

Medical Pharmacology

Course Description

Our course in Medical Pharmacology is designed to prepare the student for the clinical study of therapeutics by providing knowledge of the manner in which drugs modify biological function. The course includes a systematic study of the effects of drugs on different organ systems and disease processes, the mechanisms by which drugs produce their therapeutic and toxic effects, and the factors influencing their absorption, distribution and biological actions.

Topics include structure and physical properties of drugs; quantitative structure-activity and dose-response relationships; receptors as determinants of drug action; concepts, analysis and modeling of agonists, antagonists, and receptor mechanisms; signal amplification, selectivity, and regulation; drug absorption, distribution and metabolism; modern approaches to drug design.

TEXTBOOKS

- **Basic and Clinical Pharmacology, B. G. Katzung. AJ Trevor & S Masters (Eds).** ISBN: 978-0071764018. McGraw Hill / Lange Med. Pub., Norwalk, Conn./San Mateo, CA.
- **Goodman & Gilman's The Pharmacological Basis of Therapeutics.** ISBN: 978-0071624428. McGraw-Hill Pub.
- **Katzung & Treavor's Pharmacology. Examination & Board Review.** McGrawHill/ Lange ISBN: 978-0071701556.
- **Lippincott's Illustrated Reviews: Pharmacology.** Lippincott Williams & Wilkins. ISBN: 978-0781771559.
- **Principles of Pharmacology. The Pathophysiologic Basis of Drug Therapy.** Golan David E. et al. Editors. ISBN-13: 978-0-7817-8355-2. Wolters Kluwer, Lippincott Williams & Wilkins, Philadelphia.

Graduate Program

The Department offers both Master of Science (MS) and Doctor of Philosophy (PhD) degree programs.

Students normally enroll in the seminars and participation in undergraduate teaching as teaching assistants. Students also are expected to take part in laboratory research rotations .

PhD degree students are required to pass a comprehensive examination within 2.5 years of matriculation into the graduate program.

Dissertation Proposal - Ph.D. Students

During the third year of study students are to complete a research proposal. This will typically follow similar written.

Teaching Experience

Ph.D. students are required to spend in the department's undergraduate course offerings. For example, in a laboratory course and they will assist in the laboratory as required by the course .

Seminar Presentations

Students will present one seminar each year. The topic of the seminar will be selected by the students dissertation advisory committee on a topic not related to student's dissertation research. The student may suggest a topic. Topics for seminars beyond the second year can be dissertation related, including the proposed research and progress reports.

- **Semester(s) Offered:**

Course Name: Neuropharmacology

Course Director: professor Zarrindast

Course Content: This course surveys selected areas of research areas of particular interest to neuropharmacology. This includes areas of basic neurobiology that underlie the actions of important pharmacological agents, or which relate to current efforts to develop novel therapeutic agents. Also includes the pharmacology of selected CNS-active agents which are of intense current interest to the medical community and general public; and lectures covering the pathophysiology of specific neurological or psychiatric disorders and the therapeutic actions and side effects of drugs used in treatment of these disorders. The course consists of a series of lectures on the subject matter selected; with appropriate reading assignments prepared by each lecturer relevant to the topic. Student performance is evaluated by two exams each covering half of the course and given equal weight. Lectures: 2 hrs/wk. Letter-graded.

Course Name: Principles of Pharmacology

Course Director: professor Dehpour

Course Content: Topics include structure and physical properties of drugs; quantitative structure-activity and dose-response relationships; receptors as determinants of drug action; concepts, analysis and modeling of agonists, antagonists, and receptor mechanisms; signal amplification, selectivity, and regulation; drug absorption, distribution and metabolism; modern approaches to drug design.

Course Name: Cardiovascular Pharmacology

Course Director: professor Jahanguiri

Course Content: This course will provide a background of the anatomy, physiology, and pharmacology of the heart, and blood vessels.

Students develop understanding of the underlying cellular mechanisms by which drugs affect both normal and pathophysiologic processes. Pharmacokinetics, pharmacodynamics, toxicologic actions and side effects and pharmacotherapeutics are highlighted. The overall goal is to establish the pharmacologic basis to manage cardiovascular disease in humans.

