UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Pharmacology

2526-3-H4101D017

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. The student will learn to analyze and evaluate pathologies with a medical and scientific approach from a gender perspective to improve not only the knowledge on the different aspects underlying the differences but also the adequacy of the health intervention to stimulate greater attention to the collection of anamnestic, instrumental and laboratory data and to the drafting of records and reports in relation to the patient's gender. 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.

Detailed program

GENERAL PRINCIPLES – Concepts of drug, toxic, and placebo – Methods for the evaluation of toxicity risks and

extrapolation of data from animal to human – Pharmacological anamnesis – Ways of communication to competent authorities of adverse drug reactions (pharmacovigilance) - Ethical and socio-economical aspects of pharmacovigilance.

PHARMACOKINETICS – Regulatory mechanisms of drug absorption through cell membranes – Routes of drug administration, their implications for therapy and concept of bioavailability – Drug distribution mechanisms in the organism, transfer of drugs across cell barriers, drug-protein binding, biotransformation and elimination processes and their clinical relevance – Relevance of plasma half-life and clearance for drug dosing – Ways to reach and maintain plasma concentration of drugs at steady-state – Drug kinetics for single and repeated administration – Drug dosing adjustments according to physiological and pathological alterations of excretion and metabolism – Adverse drug reactions – Altered drug effects according to age and pregnancy.
MOLECULAR AND CELLULAR PHARMACOLOGY – Mechanisms of action of drugs, molecular targets and intracellular cascades mediating drug effects – Cellular basis of drug effects – Agonists and antagonists and structure/activity principles – Quantitative dose-response relationships – Definition of drug selectivity, specificity, toxicity, potency, and efficacy – Drug efficacy and potency according to dose-response curves – Therapeutic index and risk-benefit evaluation of a pharmacological therapy – Factors influencing drug response variability due to concomitant pathologies and therapies or being a risk subject – Pharmacogenetics, pharmacogenomics, and unpredicted drug.

Prerequisites

Knowledge acquired during all preparatory courses of Anatomy and Physiology

Teaching form

Lessons will be provided in attendance.
Course with different teaching methods:

19 2-h frontal lessons
2 2-h lessons with Endocrinologist
1 6-h practical demonstrations

Textbook and teaching resource

- Bertram G. Katzung Farmacologia generale clinica. XI Edizione italiana, Piccin Nuova Libraria, 2021.
- Derek G. Waller, Andrew G. Renwick e Keith Hillier Farmacologia medica ed elementi di terapia. III edizione, Elsevier, 2011.
- Francesco Clementi, Guido Fumagalli Farmacologia generale e molecolare. IV edizione aggiornata, Edra, 2016.
- Goodman e Gilman, Le basi farmacologiche della terapia. XIII edizione, Zanichelli, 2019.

Semester

Second semester of the third year.

Assessment method

The exam will take place after the completion of the Pharmacology 2 course of the VII semester (4th year). The exam is written and oral. The written exam will be carried out using the "esamionline" platform and consists of open questions and multiple choice quizzes regarding general and special pharmacology. Sufficiency in the written test allows access to the oral test.

The oral test is inherent both in general knowledge of pharmacology and specific for individual classes of drugs with therapeutic implications

Office hours

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Sustainable Development Goals

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