VNIVERSITAT ĬD VALÈNCIA

COURSE DATA

Data Subject

Code	43089
Name	Pathophysiology of azheimer's disease
Cycle	Master's degree
ECTS Credits	3.0
Academic year	2022 - 2023

Study (s)

Degree	Center	Acad. year	Period
2141 - M.U. en Fisiología 12-V.2	Faculty of Medicine and Odontology	1	First term

Subject-matter

Degree	Subject-matter	Character
2141 - M.U. en Fisiología 12-V.2	4 - Optional subject	Optional

Coordination

Name	Department
LLORET ALCAÑIZ, ANA	190 - Physiology
VIÑA RIBES, JOSE	190 - Physiology

SUMMARY

This Master's course studies the behaviour of physiological systems and their regulatory mechanisms related to the physiopathology of Alzheimer's disease.

Alzheimer's disease is currently considered the main cause of dementia in the world. According to the latest data, the prevalence of the disease is between 640,000 and 770,000 cases in Spain, and this number is expected to quadruple in the next 50 years due to the aging of the population. Therefore, it has become the most important social and health problem in developed and developing countries. In this way, trying to develop preventive models for the disease, knowing its physiopathology better and at the same time seeking an effective treatment to improve the living conditions of patients with this disease has become a priority objective of world research. Thus, this course studies the basic and clinical mechanisms of Alzheimer's disease. Furthermore, thanks to this course we have the opportunity to introduce the study of brain neurophysiology.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

It is recommended to have taken the subjects of Physiology, Biology or Pathophysiology.

OUTCOMES

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-   Students should apply acquired knowledge to solve problems in unfamiliar contexts within their field of study, including multidisciplinary scenarios.

-   Students should be able to integrate knowledge and address the complexity of making informed judgments based on incomplete or limited information, including reflections on the social and ethical responsibilities associated with the application of their knowledge and judgments.

-   Students should communicate conclusions and underlying knowledge clearly and unambiguously to both specialized and non-specialized audiences.

-   Students should demonstrate self-directed learning skills for continued academic growth.

-   Students should possess and understand foundational knowledge that enables original thinking and research in the field.

-   Have a proactive attitude towards possible changes that may occur in their professional and/or investigative work.

-   Know how to write and prepare presentations to present and defend them later.

-   To prepare a clear and concise memory of the results of your work and the conclusions obtained.

-   Use the different exhibition techniques oral, written, presentations, panels, etc., to communicate the knowledge, proposals and positions.

-   To acquire a critical attitude that allows you to make reasoned judgments and defend them with rigor and tolerance.

-   Search, order, analyze and synthesize scientific information (databases, scientific articles, bibliographic repertoires), selecting the pertinent to focus current knowledge on a topic of scientific interest in Physiology.

-   Assess the need to complete the scientific training, in languages, computer science, ethics, etc., attending conferences or courses and/or carrying out complementary activities, self-evaluating the contribution that the performance of these activities implies for their comprehensive training.

-   Describe the pathophysiological modifications of the functioning of the neural pathways associated with Alzheimer's disease and apply intervention strategies aimed at its treatment.

LEARNING OUTCOMES

- To demonstrate sufficient knowledge to understand and describe the functioning of neural pathways in the healthy human brain in relation to cognition, as well as their modifications associated with Alzheimer's disease.
- To know how preventive models for the disease are developed and how effective treatments are sought to improve the living conditions of patients with this disease.
- To know the different techniques for studying the altered neuronal mechanisms in Alzheimer's disease, both in experimental animals and in humans.
- To know the different techniques for the study of cognitive abilities both in experimental animals and in humans.
- To acquire the necessary skills to assess the physiological changes that occur during the development of Alzheimer's disease.
- To acquire skills for the development of intervention strategies aimed at the treatment of the physiopathological modifications that are produced during Alzheimer's disease.

DESCRIPTION OF CONTENTS

1. Introduction to the physiopathology of Alzheimer's disease

-Definition and types of dementia.
-Alzheimer's disease: discovery and main anatomopathological lesions.
-Symptoms: amnesia, aphasia, agnosia, and psychiatric disorders.
-Molecular aspects of Alzheimer's disease.
-Anatomy session of the areas affected in Alzheimer's disease.

2. Biomarkers in Alzheimer's disease session

-Diagnosis of Alzheimer's disease.
-Main biomarkers: in cerebrospinal fluid and imaging
-When does the disease really start? Role of biomarkers.
-Biomarkers in plasma.
-Biomarkers and treatments of the disease.

3. Neuropsychological exploration.

-Neuropsychological examination in Alzheimer's disease by the screening test
-Examination by specific memory and learning tests

4. Hypothesis of disease onset

-The disease onset hypotheses: The amyloid cascade hypothesis, the vascular hypothesis, oxidative stress, and other hypotheses.
-Neurogenesis and migration of nerve stem cells in AD
-Sleep disorders in Alzheimer's disease
-Practical session: Practical realization of electroencephalography.

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	18,00	100
Tutorials	2,00	100
Other activities	2,00	100
Attendance at events and external activities	12,00	0
Study and independent work	11,00	0
Readings supplementary material	5,00	0
Preparation of evaluation activities	11,00	0
Preparing lectures	3,00	0
Preparation of practical classes and problem	2,00	0
Resolution of case studies	10,00	0
TOTAL	76,00	

TEACHING METHODOLOGY

- The programmed subject will have a content divided into four blocks, which will be developed in a coordinated manner. In each block the theoretical content of the topics will be exposed through participative classes that will serve to fix the knowledge linked to the foreseen competences.
- Based on these theoretical classes, the teachers will propose to the students the realization of personal/group works that develop some of the most innovative sections of the agenda, for which they will have the support of the teacher in supervised seminars. In these seminars, students will be able to share with their classmates and with the teacher the doubts they find, obtain solutions to them and start performing the module's competences by themselves.
- In addition, the students will have to develop a personal work of study and assimilation of the theoretical and practical knowledge and preparation of the proposed works, to reach the foreseen competences. They will have to respond to this, presenting their work to the teacher and other colleagues and then commenting on it in a personal tutorial between student and teacher, as well as taking theoretical exams.

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EVALUATION

Evaluation system:

- Written exam consisting of development questions: evaluation up to 10 points.

Minimum passing grade: 5 points.

REFERENCES

Basic

- BRADY ST, SIEGEL GJ, ALBERS RW, PRICE DL. Basic Neurochemistry-Principles of Molecular, Cellular, and Medical Neurobiology. Eighth Edition; Elsevier Academic Press 2011.
- GUYTON AC, HALL JE. Tratado de Fisiología Médica. 12ª ed. Madrid. Ed. McGraw-Hill. 2011.
- KAUFMAN AND MCKEE. Essentials of Pathophysiology. 1ª Ed. 1997

Additional

- LLORET ANA. La enfermedad de ALzheimer ¿dónde nos encontramos? Editoral Aula Médica. 2020.
  - FELDMAN H. Atlas of Alzheimer's Disease. 1ª Edición. 2007.