

**Pharmacology in Physiotherapy**

Code: 102994  
ECTS Credits: 6

Degree	Type	Year	Semester
2500892 Physiotherapy	OT	3	2

The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

**Contact**

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**Use of Languages**

Principal working language: catalan (cat)  
Some groups entirely in English: No  
Some groups entirely in Catalan: Yes  
Some groups entirely in Spanish: No

**Teachers**

Josep Torrent Farnell

**External teachers**

Claudia Delgado  
Cristina Vedia  
Pol Molina  
Rosa M Antonijoan Arbós

**Prerequisites**

It is convenient for the student to have attained the basic knowledge and skills of biology, physiology (function of the human body) and medico-surgical pathology.

**Objectives and Contextualisation**

The subject is an elective one in the third year of the Degree in Physiotherapy. It is scheduled when students are already reached basic knowledge of Biology, Physiology and Medical-Surgical Pathology.

The learning objectives of the subject are to show the scientific basis of drug discovery and medicines development including basic and clinical phases. The subject describes the different processes that a drug is submitted in the organism from its administration, its desirable and undesirable (adverse) effects and its interactions. In addition, the pharmacological characteristics of the main groups of drugs are studied.

**Competences**

- Act with ethical responsibility and respect for fundamental rights and duties, diversity and democratic values.
- Analyse and synthesise.
- Display knowledge of the morphology, physiology, pathology and conduct of both healthy and sick people, in the natural and social environment.
- Display knowledge of the sciences, models, techniques and instruments around which physiotherapy is structured and developed.
- Easily recognise and cope with changes.
- Make changes to methods and processes in the area of knowledge in order to provide innovative responses to society's needs and demands.
- Organise and plan.
- Provide effective physiotherapeutic treatment and offer patients integral care.
- Take account of social, economic and environmental impacts when operating within one's own area of knowledge.
- Take sex- or gender-based inequalities into consideration when operating within one's own area of knowledge.
- Work effectively and cooperatively in multidisciplinary professional teams.

## Learning Outcomes

1. "Demonstrate teamwork skills; identify the role of drugs in patient therapy."
2. Analyse a situation and identify its points for improvement.
3. Analyse and synthesise.
4. Collect the pharmacological anamnesis data.
5. Communicate using language that is not sexist.
6. Consider how gender stereotypes and roles impinge on the exercise of the profession.
7. Critically analyse the principles, values and procedures that govern the exercise of the profession.
8. Define the concept of pharmacological interaction and know the principal mechanisms of interactions between medications and between medications and other substances.
9. Describe the concepts of drug, medication, and toxic.
10. Describe the principal types of alternative medicines. Know the principles of homeopathy, acupuncture and phytotherapy.
11. Determine the importance of self-medication.
12. Easily recognise and cope with changes.
13. Explain the explicit or implicit code of practice of one's own area of knowledge.
14. Identify situations in which a change or improvement is needed.
15. Identify the principal forms of sex- or gender-based inequality present in society.
16. Identify the social, economic and environmental implications of academic and professional activities within one's own area of knowledge.
17. Keep the patient treatment is applied, including pharmacological and encourage it to cooperate at all times with compliance.
18. Organise and plan.
19. Propose new ways to measure success or failure when implementing innovative proposals or ideas.
20. Propose projects and actions in accordance with the principles of ethical responsibility and respect for fundamental rights, diversity and democratic values.
21. Propose projects and actions that incorporate the gender perspective.
22. Refer patients to another professional when necessary.

## Content

Contents

Theory: 30 lectures.

Practices: 15 classroom practices.

THEORY

## I. GENERAL PHARMACOLOGY

Unit 1. Introduction to Pharmacology. Concept, History, Divisions, Methods of study. Types of medicines. Generic medicines.

Unit 2. General cycle of drugs in the body. Transport and absorption of drugs through the membranes. Distribution. Routes of administration.

Unit 3. Metabolism and excretion of drugs in the body. Metabolic pathways. Renal excretion and other sites of elimination.

Unit 4. Pharmacokinetics. Parameters that determine the concentrations of the drugs. Half-life of elimination, volume of distribution and clearance.

Unit 5. General principles of the mechanism of action of drugs. Concept of pharmacodynamics. Concept of action and of effect. Levels of action of the drugs: systemic, tissue, cellular and molecular. Relationship between concentration-effect and parameters that characterize this relationship.

Unit 6. Mechanism of action of drugs. Targets of drug action.

