

BI435 – Cancer Biology

Fall 2017

Syllabus

Instructor: Dr. Michael Weichhaus
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Office Hours: Tue: 13:00-16:00, Thu: 13:00-16:00
Class Hours: TTH 11:30-12:50 Henry Hall 225

Texts:

- The Biology of Cancer, 2nd Edition, by Robert A Weinberg, (Resources: tinyurl.com/nvecp44), (ebay first edition: tinyurl.com/pth6xqa)
- Molecular Biology of Cancer: Mechanisms, Targets, and Therapeutics, 4th Edition, by Lauren Pecorino (Amazon, ebay)

Additional Resources:

[American Cancer Society website](#)
[American Association for Cancer Research](#)
[Cold Spring Harbor website](#)
[Emory University website](#)
[Cancer Research UK](#)
[Susan G. Komen](#)
[American Institute of Cancer Research](#)

Pre-requisites: BI 308/BI 308L

Course Overview:

This course provides students with knowledge of the fundamental principles of the molecular and cellular biology of cancer cells. Lectures and demonstrations explain the role of growth factors, oncogenes, tumor suppressor genes, angiogenesis, and signal transduction mechanisms in tumor formation. Discussion of aspects of cancer epidemiology, prevention, and principles of drug action in cancer management is part of the course.

General Information:

The study of Cancer Biology is a relatively new field which began with the discovery of oncogenes in 1975. Since then the field is rapidly expanding with new discoveries being made daily. As with any disorder/disease, knowledge is the key for prevention and treatment options. Therefore this class will examine the basics of cancer biology: how a cell becomes cancerous and the changes that occur. Signaling within the cell may differ for different types of cancer (and subtypes) and we will investigate the similarities as well as the differences. This will be through cell biology, molecular biology, biochemistry and genetics. "The biology of Cancer" by Robert A Weinberg will be the primary resource, but we will also read primary scientific literature in order

for you to begin to understand research papers. Memorization will be necessary, but a stronger focus will be on understanding the material and interpretation.

Course Outcomes:

1. Have a general understanding of the six hallmarks of cancer (proliferation, evading growth suppressors, invasion and metastasis, achieving immortality, inducing angiogenesis, resisting apoptosis).
2. Comprehend the molecular changes that occur within cancer cells and have basic knowledge about the signaling pathways within different cancer types.
3. Demonstrate an understanding of primary literature and techniques used in the research field.
4. Have the basic background to clinically evaluate cancer for prevention and treatment.

Evaluation of Student Performance

1. Quiz grades may be curved, if the class average falls below 70%. Individual assignments will NOT be curved. The scale used is given below.
2. There will weekly online quizzes covering the content of the lecture. Quizzes will be available on canvas and will be available for you to take at the end of each week. Quizzes are timed at 15-30 minutes. You will have two attempts for each quiz.
3. There is no final exam. You will submit a final paper, following the instructions below.
4. Extra credit work is NOT available.
5. Missed quizzes can only be made up for valid excuses (to be determined by the instructor). In cases of illness, a physician's note is necessary.
6. The grade will be determined in the following manner:

		Strict scale:	85% - 100% = A
Quizzes	60 percent		70% - 84% = B
Journal Paper presentation	20 percent		55% - 69% = C
Final Paper	<u>20 percent</u>		40% - 54% = D
	100 percent		Below 40% = F

Grade Dissemination

My goal will be to return grades of assignments within one week of the due date. You will be informed by email of the grade you received. Graded quizzes and materials in this course will NOT be returned, but can be viewed in my office during office hours or by request. Letter grades for quizzes only will also be posted on the portal website. You may request a breakdown of your grade and your current overall grade any time by email.

Class standing:

The instructor, prior to the withdrawal deadline, will notify students with grades of D or lower. Students receiving deficiency notices are required to arrange a conference with instructor.

Late Work Policy

There are no make-ups for quizzes, unless a physician's note documents your absence during quizzes. Journal article presentations CANNOT be made-up. I will NOT accept late submission of journal article reviews or final papers.

Student Expectations

1. Disability Access

Pursuant to several federal and state laws, including the Americans with Disabilities Act of 1990, as amended by the ADA Amendments Act of 2008, and Section 504 of the Rehabilitation Act of 1973, all qualified students with disabilities are protected from discrimination on basis of disability and are eligible for reasonable accommodations or modifications in the academic environment to enable them to enjoy equal access to academic programs, services, or activities. If a student would like to determine if they meet the criteria for accommodations, they should contact the Counseling Center at 808-735-4845 for further information.

