

USC School of Pharmacy

RXRS 402: Human Pharmacology: Challenge of Therapeutics in Society

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Office Location: HSC campus PSC 506; Office Hours (by appt).

Course Weight: 4 units

Days/Time/Location: Tuesday, Thursday: 9:30 am to 10:50 am, VKC 261

Introduction

Pharmacology combines pharmacy (the science of drug preparation) and therapeutics (the treatment of disease with drugs and other means). This course is designed for upper-level undergraduate students from science majors who want to gain a working knowledge of how drugs are administered, what happens to them once in the body (pharmacokinetics [PK]) how drugs alter disease (pharmacodynamics [PD]); and potentially damage the body (toxicology). Content also focuses on the use of prescription and over-the counter drugs to prevent and treat diseases (pharmacotherapeutics). The course should give you a basic understanding of many different classes of drugs that are commonly prescribed. It should be important for undergraduates in Pre Pharmacy, Pre Medicine and other health and life science majors as well as students in biomedical engineering. Chapters from the core textbook will be supplemented with a variety of source materials including online resources and articles from scientific journals.

Course Objectives: Upon successful completion of this course, you should be able to:

- Describe how drugs are administered
- Describe the important pharmacokinetic parameters (absorption, distribution, metabolism and elimination; ADME) that affect drug dosing in a patient.
- Describe different drug-receptor interactions and the basic principles of pharmacodynamics (PD)
- Understand the basic principles in the use of drugs to prevent and treat diseases (pharmacotherapy).
- Describe and understand the importance of pharmacogenomics.
- Describe why particular drugs are prescribed (selected by the clinician) and used in patients and the monitoring of their effects (clinical pharmacology)
- Describe and understand the importance of proper drug use in the treatment of a disease and its relationship to health, economy, and wellbeing of society.

- Describe and understand the societal challenges and perceptions related to the economics of drug availability.
- Describe and understand why some drugs are toxic to humans and why some individuals have different reactions to a drug (basic principles of toxicology).

Evaluation and Grading:

Evaluation will be based on two midterm examinations, a final examination, course quizzes and class participation.

Class participation:	20 pts (10%)
5 quizzes @ 10 pts each	50 pts (25%)
2 midterm exams @ 35 pts each:	70 pts (35%)
1 final exam (partially cumulative):	<u>60 pts</u> (30%)
Total:	200 pts.

Class Participation and Attendance: Attendance at all classes is expected. Participation will include asking and answering questions and being actively engaged in the discussion. It is expected that students read the assigned papers prior to the lecture and be prepared to discuss background, current understanding, treatments, and gaps in knowledge for the topic in each lecture.

There will be 4 quizzes over the course of the semester that will primarily be based on questions pulled from the text book. There will be one short student presentation that will count as the 5th quiz. The midterms (35 points each) will include multiple choice and T/F questions as well as a series of questions involving short answers.

The final exam (60 points) will include multiple choice and T/F questions as well as a series of questions involving short answers. The final exam will be cumulative, but will emphasize material covered after the 2nd midterm.

There are no make-up exams. If exceptional circumstances prevent you from attending an exam, your reason for missing it must be accompanied by a written statement from a third party (e.g. a note from a medical doctor).

Notes, books, calculators, electronic dictionaries, regular dictionaries, cell phones or any other aids are not allowed during exams.

Students will be asked to complete an anonymous critical evaluation of the course at its completion.

Course Readings

Required Readings

The text is mandatory for this course as it will greatly improve your grasp on the course content. There is a supplemental online student companion website for this course that can be accessed once the textbook is purchased. The chapters identified for your assigned reading in the in the text will support your learning process throughout the semester.

Pharmacology by Karen Whalen, Pharm.D., BCPS
Edition: 7th ISBN 978-1-4963-8413-3
Format: Paperback w/ Access Code
Pub. Date: 2019
Publisher(s): Wolters Kluwer

Prerequisites: Students should have completed at least one year of undergraduate biology and/or chemistry (e.g., BISC 220/221 or CHEM 105A/B, etc).

