BIOL 465 (CRN 10443 - A01)
The Molecular Biology of Cancer
Fall 2020
Tues/Wed/Fri 8:30 am - 9:30 am
Location: Online TopHat and Zoom

Lecture: Live online TopHat and Zoom; Tues/Wed/Fri 8:30 am - 9:30 am
Lectures will be Synchronous (live) and recorded
https://app-ca.tophat.com/e/962649

Office Hrs: Online ZoomTues and Fri 9:30 - 10:30 am (Also by appointment).
https://uvic.zoom.us/j/4021212188 (please login to Uvic first)

Instructors: Dr. Patrick Walter **Email: pwalter@uvic.ca (**Phone: 250-472-4741)
Dr. Julian Lum **Email: JLum@bccancer.bc.ca**

Description:
This course will cover molecular events that lead to cancer. The course will be divided into sections structured around first understanding important signal transduction pathways in cancer and then discussing some of the major types of cancer, including leukemia, breast, prostate and CLL. 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. The course will consist of formal lectures and assigned journal article reading from the current literature, discussions and class questions using TopHat (an electronic interactive lecture experience, described below). The goal of the journal article reading, discussions and questions will be to create an interactive environment to introduce students to the role of scientific discovery in the development of ideas in understanding cancer mechanisms and 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. You are expected to have familiarity with cell biology and cell signaling – i.e. have taken biology 360, Bioc 300, and/or Bioc 403. If you wish to review molecular cancer details, there is an excellent textbook by Dr. Robert A. Weinberg, “The Biology of Cancer” by Garland Science (ISBN 9780815342205) that is recommended. This is NOT a required text but is a useful reference if you feel you have a deficiency in background material or if you simply learn better from textbooks.

Description from the UVic Calendar:

Units: 1.5, Hours: 3-0
Clinical terminology, concepts of cancer epidemiology, DNA mutation and repair, molecular basis of cell cycle regulation, cell proliferation and apoptosis. Special emphasis on chemotherapy, gene therapy, diet and cancer, and the immunology of cancer

Prerequisites: BIOL 225, 230, 360 or either of BIOC 300a or 300b

Office Hours:
Online 9:30 – 10:30 Tuesdays and Fridays (or by appointment, send an email with Biol 465 in the subject) – The instructor that teaches the lecture that follows will be present. Dr. Walter is adjunct faculty and therefore has limited time on campus, and Dr. Lum is not on campus except possibly for this course. If these times conflict with your schedule, e-mail to set up an alternate time.

Brightspace:
This course uses the university Brightspace learning/teaching resource. To access this Course, use your Netlink ID and password and log onto Brightspace from your Mypage area (https://www.uvic.ca/mypage/).
We will post the course notes outline, journal article guidelines and other important information through this site. We will also post the PowerPoint presentation (in pdf format) for each lecture prior to each class. You may choose to print the slides and add notes to them during class. Please check Brightspace regularly, as this is where course announcements will be posted.

Top Hat:
We will be using TopHat as an additional interactive question resource. TopHat will be worth 10% where 4% are participation bonus marks (if you complete 70% of the questions) and 6% are marked and graded as a part of the course total. Review questions, and discussions of scientific papers, and in-class questions will be posted using this site. It is recommended that all students purchase a TopHat account.

You can visit tinyurl.com/StudentStartGuide for Top Hat's Student Quick Start Guide which outlines how you will register for a Top Hat account, as well as providing a brief overview to get you up and running on the system. Also, https://support.tophat.com/s/ is a great way to get a lot of information as there is a wide variety of articles uploaded there that can help.