2. Title IX Compliance

Chaminade University of Honolulu recognizes the inherent dignity of all individuals and promotes respect for all people. Sexual misconduct, physical and/or psychological abuse will NOT be tolerated at CUH. If you have been the victim of sexual misconduct, physical and/or psychological abuse, we encourage you to report this matter promptly. As a faculty member, I am interested in promoting a safe and healthy environment, and should I learn of any sexual misconduct, physical and/or psychological abuse, I must report the matter to the Title IX Coordinator. Should you want to speak to a confidential source you may contact the following:

- Chaminade Counseling Center| 808 735-4845.
- Any priest serving as a sacramental confessor or any ordained religious leader serving in the sacred confidence role.

3. Attendance Policy

As a senior level course, you are solely responsible for your learning. Attendance during lecture is one way to familiarize yourself with the learning material, however you may by now have discovered more effective ways of learning. As such attendance during lecture is not mandatory. You are responsible to familiarize yourself on all topics/material covered during your absence. Please note that university policies require you to attend class.

4. Academic Conduct Policy

The success of the Honor Code is made possible only with the acceptance and cooperation of every student. Each student is expected to maintain the principles of the Code. Example of Honor Code violations include, but are not limited to:

- Giving or receiving information from another student during an examination;
- Using unauthorized sources for answers during an examination;

- Illegally obtained test questions before the test;
- Any and all forms of plagiarism – submit all or part of someone else’s work or ideas as your own;
- The destruction and/or confiscation of school and/or personal property.

Violations of the Honor Code are serious. They harm other students, your professor, and the integrity of the University. Alleged violations will be referred to the Office of Judicial Affairs. If found guilty of plagiarism, a student might receive a range of penalties, including failure of an assignment, failure of an assignment and withholding of the final course grade until a paper is turned in on the topic of plagiarism, failure of the course, or suspension from the University.

Violations of Academic Integrity: Violations of the principle include, but are not limited to:

- Cheating: Intentionally using or attempting to use unauthorized materials, information, notes, study aids, or other devices in any academic exercise.
- Fabrication and Falsification: Intentional and unauthorized alteration or invention of any information or citation in an academic exercise. Falsification is a matter of inventing or counterfeiting information for use in any academic exercise.
- Multiple Submissions: The submission of substantial portions of the same academic work for credit (including oral reports) more than once without authorization.
- Plagiarism: Intentionally or knowingly presenting the work of another as one’s own (i.e., without proper acknowledgment of the source).
- Abuse of Academic Materials: Intentionally or knowingly destroying, stealing, or making inaccessible library or other academic resource materials.
- Complicity in Academic Dishonesty: Intentionally or knowingly helping or attempting to help another to commit an act of academic dishonesty.

Plagiarism includes, but is not limited to:

- Copying or borrowing liberally from someone else’s work without his/her knowledge or permission; or with his/her knowledge or permission and turning it in as your own work.
- Copying of someone else’s exam or paper.
- Allowing someone to turn in your work as his or her own. DO NOT provide your work to someone else for reference.
- Not providing adequate references for cited work.
- Copying and pasting large quotes or passages without properly citing them.

On-Campus Tutoring

- Retention, Advising, and Career Preparation offers free, one-on-one tutoring for all undergraduate students at Chaminade. Subjects tutored include, but are not limited to: biology, chemistry, math, nursing, English, etc. The tutoring corps consists of trained Peer and Professional Tutors.
- Tutoring is available by appointment only. Tutoring takes place in either the Student Support Services building during the hours of 8:30 a.m. to 4:30 p.m., Monday to Friday.

- In order to receive tutoring, a student can visit the Student Support Services building and complete an information form. After submitting this form, a staff member will assist the student in creating an online account that allows him/her to book a tutoring appointment through the online system.
- All appointments must be made two days prior to the desired appointment. Cancellations must be made 24 hours in advance.

Online Tutoring through Smarthinking

- All CUH students are eligible to use Smarthinking, an online tutoring system. Students are able to access Smarthinking via their Canvas account.
- Through Smarthinking, students are able to connect in real-time with an expert educator in a variety of subjects using a virtual whiteboard technology. Students also have an option to schedule a 30-minute appointment with a tutor of their choice. The Online Writing Lab provides students with the ability to receive a detailed, personalized critique of any written assignment through a formal critique process.
- All sessions are archived and available for students to review at any time for studying or test preparation.
- For any questions related to tutoring services, please contact Nicolle Bekers, Tutor Coordinator, at nicolle.bekers@chaminade.edu.

