UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

# COURSE SYLLABUS

# Pharmacology

**2425-2-I0303D034-I0303D082M**

## Aims

The Pharmacology module aims to provide students with a basic understanding of the fundamental principles of general pharmacology. In particular, students will acquire:
? Basic knowledge of pharmacokinetics and ADME phases (Absorption, Distribution, Metabolism and Excretion).
? Skills on the drug development process, from preclinical to clinical phase, including pharmacovigilance.
? Basic knowledge of radiopharmacology
? Use of antiseptics and disinfectants in clinical practice

## Contents

During the module, students will explore fundamental concepts related to the development and fate of drugs in the body, with a particular focus on pharmacokinetics. The part on radiopharmaceuticals will describe the pharmacokinetic properties and general aspects of the pharmacokinetic requirements and mechanism of action of radiopharmaceuticals for diagnostic or therapeutic use.

## Detailed program

The first part of the module will begin with brief historical notes on the development of pharmacology, and then illustrate the different phases of drug development. Students will learn to distinguish between the preclinical and clinical phases, understanding the importance of pharmacovigilance in monitoring the safety of drugs after they are placed on the market. Next, the course will focus on pharmacokinetics, providing a detailed overview of the four main phases: Absorption, Distribution, Metabolism and Excretion (ADME). Topics such as the different routes of drug administration and the mechanisms of absorption through cell membranes will be covered. Key concepts such as bioavailability and first pass effect will be explained. In the distribution section, we will examine factors that

influence the movement of drugs within the body, including binding to plasma proteins. As regards metabolism, biotransformation processes will be explored in depth, with particular attention to phase I and phase II reactions and the role of liver enzymes, especially cytochromes P450. Finally, the part on excretion will cover the main mechanisms of renal elimination and the phenomenon of enterohepatic circulation, with brief mentions of secondary excretion routes. As regards radiopharmacology, the course will focus on: chemical structure and radionuclides used in diagnostics and therapy, biodistribution kinetics at organ level, and chemical-physical requirements, mechanism of action (binding, entrapment) for the definition of the release time acquisition for radiopharmaceuticals for diagnostic use or of the selectivity and duration of action of radiopharmaceuticals for therapeutic use. Furthermore, physical, biological and effective elimination, the physical decay equation of radionuclides and applications in clinical practice will be covered. Finally, antiseptic or disinfected medicines, devices and aids to be used in clinical practice will be presented.

## Prerequisites

Biomedical Sciences

## Teaching form

The frontal lessons will be held in mixed mode in presence with occasional remote sessions (synchronous mode): the majority of the lessons will be held in delivery mode with a part in interactive mode. In the context of interactive lessons, the Wooclap platform will be used. This tool offers various features, such as polls, quizzes and real-time discussions, in order to make lessons more engaging and participatory for students and encourage active interaction during teaching sessions, allowing students to receive immediate feedback on their learning. In addition, audiovisual materials will be used, which constitute a valid support to facilitate the understanding and memorization of the concepts covered. The integration of these tools aims to make the learning process more dynamic and accessible for students.

## Textbook and teaching resource

For the general pharmacology part, the following are recommended: "Farmacologia generale e speciale per le lauree sanitarie triennali" by Cella, Di Giulio, Gorio, and Scaglione (Ed. Piccin). "Farmacologia generale" by Collino, Cicala, and Ialenti (Ed. UTET). The teacher will provide additional teaching material, including lesson slides. For the radiopharmacology part, the students' preparation will be based on the slides of the lessons held and on self-assessment quizzes of learning.

## Semester

Second semester

## Assessment method

Written exam (22 multiple choice questions) followed by an oral test to evaluate preparation on the teaching programme, the ability to organize knowledge in a short discussion and communication skills in a disciplinary context.

## Office hours

By appointment required by mail

## Sustainable Development Goals

GOOD HEALTH AND WELL-BEING | QUALITY EDUCATION