

EH733 Environmental Carcinogenesis

Time and place: 1:00-2:00 MWF, room 17 Physiology

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Purpose and Course Outline

The role of exposures to environmental toxicants in the development of malignancies has become increasingly clear as a result of epidemiological studies in humans and confirmatory experimental animal studies. In order to learn how these agents exert their carcinogenic effects, a fundamental understanding of the multiple stages and pathways of neoplastic progression must be accomplished, including the molecular biological responses and genetic alteration that occur in cells following exposures to carcinogens. The focus of this course will be the molecular and cellular mechanisms by which specific classes of environmental toxicants exert their carcinogenicity. In addition, the theoretical implications of these molecular mechanisms on carcinogen risk assessment will be evaluated. Finally, the role of epidemiological studies, including the newly emerged discipline of molecular epidemiology, in understanding mammalian responses and genetic susceptibility to carcinogen exposures will be discussed.

This course will be taught in a traditional lecture format augmented by assigned reading of relevant papers pertaining to the lecture material; there will be class discussion on the assigned reading and students are expected to participate fully in this discussion. Mid-term and final examinations will be administered, which will consist of essay questions and some short answers prepared by the course coordinator and/or individual lecturers. In addition, students will be required to write and present a researched topic (pre-approved by the course coordinator) on a relevant topic to this course. The write-up will follow the format of a 8 -10 page small grant proposal, including a hypothesis, an in depth introduction outlining the relevant information regarding the topic of research, and what methods would be utilized to address this issue will be required. Traditional final letter grades will be assigned from equally weighted mid-term and final exams (30% each) and the written proposal (30%) and presentation (10%). Student participation and discussions will be considered for borderline grades.

Student Learning Objectives

Upon completion of this course, students will be able to:

- describe experimental approaches used by others to characterize the tumor phenotype at various levels
- discover the cellular and molecular basis underlying carcinogenesis

Textbook and Reading Materials

Research and review articles will be selected by the instructor(s).

<i>Date</i>	<i>Topic</i>	<i>Lecturer</i>
Jan 23	Organization, Expectations, Overview	Legare
Jan 25	Cell Cycle Control and Cancer: dysregulation of differentiation and proliferation	Legare
Jan 28	“ “ “ “	Legare
Jan 30	Carcinogenicity Evaluation: Approaches	Legare
Feb 1	Environmental Carcinogenesis: Introduction	Legare

Feb 4	Histopathology and Hallmarks of Cancer	Legare
Feb 6	Cancer Epidemiology I	Reif
Feb 8	“ “ “ “	Reif
Feb 11	Cancer BioAssays	Yang
Feb 13	Dose-Response Assessment	Yang
Feb 15	Dose-Response Assessment / PBPK modeling	Yang
Feb 18	Bayesian Statistics, Monte Carol simulation, etc	Yang
Feb 20	Cancer Susceptibility Genes / Tumor Suppressor Genes	Duval
Feb 22	“ “ “ “	Duval
Feb 25	“ “ “ “	Duval
Feb 27	Toxicogenomics / Gene-Environmental Interactions	Hanneman
Feb 29	“ “ “ “	Hanneman
Mar 3	“ “ “ “	Hanneman
Mar 5	MIDTERM EXAM	Legare
Mar 7	Carcinogens: Overview	Legare
Mar 10	Carcinogens: Infectious agents / bacteria, parasites	Legare
Mar 12	Infectious agents: viruses	Ray
Mar 14	“ “ “ “	Ray
	<i>Spring Break</i>	
Mar 24	Metabolism / Bioactivation	Tjalkens
Mar 26	“ “ “ “	Tjalkens
Mar 28	“ “ “ “	Tjalkens
Mar 31	Carcinogens: Medical / estrogens	Hanneman
Apr 2	Medical: Hormonal / Endocrine	Hanneman
Apr 4	Medical: PCB, TCDD, atrazine, others	Hanneman
Apr 7	Radiation: UV	Weil
Apr 9	Radiation: Radon	Weil
Apr 11	Carcinogens: Consumer Products	Legare
Apr 14	Carcinogenesis: Chemicals	Mayeno
Apr 16	Chemicals: Ethanol	Legare
Apr 18	Chemicals: Tobacco	Legare
Apr 21	Chemicals:	Legare
Apr 23	Carcinogens: Radiation /Telomeres	Bailey
Apr 25	Emerging Treatment Technologies	Gustafson
Apr 28	“ “ “ “	Gustafson
Apr 30	“ “ “ “	Gustafson
May 2	“ “ “ “ ***written assignment due	Gustafson
May 5	Final student presentations	Legare
May 7	“ “ “ “	Legare
May 9	“ “ “ “	Legare
May 15	FINAL EXAM: May 15th (Th) 3:40-5:40	Legare

