



PHARM. 781. MOLECULAR TOXICOLOGY

Course Description: This is a reading and discussion-based class. The molecular mechanisms of several toxicant classes are covered. Emphasis is placed on the effects of xenobiotics on cellular processes, including biochemical reactions and signaling pathways.

Credit Hours: 2 semester hours

Course Prerequisites: It is expected that students in the pharmacology program will have already completed basic courses in biochemistry, physiology and pharmacology. Students in other programs should have background in one of these disciplines. Prior approval by either the Graduate Director of the program in which the student is enrolled or the student's faculty advisor is also required.

Course Dates: August 16 – December 21, 2010 (Fall Semester)

Course Times: Times will be arranged.

Course Location: Arrangements for a classroom will be made as needed.

Instructor: Rodney C. Baker, Ph.D.

Required Text and Other Learning Resources:

A Textbook of Modern Toxicology, 3rd Edition, Edited by Ernest Hodgson

Cytochrome 450, 3rd edition, Edited by P.R. Ortiz de Montellano
2005, Kluwer Academic/Plenum Publishers, New York.

Course Overview: The course will cover the source and route of exposure to major toxicant classes, how the toxicants gain entrance to the affected organism, and how the substance is distributed, stored metabolized and excreted will be discussed. The contribution made by toxicant metabolism as apposed to detoxification by metabolism will emphasized in the discussions. Primary mechanism of toxicity will be covered and in situations where the mechanism of toxicity is not known the students will be expected to propose possible mechanisms of action and lead a discussion defending the proposed mechanisms. Genetic effects related to toxicant metabolism, chemical carcinogenesis, hepatotoxicants, endocrine disruptors, toxicities related to the immune system and nervous system will be emphasized.

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

(1) describe or otherwise relate major physiological functions and regulatory mechanisms to the ultimate perturbations elicited by exposure to a specific compound (toxicant or toxin) or mixture of compounds.

(2) identify organs or sites within the relevant system or systems at which toxicants act, from both

an experimental and a therapeutic or antidote perspectives.

(3) identify the fate of toxicants or toxins starting from initial exposure to site of toxicity and elimination

(4) define the mechanisms of action of the toxicants or toxins and evaluate the impact of their actions on the basic biochemical processes and physiological functions as related to the toxicity observed

(5) identify or otherwise enumerate the experimental evidence that supports (or refutes) the presumed mechanisms of toxic action or regulatory process being studied.

(6) discuss the evidence cited above (4) and offer reasoned conclusions concerning the validity of currently accepted models related to the specified topic.

Grading Policy and Rubric. The final grade in this course will be based on active participation, written assignment(s) and oral presentation(s), and written examinations. The general grading scheme will be as follows:

Component of Grade	Percentage of Grade
Participation	
a. contributed to discussion (yes/no)	10
b. apparent depth of knowledge, analysis, critical thinking	10
Presentation (clarity, knowledge, ability to answer questions)	20
Written Assignments (clarity, depth, analysis, interpretation)	20
Examinations	40
Total:	100

Course Policies:

Attendance at scheduled classes, active participation in discussion, and timely completion of reading and other assignments are required. Written assignments must be typed and comply with the format of appropriate scientific publications or as otherwise stipulated in the assignment. Completed written assignments should be submitted electronically through GroupWise or provided as hard copy.

Information related to this course will be relayed verbally, as written documents or electronically through Groupwise.

University Policies:

Students with disabilities (ADA) statement Refer to UMC policy
Academic honesty statement Refer to UMC policy