UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Pharmacology

2021-3-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. 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 indicated in the medical degree course plan.

Teaching form

During the Covid-19 emergency period, the lessons will take place using the webex platform with asynchronous / synchronous recorded lessons. Formal lectures, seminars, practical demonstrations, interactive discussion of simulated clinical cases, small-group teaching will be provided with the webex platform.

Textbook and teaching resource

- Bertram G. Katzung e Anthony J. Trevor Farmacologia generale clinica. X Edizione italiana, Piccin Nuova Libraria, 2017.

- 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. XII edizione, Zanichelli, 2017.

Semester

Second semester of the third year.

Assessment method

During the Covid-19 emergency period, oral exams will only be online. They will be carried out using the WebEx platform and on the e-learning page of the course there will be a public link for access to the examination of possible virtual spectators. The exam is written and oral and will be held after the completion of Pharmacology 2 course.. The written exam will be carried out using the esamionline platform and consists of open questions with short answers, justified quizzes, multiple choice quizzes, true/false quizzes. 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

By appointment to be requested by e-mail