UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Pharmacology

2627-2-I0302D034-I0302D039M

Aims

The module aims to provide students with fundamental knowledge of general pharmacology, with particular reference to the principles of pharmacokinetics and pharmacodynamics, the main mechanisms of drug action, adverse drug reactions, and the factors influencing drug response, including sex- and gender-related differences.

Students will be able to apply the acquired knowledge to interpret the characteristics of the main classes of drugs, recognize potential drug interactions, and understand the implications of inter-individual variability in drug response, with reference to professional contexts in clinical or laboratory practice.

Contents

During the course, the fundamental principles of pharmacokinetics and pharmacodynamics will be addressed, with particular emphasis on the mechanisms of drug action and the factors influencing drug effects. The course will also cover selected major drug classes relevant to the course, drug interactions, inter-individual variability in drug response, including sex- and gender-related differences and the classification of the main adverse drug reactions.

Detailed program

The module provides an in-depth overview of the key principles of general pharmacology.

Overview: historical background; stages of drug development, including preclinical and clinical studies; principles of pharmacovigilance.

Pharmacokinetics: study of the processes of Absorption, Distribution, Metabolism, and Excretion (ADME). Topics

include routes of administration, bioavailability, protein binding, hepatic biotransformation (Phase I and Phase II reactions, cytochrome P450 enzymes), and renal and enterohepatic elimination mechanisms.

Pharmacodynamics: mechanisms of drug action and cellular targets; classification of membrane and intracellular receptors; dose–response relationships; concepts of therapeutic index and therapeutic window.

Drug safety and variability: factors influencing individual drug response (physiological, pathological, genetic, and sex- and gender-related factors); classification of adverse drug reactions (hypersensitivity, idiosyncrasy, and allergy); drug interactions.

Special pharmacology: the module may include the study of selected drug classes of particular relevance to healthcare professions, chosen according to the educational objectives of the course (for example, non-steroidal anti-inflammatory drugs, analgesics, local anesthetics, drugs acting on the autonomic nervous system, antibiotics, and antithrombotic agents).

Prerequisites

Knowledge of prerequisite courses indicated in the degree course regulations is required.

Teaching form

The module consists of 14 lectures of 2 hours each. Teaching activities are delivered in person through an approach that combines lectures and interactive learning activities designed to promote active engagement with the course contents.

During selected lectures, digital student interaction tools, including the Wooclap platform, will be used to conduct quizzes, polls, and real-time discussions. Audiovisual materials may also be employed to support learning, including educational video resources available through the JoVE platform (in Italian and English).

Gender medicine principles will be integrated throughout the teaching activities, with particular attention to sex- and gender-related differences in drug response.

Textbook and teaching resource

For a comprehensive study of the topics covered in the module, students are encouraged to consult the following textbooks:

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

In addition to the recommended textbooks, the lecturer will provide supplementary teaching materials, including lecture slides and any additional resources considered useful for further study of the topics covered in the module.

Semester

The course will be delivered in the second year of the Degree Course, during the second semester.

Assessment method

The module assessment consists of a written examination comprising 22 questions, including multiple-choice and open-ended questions, designed to evaluate students' knowledge and understanding of the fundamental concepts of general pharmacology, as well as their ability to apply this knowledge to the interpretation of drug mechanisms of action, drug interactions and inter-individual variability in drug response.

The examination is taken together with the Anesthesiology module assessment, in accordance with the procedures described in the integrated course syllabus.

Assessment is based on the correctness, relevance, and completeness of the answers, in order to verify the achievement of the module learning outcomes.

Office hours

The teacher will be available for in-person and online appointments.

Sustainable Development Goals

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