



UNIVERSIDAD AUTÓNOMA DE MADRID

## 33200 - PHARMACOLOGY OF ORGANS AND SYSTEMS

This is a non-sworn translation intended to provide students with information about the course

### Information of the subject

**Code - Course title:** 33200 - PHARMACOLOGY OF ORGANS AND SYSTEMS

**Degree:** 721 - Máster en Investigación Farmacológica (2018)

**Faculty:** 106 - Facultad de Medicina

**Academic year:** 2023/24

### 1. Course details

#### 1.1. Content area

The students will be provided with a systematic and state of the art information on the latest experimental findings in the main pharmacological areas, as well as the clinical trials conducted to demonstrate the therapeutic efficacy of drugs and possible adverse effects that may arise. The main families of drugs will be studied grouped by systems, analyzing in detail their mechanisms of cellular and molecular action, their physiological and physiopathological repercussions, as well as their therapeutic indications and main adverse effects. These will enable the student to acquire the necessary knowledge to understand the subsequent specialization module. Likewise, the student will be provided with knowledge on the new biological therapies, which are recently contributing with new drugs (monoclonal antibodies, recombinant proteins). The current state of cell therapy and gene therapy will also be presented, as therapeutic strategies still in the experimental phase but with potential clinical applicability in the future. Finally, the situation of the so-called "Orphan drugs" will also be analyzed.

#### 1.2. Course nature

Compulsory

#### 1.3. Course level

Máster (EQF/MECU 7)

#### 1.4. Year of study

1

#### 1.5. Semester

First semester

#### 1.6. ECTS Credit allotment

4.0

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## 1.7. Language of instruction

English

## 1.8. Prerequisites

Knowledge of Biochemistry and Molecular Biology at the undergraduate level in Biochemistry, Biology, Chemistry, Medicine, Pharmacy, Veterinary Medicine or equivalent degree.  
To possess a level of English that allows the student to understand the lectures and read the scientific literature (level B2 or similar).

## 1.9. Recommendations

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## 1.10. Minimum attendance requirement

Minimum attendance 80% (theoretical and seminars/resolution of problems)

## 1.11. Subject coordinator

Maria Francisca Cano Abad

<https://autoservicio.uam.es/paginas-blancas/>

## 1.12. Competences and learning outcomes

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### 1.12.1. Competences

#### **BASIC AND GENERAL**

GE1 - Acquire the knowledge, skills and abilities necessary to carry out an innovative quality research in Pharmacology

CB6 - Possess and understand knowledge that provides a basis or opportunity to be original in the development and / or application of ideas, often in a research context

CB8 - The ability to integrate knowledge and face the complexity of formulating judgments based on information that, being incomplete or limited, includes reflections on social and ethical responsibilities linked to the application of their knowledge and judgments

CB10 - Posses the learning skills that will allow the students to continue studying in a way that will be largely self-directed or autonomous.

#### **TRANSVERSAL**

There are no data

#### **SPECIFIC**

ES-1 - Know the physiological bases of Pharmacology, the main pharmacological groups and the main known and potential therapeutic targets: receptors, transporters, proteins, genes, and others, which will serve as a starting point in pharmacological research and innovation.

ES-2 - Know the potential of new biological, gene and cell therapies

ES-3 - Know the basic aspects about the design and obtaining new drugs, both at a chemical and biotechnological level, as well as the scientific, ethical and regulatory aspects that condition it.

### 1.12.2. Learning outcomes

Through this subject, the student will acquire a series of basic knowledge in the field of drug research, including the physiological and pharmacological bases of therapeutics, the identification of potential therapeutic targets and new perspectives in pharmacological therapy.

### 1.12.3. Course objectives

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### 1.13. Course contents

#### **MODULE I: CENTRAL AND PERIPHERAL NERVOUS SYSTEM**

##### **LECTURES (8h)**

1. Neurotransmission in the Autonomic Nervous System
2. Neurotransmission in the Central Nervous system
3. Cholinergic Neurotransmission
4. Drugs for the treatment of migraine
5. Hypnotic and sedative drugs
6. Antidepressants
7. Antipsychotic and anti-Parkinson drugs
8. Antiepileptic drugs

##### **SEMINARS (4 h)**

1. Pharmacology of autonomic nervous system
2. Neurotransmission in the CNS and its pharmacological interference

#### **MODULE II: BLOOD**

##### **LECTURES (2h)**

1. Drug that interfere with coagulation (1h)
2. Drugs for the treatment of anemia and colony stimulating drugs

##### **SEMINARS (2h)**

1. Pharmacology of the blood system (2h)

#### **MODULE III: ANTI-INFLAMMATORY AND IMMUNOMODULATING DRUGS**

##### **LECTURES (5h)**

1. Non-steroidal and anti-inflammatory drugs (1h)
2. Anti-inflammatory steroids (1h)
3. Biological anti-inflammatory drugs (1h)
4. Immunoregulating drugs (1h)
5. Opioids (1h)

##### **SEMINARS (2h)**

1. Pharmacology of pain and inflammation (2h)

#### **MODULE IV: CARDIOVASCULAR PHARMACOLOGY**

##### **LECTURES (4h)**

2. Pharmacology of the Renin-Angiotensin system (1h)
3. Vasodilators and calcium antagonists (1h)
4. Diuretics (1h)
5. Lipid Lowering drugs(1h)

