

Biology 465

The Molecular Basis of Cancer (Fall 2011) TWF 8:30-9:30

Instructor: P. Howard 053A Petch Hours Mon, Thurs 10-11 am or by appointment (250 472-4074) email phoward@uvic.ca

Description:

This course will cover molecular events that lead to cancer. The course will be divided into modules structured around the major sites of cancer, including leukemia, breast, and colorectal cancer. Special emphasis will be placed on understanding the signal transduction pathways important in driving tumorigenesis in each of the sites, in particular the role of tumor suppressors and oncogenes. We will also discuss the role of stem cells, and the concept of the cancer stem cell. The course will alternate between formal lectures and assigned reading and discussions. The goal of the reading/ discussion groups will be to introduce students to role of scientific discovery in the development of cancer treatments. The use of genetic tools such as transgenic and knockout mouse models to dissect oncogenic pathways will be examined, and experimental design will be discussed. Pathways and molecules to be included are: Wnt/Bcatenin, Rb and p53, cyclin D, ras/raf mapk, src, ErbB2, TGFB, BCL/BCLx, Bad, Bax , TNFR, NF κ B, IAP/Diablo, BCR-ABL, PI3K and AKT, VEGF and the genes involved in inherited forms of cancer. Students are expected to have familiarity with cell biology and cell signaling – i.e. have taken biology 360, bioc 300, and/or bioc 403. For those students who wish to review this material, there is an excellent textbook by Dr. Robert A. Weinberg, “The Biology of Cancer” by Garland Science (ISBN 0-8153-4076-1). This is not a required text but is a useful reference for students who feel they have a deficiency in their background or who simply learn better from textbooks.

Course Material:

There is not an assigned text for the course, rather topics will be drawn from primary and review literature which will be assigned during class and links posted on Moodle. Reading assignments are mandatory and will be included in the evaluation (**ie on the midterm and final exams**). In addition, when readings are assigned for a discussion lecture, students must come to the lecture prepared to discuss the paper and having read the assigned reading. Students are also expected to attend all the lectures, to take notes, to participate in discussions.

Preliminary Schedule (subject to change):

Week Topic

1. Hallmarks of Cancer: Introduction to concepts, terms and overview, Define the hallmarks
2. Introduction to mechanisms of cancer development, oncogenes, and tumor suppressors how they relate to the hallmarks of cancer
3. Mechanisms of mutagenesis (Dr. Glickman)
4. Oncogenic addiction, Introduction to Leukemia, Chronic myelogenous Leukemia
5. Melanoma and BRAf mutations
6. AML and introduction to stem cells
7. Breast cancer introduction/**midterm1 October 7**
8. Breast Cancer Molecular Topics / inherited breast cancer
9. Breast Cancer topics/stem cells
10. Colon cancer introduction
11. colon cancer **midterm 2 November 4**
12. Angiogenesis introduction/Reading break
13. Apoptosis
14. Targeted cancer therapies/

Course Evaluation:

Midterm 1 25% **Friday October 7 2011**

Midterm 2 25 % **Friday November 4 2011**

Final Exam (comprehensive) 50% date to be determined.

Students are expected to be present for all midterm exams on the specified dates. The Biology Department does not allow supplemental Final Exams nor will deferred midterm exams be granted. Failure to write a midterm test will result in a grade of 0% for the exam unless for illness, accident, or family affliction, and students must provide the appropriate documentation within 48 hours after the midterm exam. Students who miss the first midterm exam for one of the legitimate, documented reasons listed above will have the weight of the exam added to the next midterm and final (10% and 15% respectively). Students who miss the second midterm exam for one of the legitimate, documented, reasons listed above, will have the weight of the exam added to the final exam. Deferral of a final exam must be requested with an Academic Concession form and submitted directly to Undergraduate Records. Deferred final exams for fall term courses will be arranged by the instructor. Deferred final exams for spring term courses will be arranged through Undergraduate Records and must be written

Course Outline Biol 465

before the end of the summer term as stipulated in the University Calendar.

Students are expected to take notes during class, copies of slides will be provided on moodle before class, however these notes should not be considered complete and students are responsible for all material discussed in class, drawn on board etc. Plagiarism, sharing of assignments, and copying are all academic offences. While students are encouraged to talk to one another about class material, submitted material must be your own work. Grading will be based on answering of short and long answer exam questions. The exams will test the student's ability to think and incorporate concepts and ideas, and design experiments. Understanding of material will be tested and memorizing the lecture handouts will not be sufficient. This course is not a cancer survey course. Students are expected to have completed 3rd year Cell biology and Biochemistry, and the onus is on students to review pertinent material as needed.

The total mark, calculated from the marks on all of the exams and assignments according to the weighting scheme above, will be converted to a percentage and then to a letter grade in the following way:

90-100%	A+
85-89.9	A
80-84.9	A-
75-79.9	B+
70-74.9	B
65-69.9	B-
60-64.9	C+
55-59.9	C
50-54.9	D
0-49.9	F