Once you have registered and entered in your subscription code, your course can be directly accessed via the following:

Top Hat course name: **The Molecular Basis of Cancer – Fall 2020"**
Direct URL: **https://app-ca.tophat.com/e/962649**

6-digit course code: **962649**

Optional Course Text:
The Biology of Cancer by Robert A. Weinberg. ***This text is recommended, but not required.*** This text is now available in a digital format and is a great text with extensive clinical information. If you intend to continue studying in the medical field, it would be a good reference text for you to own. We will NOT be covering all the material in the text. The primary source of information will be the lecture slides covered online in class. Two copies of the textbook are on reserve in the library. There also may be secondhand copies of the text which may be available from the Used Book Store.

Assigned Material and Journal Articles:
Because there is not an assigned text for the course, topics will be drawn from primary and review articles from the scientific literature which will be assigned during class and links posted on Brightspace. Lecture time will be allocated to going over the papers as part of class discussion. Reading assignments are mandatory and will be included in the evaluation (i.e. 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 the lectures, to take notes and to participate in discussions. Questions will be asked during class using TopHat throughout the term. Questions on each journal article will be tested on the midterm and final exam. More details regarding the journal articles and sample exam questions will be available on Brightspace. Journal article discussion questions will be posted using TopHat online in class.

Course Evaluation:

35% Midterm – Tuesday Oct. 20 (50 min online, cumulative, includes journal articles and will be short answer or multiple choice). If the midterm is missed with a medical excuse, there will be a makeup exam at a scheduled date. If you feel that we should be made aware of any special circumstances or accommodations for your participation in the course, please notify us.
55% Final exam - Date TBA, Saturday Dec. 9th or thereafter (3 hours, cumulative but builds on the previous section's material)
Must be completed to receive a final grade for the course. Deferred exams will be handled as outlined in the University of Victoria calendar.
10% TopHat Online Activities:
6% - Graded Course Marks for Top Hat questions and activities.
4% - Of the 10% TopHat Activity, there is 4% Bonus participation Marks for Top Hat questions and activities (must complete 70% or more of the questions during semester).

Students are expected to be present for the midterm and final exam on the specified dates. Failure to write the midterm exam as described above will result in a grade of 0% for the exam unless for illness, accident, or family affliction. Students who miss the midterm exam for one of the legitimate, documented reasons listed will have the to write a deferred midterm exam within approximately 10 business days of the midterm date.

N grades
Students who have completed the following elements will be considered to have completed the course and will be assigned a final grade: The Midterm and the Final Exam.

Failure to complete one or more of these elements will result in a grade of "N" regardless of the cumulative percentage on other elements of the course. An N is a failing grade, and it factors into a student's GPA as 0. The maximum percentage that can accompany an N on a student's transcript is 49.

Therefore, you must write the midterm exam and the final exam to pass the course. Furthermore, if you have any emergency or any situation (That may include but not limited to; illness, mental health and wellness, or lack of access to information. Please also see the link below on concessions for more details) that will in anyway affect your ability to attend (or have attention to) online classes or exams, please contact me (there is no need for you to give me any description of your situation) as soon as possible (email or phone). If it's after the midterm and affects your ability to complete the course or for the final exam please download and complete an academic concession form from Uvic's website: https://www.uvic.ca/registrar/students/appeals/acad-concession/index.php . Deferral of a final exam must be requested with this Academic Concession form and submitted directly to Undergraduate Records. Deferred final exams will be arranged by the instructor in the first two weeks of January. Travel is not an acceptable reason to miss the deferred final exam date.

Your total mark, calculated from the marks on all of the exams and TopHat questions according to the weighting scheme above, will be converted to a percentage and then to a letter grade (please see the grade information below).

Your final overall mark in the course will be given as a percent and a Letter Grade based on the following guidelines: A+ = 90-l00%, A = 85-89.9%, A- = 80-84.9%, B+ = 77-79.9%, B = 73-76.9%, B- = 70-72.9%, C+ = 65-69.9%, C = 60-64.9%, D = 50-59.9%, F = 0-49.9% (if all requirements completed), N (if not all requirements completed). Please see details below.

You are not allowed to cheat or plagiarize in this course, as outlined in the University of Victoria calendar. This course will strive to be an inclusive and safe learning environment recognizing the diversity of the students and their opinions as outlined in the University calendar.

