Bio66/Bio166: The Molecular Basis of Cancer
Winter 2015

Instructor: Professor Natasha Grotz
Tuesday/Thursday 10-11:50am, LSC Room 105
Office Hours: Sundays 5:00-6:00pm, 231 LSC

OBJECTIVES
1. To learn how to critically read primary scientific literature
2. To improve formulating and defending arguments
3. To practice experimental design
4. To understand how basic biological processes are misregulated in cancer
5. To gain an appreciation for how basic research informs/has informed our understanding of cancer

We will use the primary scientific literature as a framework for training critical thinking and data analysis. We will work together to help you develop skills that you can then apply beyond biomedical science to any field where information or data have to be evaluated, analyzed and synthesized.

Organization
This course will be a mixture of small group problem solving/active class discussion of the primary literature and short lectures. In general, each 2-hour session will be divided into a combination of small group discussions and classroom discussion of a scientific paper. One or two papers will be discussed in depth each class session. In some classes, there will be a short lecture providing background material for the next class paper.

Grading
20% active participation in discussion
80% assignments
  -15% first
  -45% second (15% background presentations, 20% paper presentation, 10% News & Views article)
  -20% third

Participation
Discussion participation will be based on a student asking thoughtful questions, willingly offering answers to questions in class and generally fueling the classroom dialogue. This can make the difference between letter grades. If you hide in the back with a computer open and rarely speak, this can adversely affect your final grade in the course.
Assignments
Assignment 1: You will be given a paper to read and a series of questions to answer.
Assignment 2: As a team of four, two of you will present the background material for a primary research article from the current cancer literature to the class. The other two will then lead an in-class discussion major findings of the paper. You will then repeat this process with the two who presented the background presenting the primary literature paper and vice versa. You will independently prepare a “News and Views” review of the primary research paper presented by your group in the first round of presentations.
Assignment 3: You will prepare a written review of a recent paper. This article will be one of the articles presented by your classmates for assignment 2.

For all three assignments, each student must independently write their assignment in their own original words. Any suspiciously similar prose on assignments will be considered in light of the honor code. Late assignments will not be accepted without substantial penalty.
Written material will be evaluated for content as well as creativity, clarity, brevity and quality of writing.

Details on Second assignment Presentation
For the presentation, students will work in small groups of approximately four students. Each group will complete Part 1 and Part 2 twice with each student within the group completing Part 1 and Part 2 once.
Part 1: Introduction and Background: This 25-minute presentation should set up the class discussion of the article that will take place the following class period or following week (see Part 2). This presentation should go over the specific relationship of the subject matter to disease, the key discoveries/experiments that led up to the question being asked in this paper as well as providing a quick review of any fundamental molecular biology or any special experimental techniques that would assist the rest of us in preparing to read the article that you chose.
Part 2: Lead In-Class Discussion (~50 minutes): Prepare slides and talking points directly related to the article that you chose. You should dedicate the final 10 minutes to your own thoughts as to what major questions are raised by the paper and what type of experiments might answer them.

Written
For the written section, each student will submit one “News & Views” article based on the paper their group presented in the first round of presentations. A “News & Views” article is written for a broad scientific audience, and it should appeal to all biologists and hopefully other scientists with some interest in biology. These articles are approximately two pages long and contain eight to 12 references to reviews and key papers from the primary literature. Often they will include an illustrated figure (different from any figure in the paper) that summarizes the central point of the paper. These articles highlight what is remarkable about the work in the broad context of cancer biology and the particular sub-field within cancer biology. Depending on the particular paper being covered, the “News & Views” article could compare this approach (favorably and/or unfavorably) to others that are being currently pursued in the field, describe how a new approach has allowed the researchers to overcome a major barrier in this field and/or describe how this finding will have a direct impact cancer research.
Details on Third assignment
Practice peer review process (2 page review)
You will pretend as if you have been asked to review an article before publication. As part of your review you will:
1. Put the work into context by describing what it adds to current knowledge in cancer biology
2. Critically evaluate the main experiments.
3. Summarize the major conclusions that can be made based on how you interpret the experiments. This may differ from what the authors conclude!
4. Present an alternative interpretation of at least one experiment and/or the major model presented in the paper.

Honor code
In all written material submitted for this course students are expected to obey the honor code. This means that unless otherwise stated, assignments are performed and written independently and that any external sources used in preparing assignments are formally cited. Only original research articles, reviews, articles, textbooks, or personal communication with researchers may be cited; Website URLs are not appropriate references. In addition to putting a list of references at the end of the assignment, you need to note with a number or with the author, date within your text whenever you use a reference.

Reading
Each week, original research papers will be discussed. Papers for the week will be posted by Saturday. It is essential that you read the assigned papers before class begins. Additional background readings that may aid in your analysis of papers will be posted along with papers on Canvas.

Professor-led Topics
In January, we will focus on oncogenes and tumor suppressors.

Student-led Topics
At the end of January and in February/early March, we will focus on student presentations, the topics of which will be selected by the groups in conjunction with me. These should include aspects of some of the other hallmarks of cancer. A draft of the presentation schedule is on Canvas; the final draft will be available when the groups are assigned in mid-January.

Written Assignment Dates
Assignment 1: This assignment will be posted by January 16th and will be due at the start of class on January 20th.

Assignment 2: Groups will be determined by January 15th; topics for the first round of presentations must be approved by January 23rd. Topics for the second round of presentations must be approved by February 13th. “News & Views” written assignments are due one week after the presentation of the paper and will only be done for the first round of presentations.

Assignment 3: The article will be assigned by March 5th, and your review is due at the beginning of class on March 10th.