

PHARMACOLOGY II (MG4218)

1. teaching language

Italian

2. COURSE CONTENTS

Coordinator: Prof. PIERLUIGI NAVARRA

Course Year: IV Year

Semester: 1st and 2nd semester

UFC: 5

Modules and lecturers:

- Pharmacology professionalizing activity (MG000024) – 1 UFC – ssd BIO/14

Profs. Diego Currò, Lucia Lisi, Cesare Mancuso, Maria Martire, Fiorella Miceli, Paolo Montuschi, Nadia Mores, Giuseppe Tringali

- PHARMACOLOGY II (MG0466) – 4 UFC – ssd BIO/14

Profs. Diego Currò, Cesare Mancuso, Maria Martire, Paolo Montuschi, Nadia Mores, Pierluigi Navarra, Giacomo Pozzoli

3. BIBLIOGRAPHY

Reccomended texts:

Laurence L. Brunton, Randa Hilal-Dandan. Goodman & Gilman. The pharmacological basis of therapy. 13th edition, 2018 (2019 Italian translation, Zanichelli publisher).

Bertram G. Katzung. Farmacologia generale e clinica. 14th edition, 2018. (2021 Italian translation, Piccin Nuova Libreria publisher).

Govoni Stefano, Farmacologia. Casa Editrice Ambrosiana, Milano.

4. learning objectives

Knowledge and understanding - The objective of the course is to provide students with fundamental knowledge of the basic principles of pharmacology, the mode of action of drugs, their fate in living organisms from absorption through elimination, and their adverse and toxic effects. At the end of the course, the student should be able to: understand and describe the basics of drugs' interactions with organs and organ systems; understand and discuss the general principles of pharmacokinetics and pharmacogenetics; know and understand the modes of action of drugs and the benefits and limitations of their therapeutic use; know the various stages of drug development and be aware of the ethical and economic implications associated with the use of drugs.

Applied knowledge and understanding - At the end of the course, the student should have acquired a basic knowledge of the principles of appropriate drug prescribing and rational criteria for choosing among the various drugs available in relation to therapeutic needs.

Autonomy of judgement - Students should be able to independently develop the knowledge acquired in the course in order to be capable of critically predicting the consequences of both appropriate and inappropriate uses of medications.

Communication skills - The student must be able to discuss the main concepts learned, clearly and coherently, and with appropriate use of technical terminology. During the training course, the student is stimulated to familiarize himself with the technical language of the discipline so that he is able to transmit the basic concepts acquired in a concise and clear way to non-experts.

Learning skill - Students should be able to expand their knowledge independently, drawing on the concepts and methodological approach learned during the course. They should be capable of autonomously selecting texts and articles from the most accredited literature in the field, with the aim of acquiring an increasingly mature understanding of specific issues. To this end, students will usually be informed about seminars and lectures

being delivered by experts in the field (including those organized by pharmacologists at the U.C.S.C. Institute of Pharmacology) and invited to participate actively in order to improve their learning skills and develop their knowledge base.

5. prerequisites

For optimal participation in the didactic activities of the course, the student should enter the course with a valid understanding of the basic propaedeutic disciplines listed in the study plan, in particular, Chemistry, Biology, Biochemistry, Physiology, General Pathology, Pathophysiology, and Microbiology.

6. teaching methods

The didactics of the course include face-to-face lectures, a series of professional training sessions, and possible seminars held by qualified experts, which the students are allowed to attend. The lectures and the visual material presented during the lectures are the primary source of information provided to ensure that students meet the necessary knowledge and comprehension objectives. Therefore, class attendance is strongly recommended.

The professional training sessions will be organized in groups, and attendance is compulsory. (As with the face-to-face lectures, students will be required to attend at least 67% of the sessions held). The aims are to integrate the lectures by treating specific topics in the toxicological and regulatory field or by deepening particular aspects relating to the use of certain classes of drugs in selected patient populations. In addition, the professionalizing activity aims to provide knowledge and tools useful for the training of professionals capable of working at multiple levels in the pharmacological field.

The following topics will be dealt with in the professionalizing activity II:

Prof. Diego Currò	Therapeutic drug monitoring: theoretical basis and practical aspects
Prof. Lucia Lisi	Biosimilar and generic drugs: general aspects and critical reading of the summary of product characteristics (SmPC / data sheet)
Prof. Cesare Mancuso	
Prof. Maria Martire	

Prof. Fiorella Miceli	
Prof. Paolo Montuschi	
Prof. Nadia Mores	Management of adverse events in clinical trials; surveillance system for products of natural origin, food supplements.
Prof. Giuseppe Tringali	Cannabis, from plant to pill. The role of cannabis in clinical practice: state of the art and social and regulatory implications.

7. other informationS

The course lecturers will receive students, by appointment (to be set-up via e-mail, in their offices in the Institute of Pharmacology (third floor of the Biological Institutes). Alternatively, meetings can be held electronically on the Microsoft Teams platform.

