

# M170A: Molecular Pharmacology I

## General Course Information

Course Number: M170A, 4 Units

Course Faculty:

Dr. Rommie Amaro  
Assistant Professor  
Office: 3134C Natural Sciences I  
(949) 824 2559  
Email: [ramaro@uci.edu](mailto:ramaro@uci.edu)

Dr. Mahtab Jafari  
Assistant Professor  
Director, Pharmaceutical Sciences  
Undergraduate Program  
Office: 2218 Biological Sciences III  
(949) 824 0145 E-mail: [mjafari@uci.edu](mailto:mjafari@uci.edu)

Course Teaching Assistant:  
Ms. Agnesa Avanesian  
E-mail: [aavanesia@uci.edu](mailto:aavanesia@uci.edu)

Lectures:  
Tuesdays and Thursdays 12:30 to 1:50, Rowland Hall 104

Discussion:  
Wednesdays 2:00 to 2:50, Parkview Classroom Building 1100

Office Hours:		
Dr. Amaro	Dr. Jafari	Ms. Agnesa Avanesian
Tues. 4:00-5:00 PM	Tues. 11:00-12:00AM	Thur. 9:00-10:00AM
3134C Nat Sci I	2218 Bio Sci III	147 BSA

## Course Philosophy

The course will be structured around ability-based education. Students will integrate knowledge, attitudes and skills in a variety of ways to accomplish the course outcomes.

The procedures in ability-based education are:

- Clearly define and make public the *ability outcome and objectives* students are expected to achieve during the course.
- Give students multiple opportunities to accomplish the course objectives
- Provide clear criteria so students can know how well they are performing the abilities during their practices
- Provide feedback from the faculty, peers and self to determine how successfully students are meeting the criteria

The overall goal of this course is to enable students to integrate their knowledge from a number of disciplines (see prerequisites) in the context of formulating a conceptual understanding of how drugs work from a molecular to a clinical perspective.

## Course Description

Pharmacology is broadly defined as the effect of drugs and chemicals on living organisms. This course will utilize the knowledge that students gained in organic chemistry, biochemistry, molecular biology and physiology to learn about how drugs interact with various targets in the body and how our body affects these compounds. Molecular pharmacology 170A offers a mechanism-based overview of pharmacology with strong emphasis on clinical application of pharmacology. The course begins with basic principles of pharmacology, pharmacokinetics and pharmacodynamics such as sites of drug action, agonists and antagonists, drug absorption, distribution, metabolism, and elimination. Mechanism of drug action, receptor theories and dose response relationships will be addressed during the first part of the course. For each class of drugs, the mechanism of action, adverse reactions, structure activity relationship and pharmacokinetics will be discussed. Drugs that act on the cardiovascular system and endocrine system will be discussed during this quarter.

## Course Ability Outcomes and Objectives

At the conclusion of this course, students shall be able to:

1. Understand basic general principles of pharmacokinetics and pharmacodynamics
2. Understand mechanism of action, adverse reactions, SAR, and PK/PD principles of the drugs as they relate to the management of hypertension
3. Understand the basic pharmacological properties of a number of classes of antihypertensive drugs such as diuretics, angiotensin converting enzyme inhibitors, B-blockers, and Ca channel blockers
4. Understand mechanism of action, adverse reactions, SAR, and PK/PD principles of drugs as they relate to the management of diabetes and hyperlipidemia
5. Understand the basic pharmacological properties of insulin, sulfonylurea, biguanides, thiazolidinedione, HMGCOA reductase inhibitors, fibric acid ion-exchange resins, nicotinic acids, and cholesterol absorption inhibitors.
6. Use problem solving skills to learn basic pharmacological concepts

## Course Prerequisites

Chemistry 1A and 2A, Organic Chemistry 51A and 51B, Chemistry 51C, Biological Sciences 97 (Genetics), Biological Sciences 98 (Biochemistry), Physiology 109, Chemistry 128, and Biological Sciences 99 (Molecular Biology).

## Grading

Assessment Tool	Total Number in Course	Points	Total Points
Exams	3		180
Exam #1		50	
Exam #2		50	
Exam #3		80	
Team Exams	2	10	20
Learning Assurance	2	5	10
Total Points			210
Course Grades			A: 179-200 90-100%

			B: 159-178	80-89%
			C:139-158	70-79%
			D:120-138	60-69%
			F: <120	<60%

### Exams

There will be 3 exams in this course. It is important to be on time to all exams. Exams will start on time; any student that is late will not be allotted extra time to finish their exam. Make up exams will be allowed ONLY IN THE CASE OF EXTREME EMERGENCIES AND ILLNESS and only with appropriate documentation.

