

PHRM 5290**Topics in Molecular and Cellular Pharmacology****Spring Semester 2023; Undergraduate Syllabus****Course Director**

Dr. Benedek Erdos, Assistant Professor of Pharmacology, Larner College of Medicine

Syllabus

Pharmacology 5290 will be offered by the Department of Pharmacology to advanced undergraduate students in the Spring Semester, 2023. This three credit-hour, team-taught course focuses on basic pharmacological principles, drug interactions with receptors, membranes, synapses, neurotransmitters, macromolecules, ion channels, the cytoskeleton, and membrane pumps. Recent studies of the molecular and cellular mechanisms of drug action are discussed, and state-of-the-art techniques for pharmacological analysis of various cellular target molecules are described.

This course is a core requirement for students pursuing the Pharmacology Minor.

Prerequisites

Background in Biology or Biochemistry or Permission

Time and Place

Tuesday / Thursday, 2:50 – 4:05 PM; Waterman 427

Course Faculty

Faculty	Department	Telephone	E-mail
Frances Carr	Pharmacology	656-1318	Frances.Carr@uvm.edu
Benedek Erdos	Pharmacology	656-0988	Benedek.Erdos@uvm.edu
Osama Harraz	Pharmacology	656-0782	oharraz@uvm.edu
Grant Hennig	Pharmacology	656-0859	grant.hennig@uvm.edu
Alan Howe	Pharmacology	656-9521	Alan.Howe@uvm.edu
Nicholas Klug	Pharmacology	656-0782	Nicholas.Klug@uvm.edu
Karen Lounsbury	Pharmacology	656-1319	Karen.Lounsbury@uvm.edu
Tony Morielli	Pharmacology	656-4500	Anthony.Morielli@uvm.edu
Amreen Mughal	Pharmacology	656-0782	Amreen.Mughal@uvm.edu
Maria Noterman	Pharmacology	656-8037	Maria.Noterman@uvm.edu

Office Hours

Tuesdays and Thursdays 1:00pm – 2:00 pm, Given E315

Format

All lectures will be in-person in Waterman 427. All lecture materials (PowerPoint files, handouts, etc.) will be made available through Blackboard.

Handouts

Handouts will be posted before each lecture. The handouts are detailed and usually contain learning objectives, appropriate background information, and lots and lots of study questions including detailed answers to the study questions. Working with the study questions will provide an accessible and straight forward metric to master this course with ease.

Grading:

1. Five closed-book exams: Exams (100 points each) will consist of multiple choice and short essay questions and will cover the material of the preceding 4-5 lectures (see schedule).
2. Optional Review Paper: Optional extra credit for undergraduate students (weighted as a 6th exam, 100 points).

The paper should be related to one of the general course topics and be based on at least 3 primary literature references (*not review papers*). Your paper should summarize the background, results, and conclusions of the cited papers, discuss the importance of the papers in the context of the specific topic of interest, and include your assessment of the strengths and possible limitations or weaknesses of the research.

Format: minimum 5 pages + 1 page references,
1" margins, Font size: 11, line spacing 1.5.

The paper is due on April 25th, please inform Dr. Erdos by April 13th of your intent to submit a paper and indicate the topic of your review.

Course Schedule:

Date	Topic	Instructor
1/17	G-protein coupled receptors	Erdoş
1/19	Transcription factors	Lounsbury
1/24	Hormone receptors	Carr
1/26	The Function and Pharmacology of Receptor Kinases - I	Morielli
1/31	The Function and Pharmacology of Receptor Kinases - II	Morielli
2/2	EXAM I	
2/7	Monoclonal antibodies as therapies (<i>including COVID-19</i>)	Lounsbury
2/9	Vaccine Development (<i>including COVID-19</i>)	Lounsbury
2/14	Cyclic AMP/PKA signaling	Noterman
2/16	Cyclic GMP signaling, nitric oxide	Mughal
2/21	Cell adhesion & cytoskeletal dynamics	Howe
2/23	EXAM II	
2/28	Cation channels (TRP channels)	Harraz
3/2	Potassium channels	Mughal
3/7	<i>No class - Town meeting day recess</i>	
3/9	Calcium channels	Klug
3/13 - 17	<i>No classes - Spring break</i>	
3/21	Chloride channels	Harraz
3/23	Nicotinic receptors	Morielli
3/28	EXAM III	
3/30	Ryanodine receptors	Hennig
4/4	IP3 receptors	Hennig
4/6	Synaptic pharmacology and neurotransmission - I	Erdoş
4/11	Synaptic pharmacology and neurotransmission - II	Erdoş
4/13	Central control of the cardiovascular system	Erdoş
4/18	EXAM IV	
4/20	Ocular pharmacology, retinopathy	Klug
4/25	Vascular function and disease	Mughal
4/27	Pharmacophysiology of the kidney	Erdoş
5/2	Renin-angiotensin system	Erdoş
5/4	Pharmacogenetics – pharmacogenomics	Erdoş
5/12	EXAM V	