PRINCIPLES OF TOXICOLOGY
16:963:501

Course Directors:

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Instructors:

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Course Objectives: The purpose of this course is to provide the learner with a basic understanding of toxicology: the adverse effects of drugs on living systems. The course will emphasize mechanisms, including molecular and physiological basis of actions of drugs and toxicants (pharmacodynamics), and mechanisms associated with the absorption, distribution, metabolism and excretion (ADME, pharmacokinetics) of drugs. Students will develop their skills in the critical review of literature, writing, and experimental design. Upon completion of this course, the learner is expected to:

I. Understand the basis for dose-response relationships and risk assessment
II. Be able to describe the design of preclinical safety studies for pharmaceuticals and the implications for regulatory guidance
III. Have a working understanding of the testing required for an indirect food additive
IV. Be familiar with fundamental aspects of the physiology and function of organs influencing ADME and drug action
V. Develop an appreciation for historical events in the field of toxicology

Course Description: The Principles of Toxicology class will be taken along with Pharmacology and Pharmacogenetics. Students enrolled in Principles of Toxicology will meet during additional class periods beyond the Pharmacology and Pharmacogenetics class periods.

PRINCIPLES OF TOXICOLOGY LECTURE SCHEDULE

Topic	Instructor
Principles of Toxicology: Undesired Effects and Causation	L. Aleksunes
Dose-Response Relationships: Monotonic & Nonmonotonic	L. Aleksunes
Historical Events in Toxicology	Student Presentations
Historical Events in Toxicology	Student Presentations
Toxicity Testing	L. Aleksunes
Literature Evaluation	M. Fortin
Journal Article Discussion I	M. Fortin
Journal Article Discussion II	M. Fortin
Preclinical Safety Studies : Review of Animal Species	D. Ibrahim Aido
Preclinical Safety in Drug Development I	R. Bergeron
Preclinical Safety in Drug Development II	J. Kinyamu-Akunda
Experimental Design I	L. Aleksunes
Experimental Design II	L. Aleksunes
Experimental Design III	L. Aleksunes

PHARMACOLOGY & PHARMACOGENETICS LECTURE SCHEDULE

Topic		Instructor
Basic Principles of Pharmacology		
	Ligand-Receptor Interactions	L. Aleksunes
	Dose Response I: Dose and Exposure	L. Aleksunes
	Dose Response II: Fundamental Models	L. Aleksunes
	Signal Transduction: Nuclear Receptors	L. Aleksunes
	Signal Transduction: Electrical Conductance	A. Gow
	Signal Transduction: Ion Channels	A. Gow
	Signal Transduction: G-Protein Coupled Receptors I	A. Gow
	Signal Transduction: G-Protein Coupled Receptors II	A. Gow
	Signal Transduction: Kinases and Intracellular Signaling	L. Aleksunes
Absorption, Distribution, Metabolism, and Excretion		
	Absorption & Distribution I	G. Guo
	Absorption & Distribution II	G. Guo
	Absorption & Distribution III and Phase I Metabolism	G. Guo & I. Hanna
	Phase I Metabolism	I. Hanna
	Phase II Metabolism	I. Hanna
	Transport	L. Aleksunes
	Regulation of Metabolism and Transport	L. Aleksunes
	Drug Interactions: Principles and Mechanisms	L. Aleksunes
	Clinical Drug Interactions	M. Wynd
Special Populations, Personalized Medicine, and Pharmacogenetics		
	Pharmacokinetics in Pregnancy & Developmental Toxicology	L. Aleksunes
	Pediatric Pharmacokinetics	C. Robinson
	Geriatric Pharmacokinetics	M. Wynd
	Pharmacogenetics: Pharmacokinetics	L. Aleksunes & M. Wynd
	Personalized Medicine	C. Molloy
	Pharmacogenetics: Pharmacokinetics	L. Aleksunes & M. Wynd
	Pharmacogenetics: Pharmacodynamics	L. Aleksunes & M. Wynd
	Clinical Pharmacogenetics	M. Wynd