

Academic Year/course: 2021/22

## 68409 - Morphology. Development. Biology

### Syllabus Information

**Academic Year:** 2021/22

**Subject:** 68409 - Morphology. Development. Biology

**Faculty / School:** 104 - Facultad de Medicina

**Degree:** 530 - Master's in Introduction to Medical Research

**ECTS:** 5.0

**Year:** 1

**Semester:** Second semester

**Subject Type:** Optional

**Module:**

## 1. General information

### 1.1. Aims of the course

The subject and its expected results respond to the following approaches and objectives:

1. To know cellular mechanisms of regeneration.
2. To analyse the processes of neurogenesis and neurodegeneration in central and enteric nervous system (CNS and ENS, respectively) models.
3. To Learn about in-vitro technologies that allow to better understand the progression of brain tumors.
- 3.-To Know the basic phenomena that lead to model the external appearance of the embryo and the fetus.
  - To know scientifically the failures of development mechanisms and to interpret their consequences.
  - To understand the successive states of prenatal development of the human being.

### 1.2. Context and importance of this course in the degree

1. Short introduction about the concept of Regenerative Medicine: assessment of stem cells and the relevance of neurogenesis.

Introduction to lab techniques for identification of cellular components of nervous system.

2. Relevance of the microenvironment for tumor progression and its ability to respond to different treatments.
3. With the previous training favor the creation of attitudes in the application of the different approaches that provides structure and development.

### 1.3. Recommendations to take this course

It is an optional subject of the second semester of the Master, which aims to introduce the st

Mandatory attendance of at least 50% of the exhibition sessions.

## 2. Learning goals

### 2.1. Competences

By passing the subject, the student will be more competent to ...

1. Understand the process of neurogenesis through the knowledge of Regenerative Medicine and neurodegenerative pathologies.
2. Understand the relevance of the tissue microenvironment in the tumorigenic processes of the central nervous system.
- 3.- Select, order and hierarchize the embryological and anatomical knowledge to obtain a scientific, complete and integrated vision of the healthy human being.

### 2.2. Learning goals

The student must be able to:

- 1.- Analyze the processes of neurogenesis.
- 2.- Describe the tissue repair processes. Assess the importance of stem cells in neurogenesis processes.
- 3.- Identify the different structures of the nervous system using morphological techniques.
- 4.- Identify relevant characteristics of the microenvironment to take into account in diseases of the nervous tissue.
- 5.- Know the embryonic development. Organogenesis, growth, maturation and cranio-facial aging.
- 6.- Prepare a work within the contents related to the subject to present it in writing

### 2.3. Importance of learning goals

The student, to overcome this subject, must demonstrate the following results ...

1.- The learning will allow students to know:

- new techniques that are very useful in current biomedical research and will give them tools to analyze, in a critical spirit, the relevant micro-environmental aspects in the development and progression of the disease in which they are investigating.
- how to interpret current scientific and informational nature on Regenerative Medicine and Neurodegenerative Pathologies.

2.- The work done during the course of this subject is very useful for their training as doctors, researchers and even teachers, as they must exercise in the tasks that are inherent to these professions. In addition, the student will learn some useful new information to face their subsequent professional training.

3.- It will also facilitate the proper use of the sources of knowledge (natural, bibliographic, documentary) necessary in Embryology and Human Anatomy for its application.

## 3. Assessment (1st and 2nd call)

### 3.1. Assessment tasks (description of tasks, marking system and assessment criteria)

The student must demonstrate that he has achieved learning outcomes in the following assessment activities

**Participation:** It will be related to the degree of assistance and collaborative/cooperative attitude during the development of the sessions. Mandatory attendance of at least 50% of the exhibition sessions.

**Guided work:** Critical analysis of a Topic in relation to one of the blocks selected from among all those offered, which will be

indicated by the teachers involved in its supervision.

The final written report of the work carried out and delivered in paper format on the last day of class of the subject will be evaluated. In addition, the work preparation process and oral and public presentation can be assessed. (5 minute communication) made on the last day of class.

