



Subject: Therapeutic Targets in Cardiovascular Pharmacology
Code: 32511
Centre: School of Medicine
Title: Master in Pharmacological Research
Level: Master
Type: Optional
Nº of Credits: 5
Academic Course: 2017-18

1. COURSE TITLE

Therapeutic Targets in Cardiovascular Pharmacology

1.1. Course number

32511

1.2. Content area

Patophysiology and pharmacology of the cardiovascular system

1.3. Course type

Optional

1.4. Course level

Master Degree

1.5. Year

First

1.6. Semester

Second

1.7. Language

English

1.8. Prerequisites

Previous attendance to the General Module of the Master. Level B2 in English is required since the subject will be taught in that language.



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1.9. Minimum attendance requirement

Attendance to lectures and seminars is mandatory; the student must attend at least 80% of seminars to be evaluated

1.10. Faculty data

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Contact hours: Previous e-mail appointment is required

1.11. Course objectives

Abilities

Basic and general

- To acquire and understand basic knowledge allowing to the development and/or application for new ideas in a research context
- The students should be able to integrate knowledge and suggest an opinion, from information that can be incomplete or limited, including considerations about social and ethic related responsibilities related to such knowledge and opinion
- The students should be able to communicate their conclusions, and the knowledge and reasons sustaining them, in a clear manner without ambiguities
- The students should acquire the learning abilities for studying in a self-directed and autonomous manner
- To acquire the knowledge, abilities and skills required for develop an



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innovative and high quality research in Pharmacology

Transverse

- Ability to develop a self-teaching plan and to perform an independent bibliographical or database reference in scientific, technical, or regulatory sources
- Ability to perform a correct scientific or technical speech, both to an specialized environment or to general public, including the academic one

Specific

- To know the main therapeutic targets in cardiovascular and nervous system diseases, analyzing its physiological significance and therapeutic possibilities
- To identify new potential therapeutic targets, both in cardiovascular and nervous system diseases, analyzing its biological significance and therapeutic possibilities
To know the more widely used techniques and research experimental models, both in Cardiovascular Pharmacology and Psychoneuropharmacology
- To design and develop research plans in Pharmacology

The course is exposing, in a clear and well organized manner, the molecular, cellular, and physiological aspects of the vascular wall structure and function. Moreover, the specific circulatory characteristics in different organs and systems are exposed. The cellular and molecular pathophysiological mechanisms responsible for vascular damage and repair are also presented. The mechanisms involved in the development of hypertension, atherosclerosis and other cardiovascular pathologies are explained, as well as the experimental approaches used in research, and the present and future possible therapeutic targets for its treatment. Furthermore, the vascular damage associated to diabetes mellitus and metabolic syndrome is explored, as well as the alterations related to specific vascular beds. On the other hand, there is a review of the mechanisms involved in the development of cardiac failure, arrhythmias, and ischaemic cardiopathy. The experimental approaches used in research and the possible present and future therapeutic targets will be studied. Moreover, new therapeutic approaches in cardiac disease will be critically exposed and analysed, including its biological basis, cellular and molecular mechanisms, and future perspectives.



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1.12. Course contents

PROGRAM

1. Introduction to cardiovascular diseases

- 1.1. Cardiovascular diseases: definition, risk factors, and classification
- 1.2. Epidemiology, morbidity, mortality and prevention of cardiovascular diseases

2. Structure of the vascular wall

- 2.1. Cell types and structure of the vascular wall
- 2.2. Vascular remodelling

3. Regulation of the vascular tone

- 3.1. Acoplamiento excitación-contracción del músculo liso vascular / Excitation-contraction coupling in vascular smooth muscle
- 3.2. Hormone regulation of vascular tone
- 3.3. Endotelial function and vascular disease
- 3.4. Prostanoids and vascular function
- 3.5. Endothelins

4. Mecanismos de daño y regeneración vascular

- 4.1. Vascular ageing. Mechanisms of vascular senescence
- 4.2. Stem cells and vascular disease
- 4.3. Vascular function in congenital diseases
- 4.4. Vascular alterations in children
- 4.5. of the ischemia-reperfusion processes
- 4.6. Mechanisms of vascular fibrosis