### Team Exams

Students will be divided into groups of 5-7 students. At the end of exam #1 and #2, students will take a team exam. The team exams will encourage group discussion and team work.

### Learning Assurance

These sessions that take place during the discussion session after exams #1 and #2 and are intended for discussion of missed core competency exam questions and for clarification of major concepts discussed in lecture. Credit will be given for attendance. Sign-in sheet and random roll call will verify attendance during sessions.

### **Request for Examination Re-grade**

Any request by a student to have an examination regarded must be made in writing and submitted to the course faculty or teacher assistant within two working days of return of the exam. The written justification should be in the following format:

1. Written justification should be on a separate paper. Students should not write their comments on the exam.
2. Specify which question(s) and answer(s) are to be reconsidered in the request
3. Justification for your answer. In a concise manner, explain why you selected your answer rather than the correct answer. When possible, please reference specific citations from the course textbook or lecture material.

The faculty member will review the material and respond to the student within two working days of receiving the written request. All such decisions are final.

### **Required Textbook**

Brody's Human Pharmacology Molecular to Clinical. 4<sup>th</sup> or 5<sup>th</sup> edition\*\*. Mimmeman, Wecker, Larner and Brody Elsevier Mosby.

*\*\* Please note reading assignments are given for each book edition. Be sure you are following the appropriate reading assignment for the book you are using.*

### **Optional Textbook**

Basic and Clinical Pharmacology, 11<sup>th</sup> edition, B. G. Katzung editor, Appleton & Lange, 2003.

## Course Schedule

Week	Topic	Reading Assignments	Instructor
<b>1</b> 1-5-10 1-7-10	Introduction General Principles of Pharmacology Sites of drug action, agonists and antagonists, receptors and other targets, concentration-response relationships, partial agonists	4 <sup>th</sup> Ed: Ch 1 and 2 5 <sup>th</sup> Ed: Ch 1	Jafari Amaro Amaro
<b>2</b> 1-12-10 1-14-10	Pharmacokinetics Absorption, distribution, metabolism and elimination, routes of administration	4 <sup>th</sup> Ed: Ch 3 5 <sup>th</sup> Ed: Ch 2	Amaro Amaro
<b>3</b> 1-19-10  <b>1-21-10</b>	Clinical Pharmacokinetics: Drug Concentration, routes of administration, basic PK calculations, drug interactions <b>Exam #1</b> <b>Team Exam #1</b>	4 <sup>th</sup> Ed: Ch 4 5 <sup>th</sup> Ed: Ch 5	Jafari/Amaro
<b>4</b> 1-26-10 1-28-10	Learning Assurance Exam #1 (15-30 min.) Cardiovascular Drugs Antihypertensive	4 <sup>th</sup> Ed: Ch 11, 12 5 <sup>th</sup> Ed: Ch 19, 20	Amaro Jafari
<b>5</b> 2-2-10 2-4-10	Antihypertensive	4 <sup>th</sup> Ed: Ch 11, 12 5 <sup>th</sup> Ed: Ch 19, 20	Amaro Amaro
<b>6</b> 2-9-10 <b>2-11-10</b>	Lipoproteins and Lipoprotein Metabolism  <b>Exam #2</b> <b>Team Exam #2</b>	4 <sup>th</sup> Ed: Ch 18 5 <sup>th</sup> Ed: Ch 25	Jafari
<b>7</b> 2-16-10 2-18-10	Learning Assurance Exam #2 (15-30 min) Herbals and Natural Products Herbals and Natural Products	4 <sup>th</sup> Ed: Ch 7 5 <sup>th</sup> Ed: Ch 7	Jafari/Amaro Jafari/Amaro
<b>8</b> 2-23-10 2-25-10	Lipid lowering Drugs	4 <sup>th</sup> Ed: Ch 18 5 <sup>th</sup> Ed: Ch 25	Jafari Jafari
<b>9</b> 3-2-10 3-4-10	Anti-Diabetic Drugs	4 <sup>th</sup> Ed: Ch 38 5 <sup>th</sup> Ed: Ch 43	Jafari Jafari
<b>10</b> 3-9-10 3-11-10	Clinical Correlations: Case Discussions		Jafari Jafari
<b>11</b> <b>3-16-10</b>	<b>Exam #3: Final Exam</b>	<b>Cumulative</b>	