For questions regarding lecture material, students should go to the instructor for that particular topic. General concerns and questions about marks should be addressed to Dr. Walter as course administrator.

Revised UVic Grading Scheme (effective May 1, 2012)

Passing Grades	Grade Point Value	Percentage for Instructor Use Only *	Description
A+ A A-	9 8 7	90 – 100 85 – 89 80 – 84	**Exceptional**, **outstanding** and **excellent** performance. Normally achieved by a minority of students. These grades indicate a student who is self-initiating, exceeds expectation and has an insightful grasp of the subject matter.
B+ B B-	6 5 4	77 – 79 73 – 76 70 – 72	**Very good**, **good** and **solid** performance. Normally achieved by the largest number of students. These grades indicate a good grasp of the subject matter or excellent grasp in one area balanced with satisfactory grasp in the other area.
C+ C	3 2	65 – 69 60 – 64	**Satisfactory**, or **minimally satisfactory**. These grades indicate a satisfactory performance and knowledge of the subject matter.
D	1	50 – 59	**Marginal** Performance. A student receiving this grade demonstrated a superficial grasp of the subject matter.
F	0	0-49	**Unsatisfactory** performance. Wrote final examination and completed course requirements; no supplemental.
N	0	0-49	Did not write examination or complete course requirements by the end of term or session; no supplemental.

Students are expected to take notes during class, copies of slides will be provided on Brightspace before class, however these notes should not be considered complete and students are responsible for all material discussed online. Plagiarism and copying are all academic offences and submitted material must be your own work. Grading will be based on answering of short and long answer exam questions. The exams will test your 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. You are expected to have completed 3rd year Cell biology and Biochemistry, and the onus is on you to review pertinent material as needed.

Territory acknowledgement:
All the instructors involved with Biol 465 acknowledge with respect the Lekwungen peoples on whose traditional territory the university stands and the Songhees, Esquimalt and WSÁNEĆ peoples whose historical relationships with the land continue to this day. Please see:
https://www.uvic.ca/services/indigenous/facultystaff/territory-acknowledgment/index.php

Support services:
If you are in need of support, there are support services on campus to help you: Please see any of the following:
Centre for Academic Communication https://www.uvic.ca/learningandteaching/cac/
Math-assistance Centre https://www.uvic.ca/science/math-statistics/current-students/undergraduate/msac/index.php
Counselling Services https://www.uvic.ca/services/counselling/
Health Services https://www.uvic.ca/services/health/
Library https://www.uvic.ca/library/
Ombudsperson https://www.uvic.ca/universitysecretary/senate/appeals/ombudsperson/index.php
Computer Help Desk https://www.uvic.ca/systems/about/academic/helpdesk/index.php

Centre for Accessible Learning:
Accessible Learning: The University of Victoria is committed to creating a learning experience that is as accessible as possible. If you anticipate or experience any barriers to learning in this course, please feel welcome to discuss your concerns with me. If you have a disability or chronic health condition, or think you may have a disability, you may also want to meet with an advisor at the Centre for Accessible Learning (CAL). You can find more information about CAL here:
https://www.uvic.ca/services/cal/

Online conduct statement:
The University of Victoria is committed to promoting critical academic discourse while providing a respectful and supportive learning environment. All members of the university community have the right to this experience, and the responsibility to help create, such an environment. The University will not tolerate racism, sexualized violence, or any form of discrimination, bullying or harassment.

