

Applied Pharmacology

Code: 42358
ECTS Credits: 12

Degree	Type	Year	Semester
4311309 Pharmacology	OB	0	1

Contact

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Use of Languages

Principal working language: spanish (spa)

Teachers

Maria Antonieta Agusti Escasany
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Francesc Xavier Mora Igual
Ignacio José Gich Saladich
Rosa Maria Morros Pedros
Rosa María Antonijoan Arbos

External teachers

A. Vivancos
D. Capellà
P. DOcon

Prerequisites

In order to correctly follow the module, students need to have previous knowledge of pharmacology, related to the mechanisms of action of drugs as well as the need to carry out specific studies during the development of a molecule as a drug. They are also supposed to have basic knowledge of simple statistical techniques. Most of this knowledge will have been acquired in module 1 of the master's degree itself, and some others should be of

general knowledge before initiation of the master's degree. This knowledge is related to statistics, and, they are part of the knowledge gained in the majority of the diplomas, degrees, or bachelor's degrees that give access to the master's degree, .

Objectives and Contextualisation

Apply basic pharmacological knowledge to drug development optimization (R+D) and clinical use, and expand knowledge to help understand their clinical use.

Competences

- Apply pharmacological knowledge to clinical practice.
- Apply pharmacological knowledge to the development and optimisation (R&D) of drugs.
- Capacitat d'anàlisi i síntesi.
- Desenvolupar habilitats d'autoaprenentatge.
- Desenvolupar un pensament crític i autocrític.

Learning Outcomes

1. Capacitat d'anàlisi i síntesi.
2. Describe the methodology used to critically assess studies on drug effectiveness and safety.
3. Desenvolupar habilitats d'autoaprenentatge.
4. Desenvolupar un pensament crític i autocrític.
5. Explain the regulatory framework in which medical trials must take place.
6. Identify how drugs are used in our society and the economic and medical factors that determine the choice of medicines.
7. Identify the phases of clinical and pre-clinical development of medicines and describe their characteristics.
8. Indicate the scientific and technical principles and the objectives that are formulated when applying the most common laboratory techniques for drug-testing.
9. Recognise basic statistical concepts and the main tests used that help to interpret pre-clinical and clinical studies with medicines.

Content

a) Life cycle of a drug. Origin and obtaining of medicines: chemical synthesis, biotechnological processes and extraction from natural sources. Pharmaceutical and galvanic technology. Pre-clinical development: activity-structure, basic and safety pharmacology, basic and special toxicology. Clinical development: different phases of the clinical trial. Post-authorization and pharmacovigilance.

b) Legislation and registration of medicines in Spain, the European Union and other countries. Guides. Special medicines for rare diseases and/or special populations (paediatrics), medicines of biotechnological origin. The case of sanitary products. Agents involved in drug development: administration, industry, service companies (CRO), research centers and hospitals.

c) General introduction to classic and current pharmacology techniques. In vivo systems to evaluate the action and effect of drugs: induction of models, concepts of knockouts and GMOs. In vitro systems for drug evaluation: cell culture, FACS, MACS, organ bath, electrophysiology (patch clamp). Processing of histological samples and microscopy (optical, confocal, etc.). In vivo and in vitro techniques for the study of the release of neurotransmitters: indirect functional studies and others (synaptosomes, miniprisms, microdialysis). General methods of determination and quantification of molecules: colorimetry, spectrophotometry, fluorotry, chromatograph, mass spectrometry, etc. Protein determination: bioassays, immunoassays (ELISA/RIA), western blot, immunocito(histo)chemical, flow cytometry. Determination of nucleotides: RT-PCR, northern blot, in situ hybridization / sequencing. Measurement of pharmacological receptors: radioligandos fixation

techniques, biochemical techniques of application in the study of receptors. Pharmacokinetic techniques: pharmacological treatment and sample collection, drug-protein binding, extraction, dose-response curve. Biotechnological processes in the production of biopharmaceuticals: recombinant DNA, monoclonal antibodies, etc.

d) General concepts of epidemiology. Critical evaluation of clinical trials. Types of epidemiological studies. Evaluation of safety studies and pharmacovigilance. Meta-analysis. Drug use studies.

e) Descriptive statistics. Inferential statistics. Association - correlation. Imputation of causation. Bivariant analysis. Sample size. Sensitivity, specificity and ROC curves.

Methodology

Different methodologies will be used to encourage the interaction of students with each other, with professionals from different fields, as well as teamwork and personnel work.

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			
Clinical cases seminars	5	0.2	1, 2, 4, 5, 6, 7, 8, 9
Practice in class	21	0.84	1, 2, 4, 5, 6, 7, 8, 9
Theory	66	2.64	1, 2, 4, 5, 6, 7, 8, 9
Type: Supervised			
Work supervision/evaluation	24	0.96	1, 2, 4, 5, 6, 7, 8, 9
scheduled tutoring	4	0.16	1, 2, 4, 5, 6, 7, 8, 9
unscheduled tutoring	4	0.16	1, 2, 4, 5, 6, 7, 8, 9
Type: Autonomous			
Study, tasks	172	6.88	1, 2, 3, 4, 5, 6, 7, 8, 9

Assessment

The note of the module is the arithmetic mean of the notes of the materials that compose it.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Studying, performing tasks	35%	0	0	1, 2, 3, 4, 5, 7, 8
Test. Written questionnaire	15%	2	0.08	1, 2, 3, 4, 9

class follow-up	20%	0	0	1, 2, 3, 4, 5, 6, 7, 8, 9
works exhibition	30%	2	0.08	1, 2, 3, 4, 5, 7, 8

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- In vivo cellular and molecular imaging - 2005 / Ahrens E / 978-0-12-153170-6
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- Cell Biology: a laboratory handbook - 2005 / Celis JE
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Software

If needed (Teams)