Course Name: Endocrine Pharmacology

Course Director: Professor Ejtemaei Mehr

Course Content: Behavioral pharmacology is a synthesis of pharmacology and psychology that has been applied to the study of a wide variety of behaviors and many drugs from different pharmacologic classes. This course will provide a general introduction to fundamental principles in behavioral pharmacology by review and discussion of seminal papers in specific topic areas of behavioral pharmacology. Readings will include primary literature as well as selected book chapters (see below). Specific readings for the course might change over time, although the topics to be covered will remain the same.

Topics:

Classical and instrumental conditioning

Schedules of reinforcement

Dose response, agonism, antagonism, inverse agonism

Drugs and unconditioned behavior

Drugs and conditioned behavior
Drugs and stimulus control
Drugs as discriminative stimuli
Drugs as reinforcing stimuli
Tolerance, dependence and withdrawal

Course Name: Therapeutics: Autonomic Pharmacology

Course Director: Dr Bakhtiarian

Course Content: This course will provide a background of the anatomy, physiology, and pharmacology of the autonomic nervous system (ANS). Lectures will cover the role of the sympathetic and parasympathetic components of the ANS in the regulation of homeostasis. Drugs that modulate catecholaminergic and cholinergic neurotransmission will be discussed as well as diseases that involve alterations in ANS function. Additional topics include: respiratory pharmacology and drugs used in the treatment of asthma; neuromuscular blocking agents and drugs that modulate gastrointestinal function.

Course Name: Therapeutics: Central Nervous System Pharmacotherapeutics

Course Director: professor Zarrindast

Course Content: This course will provide a background of the anatomy, physiology, and pharmacology of the central nervous system (CNS). Lecture topics will include an overview of the CNS, anti-anxiety medications, hypnotic drugs, antidepressant medications, antipsychotic medications, treatments for Parkinson's and anti-convulsant medications.

Course Name: Toxicology

Course Directors: professor Ghazi

Course Content: This course consists of broad field of toxicology, including acute and chronic toxicity, toxicokinetics, reproductive toxicology, teratogenicity, mutagenicity and carcinogenicity. Specific topics include drugs, metals, solvents, food additives, pesticides and herbicides, environmental pollution, radioactive chemicals, industrial exposure and forensic toxicology.

Course Name: DRUG METABOLISM

Considerations of the biochemical mechanisms for the biotransformation of drugs and foreign compounds. Includes reaction mechanisms, methodology, kinetics of inhibition and activation, steroid and amine metabolism.

Course Name: Epilepsy**Course Director: professor Zarrindast**

Course Content: Epilepsy is an episodic neurological disorder that is characterized by recurrent spontaneous seizures. Although quite heterogeneous in clinical presentation, the condition has in common a mechanistic basis in neuronal hyperactivity and hyper-synchrony of neuronal circuits. Recent decades have witnessed tremendous advances in our understanding of genetic, molecular, cellular, and network mechanisms that may have a role in epileptogenesis, as well as advances in the treatment of epilepsy. This course will introduce students to basic mechanistic questions in the field of epilepsy research through a combination of didactic lectures and seminars.

Course Syllabus:

- 1: Introduction and Classification of Epilepsies
- 2: Genetics of Epilepsy
- 3: GABA and Epilepsy
- 4: Sprouting and Epileptogenesis
- 5: HCN Channels and Excitability
- 6: Anti-epileptic Drugs

Course Name: Therapeutics (Chemotherapy)**Course Directors: Professor Ghazi**

Course Content: This course will provide an overview of modern pharmacological approaches to chemotherapy. Lecture topics will include: antibiotic medications; anti-fungal medications; anti-viral medications; anti-tubercular medications; anti-cancer medications.

Course Name: Endocrine Pharmacology**Course Directors: Dr.'s**

Course Content: This course will provide a background of the pharmacology of major endocrine systems. Lecture topics will include: an overview of endocrine physiology; thyroid and parathyroid drugs; insulin and oral hypoglycemic drugs; sex steroids and adrenal steroids.

Course Name: Pharmacological Management of Pain

Course Director: professor Ejtemaei Mehr

Course Content: This course will provide an overview of modern pharmacological approaches used in the treatment of pain. Lecture topics will include: opiates/NSAIDS; local anesthetics; general anesthetics.

