General Pharmacology

Code: 106690
ECTS Credits: 5

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Degree	Type	Year
2502442 Medicine	OB	3

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Teachers

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Teaching groups languages

You can view this information at the end of this document.

Prerequisites

There are no prerequisites, but it is necessary to have achieved sufficient knowledge in biochemistry and molecular biology.

Objectives and Contextualisation

The subject is scheduled in the first semester of the third year of the Degree in Medicine, when knowledge of biology, biochemistry, physiology and histology has already been achieved, and when the study of the basics of pathology begins and the main syndromes; it also corresponds to the first contact with the clinic.
The educational objectives of the subject are to show a general overview of the medicines available to treat the different symptoms, the major syndromes and specific diseases, their mechanism of action, the desired and unwanted effects, as well as the possible interactions .
The knowledge of the pharmacological bases, together with that of the pathological bases of the disease, will provide the foundations to be able to understand the process of reasoned selection of medicines, during the clinical period.
The theoretical knowledge of the subject is complemented by practical knowledge acquired from seminars on the resolution of clinical cases based on the stories of specific patients, the resolution of which requires the use of one or more drugs with specific effects, or the withdrawal of any previous treatment.

Skills

• Communicate clearly, both orally and in writing, with other professionals and the media.
• Demonstrate that you understand the basics of action, indications, effectiveness and benefit-risk ratio of therapeutic interventions, based on the available scientific evidence.
• Formulate hypotheses and collect and critically assess information for problem solving following the scientific method.
• Maintain and update your professional competence, giving special importance to independent learning of new knowledge and techniques and to motivation for quality.
• Organize and properly plan the workload and time in professional activities.
• Recognize the determinants of population health, both genetic and those dependent on sex, lifestyle, demography, environmental, social, economic, psychological and cultural factors.
• Have the ability to work in an international context.

Learning outcomes

1. Apply the scientific method to alternative medicines.
2. Communicate clearly, both orally and in writing, with other professionals and the media.
3. Define the concept of pharmacological interaction and know the main mechanisms of interactions between medicines and medicines with other substances (food, toxic habits, medicinal plants) and diagnostic tests.
4. Define the concept of pharmacodynamics, action, effect, bioassay, dose-response and the mathematical models that regulate the action of drugs.
5. Define the concept of pharmacology and clinical pharmacology and know its divisions.
6. Describe the concept of drug, medicine, drug and toxic.
7. Describe the main toxicity mechanisms involved in adverse drug reactions.
8. Describe the different routes of administration of medicines.
9. Describe the main characteristics of the pharmacology of the different devices and systems (cardiovascular, respiratory, gastrointestinal, renal, blood, endocrine and metabolism).
10. Determine the relevance of self-medication.
11. Differentiate the composition of analgesic, antineoplastic, antimicrobial and anti-inflammatory drugs.
12. Formulate hypotheses and collect and critically assess information for problem solving following the scientific method.
13. Identify the medication registration process and the legal regulation of medications.
14. Identify the main sources of information on medicines, therapeutics and clinical pharmacology: primary, secondary and tertiary.
15. Maintain and update your professional competence, paying particular importance to independent learning of new knowledge and techniques and to motivation for quality.
16. Organize and properly plan the workload and time in professional activities.
17. Have the ability to work in an international context.

Competences

- Be able to work in an international context.
- Communicate clearly, orally and in writing, with other professionals and the media.
- Demonstrate an understanding of the fundamentals of action, indications, efficacy and benefit-risk ratio of therapeutic interventions based on the available scientific evidence.
- Establish the diagnosis, prognosis and treatment, basing decisions on the best possible evidence and a multidisciplinary approach focusing on the patient's needs and involving all members of the healthcare team, as well as the family and social environment.
- Formulate hypotheses and compile and critically assess information for problem-solving, using the scientific method.
- Maintain and sharpen one's professional competence, in particular by independently learning new material and techniques and by focusing on quality.
- Organise and plan time and workload in professional activity.
- Recognize the determinants of population health, both genetic and dependent on gender, lifestyle, and demographic, environmental, social, economic, psychological and cultural factors.

