SUBJECT TEACHING GUIDE

G1932 - Applied Pharmacology and Toxicology

Degree in Biomedical Sciences

Academic year 2023-2024

1. IDENTIFYING DATA					
Degree	Degree in Biomedical Sciences			Type and Year	Compulsory. Year 3
Faculty	Faculty of Medicine				
Discipline	PHARMACOLOGY				
Course unit title and code	G1932 - Applied Pharmacology and Toxicology				
Number of ECTS credits allocated	6	Term		Semester based (1)	
Web	https://web.unican.es/centros/medicina/estudios-de-grado/grado-en-ciencias-biomedicas				
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

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3.1 LEARNING OUTCOMES

- 1. Identify the basic principles of the drug-receptor interaction and the pharmacodynamic parameters that govern this process.
2. To identify the pharmacokinetic and pharmacodynamic alterations that drugs may experience based on physiological and pathological variables.
3. List the main groups of drugs, as well as their mechanism of action at the neurochemical, molecular and cellular levels, and main biological effects
.4. Design and use basic experimental protocols in Pharmacology, prepare reports of results and interpret them.
5. Apply the theoretical, methodological, and legal principles of preclinical and clinical research in pharmacology.
6. Apply pharmacological knowledge to animal experimentation.
7. Identify the fundamentals of pharmacogenetics and pharmacogenomics and their impact on personalized medicine.
8. List the basic fundamentals of pharmacoepidemiology, pharmacovigilance, pharmacoeconomics.
9. Describe the general principles of toxicology, mechanisms of action and effects on the body of toxicants.
10. Select, take and process the appropriate sample for toxicological analysis.
11. List the procedures for the determination and analytical-toxicological interpretation of the main toxicants in biological media and the environment.
12. Seek and critically analyze scientific information in the field of pharmacology and toxicology to obtain, organize, interpret and communicate scientific and health information.

4. OBJECTIVES

1. To know and apply the main methods used in Experimental Pharmacology for the evaluation of drugs, following the bioethical and legal criteria of Preclinical Research, and be able to prepare scientific-technical reports based on the experimental results and based on the available scientific information.
2. To know the main phases of the clinical trial of a new drug, as well as the ethical, legal and administrative aspects.
3. To know the basic fundamentals of pharmacoepidemiology, pharmacovigilance, pharmacoeconomics. As well as the fundamentals and usefulness of pharmacogenetics and pharmacogenomics and their impact on personalized medicine.
4. To know the general principles, mechanisms of action and effects on the body of toxicants and drugs of abuse, as well as the implications on health.
5. To know the main methods and procedures of toxicological analysis.

6. SUBJECT PROGRAM	
CONTENTS	
1	1. Introduction 1.1. Drug development and regulation. 1.2. Drug discovery. 1.3. Bioethical and legal aspects. 1.4. Evidence-based pharmacology
2	2. Experimental or Preclinical Pharmacology 2.1. Pharmacological principles, preclinical evaluation of drugs in the laboratory and in experimental animals: from cellular models to animal models. 2.2. Laboratory animals: Description and applications of different species and strains of animals. Transgenic animals and popular mutants. Blood collection techniques and common routes of drug administration in laboratory animals, Euthanasia techniques. 2.3. Pharmacology applied to the experimental animal: routes of administration, anesthetic and analgesic procedures; antiseptics, disinfectants, antiparasitics and antibiotics; evaluation of the effects of drugs on animal welfare and health.
3	2. Experimental or Preclinical Pharmacology 2.4. Methods used in Experimental Pharmacology. 2.4.1. Preclinical screening of drugs from different systems: a) CNS (antidepressants, anxiolytics, hypnotics, antiepileptics, analgesics, anaesthetics, nootropics, antiparkinsonians); b) Cardiovascular (inotropic, antiarrhythmics, antidyspidemics, antiplatelets, coagulants and anticoagulants, antihypertensives, diuretics); (c) Respiratory (anti-asthmatic); d) Digestive (anti-ulcers, antidiarrheals); e) Endocrine (antidiabetic) and f) Inflammation and cancer. 2.4.2. Experimental toxicology studies in different organs and systems.
4	2. Experimental or Preclinical Pharmacology 2.5. Research methodology and biostatistics. Selection of the research topic, literature review, research hypotheses and study design. Analysis, interpretation and graphical representation of data
5	3. Clinical studies 3.1. Clinical phases of drug development. Clinical trial. Efficacy, safety and efficiency of drugs. 3.2. Pharmacoepidemiology. Pharmacovigilance. Pharmacoeconomics. 3.3. Pharmacogenetics and pharmacogenomics and their impact on personalised medicine.
6	4. TOXICOLOGY 4.1. Fundamentals of clinical toxicology. 4.2. General principles, mechanisms of action and effects on the organism of toxicants and drugs of abuse, as well as the implications on health. 4.3. Principles and procedures for the analytical-toxicological determination of the main toxicants in biological media, food and the environment.
7	Face to face and on-line (TEAMS) tutorials
8	Continuos and final evaluation
9	Autonomous student work

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
An exam that will evaluate the knowledge of the theoretical subject and the learning acquired in the practices corresponding to the topics taught in sections 1, 2 and 3 in this guide. The exam consists of 2 parts: a) a 5-answers test and only 1 right an	Written exam	No	Yes	30,00
An exam that will evaluate the knowledge of the theoretical subject and the learning acquired in the practices corresponding to the topics taught in sections 4, 5 and 6 of the teaching content of this guide. The students who failed the continuous evaluati	Written exam	Yes	Yes	30,00
A scientific-technical report is carried out by each student with the experimental data provided by the teaching staff and written in a scientific article format. The student will send the revised work according to the comments and indications of the teac	Work	No	Yes	20,00
Group activity in class with the experimental data provided by the teacher, consisting of the oral presentation of the analysis of the same as well as the discussion-defense of their scientific-technical reports.	Work	No	No	20,00
TOTAL				100,00

Observations

N/A

Observations for part-time students

The form of evaluation of part-time students will be the same as that of the rest

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

Good Research Practice in Non-Clinical Pharmacology and Biomedicine. Handbook of Experimental Pharmacology. Anton Bespalov, Martin C. Michel , Thomas Steckler. Springer, 2020.

Basic Principles of Drug Discovery and Development. 2nd Edition - March 30, 2021. Benjamin Blass. eBook ISBN: 9780128172155. Paperback ISBN: 9780128172148

Drug Discovery and Development. Technology in Transition. 3rd Edition - May 16, 2021. Editors: Raymond G Hill, Duncan Richards. Paperback ISBN: 9780702078040. eBook ISBN: 9780702078057