Unit 7. Pharmacological interactions. Concept. Pharmacokinetic and pharmacodynamic interactions. Concept of synergy and antagonism. Importance of pharmacological interactions. Polypharmacy.

Unit 8. Undesirable effects of drugs. General concepts and terminology. Classification according to its cause: classical and modern classification of type A, B, C, D and E. Concept of therapeutic risk.

Unit 9. Physiological and pathological factors that influence the response to drugs I. Pharmacology in pregnancy, pediatrics, elderly and others.

Unit 10. Physiological and pathological factors that influence the response to drugs II. Pharmacology in organ dysfunctions and illness (liver and renal failure). Pharmacogenetics.

## II. PHARMACOLOGY OF CHEMICAL MEDIATORS: PERIPHERAL NERVOUS SYSTEM.

Unit 11. Pharmacology of adrenergic transmission. Agonists and antagonists of the different adrenoceptors.

Unit 12. Pharmacology of cholinergic transmission. Agonists and cholinergic antagonists. Ganglion and neuromuscular blockers. Local anesthetics.

## III. PHARMACOLOGY OF CHEMICAL MEDIATORS: CENTRAL NERVOUS SYSTEM

Unit 13. Pharmacology of the central noradrenergic and serotonergic system. Characteristics and functions of the noradrenergic and serotonergic neurotransmission. Neurochemical bases of depression and mania.

Unit 14. Pharmacology of the central cholinergic system. Characteristics and functions of cholinergic neurotransmission. Alzheimer's disease. Pharmacology of convulsions. Anticonvulsants.

Unit 15. Pharmacology of the central dopaminergic system. Characteristics, functions and alterations of the dopaminergic neurotransmission. Drugs in Parkinson's disease. Drugs in the treatment of schizophrenia and psychosis.

Unit 16. Pharmacology of the GABA system. GABA transmission and modulation. Anxiolytic and hypnotic drugs. General anesthetics.

Unit 17. Pharmacology of other central mediators: opioid peptides. The opioid system and opioid drugs. Pharmacology of pain.

Unit 18. Pharmacology of substance abuse and addiction I. Drugs of abuse, classification and effects. Psychostimulants and hallucinogens.

Unit 19. Pharmacology of substance abuse and addiction II. Alcohol. Tobacco Cannabis. Opioids. Sedatives.

#### IV. PHARMACOLOGY OF CHEMICAL MEDIATORS AND ANTINEOPLASTIC: ANTI-INFLAMATORIES, IMMUNOSUPPRESSANTS, ANTINEOPLASICS.

Unit 20. Pharmacology of immunity. Pharmacological targets for immunomodulation. Immunosuppressants and immunostimulants. Antineoplastic drugs. Mechanisms of action and adverse effects.

Unit 21. Pharmacology of inflammation I. Mediators of inflammation. Prostaglandins and leukotrienes. Non-steroidal anti-inflammatory drugs (NSAIDs). Antirheumatic drugs.

Unit 22. Pharmacology of inflammation II. Serotonin. Histamine. Angiotensin, nitric oxide, PAF and cytokines. Pharmacological modulation.

#### V. PHARMACOLOGY OF MAJOR ORGAN SYSTEMS.

Unit 23. Endocrine pharmacology. Regulation of hormonal secretion. Pharmacology of diabetes. Insulin, glucagon and oral antidiabetic agents. Thyroidal hormones. Glucocorticoids.

Unit 24. Pharmacology of sexual hormones. Androgens, estrogens and progestogens. Pharmacology of the fertility.

Unit 25. Pharmacology of lipid and bone metabolism. Lipid-lowering drugs. Modulation of osteoporosis. Hypocrites

Unit 26. Respiratory pharmacology. Bronchodilators, antitussives and mucolytics. Pharmacology of blood. Antianemics. Antiplatelet drugs and thrombolytics. Anticoagulants.

Unit 27. General pharmacology of the digestive tract. Pharmacological modulation of vomiting. Pharmacological modulation of gastric secretion. Pharmacology of motility and intestinal secretion: laxatives and antidiarrheal drugs.

Unit 28. Renal and urinary pharmacology. Diuretics and regulatory hormones. Vascular pharmacology. Vasodilators and antihypertensives.

Unit 29. Heart pharmacology. Antianginals. Cardiotonic drugs. Antidysrhythmic drug.