Learning Outcomes

1. Apply the scientific method to the alternative medicines.
2. Be able to work in an international context.
3. Communicate clearly, orally and in writing, with other professionals and the media.
4. Define the concept of drug interaction and know the main mechanisms of interactions between drugs and between drugs and other substances (food, toxic habits, medicinal plants) and diagnostic tests.
5. Define the concept of pharmacodynamics, action, effect, bioassay, dose-response and mathematical models governing the action of drugs.
6. Define the concepts of pharmacology and clinical pharmacology and know their divisions.
7. Describe the concept of risk-benefit in medical therapy.
8. Describe the concepts of drug, medication, narcotic and toxic.
9. Describe the different routes of medication administration.
10. Describe the main features of the pharmacology of the different body systems (cardiovascular, respiratory, gastrointestinal, kidney, blood, endocrine and metabolism).
11. Describe the main mechanisms of toxicity involved in adverse reactions to drugs.
12. Determine the importance of self-medication.
13. Differentiate the composition of analgesic, antineoplastic, antimicrobial and anti-inflammatory drugs.
14. Formulate hypotheses and compile and critically assess information for problem-solving, using the scientific method.
15. Identify the main sources of information on medication, therapeutics and clinical pharmacology: primary, secondary and tertiary.
16. Identify the medication registration process and the legal regulation of medication.
17. Maintain and sharpen one's professional competence, in particular by independently learning new material and techniques and by focusing on quality.
18. Organise and plan time and workload in professional activity.

Content

Introduction to Pharmacology. Absorption, distribution, metabolism and excretion processes of drugs. General pharmacokinetics. Mechanism of action of drugs and mathematical aspects of pharmacodynamics. Adverse reactions, pharmacological toxicity and pharmacological interactions. Biological drugs, gene therapy and cell therapy. Pharmacology of the autonomic nervous system, adrenergic agonists and antagonists. Cholinergic agonists and antagonists. Pharmacology of the motor plate and membrane excitability. Pharmacology of inflammation and cellular mediators. Anti-inflammatory and anti-rheumatic. Pharmacology of the central nervous system. Opioid analgesics. Pharmacology of drug abuse and dependence. Vascular and circulation pharmacology. Cardiac pharmacology. Respiratory pharmacology. Pharmacology of gastrointestinal motility and secretion. Blood pharmacology. Renal and plasma water pharmacology. Introduction to the pharmacology of the endocrine system: pharmacology of the adrenal cortex and sex hormones. Pharmacology of the thyroid, calcium metabolism and pancreatic secretion. Lipid-lowering agents Pharmacology of neoplastic growth. Basic principles of chemotherapy.

Distributive blocks
A. General aspects of Pharmacology. Definitions. Pharmacology, clinical pharmacology. Drug, medication, drug and toxic.
B. Principles of pharmacokinetics and pharmacodynamics. Interactions and adverse reactions.
C. Special pharmacology: of the nervous system, of inflammation, of immunity, of cell growth, of the cardiocirculatory system, respiratory system, of the internal environment, metabolism and hormones, of the digestive system and pharmacology of antimicrobials . Pharmacology of drugs.

Syllabus
Theoretical classes:
Introduction to Pharmacology. Pharmacokinetics Drug absorption and distribution processes.
Pharmacokinetics Drug metabolism and excretion processes.
Drug action mechanism, drug-receptor interactions and mathematical aspects of pharmacodynamics.
Pharmacologyof the autonomic nervous system: adrenergic, antiadrenergic, cholinergic and anticholinergic

drugs.
Pharmacology of the motor plate and membrane excitability.
Pharmacology of cellular mediators. Pharmacology of eicosanoids and histamine.
Pharmacology of inflammation and immunity. Pharmacology of uric acid metabolism.
Generalities of CNS neurotransmission. Transmission by amino acids and peptides. Opiate drugs
Classification of drugs that act on the CNS. Anticonvulsants
Pharmacology of dopaminergic pathways: antipsychotics and abnormal movements.
Pharmacology of central serotonergic and adrenergic pathways: antidepressants and psychostimulants.
Vascular and circulation pharmacology.
Cardiac pharmacology.
Pharmacology of cholesterol and lipoprotein metabolism.
Pharmacology of hemostasis and thrombosis.
Renal pharmacology and volume regulation.
Respiratory pharmacology.
Pharmacology of glucose homeostasis. Hypoglycemic drugs.
Pharmacology of the adrenal cortex, thyroid gland and bone mineral homeostasis.
Pharmacology of gastrointestinal motility and secretion.
Pharmacology of reproduction. Contraceptives and sex hormones.
Pharmacology of cancer (I). Drugs that act on phases of cell growth.
Pharmacology of cancer (II). Drugs that act on signal transduction and immunotherapy.
Pharmacology of antimicrobials (I).
Pharmacology of antimicrobials (II).
Pharmacology of antimicrobials (III).

