Biol 407 – Cancer Cell Biology
Fall 2022
Wednesday at 7–9:45pm

Instructor:
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This course will focus on the molecular mechanisms by which fundamental cellular processes are disrupted in the development and progression of cancer. The experimental basis for our current understanding will be emphasized. This course is open to LPS student and will be limited to 26. Biol 121/122 (or Biol 221) and Biol 202 are required.

Structure: This class will meet every Wednesday at 7 – 9:45pm. In each class, two hours will be reserved for lectures and discussion of central scientific topics relating to cancer, and one hour will be devoted to student presentations of an assigned research paper (3 students/ paper). Each student will present once during the term.

Text for 2015: Our textbook is *The Biology of Cancer* by Robert A. Weinberg, published in 2013. In addition to readings from the text, I will assign relevant review articles from the literature. These will be assigned in addition to the primary research articles. All review and primary research papers will be available as PDF files on the class Canvas website.

Term paper: This paper will be written in the form of a miniature NIH grant proposal. The idea is to explore a specific scientific advance relating to a particular topic (research paper) of interest, and propose a detailed experiment that would extend our understanding. The topic will have to be fairly well focused, to allow a sufficiently detailed discussion, and should be approved by the instructor. Nine typewritten pages (double space) is the upper limit. I will describe the format in detail during the course.

Grades will be based on two exams (25% each), the term paper (25%), and class presentation and participation (25%).

Tentative course outline for Fall 2023:

8-30 Introduction – cancer as genetic disease
Experimental approaches

9-6 Cancer stem cells and cell differentiation
Oncogenes I (Src, Ras)

9-13 Oncogenes II (PI3K-AKT and Myc)
Presentation demo (instructor)

9-20 Cancer metabolism
Tumor suppressors I (Rb, cell cycle)
Paper presentation #1 (group 1)

9-27 Tumor suppressors II (p53)
Apoptosis I
Paper presentation #2 (group 2)

10-4 Apoptosis II
Telomeres in cancer
Paper presentation #3 (group 3)

10-11 EXAM 1

10-18 DNA repair and transformation
Tumor microenvironment – EMC, invasion, metastasis
Paper presentation #4 (group 4)

10-25 Angiogenesis
Tumor physiology (hypoxia, Inflammation)
Paper presentation #5 (group 5)

11-1 Real cancers I – colon (APC)
Real cancers II – prostate (AR)
Paper presentation #6 (group 6)

11-8 Real cancers III – breast (BRCA1,2)
Real cancers IV – lung (carcinogens, environment)
Paper presentation #7 (group 7)

11-15 Tumor immunology/immunotherapy
Paper presentation #8 (group 8)

11-22 Thanksgiving break

11-29 Cancer therapies and vaccines

12-6 EXAM 2
No final exam