Appropriate Technology

1. Please have a mobile device (e.g. cell phone, tablet) with you in class. Alternatively you may bring your laptop. Lecture slides will be available to you prior to class through the shared google folder (drive.google.com/drive/my-drive). These are provided to you as an additional learning tool.
2. Participation in in class polling is encouraged through PollEverywhere. Instructions will be provided during class. Bookmark: www.pollev.com/weichhaus

Writing assignments

Journal Club Paper

Reading and understanding scientific literature is essential if you want to keep up to date in any growing field of science. Therefore, you will have the opportunity to choose a scientific article related to the class material that interests you from a high impact factor journal to examine. You will write a short review (<500 words) of this paper and present the main importance to the class (10 min + 5 min questions/discussion).

In your presentation/article please concentrate on the following:

- Why did they do this research?
- What did they prove? How did they prove it?

- Where their methods adequate?
- Where can it go from here?
- Can you think of anything you would have liked them to also investigate?

Research/Clinical Trial Paper (Final)

For your final, you have 2 choices:

1. This will be your opportunity to come up with your own research project.
 - a. Is there a specific cancer that interests you?
 - b. A particular signaling pathway?
 - c. Want to stop metastasis?
 - d. Or investigate why native Hawaiians have increased cancer rates vs non-Hawaiians?
 You will need to do a literature search and pick 4-5 papers of this topic in the field to discuss in the paper. As you will not actually have any data to present the main focus will be on background information, material and methods you would like to do, possible conclusions, and why this will be important.
2. Another aspect to understand scientific research is to have a basic comprehension of clinical trials available. An app called "Lilly Oncology Clinical Trials" is available in which you can search for open clinical trials. lillyoncologypipeline.com/clinicaltrialsapp
 As most cancer patients do not understand the information listed, doctors and researchers have to be able to portray to these patients the importance and relevance for them. Your goal would be to choose a trial and explain it such that someone without any scientific background would understand (and join the trial). However, you will have to include data/information from the literature (4-5 papers) that supports the trial.

Start these assignments early and seek feedback. These assignments are learning opportunities as part of your ongoing development during the semester. Use the communication resources available to you (google, facebook) to get in touch with other people from the class and with me.

Potential resources:

- Google Scholar: scholar.google.com
- Pubmed: ncbi.nlm.nih.gov/pubmed
- Sullivan Library: lib.chaminade.edu/search-db_title.php

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Week	Date	Lecture Topic	Reading Assignment	Comments
1	8/29	Course overview; Introduction to Cancer Biology	Chapter 2	

	8/31	The nature of cancer		
2	9/5	Cancer causing viruses	Chapter 3	
	9/7			
3	9/12	The role of oncogenes, growth factors and receptors in tumor development	Chapter 4 and 5	
	9/14			
4	9/19	Intracellular Signaling Pathways	Chapter 6	
	9/21			
5	9/26	Tumor Suppressor Genes	Chapter 7	
	9/28			
6	10/3	Retinoblastoma (Rb) and Cell Cycle Control	Chapter 8	
	10/5			
7	10/10	p53 and Apoptosis	Chapter 9	
	10/12			
8	10/17	Tumorigenesis: Cell immortalization	Chapter 10	
	10/19			
9	10/24	Tumorigenesis: “Evolutionary” Model	Chapter 11	
	10/26			
10	10/31	Journal Paper Presentations		
	11/2			
11	11/7	Tumorigenesis: Genetic Instability	Chapter 12	
	11/9			

12	11/1 4	Angiogenesis	Chapter 13	
	11/1 6			
13	11/2 1	Invasion and Metastasis	Chapter 14	
	11/2 3	Thanksgiving Recess – No class		
14	11/2 8	Tumor Immunology	Chapter 15	
	11/3 0			
15	12/5	Rational Cancer Treatment	Chapter 16	
	12/7			
16	12/8	Final Paper due at 11:59pm		

Reading assignments may not be repeated in class. You are responsible for covering the material contained in the textbook. The material covered during lecture time MAY NOT BE sufficient to cover the material examined during quizzes.

Every effort has been made to insure that the material in this syllabus is accurate and complete. However, occasionally changes must be made to the printed schedule. Thus the instructor reserves the right to make any changes in the contents of this syllabus that he deems necessary or desirable. These changes, if any, will be announced as soon as the need for them becomes apparent.