

Bi123
The Biology of Cancer

Instructor

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Course background and learning outcomes

Cancer has been a recognized disorder for many centuries, but was not considered a serious threat to human health until the 1900s, when advances in medical science began to mitigate the more common forms of morbidity and mortality. Cancer is a collection of over one hundred diseases that show various clinical differences, but have similar underlying causes and effects: the normal genetic controls of cell division malfunction, allowing a cell to undergo unrestrained multiplication, usually leading to an anomalous mass of cells (a tumor), some of which may spread to distant locations in the body to establish further tumors. Cancer is thus rightly called a genetic disease. We will focus our attention on the genetics and cell biology of cancer since tremendous advances in our understanding of the initiation and progression of cancers, and in the promise of effective treatment, have been realized in the past two decades through basic research in genetics and cell biology.

This is an introductory course, meaning nothing more than that there are no prerequisites for enrollment. Though a background in biology is useful, it is neither essential nor necessary. This course will be taught under the assumption that students have no more than a high-school level familiarity with basic life sciences (specifically regarding cells and genes). Those who have no experience with or recollection of biology may find the pace of this course quite rapid; those well-versed in biology may find the pace rather slow at times. Most of the material, however, will be new to all students.

There is a considerable amount of unique terminology in all branches of the life sciences, and this is perhaps most evident in medicine. While we will endeavor to minimize the use of such terminology as can be reasonably done without creating confusion, we will still develop an extensive vocabulary to describe processes or components specific to cell biology, genetics, anatomy, physiology, and cancer. You should approach this course as if you are taking an introductory course in a foreign language, and routinely review the vocabulary in common use.

By the end of the term we hope that you will have developed a thorough understanding of the biological basis of cancer—its causes, conditions, treatments, and prognoses. This can benefit you in several ways: you should be much better able to evaluate scientific articles on cancer in the popular press; you may become an effective advocate, interpreter, or liaison for a family member or friend facing cancer; you can make more educated choices if you should become a cancer patient yourself; and you may be motivated to adopt a lifestyle that significantly minimizes your lifetime risk of developing cancer.

Format

There will be three 50-minute lectures each week. Attendance is not mandatory, but much of the information that you will be expected to assimilate (and demonstrate on exams) will not be found in the reading. Slides used in the lectures will be made available on Blackboard as pdf files a day or two before each lecture. Detailed notes for the week's lectures (except for those of guest speakers) will be posted on Blackboard at the end of each week.

Labs

Many of the lab sessions are designed to give students "hands on" experience with materials related to the course content, such as viewing cells and tissues in microscopes, and examining the harmful effects of ultraviolet light on cells. Attendance for most of the sessions will count toward your course grade, and there will be work to be completed before or during these sessions. The schedule and details will be provided during the first week's lab session. It is important that you go the "Lab" link on Blackboard each week for instructions and assignments pertaining to the session for that week. You must attend the section in which you enrolled, and you cannot make up an absence by attending a different section.

Packet, text, and references

A course packet that contains selected readings is recommended, and can be purchased at the UO Bookstore. If a packet is not available, you must request one at the UO Bookstore, and they should have it for you within 24 hours.

The required text for the course is *One Renegade Cell*, by Robert Weinberg. Weinberg's focus is the molecular basis of cancer biology, but his clarity and effective use of simple analogies make the text accessible to the layperson. A copy of the book will be placed on in-library reserve in the Science Library.

A broader general text is the out-of-print *Cancer: The Misguided Cell*, by David Prescott and Abraham Flexer. *Principles of Cancer Biology*, by Lewis Kleinsmith, is a good introductory text, though its detail goes beyond the scope of this course. For a yet more detailed treatment of several topics, *The Biological Basis of Cancer*, by Robert McKinnell, et al., is an excellent resource. Copies of these books will be on reserve in the Science Library.

Course website

The course Blackboard site contains the lecture and lab schedules, course announcements, staff contact information and office hours, lecture PowerPoint slides, weekly lecture notes, supplemental reading material, homework assignments, i►clicker answers, current assignment scores, and related links.

Grading

Each student's course grade will be determined from the highest score derived from 3 methods:

	<u>Method 1</u>	<u>Method 2</u>	<u>Method 3</u>
Exam 1	100 pts	140 pts (100 x 1.4)	-
Exam 2	100 pts	-	140 pts (100 x 1.4)
Final exam	150 pts	210 pts (150 x 1.4)	210 pts (150 x 1.4)
Lab	60 pts	60 pts	60 pts
Homework	75 pts	75 pts	75 pts
Lecture participation	25 pts	25 pts	25 pts

Exams will be based upon lecture material, reading, and lab section material. The second exam is not cumulative, but the final exam is cumulative. Seven lab sessions will count toward your grade (10 points each; the lowest score will be dropped). Three 25-point homework assignments will be given during the term. They will be posted on Blackboard, and will be due at your lab section on weeks 3, 6, and 9. The "Lecture participation" component of the grading is in the form of i►clicker responses. These will be used in most lectures, and answers do not have to be correct for you to receive credit. Only 90% of the responses will be counted so that you won't necessarily be penalized for a few missed sessions. See below for i►clicker policy and registration.

No other opportunities for points will be offered. Early or makeup exams will NOT be offered. Please do not ask for exceptions.

If you miss a midterm exam your grade will be based upon the Method 2 or Method 3 scores. Late homework assignments will be accepted the day after they are due (at lecture on Friday), but will be worth only 15 points. Assignments later than that will receive no credit. Absences from lab sessions cannot be made up. Participants in Club Sports activities do not receive exemptions from any of the above policies.