120' SCC seminars:
Pharmacokinetics: concepts and parameters and dose adjustment
Pharmaceutical forms and routes of administration
Drug development
Adverse reactions and toxicity
Drugs and doping
Biological drugs and advanced therapies
Therapeutic inventory of patients: pharmacological effects, unwanted effects and interactions (I) and (II)
Pharmacology in the media: neuropharmaceuticals and oncological drugs (I) and (II)
Pharmacology in audiovisual media: from fiction to reality (I) and (II)

120' simulation practices

Pharmacological history

Administration of drugs

60' SCC seminars:
pharmacodynamics
Pharmacological interactions

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Theory (T)	26	1.04	4, 5, 6, 8, 10, 11, 12, 14, 15
clinical case seminars CCS)	26	1.04	1, 3, 4, 5, 6, 8, 10, 11, 12, 13, 14, 15, 16, 18
Type: Supervised			

Simulation practices (PSCA)	4	0.16	3, 4, 5, 9, 10, 11
Type: Autonomous			
Personal study	62.5	2.5	1, 2, 3, 4, 5, 6, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18

This Guide describes the framework, contents, methodology and general rules of the subject, in accordance with the current study plan. The final organization of the subject in terms of the number and size of groups, distribution in the calendar and exam dates, specific evaluation criteria and examination review, will be specified in each of the Hospital Teaching Units (UDH), which will make it clear through the subject programs and on the first day of class of each subject through the professors responsible for the subject at the UDHs.

For the current academic year, the professors designated by the Departments as responsible for the subject at Faculty and UDH level are:
Department responsible: Pharmacology, Therapeutics and Toxicology
Head of Faculty: Antònia Agustí Escasany
UDH managers
UD Vall d'Hebron: Mª Antonieta Agustí Escasany
UD Germans Trias and Pujol: Eva Montané Esteva
UD Sant Pau: Rosa Antonijoan Arbós
UD Parc Taulí: Antoni Vallano Ferraz
Theoretical classes: TE typology (enrollment group): 26 1-hour classes
Seminars on clinical cases or problem solving and presentation of work: SCC type (groups of 20): 2 1-hour seminars, 6 2-hour seminars and 3 of 4 hours divided into part I and II of two hours each (in total 11 seminars)
Advanced clinical simulation practices: PSCA typology (12-14 per group): 2 2-hour seminars
General Pharmacology training activities include master classes, clinical case resolution seminars and simulation practices. These activities complement each other and allow the acquisition, at the same time, of knowledge about fundamental aspects of Pharmacology and practice in the identification of problems in a specific patient that require either the use of a medication that produces the desired effect, or the withdrawal of a treatment that the patient is taking and that causes a harmful effect.
All master classes last 60 minutes (50 minutes of presentation +10minutes of interaction and resolution of doubts). On the other hand, the seminars on clinical cases and simulation practices have a duration that ranges from 60 minutes to 120 minutes, depending on the complexity of the case and the group of drugs to which it corresponds.
The case seminars are based on a clinical history that the students will receive in advance. The resolution of the clinical problem raised in the history will require individual reflection and sharing in order to identify what is happening to the patient, which pharmacological effects could help improve the symptoms and discover which medicines modify these effects. Some of the cases correspond to adverse reactions caused by one or more medications that require the withdrawal of the causal drug, or to problems with calculating and adjusting doses. In some cases, a therapeutic inventory of patients will be drawn up and its subsequent analysis (possible adverse effects, drug interactions, duplicates...). The use of simulation is also considered to experiment and solve problems and practical issues of the pharmacological anamnesis and the administration of medicines by the different routes.
Exceptionally and according to the criteria of the responsible teaching staff, the available resources and the current health situation in the different Teaching Units, part of the content corresponding to the theoretical lessons, practicals and seminars may be taught face-to-face or virtually.
Note: when possible, 15 minutes of a class will be set aside, within the calendar established by the center/degree, for students to complete the teacher performance and evaluation surveys of the subject/module.

