Biology 367: Topics in Infectious Diseases Fall 2007

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New and old disease-causing agents emerge out of obscurity every year and have an enormous impact on the world we live in, as seen during the recent SARS outbreak and in recurrent influenza epidemics over the 20th century. In Bio067: Emerging Diseases, we will discuss the biology of bacteria, viruses and other agents that cause infectious diseases and how scientists study infectious disease. This seminar course associated with Bio067 will allow students with a background in cell and molecular biology to participate in Bio067 while exploring relevant topics in greater depth through discussion of scientific research articles. Bio367 students will actively participate in Bio067 by acting as small group discussion leaders and "biology consultants" in class (Tu/Th 11:30-12:55) and helping mentor final group projects. Although Bio367 students will not take Bio067 exams, they will be expected attend class and to read the assigned texts. In addition, Bio367 students will meet on Mondays from 1-2:30 to discuss a paper from the scientific literature that relates to infectious diseases. The class will focus on learning to read the scientific literature, participating in active discussions of the papers, developing scientific writing and presentation skills, and mentoring students with limited science background. This course is designed for students who: have a strong molecular/cellular biology background (hence the prerequisites), are interested in infectious diseases, want to experience learning through teaching (i.e. enjoy helping others learn) and like to talk with other people about science.

Requirements and Grading Criteria

Leading discussions (2):	**30% (15% each)**
Overall participation:	**15%**
Short perspective paper:	**15%**
Final paper:	**25%**
Participation in Bio 067:	**15%**

Discussions:

Our weekly meetings this semester will be dedicated to **analyzing one or two articles** from the infectious disease literature. Articles will be available at least a **week in advance** either on the **library website** or as a **link from the course website**. People will be assigned to lead the discussion for each class period, and the discussion should include:

1. A **broad overview** of the **main question(s)** the paper addresses
2. A **brief description** of **background information** relevant to the paper
3. An exploration of the **experiments** described in the paper--**how** were they **performed**, what **results** were found and **how** should we **interpret** them (is our interpretation the same as the authors'?)?
4. **Speculation** about what **follow-up experiments** could be performed and **how** the authors might have **improved** the experiments (are all the proper controls present?).

For the first two weeks, I will lead the discussion. People who are **not assigned to lead** the discussion should **read the papers carefully** and **contribute ideas to a Blackboard discussion site before class**, to help stimulate discussion.

We will have the **most fun** and **learn the most** if **everyone participates** in discussions, therefore overall participation is worth a significant percentage of the final grade (including the above sheets). **If** it becomes clear that **non-presenters are not reading the articles carefully** before class, the **pre-discussion requirements may change to include more analysis of the articles**.

Short paper:

To **practice scientific writing**, there will be **a short "perspective" review paper** (3-4 p) exploring articles we have read in a broader context. These papers will be described in more detail in a couple weeks and will be modeled on similar papers we are reading for class.

Final project:

We will only be able to scratch the surface of many fascinating topics related to infectious diseases. For your final project you will select a topic related to infectious diseases that you wish to investigate in more depth. You will write a **12-15 p. review article** will be due on **Fri., Dec. 14**. In addition to allowing us all to learn more about infectious diseases, the final projects will allow you to **hone your research, critical reading and writing**. Since you are writing a review article, your paper should be **based on the primary literature** (research articles) rather than on information culled from other reviews. **Everyone** will submit a **draft** of the paper on **Wed., Nov. 28** so that reviewers can read the papers by our meeting the next week. This final meeting of the class may be spent in a group discussion of each paper to help everyone in the revision process.

Given the importance of this project, there are several **intermediate deadlines** (see schedule above) to help you maintain an appropriate pace over the semester. If anyone is interested in meeting with **Sue O'Dell in Hatch library** to get an overview of how to best use the resources there for your projects, please let me know. You will likely need to use a wide range of resources including interlibrary loan, since there are a number of potentially useful journals that we do not receive. More information on the format for these projects and potential topics will be handed out later in the semester. In the meantime, **keep your eye out for topics you find particularly interesting ...**

Work with Bio 067:

The majority of students enrolled in Bio067 have little or no background in science. Bio367 students will be critical to the success of Bio067 by **acting as "scientific consultants" for Bio067**. Over the course of the semester there will be **4 Bio067 classes dedicated** to breaking down into small groups to **discuss readings**. While **Bio367 students** will only **lead the first** of these discussions (with me floating between different groups), they will **help answer scientific questions** for the group and therefore facilitate the discussions. Bio067 students will be writing a "discussion preparation" to help stimulate discussion. Before these discussions, Bio367 students will either a) prepare to help answer questions by **writing down at least 5 questions** they think the Bio067 students may have about the readings and **how they might be addressed** or b) writing a "preparation" that is more similar to the Bio067 prep. All sheets will be turned at the end of the class. Bio367 will also facilitate "fun-filled activities" (e.g. activities to explain the Central Dogma of Molecular Biology (DNA-->RNA-->protein) and basic immunology) or problem-solving sessions in class. Lastly, Bio367 students will act as **scientific consultants for Bio067 projects** in which **groups of 2-3 students** construct a **poster** about an infectious disease issues. Bio367 folk will help by **answering scientific questions** and **helping the group read a paper from the primary literature** (Bio367 students will **not** perform literature searches, write outlines or construct posters for the group!). I will evaluate your participation in Bio067 by floating among discussion groups, reading question/answer sheets, and consulting student evaluations at the end of the semester.

Bio367 assignment deadlines and class schedule

Week of

9/3 Mentor training and introduction to infectious diseases and host responses

Readings:

1. *Basic overview of the immune system:* National Institute of Allergy and Infectious Diseases and National Cancer Institute (2003) "Understanding the Immune System: How It Works. NIH Publication #03-5423 pp. 1-28. (see link on course website)
2. *More details about the immune system*: Mims, Ch. 2-3

9/10 Tuberculosis and the innate immune system

Discussion prep for Bio067 discussion Tuesday, Sept. 11

9/17 Adaptive immunity and Ebola virus

9/24 Influenza

Discussion prep for Bio067 discussion Thursday, Sept. 27

10/1 SARS and anthrax

First short paper due Friday, Oct. 4

10/8 **FALL BREAK**

Final project topic due Friday, Oct. 12

10/15 Urban life, microbes and STDs

Final project literature search due Friday, Oct. 19

10/22 AIDS: The early years

Discussion prep for Bio067 discussion Thursday, Oct. 25

10/29 AIDS: Current HIV research

Questions/responses for Bio067 discussion Thursday, Nov. 1

Final project descriptive paragraph due Friday, Nov. 2

11/5 Hantavirus

11/12 Lyme disease

Final project outline due Thursday, Nov. 15

11/19 Prions

THANKSGIVING

11/26 Humans, the environment and disease

Final paper draft due to reviewers Wednesday, Nov. 28

12/3 Discussion of final paper drafts

Final paper reviews due Monday, Dec. 3

12/10 ***Final paper, final draft due Friday, Dec. 14***

This tentative outline may change slightly as the semester progresses.