**Final exam:** Test-type exercise on the conceptual, methodological or technical problems of the subject's Program. It will consist of 15 multiple choice test questions with only one valid answer (correct question 1 point, wrong question is discounted 0.25 points). To overcome it, you must get a 5.

The qualification will be obtained from the result of combining the following parameters: Active classroom participation (30%); Directed Work (30%); Final objective test (40%).

The qualification will be made in numerical scale of 0 to 10, with expression of a decimal, to which the corresponding qualitative qualification can be added: 0 - 4,9 Suspended. 5.9-6.9 Approved. 7.0-8.9 Noteworthy. 9.0-10 Outstanding.

## 4. Methodology, learning tasks, syllabus and resources

### 4.1. Methodological overview

The learning process that has been designed for this subject is based on the following:

The course has a fundamental theoretical / practical orientation and also has a part of autonomous work by the student. Based on brief theoretical expositions, discussion of aspects of the different topics that are developed in the course period, reading of recommended material and preparation of reports or works

### 4.2. Learning tasks

- The course includes the following learning tasks: Face-to-face classes, Directed work, ADD, Bibliography, Tutoring.
  - Lectures. Each topic included in the course syllabus will be presented, analyzed and discussed.
  - Guided assignments on proposed topics. They should include the following points: objectives, general methodology, analysis of results and personal assessment.
  - Bibliography and ADD (virtual platform). A wide range of sources available upon request of the student, which serve as guidance during the preparation of the task.
  - Tutorials for students whenever they needed in the agreed times.

If the health alert situation persists, the methodologies will be adapted to the online modality.

### 4.3. Syllabus

The course will address the following topics:

#### Topic 1. Neurogenesis and neurodegeneration

- Tissue repair: stem cells, dedifferentiation / transdifferentiation
- Introduction to the techniques applied for research
- Application of morphological techniques in the laboratory

#### Topic 2. Engineering fabrics and microtecnologicas applications for the study of brain tumors

#### Topic 3. Morphogenesis, Teratogenesis in Human Development

- Cranio-facial development

### 4.4. Course planning and calendar

#### Timetable

Wednesday: January 12, 19 and 26. February 2, 9, 16 and 23.

Location: Room nº 4. Building B of the Faculty of Medicine. From 16 to 20 hours

#### Provisional course planning

Nervous System			
Presentation	12-01-22	16-20h	M.J.Luesma
Tissue repair; Desdiferenciación/transdifferentiation			
Techniques for the SNE-muscle study.	19-01-22	16-18h	M.J.Luesma

Engineering fabrics and microtecnologicas applications for the study of brain tumors.	26-01-22	16-20h	I. Ochoa
"	2-02-22	16-20h	I. Ochoa
"	9-02-22	16-20h	I. Ochoa

#### **Morphogenesis, Teratogenesis in Human Development**

Cranio-facial development	16-02-22	16-20h	M. Lahoz
Defense works / Final Exam			
Defense works / Final Exam	23-02-22	16-20h	M.J. Luesma

**Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course will be provided on the first day of class or please refer to the website <http://moodle2.unizar.es>**

#### **4.5. Bibliography and recommended resources**

MJF Barresi, SF Gilbert. Developmental Biology. 12 a ed. Oxford: Sinauer Associates Inc (Oxford University Press); 2019.

DL Stocum. Regenerative Biology and Medicine. San Diego:Elsevier; 2010.

KL Moore, TVN Persaud, MG Torchia. Embriología clínica. 10a ed. Madrid: Elsevier; 2016.

TW Sadler. Langman embriología médica. 13a ed. Barcelona: Wolters Kluwer; 2015.

I Martín-Lacave, T García-Caballero. Atlas de inmunohistoquímica. Caracterización de células, tejidos y órganos normales. Ediciones Díaz de Santos (edición electrónica); 2014.

M Piel, D Fletcher, J Doh. Microfluidics in Cell Biology: Part A: Microfluidics for Multicellular Systems. Microfluidics in cell biology Part A. 2018;146:2-259.