UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Pharmacology

2526-2-I0202D123-I0202D042M

Aims

The course aims to provide students with the fundamental principles of general pharmacology, illustrating basic concepts of pharmacokinetics and pharmacodynamics.

Contents

During the course, the fundamental concepts of general pharmacology will be explored, focusing on how drugs interact within the body (pharmacokinetics) and the mechanisms through which they exert their effects (pharmacodynamics). Students will learn about the stages of drug development, from initial discovery to approval and post-marketing surveillance (pharmacovigilance).

Detailed program

The first part of the course, after brief historical notes on the development of pharmacology, will illustrate the phases of **drug development**: students will learn to distinguish between preclinical and clinical phases and understand the importance of pharmacovigilance.

In the section dedicated to **pharmacokinetics**, fundamental concepts will be explained, with particular emphasis on the four phases of Absorption, Distribution, Metabolism, and Excretion (ADME). Topics such as different routes of administration, absorption through cell membranes, bioavailability, and the first-pass effect will be covered. The distribution of drugs within the body will also be explored, considering aspects that influence it, such as plasma protein binding and other factors. The metabolism of drugs will be examined, including biotransformation processes (Phase I and Phase II) and the role of major hepatic enzymes, particularly cytochrome P450. Finally, drug excretion will be analyzed, focusing on renal elimination mechanisms and the phenomenon of enterohepatic circulation, with

brief mentions of secondary excretion pathways.

In the section on **pharmacodynamics**, the focus will be on the effects of drugs on the body and the mechanisms through which these effects are mediated. Receptors and their classification will be introduced, distinguishing between membrane receptors (channel receptors, G-protein coupled receptors, enzyme-linked receptors) and intracellular receptors (hormone receptors). Drug-receptor interactions will be explored, and dose-response curves will be mentioned to understand the relationship between drug dose and biological effect. Regarding drug safety, the concepts of therapeutic index and therapeutic window will be introduced.

During the course, some of the main drugs relevant to the degree program will be mentioned.

Prerequisites

A knowledge of the prerequisite courses indicated in the regulations of the degree program is required.

Teaching form

All lessons are conducted in person.

3 lessons of 2 or 3 hours each will be delivered, partly in a lecture format and partly interactively.

Within the context of interactive sessions, the Wooclap platform will be employed. This tool offers various features such as polls, quizzes, and real-time discussions, aimed at making the lessons more engaging and participatory for students and fostering active interaction during the teaching sessions, allowing students to receive immediate feedback on their learning.

Additionally, audiovisual materials will be used, serving as valuable aids to enhance the understanding and retention of the topics covered. The integration of these tools aims to make the learning process more dynamic and accessible for students.

The lessons will be conducted in Italian, but some videos shown in the classroom will be in English.

We will examine how gender differences can influence drug response and the incidence of side effects, providing a sensitive and informed perspective that will contribute to a professional approach towards patients.

Textbook and teaching resource

For the Pharmacology module, the following main textbooks are recommended:

• "Farmacologia generale e speciale per le lauree sanitarie triennali" di Cella, Di Giulio, Gorio, Scaglione (Ed. Piccin).
• "Farmacologia generale" di Collino, Cicala, Ialenti (Ed. UTET).

In addition to the recommended textbooks, the teacher will provide supplementary teaching materials including slides used during lectures and any other relevant material to deepen the topics covered in the course.

Semester

Second year of the study course, during the second semester.

Assessment method

The written exam will be common to all modules of the integrated course and will consist of a series of multiple-choice quizzes on topics covered during the lectures. These quizzes will also include 5 questions on pharmacology. Additionally, there may be one or two open-ended questions.

No interim tests are scheduled.

Office hours

The instructor will be available by appointment, either in person or online.

Sustainable Development Goals

GOOD HEALTH AND WELL-BEING