

Department of Biology Course Outline

SC/BIOL 4010 3.00 Biology of Cancer
Fall 2016-7

Learning Outcomes

The main objective of the Biology of Cancer course is to develop the understanding of the basic molecular and cellular concepts and principles related to the development of cancer, and its medical application to treatment and prevention.

The course examines molecular and cellular aspects that affect the development of cancer in humans, approaching DNA mutations and viral infections as major causes of the disease. Furthermore, the course will illustrate rational treatments and preventions for cancer.

Prerequisites

- SC/BIOL 3130 3.00 or SC/BCHM 3130 3.00.

Course Instructors and Contact Information

Course Director: Dr. Motti Anafi: Office: Room 108, Farquharson Building
moanafi@yorku.ca

Office hours:

Email to set up an appointment

Course TA: David Miller: miller93@yorku.ca

Schedule

Course Schedule and Location

Thursdays 7:00-10:00pm at LSB 106

Evaluation

Mid-Term Exam 1 25%
Date: Thursday, October 20, 2016
Time: 8:30pm

Mid-Term Exam 2 25%
Date: Thursday, November 17, 2016
Time: 8:30pm

Final Exam 50%
Date and location: will be published by the registrar office.

Contribution to the Wiki up to 2 points (bonus)

Important Dates

- Sept. 8, 2016: Fall Classes Start
- Sept 21, 2016: Last day to ENROL without requiring the permission of the Course Director.
- Oct. 27-30, 2016: Fall Reading Days
- Oct.5, 2016: Last day to ENROL even with the permission of the Course Director.
- Nov. 11, 2016: Last date to drop courses without receiving a grade
- Dec. 5, 2016: Fall classes end
- Dec. 7-22, 2016 Fall examinations

NOTE: for additional important dates such as holidays, refer to the "Important Dates" section of the Registrar's Website at <http://www.registrar.yorku.ca/enrol/dates/fw16>

Course Content

Part 1: The Nature of Cancer

The development of tumours from normal tissues
The hallmarks of cancer (read required reading no. 1)
Cancer epidemiology
Telomere, Telomerase in cell immortalization and cancer
Angiogenesis in tumors and metastasis

Part 2: Oncogenes

Retroviruses and the discovery of oncogenes
Activation of protooncogenes in human cancer
Tyrosine kinases as cellular oncogenes (read required reading no. 2)
G proteins and uncontrolled proliferation

Part 3: Tumour Suppressor Genes in Cancer

Sporadic and Inherited Cancer
pRb: retinoblastoma and cancer
BRCA's and breast cancer
p53: The evasion of cell cycle regulation and apoptosis

Part 4: Infection, Inflammation and Cancer

Inflammation and human cancer
Papilloma viruses and Cervical Neoplasia (read required reading no. 3)
Hepatitis viruses and liver cancer (read required reading no. 4)

Part 5: The Future of Rational Treatment and Prognosis of Cancer

Cancer genomics (read required reading no. 5)
The path from Abelson leukemia virus to Gleevec (read required reading no. 6)

Disclaimers

The information presented in the lectures is provided for educational purposes only, and should not be considered as a medical advice.

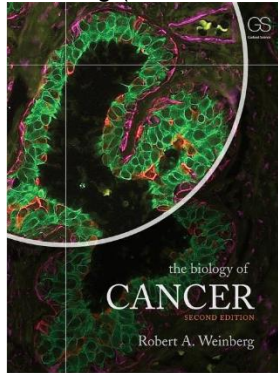
Resources

Required Readings (Review articles)

- 1) Hanahan D. and Weinberg R.A. (2011) The hallmarks of cancer. *Cell* 144(5), 646-74 ([http://www.cell.com/cell/fulltext/S0092-8674\(11\)00127-9](http://www.cell.com/cell/fulltext/S0092-8674(11)00127-9))
- 2) Blume-Jensen P. and Hunter T. (2001) Oncogenic kinase signalling. *Nature* 411, 355-65. (<http://www.nature.com/nature/journal/v411/n6835/full/411355a0.html>)
- 3) Munger K. *et al.* (2004) Mechanisms of Human Papillomavirus-Induced Oncogenesis. *Journal of Virology* 78, 11451–11460. (<http://jvi.asm.org/content/78/21/11451.short>)
- 4) Lupberger J. and Hildt E. (2007) Hepatitis B virus-induced oncogenesis. *World J Gastroenterol* 13(1), 74-81. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4065878/>
- 5) Bert Vogelstein *et al.* (2013) Cancer Genome Landscape. *Science*. 339(6127): 1546–1558 <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3749880/pdf/nihms496129.pdf>
- 6) Hunter T. (2007) Treatment for chronic myelogenous leukemia: the long road to imatinib *The Journal of Clinical Investigation* 117(8) 2036-2043 <http://www.jci.org/articles/view/31691/files/pdf>