30. Pharmacology of poisoning. Pharmacological treatment of acute poisoning. Antidotes.

#### PRACTICES

1. Pharmaceutical forms I.
2. Pharmaceutical forms II.
3. Pharmacological anamnesis I.
4. Pharmacological anamnesis II.
5. Adverse reactions, communication and pharmacovigilance I.
6. Adverse reactions, communication and pharmacovigilance II.
7. Development of medicines. Basic and clinical research. Phases of the development of medicines.
8. Placebo effect.
9. Alternative medicines. Therapeutics and alternative medicines. Homeopathy.
10. Social pharmacology. Therapeutic adherence. Self-medication. Well-being medicines.
11. Doping.
12. Legal aspects of the prescription and use of drugs I.

13. Legal aspects of the prescription and use of drugs II.
14. Visit the pharmacology research unit I.
15. Visit the pharmacology research unit II.

## Methodology

The subject of Pharmacology consists of three modules of directed activities:

Theory lectures: Lecture classes.

Classroom and computer classroom practices. Clinical cases, problems, search of information with computer, film vision and guided visits to drug research centers. In addition, an extension of the themes of the theory.

Autonomous activity: personal study and reading of recommended articles.

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.

## Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
CLASSROOM PRACTICES	15	0.6	1, 3, 22, 11, 17, 18, 4, 12
THEORY (TE)	30	1.2	8, 22, 9, 10, 17
Type: Autonomous			
READING ARTICLES/REPORTS OF INTEREST	5	0.2	3
SELF-STUDY	100	4	1, 8, 22, 9, 10, 11, 17, 4

## Assessment

The competences of this subject will be evaluated by means of:

Exams. The evaluation consists of two partial examinations of theoretical and practical knowledge. Each exam will be of type essay of restricted questions, and will consist of between 15-20 questions to be answered in a maximum time of 1 hour. To pass a rating of 5 to each of the two tests is needed. The whole evaluation of these tests will represent up to 65% of the final grade.

Continuous evaluation of practices / seminars. The attendance is mandatory to 80% of the practices / seminars.

After each practice or seminar a short assessment of the content will be made. Represents 30% of the final note.

Attendance at the theoretical classes. Up to 5%.

The subject is approved with a score of 5 (sum of the partial exams, seminars / practices and assistance).

Students who have not passed the subject by means of the evaluation mentioned above will be able to submit to a final test of recapture (essay test of restricted questions).

The student who has not been able to provide sufficient evidence of evaluation such as: not presenting to 80% attendance at the seminars / practices and / or do not do the exams, in the minutes the subject will be awarded as not evaluable.

## Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Attendance and active intervention in theory classes	5%	0	0	2, 8, 22, 9, 10, 11, 14, 17, 19, 4, 12
Continuous evaluation of practices and seminars	30%	0	0	1, 7, 3, 5, 8, 22, 9, 10, 11, 16, 15, 17, 18, 20, 21, 4, 6
Written evaluation: Objective tests	65%	0	0	8, 22, 9, 10, 11, 13, 4

## Bibliography

1. BAÑOS JE, FARRE M. Principios de Farmacología clínica: bases científicas de la utilización de medicamentos. Ediciones Masson, 2002.
2. DURAN M, MESTRES C, NOGUES RM. Fundamentos de Farmacología para Fisioterapeutas. Madrid: Editorial Médica Panamericana, 2017.
3. RITTER JM, FLOWER PK, HENDERSON G, KONG LOKE Y, MacEWAN D, RANG HP. Rang y Dale Farmacología. 9ª ed., Barcelona: Elsevier, 2020.
4. FLÓREZ J. Farmacología Humana. 6ª ed Barcelona: Elsevier 2014.
5. LORENZO P, MORENO A, LEZA JC, LIZASOAIN I, MORO MA, PORTOLES A, eds. . Velázquez. Farmacología Básica y Clínica. 19ª ed. Madrid: Editorial Médica Panamericana, 2018.
6. BRUNTON LL, HILAL-DANDAN R, KNOLLMANN BJ. Goodman and Gilman's the pharmacological basis of therapeutics. 13Th ed. New York: McGraw-Hill, 2018. Hi ha una versió en castellà.
7. UDAYKUMAR P. Pharmacology for Physiotherapy. 2nd ed. New Delhi: JAYPEE, 2004. 8. PANUS P, KATZUNG B, JOBST E, TINSLEY S, MASTERS S, TREVOR A. Pharmacology for the Physical Therapist. New York: McGraw-Hill Medical, 2008.

## Software

TEAMS