

## MEDG 421: Genetics and Cell Biology of Cancer

12 Jan 2021 – 13 Apr 2021

### **Time and Location:**

Lectures are virtually via Zoom, 9:30am-10:50am, Tuesdays and Thursdays.

### **Join Zoom Meeting**

<https://ubc.zoom.us/j/69906721751?pwd=T09Nc1ZpOS96SzJRCUlxL2tiROxvUT09>

Meeting ID: 699 0672 1751

Passcode: 313264

### **Instructors and Contacts:**

Dr. Peter Stirling ([pstirling@bccrc.ca](mailto:pstirling@bccrc.ca) )

Dr. Wyeth Wasserman ([wyeth@cmmt.ubc.ca](mailto:wyeth@cmmt.ubc.ca))

Dr. Gregor Reid ([grogreid@mail.ubc.ca](mailto:grogreid@mail.ubc.ca))

Dr. James Lim ([cjlim@mail.ubc.ca](mailto:cjlim@mail.ubc.ca))

TA: Vahid Akbari ([vahid.akbari1369@gmail.com](mailto:vahid.akbari1369@gmail.com))

### **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 interpretation of 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). There will be **optional tutorial sessions** held off timetable (in the late afternoon or early evening) near the exam dates. 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:**

Please see the course schedule on page 3 – lectures may be rescheduled depending on instructor availability. Lecture slides will be posted on the CANVAS class website usually **after** the lecture (although

1-2 lecturers may not release their slides). We will also try to record each meeting and post to the Cloud on CANVAS when lecturers agree to be recorded. You should attend class 'live' to participate in discussion and there is no guarantee that a lecture will be recorded.

**Grading Scheme:**

Paper summaries:	<b>15%</b> (Breakdown: 3%, 6%, 6%)
Oral paper summary:	<b>10%</b>
Book report/participation:	<b>15%</b>
PCAWG assignment	<b>10%</b>
Mid-term exam*:	<b>25%</b> (covers first half of the term)
Final exam*:	<b>25%</b> (non-cumulative – covers concepts from second half)

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

**Article 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 CANVAS, as each paper may only be chosen by one student.

Oral paper summaries will take the form of a 5-7 minute presentation to a small group via Zoom 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 – *The Emperor of All Maladies* by Siddhartha Mukherjee. Midway in the term, we will hold a book discussion day, in which we will split into discussion groups in Zoom 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.

MEDG421 2020W2

Lecture #	DATE	Day	Topic	Lecturer	SUPERVISOR	Assignments Due
1	12-Jan-21	Tuesday	<i>Introduction, mutagenesis and cancer</i>	Peter Stirling	Stirling	
2	14-Jan-21	Thursday	Cancer genes, p53	Peter Stirling	Stirling	
3	19-Jan-21	Tuesday	Multi-step oncogenesis, Immortality and other hallmarks	Peter Stirling	Stirling	
4	21-Jan-21	Thursday	Lung cancer and signaling	Will Lockwood	Stirling	<i>PS #1</i>
5	26-Jan-21	Tuesday	Post-transcriptional regulation in cancer	Ly Vu	Stirling	
6	28-Jan-21	Thursday	Cancer Genomes - PCAWG	Wyeth Wasserman/Phil Richmond	Wasserman	
7	02-Feb-21	Tuesday	Cancer Genomes - PCAWG	Wyeth Wasserman/Phil Richmond	Wasserman	<i>PCAWG assignment</i>
8	04-Feb-21	Thursday	Genetic Counseling – Hereditary Cancer	Cheryl Portigal-Todd	Wasserman	
9	09-Feb-21	Tuesday	Pharmacogenomics	Colin Ross / Rod Rassekh	Wasserman	
10	11-Feb-21	Thursday	Pre-midterm tutorial	-	TEAM MEDG421	
11	16-Feb-21	Tuesday	READING WEEK			
12	18-Feb-21	Thursday	READING WEEK			
13	23-Feb-21	Tuesday	Book Club Discussion	<i>TEAM MEDG421</i>	TEAM MEDG421	<i>Book Report</i>
14	25-Feb-21	Thursday	Tumor Microenvironment and Drug Resistance	James Lim	Lim	
15	02-Mar-21	Tuesday	Cancer Immunology	Gregor Reid (tentative)	Reid	
16	04-Mar-21	Thursday	Hypoxia and the solid tumour microenvironment.	Kevin Bennewith	Lim	
17	09-Mar-21	Tuesday	Metabolomics in Cancer	Seth Parker	Lim	<i>PS#2</i>
18	11-Mar-21	Thursday	Immunotherapies	Amanda Li	Reid	
19	16-Mar-21	Tuesday	Gut microbiome and colorectal cancer.	Laura Sly	Lim	
20	18-Mar-21	Thursday	Targeting solid tumors with recombinant malaria proteins	Mads Daugaard	Reid	
21	23-Mar-21	Tuesday	Chemotherapy	Cielle Wachnian	Reid	<i>PS #3</i>
22	25-Mar-21	Thursday	Cell division and stem cells	Chris Maxwell	Lim	
23	30-Mar-21	Tuesday	Personalized oncogenomics	Rebecca Deyell, Rod Rassekh	Reid	
24	01-Apr-21	Thursday	Tumor Invasion and Metastasis	Karla Williams	Lim	
25	06-Apr-21	Tuesday	Oncolytic viruses	Laura Evgin	Reid	
26	08-Apr-21	Thursday	<b>Oral Presentations</b>	<i>TEAM MEDG421</i>	TEAM MEDG421	Oral Paper Summary
27	13-Apr-21	Tuesday	<b>Oral Presentations / Tutorial</b>	<i>TEAM MEDG421</i>	TEAM MEDG421	Last day of class