Recommended Readings:

- 1) *The Biology of Cancer*, by Robert A. Weinberg (Second Edition) Publisher: Garland Science



- A. Available at York University bookstore

Additional ways to get the book in other (cheaper) formats

- B. CRC Press <https://www.crcpress.com/The-Biology-of-Cancer/Weinberg-Weinberg/9780815342199>
- C. Vital Source e-chapters <https://www.vitalsource.com/textbooks?utf8=%E2%9C%93&sort=&term=9780815342205+chapter>

- 2) Additional textbook:

Go to <http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=Books> Search BOOKS with the keyword: “Cancer”. The most relevant books are:

- **Cancer Medicine**, 6th edition.
- **Retroviruses**. Coffin, John M.; Hughes, Stephen H.; Varmus, Harold E.

Experiential Education and E-Learning

The Course MOODLE web site

To access Moodle, please follow the instructions below.

1. Go to: <http://moodle.yorku.ca>
2. Log in with your Passport York account.

Here you will find

- An updated course outline
- The course wiki
- Forum
- Announcements
- Grades

Please note that the course director's announcements on the Moodle and in-class updates take precedence over any other information in the course MOODLE web site. The course director is not responsible for the accuracy of the notes posted by students in the wiki/forum. The exam is not restricted to the material posted on wiki. If you have technical Moodle-related questions, please direct them to UIT Client Services at 416.736.2100 x55800 or email helpdesk@yorku.ca.

Other Information

Tips on studying for this course:

- For the exams, you must know and understand the material presented in the lectures and in the required reading mentioned above.
- The textbook can help students consolidate and expand their understanding of the material. However, much of the textbook will not be covered in class. For the exams you are NOT expected to know material from the textbook which has not been covered in the lectures.
- Students need to attend **all lectures** in order to do well in the course. The discussions in class are critical for the understanding of the material. The center of the course is the lectures. It is your responsibility to attend lectures as my multimedia presentations will not be provided outside the classrooms. Do not rely on the Wiki: take your own notes.
- The material presented in the lectures and other components of the course such as tests and exam have been developed from a large variety of resources, including websites, textbook supplements and the material mentioned above.
- In general, it is best that a student who was unable to attend a lecture borrow the relevant notes from a classmate. You may also wish to check the course Moodle website for additional relevant material. Here, you can find an updated course outline. In addition, you can use the course wiki. Furthermore, you have my permission to use an audio tape-recorder in class (or to arrange with a classmate to do it for you).
- I will usually be available before/after each lecture to address individual questions. If you need to speak with me out of class, please send me an email to set an appointment.

Course Policies

Tests and Exams

Attendance for all exams is mandatory. Exams missed on the ground of medical circumstances must be supported by a formal Attending Physician's Statement, which can be downloaded from the registrar's office web site, or a statement by a psychologist or counsellor. Students are NOT expected to disclose the nature of the illness. The document must specify:

- 1) date of consultation
- 2) contact information (e.g. phone number of the hospital; legible name of the health provider) that would allow verification of the document
- 3) a statement that the student would not have been able to attend class (or carry out activities) during the relevant period of time

The documentation must be dated on the same day as the exam or earlier, or it will not be accepted. The Course Director must be notified by email within 24 hours in the case of a missed test or exam. Appropriate documentation must be submitted to the Course Director within one week after the test or exam. **No opportunities to make up missed mid-term exams will be offered. However, after acceptable justification for a missed exam has been received, the percentage value of the missed mid-term will be added to the final exam.** If the final exam is missed, the student must petition the Registrar for permission to write the final exam. Deferred exams are similar to the original exam in terms of material covered and level of difficulty, However, the format is not likely to be identical to the original exam. Accordingly, all approved deferred exams will be consisting of short-answer questions (no multiple-choice).

Rules for viewing term tests:

The exams of BIOL4010 are evaluation tools, not a teaching tool.

If you are interested to view your exam and to compare it against the key, you must to send an e-mail to the course **TA by two week after the day the grades were posted** on the Moodle. Every session will be up to 20 minutes for viewing the test and to compare it against the detailed key. During test viewing sessions the regular examination rules will apply. If after you viewed your exam against the written key, you feel that you deserve more marks you can send an e. mail to the course director (Attn: Dr. Motti Anafi, e-mail: moanafi@yorku.ca) with a formal remark request. In this case the entire short answer section of the test will be remarked by the course director. The new mark (The same, higher or lower) will be used for final grade calculation. In general, as a built-in correction, I add few (1-3) buffer points to your grade in order to reduce the effect of any possible problems related to the short answer question section of the exam. If buffer point/s were added they are included on your original grade posted on the Moodle. If buffer points to the short answer portion were added, in the case of remarking by the course director, the buffer points will not be included.