8. Learning verification methods

The exam is aimed at ascertaining knowledge of the topics described in the official program of the Pharmacology I and II course. The exam includes two tests: a partial written test to be carried out before the completion of the entire Pharmacology course and a final written test. Passing the partial test is an indispensable condition for accessing the final test. Both tests consist of 32 multiple choice questions with four possible answers of which only one is correct. The time for carrying out the test is 35 minutes; the Blackboard platform will be used to carry out the test in the classrooms made available by the didactics. One point will be awarded for each correct answer, incorrect answers will not lead to negative evaluations in the overall score.

The topics covered by the exemption test will be both those developed during the lessons of the 2nd semester, third year (general pharmacology, drugs of the autonomic nervous system, antidiabetics, NSAIDs, glucocorticoids, immunosuppressants, topics of the lessons of the professionalizing activity I) and both all other topics that are part of the Pharmacology I program not covered in class.

The topics covered by the final exam are those developed in the 1st and 2nd semester of the fourth year (drugs of the respiratory system, drugs of the digestive system, chemotherapy, cardiovascular and renal drugs, drugs active on the central nervous system, lessons of the professionalizing activity II), as well as all the other topics that are part of the Pharmacology II program not covered in class.

The final grade will derive from the arithmetic average obtained in the two tests, taking into account that both must be positive (18 / 30), to consider the exam passed.

9. full program description

Active drugs on the central nervous system

At the end of the course, students will have a thorough understanding of the main central neurotransmitter systems and the drugs that modulate their function. This will include the names of the main psychopharmaceuticals, their mechanisms of action, therapeutic indications, contraindications, adverse effects, and appropriate modes of administration.

Hypnotic and sedative drugs

Antiepileptic drugs

Antidepressant and mood-stabilizing drugs

Antipsychotic drugs

Opioid medications and general guidelines for pain therapy

Drugs used in neurodegenerative diseases

Drugs that relax the skeletal muscles

General and local anesthetics

Drug and substance abuse: mechanisms and principles of therapy

Drugs that act on the cardiovascular system and the kidneys

At the end of the course, the student will have a good understanding of the main neurotransmitter systems involved in cardiovascular function and the drugs that modulate their function. This includes the names, mechanisms of action, therapeutic indications, contraindications, adverse effects, and the appropriate mode of administration of the main drugs used in the cardiovascular field, as well as the principles of hemostasis and lipoprotein metabolism and risk factors for cardiovascular disease.

Antihypertensive drugs

Medications used to treat angina

Drugs used to treat heart failure

Antiarrhythmic drugs

Anticoagulant, antiplatelet, thrombolytic, and fibrinolytic drugs

Drugs used to treat dyslipidemias

Medications that affect kidney function

Active drugs on the respiratory system

Pharmacotherapy of asthma

Inhaled glucocorticoids. Leukotriene receptor antagonists. Chromones. Theophylline

Dual inhalation therapy glucocorticoid/long-acting beta2-adrenergic agonists (LABA) in single inhaler

Triple inhalation therapy glucocorticoids/LABA/long-acting muscarinic receptor antagonists (LAMA) in a single inhaler

Biological drugs in severe asthma: omalizumab, mepolizumab, reslizumab, benralizumab, dupilumab, tezepelumab

New drugs for severe asthma

Chronic obstructive pulmonary disease pharmacotherapy

Types of inhalers and pharmaceutical forms. LAMA. LABA

LABA / LAMA dual therapy in single inhaler

Triple glucocorticoid / LABA / LAMA inhalation therapy in single inhaler

Selective inhibitors of type 4 phosphodiesterases

New drugs for chronic obstructive pulmonary disease

Active drugs on the digestive system

Drugs used for the treatment of acid-peptic diseases

Prokinetic drugs. Antiemetic agents

Laxatives. Antidiarrheal agents

Drugs used to treat irritable bowel syndrome

Drugs used to treat chronic inflammatory bowel disease

Drugs for hepato-biliary and pancreatic diseases

Chemotherapeutics for the treatment of infectious diseases and cancer

The aims of the module are to teach students how to select and use antibacterial drugs appropriately in relation to the pathogen and essential features of the main classes of chemotherapeutics (i.e., spectrum of action, mechanisms of action and resistance, pharmacokinetics, and side effects).

Antibacterial drugs: sulfonamides, -lactam antibiotics, quinolones, aminoglycosides, tetracyclines, macrolides

Antitubercular drugs

Antiviral drugs

Antimycotic drugs

Antiprotozoal and antimalarial drugs

The fundamentals of antineoplastic chemotherapy and major classes of anticancer drugs

Cytotoxic drugs

Hormones and related agents used in the treatment of cancer

Drug therapies that target signalling pathways: monoclonal antibodies, protein kinase inhibitors, several small molecules