• Learning activities
Title ECTS hours Learning outcomes
Type: Directed

Clinical Case Seminars (SCC) 26 1.04 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 16

Theory (TE) 26 1.04 3, 4, 5, 6, 7, 9, 10, 12, 14

Type: Supervised

Simulation practices (PSCA) 4 0,16 2,3,4,7,8,9

Type: Autonomous

Personal study 62.5 2.5 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17

• Evaluation

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Assessment through case studies, problem solving and simulation practices and objective tests	30%	2.5	0.1	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18
Written assessment using objective tests	two objective tests (35% each one)	4	0.16	1, 4, 5, 6, 8, 10, 11, 12, 13, 15, 16

This subject does not provide the single assessment system. The evaluation of the subject will consist of several parts, in order to respect the distribution between the theoretical and practical knowledge that the student will have to acquire:
1) Multiple answer objective test (test) with 5 options and only one correct answer. As a guide, there will be three questions for each master class and two questions for each seminar.
There will be a first partial with a multiple answer objective test which will include the material of theoretical lessons 1 to 13 and SCC 1 to 6 (according to the teaching calendar of each UD). PSCA will not be evaluated neither during the simulation practice nor in the objective tests. Students who obtain a grade equal to or higher than 5.0 out of 10.0 will be considered exempt from these subjects.
There will be a second partial with a multiple answer objective test which will include the material from theoretical lessons 14 to 26 and from SCC 7 to 11 (seminars 7, 8, 9 parts I and II, 10 parts I and II and 11 parts I and II) (according to the teaching calendar of each UD). Students who obtain a grade equal to or higher than 5.0 out of 10.0 will be considered exempt from these subjects.
There will be a final make-up test covering the material from lessons 1 to 26 and SCCs 1 to 11 and will be divided into two sub-tests of multiple choice answers that will include the same theorical material and seminars that the first and second partials, respectively. However, there will be aldo the option of incorporating other types of questions (such as short questions) in a complementary and optional way, at the discretion of the teaching unit. This option will be included in the specific program of the subject in the teaching unit at the beginning of the course.

Students who have passed one of the partials will only have to take the subtest/exam that includes the subject that was not passed. The recovery test/exam is considered passed if they obtain a grade equal to or higherthan 5.0 out of 10.0.
For students who have to examine the entire subject, the test/exam will be considered passed as long as the average grade of the two subtests/exams is equal to or higher than 5.0. ATTENTION: in order to be able to

make the average, the minimum grade of the subtests/exams must be equal to or higher than 4.0.
Students whohave passed the partials and want to raise the grade of the whole subject or one of the partials, can take the recovery test.
The final grade of the objective test has a weight of 70% (35% each sub-test) of the final mark of General Pharmacology.

2) Evaluation of the preparation and presentation of clinical cases, problem solving and presentation of works of seminars.
At the end of each seminar of clinical cases or problem solving, there will be a continuous assessment of practical knowledge and of the student's participation in the activity. This evaluation may be written or oral, based on questions or presentations made during the seminars, or when they have ended. This evaluation will be graded between 0 and 10. The average of the results obtained in the different evaluations of the seminars will correspond to the overall mark of the seminars.
This qualification is worth 30% of the final grade in General Pharmacology.

Students who do not take both the theorical and practical assessments tests will be considered "Not Evaluable", exhausting their rights to enroll in the subject.

• Evaluation activities

Title Weight ECTS hours Learning outcomes

Written assessment through
objective tests 70% (35% + 35%) 4 0.16 1, 3, 4, 5, 6, 7, 9, 10, 11, 13, 14

Assessment through cases
practices and resolution of
problems 30% 2.5 0.1 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17

Bibliography

Specific bibliography
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Range and Dale. Pharmacology. 9th ed. Barcelona: Elsevier; 2020. Available at: https://bibcercador.uab.cat/permalink/34CSUC_UAB/1c3utr0/cdi_askewsholts_vlebooks_9788491136446
Wecker L. Brody's Human Pharmacology: mechanism-based therapeutics. 6th ed. Philadelphia: Elsevier; 2018
Reference bibliography
Goodman & Gilman. The pharmacological bases of therapeutics. 14th ed. New York: McGraw Hill; 2022. Available at: https://bibcercador.uab.cat/permalink/34CSUC_UAB/1eqfv2p/alma991010719764306709
Internet resources
Agencia Española de Medicamentos y Productos Sanitarios < https://www.aemps.gob.es/?lang=ca >
Technical sheet of medicines approved and marketed in Spain. Reports on the therapeutic positioning of medicines approved and marketed in Spain.
European Medicines Agency < https://www.ema.europa.eu/en >. Evaluation reports of medicines approved by the European Commission.
Guide to good prescription. Geneva: World Health Organization, Action Program on Essential Medicines; [1999]. Available at: https://www.paho.org/hq/dmdocuments/2012/Guia-de-la-buena-prescripcion-OMS.pdf
Practical manual for reasoned prescription.

Software

No specific software required.

Language list

Information on the teaching languages can be checked on the CONTENTS section of the guide.