

MEDG 421: Genetics and Cell Biology of Cancer

7 Jan 2025 – 8 Apr 2025

Time and Location:

Lectures are 9:30am-10:50am Tuesdays and Thursdays in FNH50.

http://maps.ubc.ca/PROD/index_detail.php?locat1=449

Instructors and Contacts:

Dr. Laura Evgin (levgin@bcqsc.ca)

Dr. Peter Stirling (pstirling@bccrc.ca)

Dr. Gregor Reid (grogreid@mail.ubc.ca)

Dr. James Lim (cjlim@mail.ubc.ca)

TA: Nathalie Longakit (nathalie.longakit@ubc.ca)

Course Description and Objectives:

“Molecular mechanisms of oncogenes and tumor suppressors and the effects of oncogenic mutations on the biology of cancer cells.” A background in cell biology is assumed - **a grade of B or higher in BIOL 335 is strongly recommended**. It is assumed that students will have a firm understanding of cell biology and basic genetics, as such knowledge will be critical to the course material.

The course is designed to survey molecular oncology, introducing students to important concepts and themes in the biology of cancer cells. Due to the fast-paced nature of the area, material will be largely taken from recent journal publications and wherever possible presented by guest lecturers who are experts in a given topic area. This format should provide not only the facts of a research topic, but also highlight cutting-edge research approaches used by cancer researchers in Vancouver. Students are expected to develop skills in both searching and interpreting scientific literature through assigned class readings and paper summaries. The midterm and final exams will be problem-based. In addition, a book club style-discussion and an oral paper summary are designed to promote interaction and communication.

The class is organized into four blocks. The first block focuses on the central concepts of cancer cell biology and genetics, providing a foundation of knowledge for the more specialized information in the subsequent blocks (see attached schedule of lectures). Students may request assistance from the TA or instructors (contacts above) if they require additional support.

Text Book:

"The Biology of Cancer" by Robert A. Weinberg is **optional**. Most of the readings will come from assigned recent journal articles and reviews, although much of the material presented during the first two weeks draws from the text book. Links to all assigned readings and course material will be posted on CANVAS.

Lecture Schedule and Material:

The schedule from the 2023W session is posted on page 3 for reference. The schedule for 2024W will follow a similar pattern, although specific topics and instructors may differ. An updated schedule will be posted before the beginning of the class in January 2025. Lecture slides will be posted on the CANVAS class website usually **after** the lecture (although 1-2 lecturers may not release their slides).

Grading Scheme:

Paper summaries:	20% (Breakdown: 2%, 6%, 6%, 6%)
Oral paper summary:	10%
Book report/participation:	20%
Mid-term exam*:	25% (covers first half of the term)
Final exam*:	25% (non-cumulative – covers concepts from second half)

*Both the mid-term and the final exams will be open-book, open-note, and may be take-home.

Assignments:

Assignment details, due dates, and grading will be done on CANVAS. Below are guidelines for the assignments but for more details see CANVAS.

Paper Summaries:

This first assignment is intended to provide you with feedback prior to the submission of subsequent reports. It will be weighted less than subsequent summaries in the marking.

Before submitting a summary for a paper, you must register your choice using the class online registration page, as each paper may only be chosen by one student.

A link will be provided for you to register your paper. You cannot summarize the same paper as another student, so register your paper selections by Pubmed ID.

Oral paper summaries

Oral paper summaries will take the form of a 5-7 minute presentation to a small group on the last two days of class. More details on this will come later in the term.

Book Report and Discussion Participation:

Students will be asked to read part of a popular science book on cancer. Students will select either *The Emperor of All Maladies* by Siddhartha Mukherjee, or *The Immortal Life of Henrietta Lacks* by Rebecca Skloot. Midway in the term (likely February 25th), we will hold a book discussion day, in which we will split into discussion groups to explore the topics raised in this book. Each student will be required to submit a two-page book report in the preceding class session. Links and details for this event will be discussed in class.

Disputing marks:

If you choose to dispute an assigned mark, you must submit the assignment or exam for re-grading **with a maximum 1-page explanation/justification of your disputed mark.** The entire work will be re-graded. Please note; in the past the re-marking has led to a net decrease in the assigned grade in some cases. If there is a mathematical error (i.e. we fail to add numbers correctly), you may bring it to the attention of the TA or instructor without a formal dispute.

**COURSE SCHEDULE FROM 2023W term.
New schedule to be posted prior to January 2025.**

	Date	DAY	Topic	Lecturer	SUPERVISOR
1	9-Jan-24	Tuesday	Introduction, mutation and cancer	Peter Stirling	Stirling
2	11-Jan-24	Thursday	Cancer genes, and where to find them.	Peter Stirling	Stirling
4	16-Jan-24	Tuesday	Multistep oncogenesis and immortality	Peter Stirling	Stirling
5	18-Jan-24	Thursday	Hallmarks II / Concepts in Treatment	Peter Stirling	Stirling
6	23-Jan-24	Tuesday	Cancer Models	Gregor Reid	Stirling
7	25-Jan-24	Thursday	Cancer Genomics	Adi Steif	Stirling
8	30-Jan-24	Tuesday	Biomarkers (& circulating tumour DNA)	Alex Wyatt	Evgin
9	01-Feb-24	Thursday	Cancer Immunology	Laura Evgin	Evgin
10	06-Feb-24	Tuesday	Hypoxia and the TME	Kevin Bennewith	Evgin
11	8-Feb-24	Thursday	Cell Therapies	Amanda Li	Evgin
12	13-Feb-24	Tuesday	Blood cancers & Lymphoma	Leandro Venturutti	Evgin
13	15-Feb-24	Thursday	Q&A / MIDTERM	-	TEAM MEDG421
14	20-Feb-24	Tuesday	READING WEEK		
15	22-Feb-24	Thursday	READING WEEK		
16	27-Feb-24	Tuesday	Book club discussion	-	TEAM MEDG421
17	29-Feb-24	Thursday	The tumor microenvironment	James Lim	Lim
18	05-Mar-24	Tuesday	Tumour invasion and metastasis	Karla Williams	Lim
19	7-Mar-24	Thursday	Clinical Pathology and Biobanking	Jonathan Bush	Lim
20	12-Mar-24	Tuesday	Cancer Stem Cells	Chris Maxwell	Lim
21	14-Mar-24	Thursday	Pediatric neuro-oncology	Sylvia Cheng	Lim
22	19-Mar-24	Tuesday	Pediatric cancer	Gregor Reid	Reid
23	21-Mar-24	Thursday	Cancer signaling	Will Lockwood	Reid
24	26-Mar-24	Tuesday	Cervical cancer	Gina Ogilvie	Reid
25	28-Mar-24	Thursday	Prostate cancer	Felipe Guersetti	Reid
26	02-Apr-24	Tuesday	Precision oncology	Rebecca Deyell/Rod Rasswekh	Reid
27	04-Apr-24	Thursday	Genome stability	Peter Stirling	Reid
28	9-Apr-24	Tuesday	Oral Presentation		TEAM MEDG421
29	11-Apr-24	Thursday	Oral Presentations / course debrief		TEAM MEDG421