Class conduct

Class starts promptly at 3:00 and ends at 3:50. Please arrive on time and do not pack up before the conclusion of the lecture. Arriving late and leaving early is disruptive to others around you and to the speaker. Do not talk during lecture in a volume audible to anyone but the intended recipient. Please do not use any electronic devices during class; they are of no help to your learning, and are distracting to those around you and to the speaker.

Computers will not be allowed in lecture. If you have a requirement for using a computer to take notes, please make accommodations with me on the first day of class. Your use of the computer may be monitored by a teaching assistant.

All work submitted in this course must be your own and in your own words. Instances of suspected cheating or plagiarism on exams, quizzes, homework, and lab work will be referred to the Office of Student Conduct and Community Standards. Such cases are taken seriously, and charges of academic misconduct will be pursued to the fullest extent allowable. Sanctions may

include a failing mark for the course. For definitions of violations, a description of the hearing process, and a summary of penalties for findings of academic misconduct, go to

<http://uodos.uoregon.edu/StudentConductandCommunityStandards/StudentConductCode.aspx>

Accommodations for students with disabilities

If you have a documented disability and anticipate needing accommodations in this course, please make arrangements to meet with me as soon as possible, and not later than January 12. Please bring a notification letter from the Accessible Education Center outlining your approved accommodations.

Bi123 i►clicker policy and registration

Since lecture participation via polling by i►clickers constitutes nearly 5% of your total score in this course, it is recommended that you purchase an i►clicker remote from the UO Bookstore. Either version of the i►clicker will work for this course.

In order to receive credit for in class use of the i►clicker, you will need to register your i►clicker remote on Blackboard. You must have come to class at least once and responded on all questions posed during that lecture in order to complete this registration properly. Once you have responded in at least one class meeting, go to the “Clicker resources” section in the Bi123 Blackboard site, and complete the registration form. Please try to complete the registration by the third week of class.

The i►clicker response system will be used most days in class, and you are responsible for bringing your remote daily. I will not accept written responses from students who do not bring their remotes to class. However, since not all (90%) of the responses are counted toward a student’s total score, missing a couple of sessions will not necessarily result in a lower participation score.

Since the use of i►clickers in this course contributes to each student’s final grade, in-class misuse of these devices may be considered as acts of academic misconduct; this includes the loaning your i►clicker to a classmate who registers responses in your absence from lecture. If a student is caught using two i►clickers, both that student and the owner of the loaned device will, at the very least, lose all clicker points for the term. The few points gained from such actions is not worth the risk of a misconduct charge.

Bi123 Lecture Schedule, Winter 2015

Week	Date	Topic	Reading*
1	Jan. 5	Introduction	Bb: Cancer's Crush ORC: 1-3
	Jan. 7	Cancer trends	P: 51-59
	Jan. 9	A primer on cells	ORC: 3-6 P: 8-12
2	Jan. 12	Cancer definitions; Cell types and tissues structure	P: 13-15
	Jan. 14	Tissues structure, continued; Skin cancer	
	Jan. 16	Skin cancer, continued	
3	Jan. 19	Martin Luther King day—no class	
	Jan. 21	Cell division, the cell cycle, and chromosomes	ORC: 95-104; 121-136 P: 16-22
	Jan. 23	Chromosomes, DNA, and Proteins	ORC: 6-12 P: 39-44; 48-49
4	Jan. 26	Genes, mutations, and cancer	ORC: 18-20 P: 24-26
	Jan. 28	Cancers of the blood	P: 67-73
	Jan. 30	Midterm Exam	
5	Feb. 2	Carcinogens, mutagens and the environmental risk factor	ORC: 13-24; 55-61; 151-156 P: 79-86
	Feb. 4	Heredity	P: 26-38
	Feb. 6	Hereditary risk factor and familial cancers	ORC: 87-93 P: 75-77
6	Feb. 9	Retinoblastoma and tumor suppressor genes	ORC: 63-74
	Feb. 10	Tumor suppressor genes, continued	ORC: 75-78; 108-112
	Feb. 13	Oncogenes	ORC: 25-35; 37-44
7	Feb. 16	Angiogenesis and Metastasis	ORC: 141-149 P: 61-66
	Feb. 18	Dr. David Greenberg: Radiological diagnosis	
	Feb. 20	Multi-step development of cancer	ORC: 45-53
8	Feb. 23	Midterm Exam	
	Feb. 25	Dr. Jonathan Meyers: Colorectal cancers	ORC: 79-85; 91
	Feb. 27	Jeneva Foster Anderson: Chronic infections and cancer	ORC: 136-140
9	Mar. 2	Kate Karfilis: Cancer stem cells and brain cancer	P: 77-83
	Mar. 4	Women's cancers: Breast	ORC: 60-61; 154-155
	Mar. 6	Men's cancers: Prostate	ORC: 60-61; 154-155 P: 107-111
10	Mar. 9	Dr. Christopher Corless: Targeted therapeutics	ORC: 156-164 P: 87-92
	Mar. 11	Dr. Vern Katz: Cancer in pregnancy	
	Mar. 13	Lung cancer	P: 97-102
	Mar. 17	Final Exam—2:45-4:45 in 123 Pacific	

*Reading is from:

ORC: *One Renegade Cell*

P: Course packet

Bb: Blackboard (Supplemental reading)