



Course Syllabus

Course Code	Course Title	ECTS Credits
IMPH-215	Molecular and Biochemical Pharmacology/ Μοριακή και Βιοχημική Φαρμακολογία	6
Prerequisites	Department	Semester
IMPH-123, IMPH-120	Health Sciences	Fall/Spring
Type of Course	Field	Language of Instruction
Compulsory	Pharmacy	Greek/ English
Level of Course	Lecturer(s)	Year of Study
1 st Cycle	Dr Eleftheria Galatou/Dr Louiza Papazachariou	2 nd
Mode of Delivery	Work Placement	Corequisites
Face to face	N/A	None

Course Objectives:

The main objectives of the course are to:

1. Teach students the molecular and biochemical basis of drug action
2. Explain to students that many drugs act via receptors and other proteins that mediate cellular signaling. Such signaling proteins can be grouped into several families on the basis of their structural and functional similarities
3. Give to students examples from each family that is examined at the molecular level from a pharmacological, biochemical and biophysical point of view for insight into their structure, their mechanism of action, their modulation by drugs and the underlying dysfunctions toward which the drugs are directed
4. Give to students the understanding of basic principles of molecular pharmacology as a tool for decoding the relationship between dose and response across all families with an emphasis on the explicit nature of concepts such as potency and efficacy

Learning Outcomes:

After completion of the course students are expected to be able to:

1. Understand the molecular mechanisms of action for the most important drugs

2. Describe their mechanisms of action in molecular and mechanistic terms, and indicate how their dysfunction can lead to disease
3. Classify the different families of neurohumoral receptors and related proteins that mediate cellular signaling
4. Outline the kinetics of drug-receptor/enzyme interactions
5. Appreciate the nature of drug receptor and the different types of them
6. Define the molecular role of neurotransmitters and hormones
7. Understand the basic, molecular and chemical concepts of phenomena like drug metabolism, biologic and oxidative stress
8. Describe and differentiate among different theoretical models that have been developed to account for the functioning of receptors and for the relationship between dose and response
9. Explain the actions of agonists and antagonists in terms of fundamental physical-chemical properties and in the context of pharmacological and biophysical properties such as selectivity, potency, efficacy and the current- voltage relationship.

Course Content:

1. Definitions / Pharmacology
2. Response dose curves
3. Classification of different families of neurochemical receptors and related proteins mediated in cellular signaling
4. Mechanisms of action of drugs
5. Agonists / Receptor antagonists, Description of the actions of agonists and antagonists based on physicochemical and pharmacological properties such as selectivity, potency, efficacy
6. Proteins G and receptors associated with G proteins
7. Adenyl cyclase, Adrenergic receptors
8. Other receptors (intracellular, cell membrane)
9. Molecular basis of cell stimulation / ion channels
10. Other receptors- receptors with intrinsic catalytic activity, Nitric oxide

Learning Activities and Teaching Methods:

Lectures, class discussion, assignments

Assessment Methods:

Midterm exam, final exam

Required Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
General and Molecular Pharmacology: Principles of Drug Action	Francesco Clementi, Guido Fumagalli	Wiley online library	2015	9781118768570
Μοριακή φαρμακολογία	Παπαδημητρίου Ε.	Παρισιάνου Α.Ε.	2010	9603946095

Recommended Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Molecular Pharmacology: From DNA to Drug Discovery	John Dickenson, Fiona Freeman, Chris Lloyd Mills, Christian Thode, Shiva Sivasubramaniam	Wiley-Blackwell	2013	9780470684436
G Protein-coupled Receptors: Molecular Pharmacology	Georges Vauquelin, Bengt von Mentzer	Wiley e-book	2015	9789963258277