5. Atherosclerosis

- 5.1. Development of atherosclerotic plaque and clinical consequences: coronary and cerebrovascular disease
- 5.2. Therapeutic strategies in atherosclerosis
- 5.3. Postprandial metabolism in atherosclerosis
- 5.4. Biomarkers for vascular risk
- 5.5. Macrophages and atherosclerosis
- 5.6. Anti-inflammatory therapies in atherosclerosis
- 5.7. Alternatives to pharmacological treatment in atherosclerosis
- 5.8. New experimental approaches for atherosclerotic research
- 5.9. New proteomic techniques in atherosclerosis



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6. Metabolismo y enfermedad vascular

- 6.1. Glucose and inflammation in diabetic vasculopathy
- 6.2. Cardiac estheatosis and apoptosis in diabetes
- 6.3. Diabetic retinopathy
- 6.4. Pathophysiology of obesity
- 6.5. Adipokines and vascular disease
- 6.6. Influence of perivascular fat in the vascular wall

7. Hypertensive vasculopathy

- 7.1. Pathophysiology of high blood pressure (HBP)
- 7.2. Kidney and HBP
- 7.3. New aspects of the renin-angiotensin system
- 7.4. Therapeutic strategies for HBP
- 7.5. Reactive oxygen species and HBP

8. Alterations in specific vascular beds

- 8.1. Mechanisms of aneurysm formation and development
- 8.2. Lung hypertension
- 8.3. Septic shock
- 8.4. Therapeutic approaches of erectile dysfunction.

9. Cardiac arrhythmias

- 9.1. Cardiac ionic channels
- 9.2. Mechanism responsible for the genesis of cardiac arrhythmias
- 9.3. New atrial selective antiarrhythmic agents

10. Ischaemic heart disease

- 10.1. Treatment of acute coronary syndromes
- 10.2. / New anti-angina drugs

11. Heart failure

- 11.1. Cardiac Remodelling: dilatation, hypertrophy, fibrosis and inflammation. Underlying mechanisms
- 11.2. New inotropic drugs
- 11.3. New drugs for heart failure: erythropoietin, iron, statins, nitric oxide, sildenafil, endothelin receptor antagonists, cytokine inhibitors, modulation of ventricular remodelling, relaxin

12. Nuevas estrategias terapéuticas en patología cardiovascular



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- 12.1. Cardiovascular cronopharmacology
- 12.2. New strategies in heart failure: stem cells

This program can experience variations when new professors are invited.

1.13. Course bibliography

Bibliographic references will be original research works or recent reviews, distributed by the teachers or obtained by the students after the corresponding search in PubMed

2. Teaching methodology

RESEARCH LECTURES

Lectures will provide organized and structured information elaborated by the teacher. The lecture content will include an initial review of the topic followed by the exposition of the teacher's own research work. The content will be research in course and will include original papers and relevant reviews. Lectures will take 50 minutes, with an additional time for discussion with the students. Different teaching methodologies will be used, such as visual presentations that can be available in the teaching web page.

3. Student workload

		Nº de horas	Porcentaje
	Research topics	40 h	40,0%
	Test about the contents	2 h	
	Poster presentations	3 h	
	Oral presentations	5 h	
Independent study time	Weekly study (5 hours x 3 weeks)	20 h	60.0 %
	Reading and analysis of scientific papers (10 hours x 3 weeks)	30 h	
	Preparation of presentations	25 h	
Total student workload: 25 hours x 5 ECTS		125 h	



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4. Evaluation procedures and weight of components in the final grade

The evaluation will include two main components. First, continuous evaluation will attend assistance and the active participation in the academic activities (10% of the final mark). The second part of the evaluation will result from: (1) answering the questions related to the theoretical classes (10%); (2) evaluation of the preparation, presentation and defence of a scientific manuscript related to cardiovascular pharmacology presented in a poster (30%); and (3) evaluation of the preparation, presentation and defence of a scientific manuscript related to cardiovascular pharmacology presented orally (50%). The mark for continuous evaluation will be maintained in the extraordinary evaluation.

5. Course calendar

El cronograma se indicará en la página web / Timetable will be indicated in the website:
https://www.uam.es/ss/Satellite/Medicina/es/1242667165286/subhome/Master_Universitario_en_Investigacion_Farmacologica.htm