

Principles of Pharmacology

Pharmacology is the study of drugs, defined as chemical substances that affect biological systems. This course provides an introduction to the basic principles of pharmacology at the molecular, cellular and whole organism levels with an emphasis on drug-receptor interactions. The general goal is to provide a conceptual framework for the rational use of drugs to study biological systems and to address issues pertinent to drug discovery and development.

Course Objectives

1. Define the classification and nomenclature of drugs and explain the general process of drug development and modes of discovery.
2. Describe and illustrate the relationships between drug concentration (dose) and response. Explain drug potency and efficacy in terms of receptor theories.
3. Explain the pharmacological concepts of:
 - a. receptor subtypes
 - b. partial and inverse agonists
 - c. desensitization and adaptation
 - d. activity-dependence of drugs
4. Define and apply the principles of pharmacokinetics in terms of drug absorption, distribution and elimination. Classify the mechanisms of drug biotransformation and excretion.

Reference and Reading material:

1. Lecture handouts and articles
2. Required textbook – none
3. Optional textbook

Basic and Clinical Pharmacology, Katzung, B.G. (Editor), 10th Edition, 2007 (a good general pharmacology text but does not cover all aspects of the course in detail, copies on reserve).

4. Reference

Neubig, R.R, Spedding, M., Kenakin, T. and Christopoulos, A. International Union of Pharmacology Committee on Receptor Nomenclature and Drug Classification. XXXVIII. Update on Terms and Symbols in Quantitative Pharmacology. Pharmacological Reviews 55: 597 – 606, 2003. (pdf available on course website).

Discussion class. There will be three small group discussions in the course with a focus on a current research paper. In these discussions, the students will present the background, methods, results, and discussion including the general discussion questions.

Grading. The grade will be assigned based on numerical performance on two examinations, one mid-term and a non-comprehensive exam at the end of the course. Each exam will be 45% of the final grade. Performance in the small group discussion will be 10% of the final grade.