Other topical materials including but not limited to the syllabus, supplemental reading assignments and additional handouts will be posted on <http://blackboard.usc.edu/>. Students will also be encouraged to use the online discussions sessions (via Blackboard) as an additional learning tool.

Course Outline

This course will be in the format of a directed seminar/lecture under the guidance of the instructor for the specific session. During each weekly session the instructor will engage the students with questions and draw comments or interpretations primarily based on the assigned reading. Students are expected to ask questions and participate in an interactive fashion. Because this is an area of rapid change in policies, the readings may vary from one term to the next. Additional readings for each section that may be of added use are listed in the table below.

Course schedule is as follows:

Guest Speakers are highlighted in Yellow

Week & Date	Topic	Subtopics to be Included	Assigned and Supplemental Reading
	Guest Lectures		
Weeks 1-2. Aug. 27, 29	Introduction: expectations and goals of this class. Basic principles of pharmacology. Pharmacodynamics Pharmacokinetics Biotransformation Pharmacogenomics PK/PD	Basic Principles; The who and why drugs are used to treat disease; Drug-Body interactions: Pharmacodynamics (PD); Pharmacokinetics (PK); ADME; Dose; potency; sex differences; zero vs first order kinetics; first pass metabolism What is Pharmacology: https://www.youtube.com/watch?v=PQ2m-nrf2z8&feature=youtu.be	Pharmacology, Chapters 1-2 Principles of Drug Therapy Basics on Pharmacokinetics: what the body does to a drug https://www.youtube.com/watch?v=NKV5iaUVBUI Very brief overview of PD Utube: https://www.youtube.com/watch?v=tobx537kFaI
Sept 3, 5	Dr. Ashutosh Kulkarni (Allergan) Quiz #1 Sept 3	Clinical presentation: “How to effectively utilize PK/PD in the management of patients”	PK: https://www.youtube.com/watch?v=mp93nPUzHqM followed by watching: Clearance: https://www.youtube.com/watch?v=hHUFJAsgqkY

Weeks 3-4. Sept. 10, 12, 17, 19	Please take the time to review the UTube videos for cholinergic drugs. Introduction to Autonomic Pharmacology; Drugs affecting the autonomic nervous system Quiz #2 Sept 12	cholinergic drugs; anticholinergic drugs; adrenergic drugs; adrenergic blocking drugs. Cholinergic drug UTube: https://www.youtube.com/watch?v=r-gJaMoMon0 Anti Cholinergic & Neuromuscular Blocking https://www.youtube.com/watch?v=cp_CZpCBVpk	Pharmacology, Chapters 3-7 Drugs Affecting the Autonomic Nervous System Pharmacodynamics discussing protein targets: https://www.youtube.com/watch?v=tobx537kFaI UTube overview: https://www.youtube.com/watch?v=jA1NyCE4M2g Anti- adrenergic Antagonist https://www.youtube.com/watch?v=41Xloc_vvX8
Week 5. Sept. 24 & 26.	Drugs with important actions on smooth muscle	Histamine; serotonin; vasoactive peptides; the eicosanoids; nitric oxide; drugs used in asthma	Pharmacology: Special Topics in Pharmacology: Chapters 37, 39 Histamine and Serotonin; Drugs for Disorders of the Respiratory System
Week 6. Oct. 1	Midterm 1 Oct 1		
Weeks 6-7. Oct 3,8,10	Introduction to CARDIOVASCULAR-RENAL DRUGS Resident Lecture	Antihypertensive agents; vasodilators & the treatment of angina pectoris; drugs used in heart failure; agents used in cardiac arrhythmias; diuretic agents "Clinical perspectives on the management of Hypertension"	Pharmacology, Chapters 16-22 Chapters HYPERTENSION & ANTIHYPERTENSIVES (MADE EASY) Utube: https://www.youtube.com/watch?v=V2sEay-E-Ro Review for antiarrhythmic drugs: https://www.youtube.com/watch?v=9xSgezCMHnw
Week 8	Oct 17	Fall Recess	Fall Recess
Weeks 8-9. Oct. 15, 22, 24	Quiz #3 Oct 15 Drugs affecting the endocrine system Resident Lecture	Drugs for Diabetes; "Clinical perspectives on the management of Diabetes" Using SOAP notes in the clinic	Pharmacology, Chapters 24
Week 10 Oct. 29, 31	Resident Lecture	Clinical Management of HIV-Positive Individuals Anti Drugs; Anti-inflammatory; antipyretic and analgesic agents	Pharmacology: Special Topics in Pharmacology: Chapters: 34 & 38
Week 11. Nov 5	Midterm 2 Nov 5		

