

PHCO 701

Short title Molecular Pharmacology

Long title Introduction to Molecular Pharmacology

Effective term Fall

Course units/hours 3 credit hours M/W/F 9:00am-9:50am in MEJ 3106 (Mary Ellen Jones bldg.)

Grading basis (GRAD – H,P,L, F)

Course Component (lecture or lab) lecture

Course Description

This is a graduate-level first year course outlining the basics of molecular pharmacology, including molecular biology, bioinformatics, drug/receptor interactions, receptor and ion channels, regulation of second messengers, drug metabolism and system pharmacology. Permission of the instructor required for registration. Three credit hours a week.

Course objectives (learning outcomes):

The objectives of this course are to provide graduate students in biomedical research programs familiarity with the molecular principles of pharmacology involved in the design and action of drugs. Students will increase critical thinking skills in the context of the specific topics listed in the syllabus, which includes molecular biology underlying drug development, key drugable pathways and the interactions between drugs and human body. By the end of this course students should be familiar with molecular principles of drug development including knowledge of gene expression pathways related to drugs, key drugable targets and the interaction between drugs and their receptors. Students should have working knowledge sufficient to apply those principles to new research topics and to propose appropriate strategies to solve relevant research questions.

Course Assignments

Reading assignments may be posted by the individual instructors and will be a combination of review articles, research papers of seminal importance to the field, and recent research articles of significant impact. There may be written assignments, including quizzes/homework and short essay-style exams designed to test both the assimilation of the readings and the application of principles to new scientific scenarios posted by individual instructors.

Assessments

Achievement of course objectives and individual student grades will be determined from one take home project and two in-class exams at the end of each of three modules. By the end of the course, the students should have a good understand the principles of drug development and able to use the tools and knowledge introduced in the course in a new scientific questions related to drug actions. The students should also demonstrate a working vocabulary in the field and have a working knowledge of the pharmacologic principles.

Block 1: Pharmacological Targets Block Leader: Dohlman				
8/21/2023	Mon	Graves	Introduction / History of Pharmacology	MEJ3102
8/23/2023	Wed	Dohlman	Pharmacology I	MEJ3102
8/25/2023	Fri	Dohlman	Pharmacology II	MEJ3102
8/28/2023	Mon	Roth	GPCRs	MEJ3102
8/30/2023	Wed	Roth	GPCRs	MEJ3102
9/1/2023	Fri	Kenakin	Biased Signaling	MEJ3102
9/1/2023	Fri	Kenakin	TAKE HOME 1	
9/4/2023	Mon	Labor Day		
Block 2: Signaling Pathways Block Leader: Kenakin				
9/6/2023	Wed	Sondek	Membrane Biology	MEJ3102
9/8/2023	Fri	Graves	Kinase networks / Receptor kinases	MEJ3102
9/11/2023	Mon	Graves	Second messengers	MEJ3102
9/13/2023	Wed	Carter-Edwards	Pharmacogenetics, Personalized Medicine, and Race	MEJ3102
9/13/2023	Wed	Kenakin	TAKE HOME 2	
Block 3: Technology and Systems Pharmacology Block Leader: Hahn				
9/15/2023	Fri	Graves	The Application of Mass Spectrometry in Pharmacology	MEJ3102
9/18/2023	Mon	Herring	Proteomics	MEJ3102
9/20/2023	Wed	Szulcowski	Molecular Imaging Tools	MEJ3102
9/22/2023	Fri	Legant	Modern Fluorescence Microscopy	MEJ3102
9/25/2023	Mon	Well Being Day		
9/27/2023	Wed	Roth	Technology	MEJ3102
9/29/2023	Fri	Roth	Introduction to Systems Biology	MEJ3102
10/2/2023	Mon	Brunk	Multi-omics data integration	MEJ3102
10/2/2023	Wed	Kenakin	TAKE Home 3	
Block 4: Informatics and Modeling Block Leader: Elston				
10/4/2023	Wed	Brown	Protein Expression, Purification, Characterization, and Interactions	MEJ3102
10/6/2023	Fri	Brown	Protein Structure Determination and Structural Bioinformatics	MEJ3102
10/9/2023	Mon	Nicely	Macromolecular Crystallography	MEJ3102
10/11/2023	Wed	Gomez	Analysis of Signaling Networks	MEJ3102
10/13/2023	Fri	Elston	Modeling of Signaling networks	MEJ3102
10/16/2023	Mon	Johnson	Precision Medicine	MEJ2102
10/18/2023	Wed	Moorman	Covid 19	MEJ3102
10/18/2023	Wed	Kenakin	TAKE HOME 4	
10/20/2023	Fri	FALL BREAK		
Block 5: Emerging Concepts: Block Leader: Graves				
10/23/2023	Mon	Duncan	Principles of Biologic Therapy	MEJ3102
10/25/2023	Wed	Emanuele	Cell Cycle Regulation	MEJ2102
10/27/2023	Fri	Emanuele	Developing a Cell Cycle small Molecule	MEJ3102
10/30/2023	Mon	Dohlman	Genetic Therapy	MEJ3102
11/1/2023	Wed	Bryant	cancer metabolism	MEJ2102
11/3/2023	Fri	Morris	Oncogene & tumor suppressor network	MEJ3102
11/6/2023	Mon	Song	Stem cell therapy	MEJ3102
11/8/2023	Wed	Der	Cancer Immunotherapy	MEJ2102
11/10/2023	Fri	Der	Mechanisms of Resistance to targeted therapies	MEJ3102
11/10/2023	Fri	Kenakin	TAKE HOME 5	
Block 6: Genetics and Epigenetics Block Leader: Calabrese				
11/13/2023	Mon	Samulski	Gene Therapy	MEJ3102
11/15/2023	Wed	Calabrese	Genome structure and Diversity	MEJ3102
11/17/2023	Fri	Calabrese	Transcription	MEJ2102
11/20/2023	Mon	Calabrese	Epigenetics	MEJ3102
11/22/2023	Wed		Thanksgiving	
11/24/2023	Fri		Thanksgiving	
11/27/2023	Mon	Dominguez	Splicing	MEJ3102
11/29/2023	Wed	Dominguez	siRNA / Antisense / CRISPR	MEJ3102
12/1/2023	Fri	Dominguez	TBA	MEJ3102
12/1/2023	Fri	Kenakin	TAKE HOME 6	MEJ3102