UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Pharmacology (Bergamo)

2526-1-I0101D005-I0101D015M-BG

Aims

The main objective of the course is to give the students the basic criteria that need to be applied for a correct pharmacological therapy according to evidence-based medicine. Initially, the student must acquire an integrated view of the pharmacokinetic and pharmacodynamics principles that are necessary to study the special pharmacology. In particular, at the end of the course the student will learn the molecular targets and the mechanisms of drug action. In addition, the student will learn the pharmacokinetic features underlying the destiny of drugs within the organism, including their biotransformation and elimination, and the most relevant pharmacodynamic and pharmacokinetic interactions. By attending formal lectures, seminars, and small-groups, the students will develop autonomous and update learning abilities that will form the basic approach to correctly use drugs in their professional activity.

Contents

The course will examine: the principles underlying pharmacodynamics and pharmacokinetics, and drug biotransformation, distribution, and elimination; the determinants of the variability of drug responses; the preclinical and clinical phases of drug development. Develop skills to promote a multidimensional clinical approach according to a global vision of the concept of health, promote awareness of gender differences in healthcare.

Detailed program

GENERAL PRINCIPLES - Concepts of drug, toxicant, and placebo. - Methodologies for assessing toxicological risk and extrapolation of toxicity data from animals to humans - Pharmacological history - Methods for reporting adverse drug reactions to the competent authorities (pharmacovigilance) - Ethical and socioeconomic aspects of pharmacology.

PHARMACOKINETICS - Mechanisms regulating drug absorption across cell membranes – Routes of drug administration, their significance in therapy, and the concept of bioavailability - Mechanisms of drug distribution in the body, passage across cellular barriers, drug-protein binding, biotransformation and excretion processes, and their clinical relevance - Significance of plasma half-life and clearance of a drug in determining dosage - Methods for achieving and maintaining steady-state plasma concentrations of a drug - Drug kinetics for single or repeated administration - Dosage adjustments in relation to physiological and pathological changes in excretion and metabolism - Adverse drug reactions - Drug interactions. Basis for different drug responses at different ages and during pregnancy. Gender pharmacology, nutraceuticals, and alternative medicine.
CELLULAR AND MOLECULAR PHARMACOLOGY - Mechanisms of drug action, molecular targets, and the cascade of events through which a drug produces a cellular response - Cellular basis of drug responses - Agonists and antagonists and principles of structure/activity relationships - Quantitative dose-response relationship - Meaning of drug selectivity, specificity, toxicity, potency, and efficacy - Efficacy and potency of drugs based on their dose-response curves - Therapeutic index and assessment of the risk/benefit ratio of a drug therapy - Factors that influence drug response in relation to both concomitant diseases and therapies and at-risk populations - Pharmacogenetics, pharmacogenomics, and abnormal drug response.

GENERAL PHARMACOLOGY, NUTRACEUTICALS, and ALTERNATIVE MEDICINES

Introduction to Clinical Pharmacology

1. Drugs Acting on the Peripheral Nervous System

- Mediators and Receptors of the Sympathetic and Parasympathetic Nervous System
- Adrenergic Agonists and Antagonists
- Cholinergic Agonists and Antagonists

2. Nonsteroidal Anti-Inflammatory Drugs (NSAIDs)
3. Antibacterial and Chemotherapeutic Drugs:

- Antibacterials: beta-lactams, protein synthesis inhibitors, folic acid, DNA
- Antifungals, antivirals, antimalarials, antituberculosis

Prerequisites

Knowledge acquired during all preparatory courses indicated in the medical degree course plan

Teaching form

The lessons will be held in presence. Some lessons will be held through the Distance Learning mode Teledidattica

Textbook and teaching resource

Amico-Roxas M., Caputi A.P., Del Tacca M. (2021) Compendio di farmacologia generale e speciale. Torino, UTET

Scienze mediche

Semester

Second Semester of the First Year

Assessment method

Written examination composed of multiple choice questions and open questions.
In the exam of Biomedical Sciences 2 it is necessary to reach the sufficiency in all 4 disciplines that compose it: Pharmacology, General Pathology, Microbiology, Clinical Biochemistry and Molecular Biology

Office hours

by appointment agreed by email

Sustainable Development Goals

GOOD HEALTH AND WELL-BEING | QUALITY EDUCATION | GENDER EQUALITY