

1. Course: GMS6009-Principles of Drug Action and Therapeutics
Updated 10-14-19

Spring 2020

Course Co-Coordinators:

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And

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2. Office hours: Friday 4-6 PM, by appointment.

3. Course Objectives: a. To provide students with a basic knowledge of how therapeutics are discovered and optimized, b. to educate students on the mathematical models and quantitative analysis of ligand-receptor binding interactions and receptor-response coupling, c. to describe the biochemical and biological mechanisms of therapeutic action, and d. to explain how therapeutic agents are distributed within the body as a function of time and to outline the factors that control their half-life and access to their biologically relevant receptors.

4. Topical outline:

Section 1: Target Identification and Validation, Drug Discovery, and Drug Development

<u>Lecture</u>	<u>Day</u>	<u>Date</u>	<u>Hrs</u>	<u>Topic</u>	<u>Lecturer</u>	<u>Time/Location</u>
1	Tues	1/7	1	Intro/Perspective, Course Introduction	B. Law	1:30-2:30PM/R5-265
2	Tues	1/7	1	Drug Discovery from Natural Products	Kem	2:30-3:30PM/R5-265
3	Thur	1/9	1	Biosynthetic Approaches to Drug Production	Ding	1:30-2:30PM/R5-265
4	Thur	1/9	1	Antibiotics	Huigens	2:30-3:30PM/R5-265
5	Tues	1/14	1	Binding Sites by Crystallography	McKenna	1:30-2:30PM/R5-265
6	Tues	1/14	1	Rational Drug Design/Molecular Docking	McKenna	2:30-3:30PM/R5-265
7	Thur	1/16	1	Viruses as Therapeutics	A. Dinculescu	1:30-2:30PM/R5-265

Section 2: Analysis of Receptor Occupancy and Cellular Responses

8	Thur	1/16	1	Intro to Dose-Response	B. Law	2:30-3:30PM/R5-265
9	Tues	1/21	1	Receptor Measurement	Harrison	1:30-2:30PM/R5-265
10	Tues	1/21	1	Receptor Subtypes I	Harrison	2:30-3:30PM/R5-265
11	Thur	1/23	1	Receptor Subtypes II	Harrison	1:30-2:30PM/R5-265
12	Thur	1/23	1	Successful drugs and drug targets	B. Law	2:30-3:30PM/R5-265
	Tues	1/28	2	Review I	Faculty	1:30-3:30PM/R5-265
	Thur	1/30	2	Exam I	Faculty	1:30-3:30PM/R5-265
13	Tues	2/4	1	Partial and Inverse Agonists	M. Law	1:30-2:30PM/R5-265
14	Tues	2/4	1	Receptor Signaling Mechanisms	M. Law	2:30-3:30PM/R5-265
15	Thur	2/6	1	Receptor Occupancy Theory	S. Jahn	1:30-2:30PM/R5-265
16	Thur	2/6	1	Drug Admin., Absorp., and Distrib.	Kem	2:30-3:30PM/R5-265

Section 3: Factors Controlling Drug Efficacy in Vivo

17	Tues 2/11	1	UF Drug Development Core Technology	CTSI (Sharma)	1:30-2:30PM/R5-265
18	Tues 2/11	1	Binding Analysis by SPR and BLI	Denslow	2:30-3:30PM/R5-265
19	Thur 2/13	1	Drug Elimination	James	1:30-2:30PM/R5-265
20	Thur 2/13	1	Pharmacokinetics	Kem	2:30-3:30PM/R5-265
21	Tues 2/18	1	Drug Resistance Mechanisms	Rowe	1:30-2:30PM/R5-265
22	Tues 2/18	1	Individual Variation in Drug Response	Rowe	2:30-3:30PM/R5-265
	Thur 2/20	2	Review II	Faculty	1:30-3:30PM/R5-265
	Tues 2/25	2	Exam II	Faculty	1:30-3:30PM/R5-265

Section 4: Mechanisms of Drug Action

23	Thur 2/27	1	Allosteric Modulators	B. Law	1:30-2:30PM/R5-265
24	Thur 2/27	1	Protein Kinases as Drug Targets	B. Law	2:30-3:30PM/R5-265
25	Tues 3/10	1	Signaling Diversity I	Urs	1:30-2:30PM/R5-265
26	Tues 3/10	1	Signaling Diversity II	Urs	2:30-3:30PM/R5-265
27	Thur 3/12	1	Basic Principles of Electrophysiology	Papke	1:30-2:30PM/R5-265
28	Thur 3/12	1	Channel Types, Gating, and Kinetics	Papke	2:30-3:30PM/R5-265
29	Tues 3/17	1	Modulators and Channel Blockers	Papke	1:30-2:30PM/R5-265
30	Tues 3/17	1	Immunotherapy	Guryanova	2:30-3:30PM/R5-265
31	Thur 3/19	1	Proteins and Peptides as Drugs	Fletcher	1:30-2:30PM/R5-265
32	Thur 3/19	1	Pharmacology of DNA Damage	Narayan	2:30-3:30PM/R5-265
33	Tues 3/24	1	Epigenetic gene regulation as a drug target	Liao	1:30-2:30PM/R5-265
34	Tues 3/24	1	Pharmacogenetics	Rowe	2:30-3:30PM/R5-265
	Thur 3/26	2	Review III	Faculty	1:30-3:30PM/R5-265
	Tues 3/31	2	Exam III	Faculty	1:30-3:30PM/R5-265

46 hours total
34 hours of lectures
6 hours of review
6 hours of exams

5. Grading

The grade will be assigned based on numerical performance on three non-comprehensive examinations. Each exam will be 33% of the final grade. Students will be expected to answer all of the questions on each exam.

The following scale will be used:

A	93-100%
A-	90-92%
B+	87-89%
B	84-86%
B-	80-83%
C+	77-79%
C	74-76%
C-	70-73%
D+	67-69%
D	64-66%
D-	60-63%
F	< 60%

Information on current UF grading policies:

<http://www.registrar.ufl.edu/catalog/policies/regulationgrades.html>

6. Attendance: Attendance of lectures is not mandatory, but is however strongly encouraged.

7. Make-up exams: If necessary, make-up exams will be given at a time that is mutually convenient for the instructor and student(s).

8. Accommodations for students with disabilities:

Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation.

9. Required and recommended textbooks: Lecture materials will be provided in pdf format. There is no required textbook. Goodman and Gilman's The Pharmacological Basis of Therapeutics and Katzung's Basic and Clinical Pharmacology are suggested study aids and will be placed on reserve in the Health Sciences Center Library.

10. Class Demeanor

Students are expected to arrive to class on time and behave in a manner that is respectful to the instructor and to fellow students. Please avoid the use of cell phones and restrict eating to outside of the classroom. Opinions held by other students should be respected in discussion, and conversations that do not contribute to the discussion should be held at minimum, if at all.

11. Course Evaluation

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.