation of immunity</td>
<td>Ron-Drew</td>
<td>Nick</td>
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K. Topics and articles (subject to modification)

   IFN-inducible mechanism

2. Entry – CCR5 knockout – Una
   Perez or Cannon mouse model
   NEJM berlin pt

3. Viral assembly & innate cellular resistance – Tetherin – Ron
   Beiniasz or Guatelli – 2009
   Kirchhoff – Vpu vs Nef
   (post discussion of other viruses)

4. Epidemiology of transmission – HIV Transmission – George Shaw guest or Ron
   T/F viruses – Keele & Shaw
   Explant or macaque or hu-Mouse model study

5. NK biology & function - Innate immunity – NK cell control - Drew
   HLA/KIR genetics paper
   Alter & Altfeld – Nature 2011

6. Integration – Latency - Una
   Una to pick 2 papers

7. Origins of HIV & SIV - Nonpathogenic Natural Host - Ron
   Sivelstri Immunity or alternative
   Giorgi early paper

8. Mucosal immunology - GALT and immune activation – Drew
   Brenchley & Douek Nature Medicine 2006
   TH17 RM vs SM

9. Antibody structure & function - B cell Vaccines –Ron
   Glycan shield - Shaw
   Either Phil Johnson Ad transfer OR Dennis Burton FC passive transfer
   (post discussion of Thai trial)

10. T cell subsets – T cell Vaccines –Una
    Picker CMV Nature (may 2011)
    STEP trial paper

11. CTL & HLA - Immune control of HIV – Drew
    Genetics of elite suppressors (HLA)
    T cell correlates of LTNP – Migueles & Connors
12. **ART targets - Ongoing replication under ART (supersensitive VL and 2-circle LTR) - Una**
   - No intensification effect
   - Yes intensification effect

13. **Negative regulation of immunity – PD1 and exhaustion – Ron**
    - PD-1 blockade in SIV infection – Velu & Amara Nature 2009