



MODULE 3: NERVOUS SYSTEM DISEASES

Code: 43645

Type: Elective

Credits: 6 ECTS

Language: English

Module's Coordinator: María José Pérez García, PhD

✉ maria.perez@vhir.org

Schedule for mentoring: Monday from 10:00 to 12:00h

*Although having this timetable proposal, the **students have to arrange an appointment with the teacher by e-mail.***

OBJECTIVES

The goal of the module is to provide the students the knowledge of the physiological and pathological mechanisms responsible in the development of psychiatric and neurological diseases.

In addition, the module aims to generate in the students a critical vision of problems and challenges that appear in this field and the approaches to overcome those issues.

SKILLS

E01. Identify and use the tools, techniques and methodologies of translational clinical research to solve problems in human health.

E01.14 Learn morphological, imaging, biochemical, genetic, molecular and cellular techniques used in neurological and psychiatric research.

E01.15 Learn the bases and methodologies that enable the identification and design of new therapeutic targets against neurological and psychiatric diseases.

E02. Use of modification techniques in living organisms (or part of them) to improve pharmaceutical and biotech processes or to develop new products.

E02.3 Apply cell and molecular biology techniques to produce diagnostic and therapeutic products for neurological and psychiatric diseases.

E03. Analyze the pathophysiology at the molecular level using the scientific method and identify its relationship with the clinical process of different diseases.

E03.3 Understand the basis that underlay the main neurological and psychiatric diseases from the point of view of epidemiology, physiopathology, clinics and diagnosis.

CONTENTS

Lesson 1. Introduction

- 1.1 Brain Neuroanatomy
- 1.2 Brain imaging techniques
- 1.3 Neuropathology (theory and practicum)

Lesson 2. Pheripheral Nervous System

- 2.1 Regeneration and plasticity of the nervous system

Lesson 3. Pheripheral Nervous System

- 3.1 Neuropathology (theory and practicum)

Lesson 4: Neurodegenerative diseases

- 4.1 Alzheimer´s Disease
 - 4.1.1 Clinical aspects of Alzheimer´s diseases

- 4.1.2 Biomarkers in Alzheimer's Disease
- 4.1.3 *In vivo* and *in vitro* models of Alzheimer's Disease
- 4.1.4 Apoptosis and Neuroinflammation in Alzheimer's Disease

4.2 Parkinson's Disease

- 4.2.1 Clinical aspects and current treatments for Parkinson Disease.
- 4.2.2 Parkinson's Disease: Molecular mechanism of neurodegeneration
- 4.2.3 Role of the lysosomal pathway in Parkinson's Disease
- 4.2.4 Biomarkers in Parkinson's disease

Lesson 5. Mitochondrial diseases

- 5.1 Leigh syndrome due to mitochondrial disorders in children
- 5.2 Mitochondrial diseases I
- 5.3 Mitochondrial diseases II
- 5.4 Mitochondrial diseases III. Experimental models

Lesson 6. Psychiatric diseases

- 6.1 Understanding ADHD across lifespan
- 6.2 Autism
- 6.3 An overview of approaches to study the genetics and epigenetics of psychiatric

Lesson 7. Neuromuscular diseases

- 7.1 Myasthenia Gravis and related disorders
- 7.2 Duchenne muscular dystrophy and Spinal Muscular Atrophy: Novel therapeutic options.
- 7.3 McArdle Disease and other glycogen storage diseases

Lesson 8. Neurovascular diseases

- 8.1 Stroke physiopathology, diagnosis and treatment
- 8.2 Experimental models of ischemic stroke
- 8.3 Intracranial hemorrhage: Etiology and pathophysiology
- 8.4 What is the process of neurorehabilitation? What scientific evidence is there?

Lesson 9. Neuroimmunological diseases

- 9.1 Role of environmental factors, Epstein-barr virus and vitamin D in Multiple Sclerosis
- 9.2 Genetics of Multiple Sclerosis
- 9.3 Clinical and diagnostic aspects of Multiple Sclerosis.
- 9.4 Overview drugs currently registered for Multiple Sclerosis

Lesson 10. Paroxysmal diseases

- 10.1 Childhood onset paroxysmal and hyperkinetic movement disorders
- 10.2 Headache and Neuropathic pain

METHODOLOGY

Theoretical classes
Making reports/works
Autonomous study
Reading articles/reports of scientific interest
Presentation/ oral defense of works
Tutorials

EVALUATION

Theoretical exam	50%
Submission of reports/works	20%
Oral presentation	30%

Attending a minimum of 80% of the classes is required for taking the exam and passing the course.

TEACHING STAFF

Mar Henández Guillamon, PhD – mar.hernandez.guillamon@vhir.org
Principal Investigator in Neurovascular Diseases Research Group. VHIR.

Marta Martínez Vicente, PhD – marta.martinez@vhir.org
Principal Investigator in Neurodegenerative Diseases Research Group. VHIR.

Maria José Pérez García, PhD – maria.perez@vhir.org
Principal Investigator in Cell Signaling and Apoptosis Research Group. VHIR.

Tomàs Pinós Figueras, PhD - tomas.pinos@vhir.org
Postdoctoral researcher in Neuromuscular and Mitochondrial Pathology Research Group. VHIR.

ACADEMIC SCHEDULE

Dates: from 19th October to 4th November 2021.

Exam date: 24th, 25th, and 26th November, from 9 to 11 am.

[See the Master's Degree Schedule for academic year 2020-2021](#)

Classroom:

Please, check the information board at the Academic Office of the Teaching Pavilion in order to confirm the classroom before the class starts.