Week 11 Nov 7	Resident Lecture	Clinical Presentation: Principles of Antimicrobial Therapy	Principles of Antimicrobial Therapy; Cell Wall Inhibitors; Antimycobacterial Drugs; anthelmintic drugs; antiviral drugs, anticancer drugs; age-associated changes and the implications for drug therapy. “Infectious Disease Pharmacotherapy” Chapters 32, 33, 47
Week 12. Nov. 12, Nov 14	Drugs that act on the CNS Resident Lecture	"Clinical perspectives on the management of Parkinson's Disease" Introduction to the pharmacology of CNS drugs. Drugs for Neurodegenerative Diseases: Parkinson's Disease	Utube: Exercise yes or no?? https://www.youtube.com/watch?v=eXTiiz99p9o Pharmacology, Chapter 8-15 1): Pathophysiology of Parkinson's Disease -- https://youtu.be/WCrZvSFr-TM 2): Basic medications overview of PD. https://www.youtube.com/watch?v=zJBeHPEuIHs&index=10&list=PLUwPvKZhaW-EGXQELQOSAC5pHe8DaDbqY
Week 13. Nov 19 Nov 21	Drugs for other disorders Quiz #4 Nov 19 Melissa Durham, PharmD	Pharmacology of Alcohol General Principles; drug mechanisms; Case Histories, Energy drinks; caffeine; alcohol Clinical Perspectives in Pain Management	Pharmacology Chapter 45
Nov 27-29 Thanksgiving Recess			
Week 14 Nov 26	Anna Arabyan, PharmD	Case Studies in Geriatrics	
Week 15. Dec 3 Dec 5	Quiz #5 SOAP note presentations – to be presented in groups of 2-3 students per group. Clinical toxicology Dr. Martine Culty	Group student presentations. 10 mins each. Risk vs Hazard; routes of exposure for toxins; important targets of toxicity; what makes a drug toxic; management of the poisoned patient.	Pharmacology, Chapter 48 FRONTLINE: Supplements and Safety – https://www.youtube.com/watch?v=uXtr-Qelxcc
Final Exam Thursday, Dec 12th 11:00 am to 1:00 pm in VKC 261			

Statement on Academic Conduct and Support Systems

Academic Conduct:

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, “Behavior Violating University Standards” policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, policy.usc.edu/scientific-misconduct.

Support Systems:

Student Health Counseling Services - (213) 740-7711 – 24/7 on call
engemannshc.usc.edu/counseling

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call
suicidepreventionlifeline.org

Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-4900 – 24/7 on call
engemannshc.usc.edu/rsvp

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED) | Title IX - (213) 740-5086
equity.usc.edu, titleix.usc.edu

Information about how to get help or help a survivor of harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants. The university prohibits discrimination or harassment based on the following protected characteristics: race, color, national origin, ancestry, religion, sex, gender, gender identity, gender expression, sexual orientation, age, physical disability, medical condition, mental disability, marital status, pregnancy, veteran status, genetic information, and any other characteristic which may be specified in applicable laws and governmental regulations.

Bias Assessment Response and Support - (213) 740-2421
studentaffairs.usc.edu/bias-assessment-response-support

Avenue to report incidents of bias, hate crimes, and microaggressions for appropriate investigation and response.

The Office of Disability Services and Programs - (213) 740-0776

dsp.usc.edu

Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

USC Support and Advocacy - (213) 821-4710

studentaffairs.usc.edu/ssa

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity at USC - (213) 740-2101

diversity.usc.edu

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call

dps.usc.edu, emergency.usc.edu

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call

dps.usc.edu

Non-emergency assistance or information.