ERHS 510 Cancer Biology

Instructor: Team taught
Course Coordinator, Andrew Ray, MRB491, faray@colostate.edu, 491-5976
The course will meet twice weekly for 75 minutes per session.

Outline

Description: The course will cover the biology of cancer at multiple levels. In the first unit, lectures will focus on the cancer phenotype; epidemiology, histology and classification, cancer cell biology and animal models. The molecular basis of the cancer phenotype will then be explored in the next unit. The third unit continues to explore the mechanism of cancer causation and development. Finally, clinicians from the Animal Cancer Center describe in detail how cancer is detected, treated and prevented. The course will focus on human cancers as well as cancers in veterinary medicine. The course will be taught as didactic lectures by a number of cancer researchers and clinicians.

Student learning objectives: Students will be fluent in the terminology describing cancer. Students will know how various research and clinical disciplines contribute to our current understanding of the biology of cancer. Students will be able to describe historically significant experimental approaches used by others to detect and describe the complex phenotype of cancer from the level of the gene, the cell, the organ, the organism and the population.

Class #	Topic	Reading	
Unit 1: Overview of Hallmarks of Cancer			
1	**Cancer epidemiology (Reif)**	Ch. 2	1/16
2	**Cancer epidemiology (Reif)**	Ch. 2	1/18
3	**Histology/nomenclature/ classification *(Ehrhart)***	Supp	1/23
4	**Hallmarks of a cancer cell *(Ray)***	Review article	1/25
5	**Cytogenetics *(Bedford)***		1/30
6	**Animal models *(Weil/Thamm)***		2/1
7	**Prevention/Detection *(Thompson)***		2/6
8	**Unit #1 Exam**		2/8
Unit 2: Carcinogenesis and Tumor Biology			
9	**Oncogenes *(Weil)***	Ch. 7	2/13
10	**Tumor suppressor genes/caretaker/ gatekeeper genes/multistep model *(Weil)***	Ch. 7	2/15
11	**Signal transduction (growth signals) *(Bamburg)***	Ch. 8	2/20
12	**Signal transduction (anti-growth signals) *(Bamburg)***	Ch. 8	2/22
13	**Apoptosis *(Fox)***	Ch. 10	2/27
14	**Telomeres *(Bailey)***	Supp	3/1
15	**Unit #2 Exam**		3/6
Unit 3: Carcinogenesis and Tumor Biology			
16	**Viral carcinogenesis *(Ray)***	Ch. 6	3/8
17	**Carcinogens (tobacco, asbestos,etc) (*Legare*)**	Ch. 3	3/20
18	**Radiogenic cancers *(Ullrich)***	Ch. 3	3/22
19	**Cancer syndromes *(Weil)***	Review article	3/27
20	**Angiogenesis *(Thamm)***	Ch. 12	3/29
21	**Tumor immunology (*Dow*)**	Ch. 20	4/3

22	**Tumor microenvironment *(Larue)***		4/5
23	**Unit #3 Exam**		4/10
Unit 4: Clinical Issues (Diagnosis and Treatment)			
24	**Tumor classification and clinical staging *(Ehrhart/Thamm)***		4/12
25	**Tumor imaging (*Kraft)***	Ch. 13	4/17
26	**Tumor immunotherapy and vaccines (*Dow*)**	Ch. 20	4/19
27	**Radiotherapy/Surgery *(Larue)***	Ch. 14/15	4/24
28	**Chemotherapy *(Thamm)***	Ch. 17	4/26
29	**Drug discovery and development *(Thamm)***		5/1
30	**Tissue invasion and metastasis (*Rebhun*)**	Ch.11	5/3
31	**Final Exam**		5/7 - 5/11

The required textbook will be:
The Biology of Cancer; Weinberg; Garland Science; 2006

Evaluation Methods: Essay and objective examinations will be used. There will be three unit examinations, each one measuring your understanding of a specific group of topics. The final exam will cover material from unit 4 and will **not** be cumulative.

Exam 1 – 25%
Exam 2 – 25%
Exam 3 – 25%
Final examination - 25%

Grading Scale
90–100% = A
80–89% = B
70–79% = C
60–69% = D
< 60 = F