Please be advised that by logging into UVic's learning systems and interacting with online resources you are engaging in a university activity.
All interactions within this environment are subject to the university expectations and policies. Any concerns about student conduct, may be reviewed and responded to in accordance with the appropriate university policy.
To report concerns about online student conduct: onlineconduct@uvic.ca

Provisional Lecture Schedule 2020 (Changes will be necessary)

Week 1: SEMESTER STARTS Wed Sept. 9 ENDS Fri Dec. 4 2020

1. Wed Sept 9. Introductions/Outline/Cancer Overview – Walter.
2. Fri Sept 11. Introduction to concepts, terms and overview of Cancer, defining the hallmarks – Walter

Week 2:

3. Tues Sept 15. Hallmarks of cancer – 1st hallmark – self-sufficiency in growth factors - Walter
4. Wed Sept 16. Oncogenes & tumor suppressors how they relate to the hallmarks of cancer - Walter
5. Fri Sept 18. Self-sufficiency in growth signals, HER2 / EGF - Walter

Week 3:

Tues Sept 22 Last day for 100% reduction of first-term fees

6. Tues Sept 22. Insensitivity to Antigrowth signals, TGF-β – Walter
7. Wed Sept 13. Insensitivity to Antigrowth signals, Vitamin D – Walter

Fri Sept 25 Last day for adding courses that begin in the second term

8. Fri Sept 25. Cancer Inflammation and metabolism – Walter

Week 4:

9. Tues Sept 29. Cancer immunoediting and metabolism, hypoxia – Walter
10. Wed Sept 30. The tumor microenvironment and the immune system – Walter
11. Fri Oct. 2. The immune system and cancer – Walter

Week 5:

12. Tues Oct 6. The immune system, hypoxia and TAMs and the tumor microenvironment – Walter
13. Wed Oct 7. Hypoxia and TAMs and the tumor microenvironment Continued – Walter
14. Fri Oct 9. The immune system and Introduction to Leukemia and DNA damage – Walter

Week 6:

Monday Oct. 12. Thanksgiving Day

Tues Oct 13 Last day for 50% reduction of tuition fees for standard courses

15. Tues Oct 13. The immune system and cancer – Walter
16. Wed Oct 14. The immune system and DNA damage – Walter
17. Fri Oct 16. DNA damage and Reactive Oxygen – Walter

Week 7:

18. Tues Oct 20. **Midterm 35% (Walter)**
19. Wed Oct 21. Cells of the tumor microenvironment in leukemia - Walter
20. Fri Oct 23. The tumor microenvironment – description of macrophage involvement - Walter

Week 8:

21. Tues Oct 27. Paper "Targeting macrophages sensitizes CLL cells to death and inhibits Disease Progression" - Walter
22. Wed Oct 28. Review of paper targeting macrophages - Walter
23. Fri Oct 30. Review of paper targeting macrophages – Walter

Thursday Oct 31 Last Day to Drop Courses without Failure

Week 9:

24. Tues Nov 3 Summary of CLL paper**,** Breast Cancer and estrogen introduction – Walter
25**.** Wed Nov 4. Exome analysis - T cell therapy – Lum
26. Fri Nov 6. Molecular Cancer Topics / inherited cancer – Lum

Reading break following week

Week 10:

Monday, Nov. 9 -11 Reading break, Monday Nov 11, Remembrance Day

27. Fri Nov 13. Ovarian Cancer topics/stem cells – Lum

Week 11:

28. Tues Nov 17. Introduction to Ovarian Cancer - Lum
29. Wed Nov 18. Angiogenesis introduction – Lum

30. Fri Nov 20. Angiogenesis – Lum

Week 12:

31. Tues Nov 24. Introduction to Autophagy and cancer– Lum
32. Wed Nov 25. Autophagy – Lum
33. Fri Nov 27 – Autophagy and Apoptosis - Lum

Week 13:

34. Tues Dec 1. Biomarkers and Molecular Pathology of Breast cancer – Peter Watson
35. Wed Dec 2. Breast cancer and Light at Night (LAN) –Walter
36. Fri Dec 4. Breast cancer and LAN – Walter

Fi Dec. 4 National Day of Remembrance and Action on Violence Against Women. Classes cancelled from 11:30 am to 12:30 pm.

FINAL EXAMS DEC. 7 – 21. Biol 465 -TBD