The Molecular Biology of Cancer

CELL 4710/6710

Fall 2016

**Instructor:** Dr. Frank Jones  
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**Lecture:** 12:30 PM – 1:45 PM, (Tue and Thur)  
**Room:** 240 Lindy Boggs

**Reference Book:** The Biology of Cancer by Robert A. Weinberg

**Course Description:** This course will focus on the molecular biology of cancer and the associated changes in cell biology of transformed cells. Topics covered will include: oncogenes, tumor suppressor genes, genetic instability, metastasis, the regulation of gene expression in cancer cells, and cancer treatment strategies. The course will focus on clinical aspects of cancer biology including discussions on therapeutic advances.

**Course Objectives:** For students to relate previous studies in cell and molecular biology to cancer biology and to learn and understand the molecular mechanisms that contribute to the complex set of diseases called cancer.

**Learning Outcomes:**

1. To analyze and describe molecular alterations in cancer cells and understand how these alterations contribute to tumorigenesis
2. To understand the different contributions of important oncogenes, tumor suppressor genes, and metastasis-associated genes to tumorigenesis.
3. To understand the molecular basis of gene interactions during tumor development and progression.
4. To develop in depth knowledge of specific cancer types and current treatment strategies.
5. To critically examine our current understanding of cancer biology and evaluate strategies to improve patient treatment options, morbidity, and survival.

**Date**  
**Topic**

8/30 (T) 1. What is Cancer

9/1 (Th) 2. The Theory of Multistep Tumorigenesis

9/6 (T) 3. Oncogenes I

9/8 (Th) 4. Oncogenes II

9/13 (T) 5. Tumor Suppressors I

9/15 (Th) 6. Tumor Suppressors II
9/20  (T)  7. Tumor Cell Immortalization and Senescence
9/22  (Th)  8. Evading Apoptosis and Autophagy
9/27  (T)  **EXAM I**
9/29  (Th)  9. The Tumor Cell Cycle
10/4  (T)  10. DNA Repair and Tumorigenesis
10/6  (Th)  11. Tumor Angiogenesis
10/11 (T)  12. Tissue Invasion
10/13 (Th)  NO CLASS – HOLIDAY
10/18 (T)  13. The Metastatic Cascade
10/20 (Th)  14. Tumor Cell Metabolism
10/25 (T)  15. Non-Coding RNAs and Cancer
10/27 (Th)  16. Cancer Epigenetics
11/1  (T)  NO CLASS
11/3  (Th)  **EXAM II**
11/8  (T)  17. Immune Response to Cancer
11/10 (Th)  18. Cancer Therapy
11/15 (T)  19. The Cancer Stem Cell Theory
11/17 (Th)  20. Cancer Prevention
11/22 (T)  NO CLASS – HOLIDAY
11/24 (Th)  NO CLASS – HOLIDAY
12/1  (Th)  22. Molecular Biology of Colon and Prostate Cancers
12/1  (T)  23. Clinical Case – Molecular Biology of Breast Cancer
12/3  (Th)  REVIEW
12/14  (W)  **EXAM III  3 pm – 5 pm**

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