Biology of Cancer.
BIOL 492O/692 (3) CRN 80179, 80180

Preliminary Course Syllabus

Leonardo da Vinci. *The Vitruvian Man* (drawing circa 1490)
Gallerie dell'Accademia, in Venice, Italy.

Andrej Podlutsky

University of Alaska Fairbanks

1. Course Information:

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Biology of Cancer, BIOL 492O/692 (3); CRN 80179, 80180
Meeting times: Tuesday & Thursday 11:30 am – 1:00 pm, Murie room 107
Prerequisite: BIOL360 (with BIOL115X &116X); or permission of instructor.

Instructor:

Andrej Podlutsky, Ph.D., Associate Professor of Molecular Biology

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Research Lab:	AHRB 2W10
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Lectures:	Tu & Th 11:30 am -1:00 pm
Lecture room:	Murie, room 107
Office hours:	Wednesday 10:00 am – 12:00 pm, or by appointment

2. Course readings/materials

Textbook:"The Biology of Cancer"10.44 359.6 room 107

3. Course description:

Welcome to the Biology of Cancer! The UAF Catalogue describes the topic of this course as follows:

> Course covers current knowledge of cancer: basic research, treatment, various genetic and molecular changes normal cells undergo during transformation into malignant cells. Topics include: growth factors, oncogenes, tumor suppressors, cancer-causing viruses, and current therapeutic approaches to treatment. Premed-students would benefit by learning about fastest developing field of medicine.

The goal of this course is to cover current concepts and knowledge of cancer, including cancer research and cancer treatment; it will educate students on various genetic and molecular changes normal cells undergo during transformation into malignant cancer cells. This course will explore the cellular and molecular mechanisms underlying cancer development with the aim of understanding how changes in the normal growth and division processes lead to the formation of tumors. Topics include the natural history of cancer, oncogenes, tumor suppressors, cancer-causing viruses, and current therapeutic approaches to cancer treatment. It will cover the **fundamental facts and principles of cancer biology.**

Students will gain knowledge of tumorigenesis, learn techniques commonly used in cancer biology, sharpen their critical thinking skills, and gain insight into the cellular and molecular basis of disease. Students will be able to: describe the six hallmarks of cancer, explain the types of gene mutations possible and how these mutations can contribute to cancer formation, describe an oncogene and why it is important in cancer development, describe the function of tumor suppressor genes, learn how cancer cells escape cell death, and explain current approaches in cancer treatment.

Course Organization:The course will consist of 6 major themes, each divided into topics. We will spend 2 - 4 class periods on each topic. You will receive more detailed outlines for upcoming lectures on each topic (posted on the web site). Questions and discussion throughout the course are encouraged and this syllabus should be considered flexible. For example, if there is great interest and prolonged discussion regarding growth factors and receptors, we will spend more time on this subject and can easily adjust the rest of the course to accommodate. If necessary, exams may be rescheduled.

The basic goals of this course are:

1. **To understand key concepts of cancer biology, such as:**
   a) Molecular mechanisms behind of seven distinctive characteristics of cancerous cell;
   b) Role of oncogenes and tumor suppressor genes in tumor formation and invasiveness;
   c) The integration of basic scientific knowledge into medical research and treatment protocols.

2. **To contribute to a student-centered interactive learning environment.** A substantial proportion of the content of the course will be presented and chosen by students.

3. **To improve oral communication skills.** This is an oral intensive class and you will get detailed feedback from peers and the instructor for all your presentations.

4. To work effectively with others. This includes teamwork to prepare for lectures and presentations, participation in group discussion and peer evaluation.

We will use a variety of approaches to achieve these goals:

1. **Lecture and discussion.** In lecture, we are going to talk about the basic concepts in Biology of Cancer

4. Course Requirements

- Some suggestions for review topics:
  - Basic cancer research and clinical trials
  - War on cancer: who is winning?
  - Ecological and environmental risk-factors in cancer
  - Spontaneous remission of cancer
  - Immunotherapy: current approach
  - Combinational therapy in cancer treatments

Oral Presentation: Literature Review

Students also have the option of an oral presentation on an article from the peer-reviewed primary literature. These articles will complement lecture topics and should be taken from the recent literature (published in 2008 or more recently). You are strongly encouraged to select the article at least three weeks before your presentation, and provide a copy for distribution to the class.

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5. Grading

The final grade will be based on the average of all assignment marks according to the following fixed scale:

		BIOL492O	BIOL692
1.	Attendance and Class Participation	**5%**	**5%**
2.	Midterm / Quizzes	**45%** (15% Midterm, 30% Quizzes)	**45%** (15% Midterm, 30% Quizzes)
3.	1st Oral presentations 30 minute Lecture	**10%** (5% peer evaluation & 5% instructor evaluation)	-
4.	2nd Oral Presentation:	**15%** (7.5% peer evaluation & 7.5	

6. Dates and topics (Subject to change)

Theme I. Fundamentals of Cancer Biology.

10	Cell immortalization	Chapt. 10
11	Multi-Step Tumorigenesis	Chapt. 11
12	Maintenance of Genetic Integrity	Chapt. 12

Theme V. Invasion and Colonization.

13	Biology of Angiogenesis	Chapt. 13
14	Invasion Metastasis	Chapt. 14

Theme VI. Rational Treatment of Cancer.

15	Tumor Immunology and Immunotherapy	Chapt. 15
16	Strategy of Treatment	Chapt. 16
17	Aging and Cancer Risk	TBA

	Final Exam	Ch 2-16, additional topics, plus… student presentations

This table will be used to plan and track course content. This schedule will be dictated by the number of students enrolled in the class and is subject to modification.
Chapters refer to Weinberg R.A., Biology of Cancer 2th ed.

Date	Lecture	Exam	Book Chapter
9/8	Introduction: Biology and Genetics of Cells and Organisms		Ch 1
9/10	The Nature of Cancer		Ch 2
9/15	Tumor Viruses		Ch 3
9/17	Cellular Oncogenes		Ch 4
9/22	Growth Factors, Receptors, and		

11/19	Stem Cells and Cancer *Current Topics in Cancer Research. Student's presentation*		TBA
11/25	Crowd Control: Tumor Immunology & Immunotherapy I		Ch 15
11/27	Crowd Control: Tumor Immunology & Immunotherapy II		Ch 15

7. Student Code of Conduct

As a UAF student, you're subject to the Student Code of Conduct. In accordance with Board of Regents' Policy 09.02.01, UAF will maintain an academic environment in which the freedom to teach, conduct research, learn, and administer the university is protected. Students will enjoy maximum benefit from this environment by accepting responsibilities commensurate with their role in the academic community. The principles of the Code are designed to facilitate communication, foster academic integrity, and defend freedoms of inquiry, discussion, and expression among members of the university community. You should become familiar with campus policies and regulations as published in the student handbook.

or web www.alaska.edu/bor/ or refer to the student