Course Name: Journal Club

Course Content: Pharmacology graduate students will be responsible for demonstrating experiments in the medical pharmacology course as assigned by a teaching staff member.

Course Name: Survey of Research Techniques in Pharmacology

Course Director: Drs.

Course Content: This course is intended to acquaint PhD students in pharmacology with the research being carried out by departmental faculty. Students will rotate through the laboratories on an arranged schedule, observing and participating in research activities.

Course Name: Practical Pharmacology

Course Director: Drs.

Course Content: Experiments will be performed on standard pharmacological in vitro preparation to demonstrate the principles of competitive and non-competitive antagonism, drug efficacy and the mechanisms of drug action. Also include methods used in the fields of cardiovascular, behavior and psychopharmacology.

Course Name: PhD & Master's Literature Review

The student conducts a thorough library search and writes a scholarly report on an advanced topic in pharmacology under the guidance of a faculty advisor.

Course Name: PhD & Master's Thesis Research

The candidate must write a scholarly thesis describing his/her original laboratory research. The thesis must be approved by a faculty committee and defended by the student.

Research is conducted in a selected field under the guidance of the student's advisor. The emphasis will be on originality, creativity, and contribution to the field.

Pharmacology Courses for Medical Students

			<u>Introductory course</u>	Pharmacology (I)
1	Principles & introduction			
2	Drug Receptors & Pharmacodynamics (1)			
3	Drug Receptors & Pharmacodynamics (2) Signaling Mechanisms			
4	Pharmacokinetics(Absorption, Distribution, Extraction)1&2			
5	Introduction to Autonomic Pharmacology Cholinoceptor-Activating & Cholinesterase-Inhibiting drugs			
6	Chemotherapeutic drugs			
7	Drug metabolism			
8	Sulfonamides, trimethoprim, Beta-Lactam Antibiotics			
9	Chloramphenicol & /Tetracycline			
10	Adrenoceptor antagonist drugs			
11	Adrenoceptor agonist & sympathomimetic drugs			
12	Cholinoceptor blocking drugs			
13	Basic and clinical evaluation of new drugs			
1	Diuretic drugs		<u>Renal course</u>	
2	Immunopharmacology			
3	Antihypertensive drugs			
1	Antiarrhythmic drugs - Vasodilators - Angina pectoris treatment		<u>Cardiovascular course</u>	
2	hyperlipidemic drugs			
3	Heart glycosides & Heart failure medication			
1	Hypothalamus & (posterior -anterior) Pituitary gland hormones		<u>Endocrine course</u>	
2	Corticosteroids			
3	Calcium homeostasis drugs			
4	Thyroid and anti-thyroid drugs- Pancreatic hormones & Anti-diabetic drugs			
5	Gonadal hormones & inhibitors			
1	Anti-Helminthic drugs		<u>Gastrointestinal course</u>	
2	Histamine antagonist drugs			
3	Gastrointestinal drugs			

1	Drugs to treat aggregation	<u>Blood course</u>	Pharmacology (II)
2	Anti anemia drugs		
3	Cancer chemotherapy drugs(1-2)		
4	Drug interactions		
5	prenatal & pediatrics pharmacology- Geriatric Pharmacology		
6	OTC drugs & Prescription		
7	Toxicology & Poison control		
1	Introduction of CNS drugs	<u>Neuropharmacology course</u>	
2	Sedatives, hypnotics, and antianxiety medications & Alcohol pharmacology		
3	Opioid analgesics & Antagonists – Substance Abuse		
4	Antidepressants drugs		
5	Muscle relaxants & anesthetic drugs		
6	Antiepileptic drugs		
7	Topical anesthetics		
8	Anti fungal and antiseptics		
9	Dermatopharmacology		
10	Medicinal Plants		
11	Anti-Virus drugs		
1	Eicosanoids - Nonsteroidal anti-inflammatory drugs	<u>Rheumatology course</u>	
2	Gout drugs		
1	Histamine	<u>pulmonary course</u>	
2	Serotonin		
3	H1 blockers- Bronchodilators -Anti-asthmatic drugs		
4	Eicosanoids		
5	Antituberculosis drugs		