UPCM+ PHARMACOLOGY

UPCM+ Pharmacology covers Basic Principles of Pharmacodynamics and Pharmacokinetics. This is composed of **seven (7) modules and around thirty (30) hours of coursework** designed to introduce and facilitate understanding of important concepts in Pharmacology relevant to students of both medical and paramedical fields. The principles of how drug works and is handled by the body are presented using common drugs that students can also familiarize with.

The content of the course is as follows (with description and learning outcomes)

OVERVIEW

This module will present a brief overview of the objectives, scope, mode of teaching and evaluation of this course. It will also touch on definitions of pharmacology, its branches or fields, and the history of Pharmacology in the Philippines with special focus on the UP College of Medicine.

Objectives:

1. *To outline the rationale for the bridging course, its objectives, the scope of topics, intended audience, general schedule and evaluation tools or requirements.*
2. *To review the history of pharmacology (teaching) in the Philippines.*

MODULE 1 INTRODUCTION TO PHARMACOLOGY (clickable description and learning outcomes)

This module discusses basic concepts about drugs, including different ways of naming, classifying, grouping, and administering them.

Learning Outcomes

At the end of the module, the student should be able to:

1. Identify a drug by its different names.
2. Classify a drug according to its function or purpose.
3. Differentiate drug modalities according to their size and chemical structure.
4. Describe the different routes of administration of a drug.

MODULE 2 MECHANISMS OF DRUG ACTION (clickable description and learning outcomes)

This module will discuss the mechanisms of drug actions including both receptor-mediated and non-receptor mediated drug actions. Specific prototype drugs will be given per mechanism of drug action. Novel drug mechanisms will be discussed briefly in the end.

Learning Outcomes: At the end of the module, the student should be able to

1. *Discuss the general mechanisms of drug actions*
2. *Discuss receptor-mediated actions and give specific examples.*
3. *Describe the types of drug interactions and receptor regulation*
4. *Discuss and explain non-receptor mediated drug actions and give specific examples.*
5. *Discuss the novel mechanisms of drug actions including gene and stem-cell therapies*

MODULE 3 PHARMACODYNAMICS

This module talks about receptor-mediated action and effects of drugs on the body. This encompasses drug-receptor interaction, graded and quantal dose-response relationships, and important drug parameters derived from dose-response curves.

Learning Outcomes:
At the end of the module, the student should be able to
1. *Discuss the principles of drug-receptor interaction and receptor regulation.*
2. *Describe the occupational theory of drug action.*
3. *Differentiate graded and quantal dose response curves.*
4. *Differentiate types of drug action.*
5. *Explain potency, efficacy, and therapeutic index based on dose-response curves.*

MODULE 4 PHARMACOKINETICS
Description: Pharmacodynamics discussed in the previous module is the effect of the drug on the body while pharmacokinetics is the effect of the body on the drug. This module will introduce the concept of pharmacokinetics, on how a drug reaches its target. This would encompass how a drug is absorbed, distributed, metabolized and excreted.

Learning Outcomes:
At the end of this module the student should be able to
1. Review the routes of drug administration.
2. Define the process of drug absorption.
3. Discuss the factors that affect the process of absorption.
4. Define the process of drug distribution.
5. Discuss the factors that affect the process of distribution.
6. Define the process of drug metabolism.
7. Enumerate the processes involved in metabolism.
8. Define the process of drug excretion.
9. Discuss the factors that affect the process of drug excretion.
10. Discuss the pharmacokinetic concepts of clearance, elimination rate, Cmax, Tmax, half-life, and area under the curve.

MODULE 5 PHARMACOGENETICS
Description: This short module discusses how genetics can alter the effects and disposition of drugs, and thus, response of the individual to drugs.

Learning Outcomes: At the end of the module, the student should be able to
1. *Describe the concept of pharmacogenetics in relation to variability in drug responses.*
2. *Recognize the importance of genetic variability in pharmacodynamics and pharmacokinetics.*
3. *Illustrate the potential role of pharmacogenetics in individualizing drug therapy in the Philippine setting.*

MODULE 6 DRUG TOXICITY AND ADVERSE DRUG REACTION
This short video describes adverse drug reaction and drug interaction, including definitions, classification, types, and mechanisms of action leading to toxicity or harmful effects.

Learning Outcomes:
At the end of the module, the student is expected to
1. *Define adverse drug reaction and drug interaction*
2. *Recognize the significance of adverse drug reaction and drug interaction*
3. *Differentiate adverse drug reaction from drug interaction*
4. *Discuss the classification of adverse drug reactions*

5. *Discuss the types of drug interactions*
6. *Describe ways to decrease drug toxicity and adverse drug reactions.*

MODULE 7 DRUG DISCOVERY AND DEVELOPMENT

Description: Drug discovery is a complex process, involving the fields of pharmacology, medicine and biotechnology, in order to identify compounds with the potential to become therapeutic agents.

Learning Outcomes:At the end of the module, the student should be able to

1. *Discuss each stage of drug discovery*
2. *Identify sources of drugs and approaches to drug design and discovery*
3. *Discuss the steps and protocols involved in the non-clinical part of drug development.*
4. *Describe the different phases of clinical trials of drugs.*
5. *Compare and contrast the similarities and differences of the clinical trial phases.*

WRAP-UP

Summarizes what you have learned from the course and its relevance in the pharmacologic treatment of disease.

A timed quiz which can be taken twice will follow each module, and a proctored summative evaluation will be on August 16, 2024, Friday. A certificate of accomplishment will be given after completion of all modules and passing the summative evaluation.

MAJOR REFERENCES:

1. Katzung BG et al. eds. *Basic and Clinical Pharmacology*, *15e*. McGraw-Hill; 2021.
2. Panganiban et al. (adapting eds) Rang and Dale's Pharmacology (Philippine Adaptation). Elsevier Churchill Livinstone, 2015.