**Fall 2006**

# Biology 243
# Topics in Molecular and Cellular Biology

**Meetings:** We will meet from 1:30-4:30 every Wednesday in Barnum 113. The first class will be Sept. 6, the last Dec. 6. There will be no class on Nov. 22.

**Instructors:**
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Mitch McVey, Dana 024, x7-4196, mitch.mcvey@tufts.edu

Office Hours: Mondays, 2-3 P.M. or by appointment

**Prerequisites:** Biology 105 (Molecular Biology) or consent of Dr. Freudenreich and Dr. McVey

**Papers:** All papers will be posted on the course Blackboard site: http://blackboard.tufts.edu/. Most papers are available electronically and can be accessed through the library catalog: http://www.library.tufts.edu/tisch/ by clicking on the electronic journals link.

**Class Objectives:** The aims of this graduate seminar course are:
1) To learn to read and evaluate papers from the primary literature in the area of molecular and cellular biology.
2) To understand modern experimental methods used to ask fundamental questions.
3) To practice synthesizing, presenting and critiquing original research.
In the course of reading, evaluating and presenting papers, we will also learn about the latest research in the selected areas of molecular and cellular biology we have chosen to cover.

Each class will be conducted as a "journal club". Two people will each present a paper. Each presentation should last approximately one hour and give background information needed to understand the paper, present the results figure-by-figure, and include a discussion and evaluation of the results. Everyone is expected to read the reviews and original papers assigned so that they can participate in the discussion.

**Grading:** 40% from presentations, 40% from position papers, 20% from class participation. You do not need to turn in a position paper for any week that you are presenting. In addition, each student will be excused from turning in **two** other position papers; these can be on the same week or different weeks.

**Meeting with Professors:** Each student is expected to arrange a meeting time with the professor on the Monday prior to their presentation to go over the presentation and clear up any questions. You should have read all papers and have an outline of your presentation prepared before this meeting. After your presentation, we will schedule a brief post-presentation meeting to communicate your grade and to provide feedback.

**Guidelines:**

**1. Presentations:** Presenting a paper involves three aspects. *First*, you should give some background that will help the other students understand the paper and put the paper in the context of other research in this area. You should focus on introducing background that relates to the paper. In some cases it is helpful to review previous results by the same authors that lead to the paper you are presenting. *Second*, you should go through the paper figure by figure. Your role here is to point out what the purpose for each experiment is and to assist the class in evaluating the data. To properly evaluate the data you must understand how the experiment was done and look up any techniques you are unfamiliar with. You should present supplementary data if you feel that it adds significant value to the discussion. *Third*, you should facilitate a discussion with your fellow students. Ideally, other students will interject their opinions of the experiments as you present each one. You can encourage participation by pausing to ask specific questions ("I thought that a control was needed in this experiment, does anyone agree, and if so what control is needed?"). You should also summarize the author's conclusions (usually found in the Discussion section of the paper) and encourage a discussion of these conclusions and future lines of inquiry suggested by these studies.

<u>Grading of Presentations</u>
30% - quality of background given – does it set up the paper well and include discussion of any background data or techniques needed to understand the paper?
35% - presentation of the figures
15% - role as discussion leader
20% - summary and discussion of conclusions/future directions

**2. Class Participation:** Learning to participate in a meaningful discussion of scientific data is a major goal of this course. You can only participate if you have read all assigned papers and come to class prepared. During the presentation, it is OK to interrupt (politely) to ask a question or make a comment. You should not save all your questions/comments until the end. Active participation by everyone makes for a lively and interesting discussion. Your opinion is important, and you are encouraged to express it.

**3. Position Papers:** For each class, everyone will be expected to hand in two "Position Papers" at the beginning of class (one for each article covered). Each paper should consist of two parts (see below). Suggested length is one page, max length is two pages. Leave 1.25 inch margins so there is room for us to write comments. Position papers will be graded equally on the summary and position paragraphs.

*First*, a summary, in either paragraph or outline form, of the results and conclusions of the paper. As you read each paper, consider the following points:

- *What specific questions were the researchers attempting to answer?*
- *Why were these questions thought to be important?*
- *What is the main point or message conveyed by each paper?*
- *What line of reasoning or form of evidence is used to support this point?*

*Second*, a "position" paragraph that states what you liked or disliked about the paper, how it contributes to the field, and what next steps could be taken. You could also discuss how it relates to other papers we have read. For example:

*-How did the work contribute to extending or transforming what was already known?*
*-How well did the data support the author's conclusions?*
*-What further lines of inquiry are suggested by these studies?*
*-What unifying concepts are addressed by this group of papers?*
*-How do these papers differ in their approaches?*

**Topics, Fall 2006**

**Weeks 1-3 (Freudenreich):** Chromatin dynamics in the context of DNA repair: histone modification, histone variants, and nucleosome remodeling

**Weeks 4-6 (McVey):** The milieu of small RNAs and gene regulation: siRNAs, miRNAs, piRNAs, rasiRNAs

**Weeks 7-9 (Freudenreich):** Genome Instability: gene duplications, deletions, amplifications
OR DNA replication: replication factories, origins, forks

**Weeks 10-12 (McVey):** Beyond DNA: protein modifications and their role in development, regulation of biological rhythms