##### **SEMINARS (2h)**

1. Pharmacology of the cardiovascular system (2h)

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## **MODULE V: RESPIRATORY AND GASTROINTESTINAL SYSTEM**

### **LECTURES (2h)**

1. Pharmacology of the respiratory system (1h)
2. Pharmacology of the GI system (1h)

### **SEMINARS (2h)**

1. Pharmacology of the respiratory and GI system (2h)

## **MODULE VI: METABOLISM**

### **LECTURES (2h)**

1. Drugs that regulate bone metabolism (1h)
2. Pharmacology of sexual hormones (1h)
3. Antidiabetic drugs (1h)

### **SEMINARS (2h)**

2. Pharmacology of drugs that interfere with the metabolism (2h)

## **MODULE VII: ANTIBIOTICS AND ANTIVIRAL DRUGS**

### **LECTURES (2h)**

1. Mechanism of action of antibiotics (1h)
2. Classification of antibiotics (1h)
3. Antiviral drugs (1h)
4. Antifungal and antiparasitic drugs (1h)

### **SEMINARS (2h)**

1. Antibiotics, antiviral and antifungal drugs (2h)

## **MODULE VIII: DRUGS FOR CANCER**

### **LECTURES (2h)**

1. Biological therapy in cancer (1h)
2. Antineoplastic drugs: cytostatics (1h)

### **SEMINARS (2h)**

1. Anti-cancer drugs (2h)

## **MODULE IX: OTHERS**

### **LECTURES (2h)**

1. Gene therapy: General concepts (1h)
2. Vaccines (1h)
3. Cellular therapy: An example for Chron's Disease

### **1.14. Course bibliography**

- **Goodman and Gilman's: The Pharmacological Basis of Therapeutics.** LL Brunton, B

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Chabner, B Knollman, 13th Edition, McGraw-Hill, 2017

- **Rang and Dale's. Pharmacology, 9th Edition, ELSEVIER.** James Ritter, Rod Flower, Graeme Henderson, Yoon Kong Loke, David MacEwan, Humphrey Rang. eBook ISBN: 9780702074462. Paperback ISBN: 9780702074486
- **Velázquez. Farmacología Básica y Clínica.** Lorenzo P, Moreno A, Leza JC, Lizasoain I, Moro MA. 19ª Edición. Panamericana, 2010.
- Edición española: **Principios de Farmacología.** David E. Golan, Armen H. Tahjian, Ehrin J. Armstrong, April W. Armstrong. 5ª Edición, Wolters Kluwer/Lippincott, 2012
- Edición española: **Farmacología.** Michelle A. Clark, Richard Finkel, José A. Rey, Karen Whallen, 5ª Edición, Wolters Kluwer/Lippincott, 2012
- **Farmacología Humana.** J Flórez, JA Armijo y A Mediavilla, 5ª Edición, Elsevier 2008

## 2. Teaching-and-learning methodologies and student workload

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### 2.1. Contact hours

TOTAL HOURS OF PHARMACOLOGY OF ORGANS AND SYSTEMS			
		Nº of Hours	%
ACTIVITIES	LECTURES	33	33
	SEMINARS	18	18
	EXAMS	3	3
	TUTOR	3	3
STUDENT WORK		43	43
TOTAL WORK LOAD		100	100

### 2.2. List of training activities

#### LECTURES

Lectures will provide organized and structured information elaborated by the Lecturer. The lecture content will include the knowledge already established or in very advanced situation, obtained from textbooks, bibliographic reviews, and relevant original papers. Lectures will take 50 minutes, using audiovisual presentations that can be available in the teaching web page.

#### SEMINARS/RESOLUTION OF PROBLEMS

Seminars will provide complementary information to Lectures, including practical exercises and problems to stimulate active student participation, under the supervision of a lecturer. During the Seminars, original research papers, describing classical pharmacological experiments or more recent scientific findings, as well as clinical studies, will be discussed in order to stimulate critical and rigorous scientific analysis by the students. Seminars will take 60 minutes. The content of every Seminar will be previously available in the teaching page web, and the students must work previously on them. Therefore, during the Seminar, the students will expose and discuss the provided solutions. Moreover, the students will answer and review several multiple choice questions, similar to those of the Objective evaluation test.

## 3. Evaluation procedures and weight of components in the final grade

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### 3.1. Regular assessment

The final mark (for both ordinary and extraordinary evaluations) will be the result of the marks obtained in the exam (70%) and in the continuous evaluations (30%).

**IMPORTANT:** To pass the subject it is compulsory to attend 80 % of the scheduled activities

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and to have a minimum score of 5/10 points in the final exam. If the student does not pass the exam in the ordinary call, he/she will need to attend the extraordinary exam.

### 3.1.1. List of evaluation activities

#### **Final exam characteristics (70%)**

The exam (for both the ordinary and the extraordinary call) will be mainly based on multiple choice questions and it can also include short questions. The type and date of exam will be announced previously by the coordinator.

#### **Continuous evaluation (30%).** Includes:

- Attendance to classes and seminars (10%)
- Exercises (20%). These exercises will be performed during the classroom or non-face-to-face through the Moodle platform. These exercises may have different format depending on the lecturer. They may include: short questions, multiple choice or true/false questions, problems or simulations. The lecturer will announce previously the type and the date of each exercise.

### 3.2. Resit

The same requirements as for the Regular assessment apply in this case.

#### 3.2.1. List of evaluation activities

The same list of evaluation activities as for the regular assessment apply in this case.

### 4. Proposed workplan

TOTAL HOURS OF PHARMACOLOGY OF ORGANS AND SYSTEMS			
		Nº OF HOURS	%
Activities	Lectures	37	37%
	Seminars	10	10%
	Exams	3	3%
Student work	Weekly study and exam preparation	50	50%
Total work load		100	100%

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