Emailing the Course Director

Your email will be read and answered as soon as possible. However, we will open only e-mails that fulfill the following requirements:

- Your email must be sent from your regular yorku.ca email account (**not from the moodle server**). Do not use non-yorku.ca accounts (such as hotmail or personal gmail). Emails from non-yorku.ca accounts or from the Moodle will likely languish in a spam folder that is checked only intermittently.
- Be sure to include your full name and student number in your email text.
- Your email must include "BIOL4010" in the subject line
- Your email must NOT include an attachment.

Copyright Policy at York University (Q & A from YorkU Web site)

1. Question: Can I (the instructor) include copyrighted content in a class presentation without permission of the rights holder?

Answer: Yes, if you stay within the limits of the Copyright Act. The educational exceptions allow you to:

- “make a copy of a work to be used to project an image of that copy using an overhead projector or similar device”
- “You are not allowed to distribute copies in either paper or electronic form.”

2. Question: Can I (the instructor) post that same presentation on my Course website?

Answer: “No, the educational exceptions do not allow you to distribute copies in either paper or electronic form.”

Accordingly, my multimedia presentations will not be provided outside the classrooms.

University Policies

Academic Honesty and Integrity

York students are required to maintain the highest standards of academic honesty and they are subject to the Senate Policy on Academic Honesty (<http://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/>). The Policy affirms the responsibility of faculty members to foster acceptable standards of academic conduct and of the student to abide by such standards.

There is also an academic integrity website with comprehensive information about academic honesty and how to find resources at York to help improve students' research and writing skills, and cope with University life. Students are expected to review the materials on the Academic Integrity website at - http://www.yorku.ca/spark/academic_integrity/index.html

Access/Disability

York University is committed to principles of respect, inclusion and equality of all persons with disabilities across campus. The University provides services for students with disabilities (including physical, medical, learning and psychiatric disabilities) needing accommodation related to teaching and evaluation methods/materials. These services are made available to students in all Faculties and programs at York University.

Student's in need of these services are asked to register with disability services as early as possible to ensure that appropriate academic accommodation can be provided with advance notice. You are encouraged to schedule a time early in the term to meet with each professor to discuss your accommodation needs. Please note that registering with disabilities services and discussing your needs with your professors is necessary to avoid any impediment to receiving the necessary academic accommodations to meet your needs.

Additional information is available at the following websites:

Counselling & Disability Services - <http://cds.info.yorku.ca/>

Counselling & Disability Services at Glendon –

<http://www.glendon.yorku.ca/counselling/personal-counselling/what-is-counselling/>

York Accessibility Hub - <http://accessibilityhub.info.yorku.ca/>

Ethics Review Process

York students are subject to the York University *Policy for the Ethics Review Process for Research Involving Human Participants*. In particular, students proposing to undertake research involving human participants (e.g., interviewing the director of a company or government agency, having students complete a questionnaire, etc.) are required to submit an *Application for Ethical Approval of Research Involving Human Participants* at least one month before you plan to begin the research. If you are in doubt as to whether this requirement applies to you, contact your Course Director immediately.

Religious Observance Accommodation

York University is committed to respecting the religious beliefs and practices of all members of the community, and making accommodations for observances of special significance to adherents. Should any of the dates specified in this syllabus for an in-class test or examination pose such a conflict for

you, contact the Course Director within the first three weeks of class. Similarly, should an assignment to be completed in a lab, practicum placement, workshop, etc., scheduled later in the term pose such a conflict, contact the Course director immediately. Please note that to arrange an alternative date or time for an examination scheduled in the formal examination periods (December and April/May), students must complete an Examination Accommodation Form, which can be obtained from Student Client Services, Student Services Centre or online at http://www.registrar.yorku.ca/pdf/exam_accommodation.pdf

Student Conduct in Academic Situations

Students and instructors are expected to maintain a professional relationship characterized by courtesy and mutual respect. Moreover, it is the responsibility of the instructor to maintain an appropriate academic atmosphere in the classroom and other academic settings, and the responsibility of the student to cooperate in that endeavour. Further, the instructor is the best person to decide, in the first instance, whether such an atmosphere is present in the class. The policy and procedures governing disruptive and/or harassing behaviour by students in academic situations is available at - <http://secretariat-policies.info.yorku.ca/policies/disruptive-and-or-harassing-behaviour-in-academic-situations-senate-policy/>