

Histology and General Physiology

Code: 101894
ECTS Credits: 6

Degree	Type	Year	Semester
2501230 Biomedical Sciences	OB	1	2

Contact

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Use of Languages

Principal working language: catalan (cat)
Some groups entirely in English: No
Some groups entirely in Catalan: No
Some groups entirely in Spanish: No

Teachers

Ignasi Roig Navarro

Prerequisites

No official prerequisites are defined for this subject. However, it is recommended that the student has acquired the basic knowledge and competences of the subjects corresponding to Cell Biology, Biochemistry and Molecular Biology, and Biophysics.

Objectives and Contextualisation

The subject *Histology and General physiology* is programmed during the second semester of the first course of the Degree of Biomedical Sciences and develops the knowledge of the basic principles of the function of cells and tissues of the human organism. The acquisition of the competences of this subject will allow the student to be well prepared to confront the study of the histology physiology of the different systems of the human body during the second course.

The general training objectives of the course are:

- Differentiate different types of tissues by their histological and functional characteristics.
- Identify the different cell types that constitute each tissue and describe its most important differential characteristics.
- To learn the basic mechanisms of body tissue operation.
- Use textbooks, atlases and specific Internet resources for the study of matter.
- Develop with ease in the management of the optical microscope and the study of histological preparations.
- To learn the electrophysiological techniques for evaluating the nervous and muscular system.

Unless the restrictions imposed by the health authorities require a prioritization or reduction of such content.

Competences

- Act with ethical responsibility and respect for fundamental rights and duties, diversity and democratic values.
- Make changes to methods and processes in the area of knowledge in order to provide innovative responses to society's needs and demands.
- Students must be capable of applying their knowledge to their work or vocation in a professional way and they should have building arguments and problem resolution skills within their area of study.
- Students must be capable of collecting and interpreting relevant data (usually within their area of study) in order to make statements that reflect social, scientific or ethical relevant issues.
- Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.
- Students must develop the necessary learning skills to undertake further training with a high degree of autonomy.
- Students must have and understand knowledge of an area of study built on the basis of general secondary education, and while it relies on some advanced textbooks it also includes some aspects coming from the forefront of its field of study.
- Take account of social, economic and environmental impacts when operating within one's own area of knowledge.
- Work as part of a group with members of other professions, understanding their viewpoint and establishing a constructive collaboration.

Learning Outcomes

1. Act with ethical responsibility and respect for fundamental rights and duties, diversity and democratic values.
2. Make changes to methods and processes in the area of knowledge in order to provide innovative responses to society's needs and demands.
3. Students must be capable of applying their knowledge to their work or vocation in a professional way and they should have building arguments and problem resolution skills within their area of study.
4. Students must be capable of collecting and interpreting relevant data (usually within their area of study) in order to make statements that reflect social, scientific or ethical relevant issues.
5. Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.
6. Students must develop the necessary learning skills to undertake further training with a high degree of autonomy.
7. Students must have and understand knowledge of an area of study built on the basis of general secondary education, and while it relies on some advanced textbooks it also includes some aspects coming from the forefront of its field of study.
8. Take account of social, economic and environmental impacts when operating within one's own area of knowledge.
9. Work as part of a group with members of other professions, understanding their viewpoint and establishing a constructive collaboration.

Content

GENERAL HISTOLOGY

CONCEPT OF TISSUE

- Cellular and extracellular components.
- Classification of animal tissues.

EPITHELIAL TISSUE

- Lining epithelia.

- Glandular epithelia.

CONJUNCTIVE TISSUE

- Extracellular matrix.
- Fibroblast and free cells.
- Varieties of connective tissue.

ADIPOSE TISSUE

- The adipocyte.
- Unilocular and multilocular adipose tissue.

CARTILAGINOUS TISSUE

- Cartilaginous matrix.
- Chondrocyte.
- Varieties of cartilaginous tissue.

BONE TISSUE

- Architectural organization of the bone.
- Bone matrix.
- Osteoblast-osteocyte. osteoclast.
- Varieties of bone tissue.

BLOOD

- Blood plasma and elements forms.

MUSCLE TISSUE

- Varieties of muscle tissue.
- Striated muscle fiber.
- Cardiac muscle fiber.
- Smooth muscle fiber.

NERVOUS TISSUE

- The neuron. axon flow.
- Interneuronal synapses.
- Neuroglia.

GENERAL PHYSIOLOGY

INTRODUCTION

- Basics of cell physiology
- Function of cellular compartments

IONIC TRANSPORT THROUGH THE CELL MEMBRANE Cell

- Concentrations in intracellular and extracellular medium ions
- Diffusion through the cell membrane. Ionic channels

PHYSIOLOGY OF CELLS EPITHELIAL CELLS

- Functional structure of the epithelium
- Epithelial Transport
- Physiology of the epithelial glands. Secretion mechanisms

ELECTRICAL CELLULAR PHENOMENA CELLULAR

- Transmembrane resting potential
- Local potential and excitability
- Action potential. Spread of action potential

SYNAPTIC TRANSMISSION

- Electric synapses.
- Chemical synapses. Synapses structure and function
- General characteristics of the chemical neurotransmission
- Postsynaptic Receptors. Postsynaptic potentials

MUSCLE EXCITATION AND CONTRACTION

- Functional organization of striated muscle fibers
- Electrical phenomena
- Mechanical phenomena
- Variations in muscle contractility
- Energetic muscle contraction
- Types of skeletal muscle fibers
- Contraction of smooth muscle fibers
- Contraction of skeletal muscle

AXONAL REGENERATION AFTER INJURIES TO THE NERVOUS SYSTEM

- Walleriana Degeneration
- Axonal regeneration in peripheral nervous system injuries
- Axonal regeneration in lesions of the central nervous system

Methodology

Lectures:

Systematic explanation of the subject topics, giving relevance to the most important concepts. The student acquires the basic scientific knowledge of the subject in theory classes, which will be complemented by self study of the themes of the subject program

Seminar Sessions:

Presentation and work on cases or problems of relevance for the learning of the subject. The knowledge acquired in the theory classes and in the personal study are applied to the resolution of practical cases that are posed in the seminars. Students work in small groups.

Tutorials

The tutorials will be done in a personalized way to the teacher's office (hours to be agreed). The tutorías aim to clarify concepts, to establish the acquired knowledge and to facilitate the study by the students. They can also be used to resolve doubts that students have about preparing the seminars.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Lectures	36	1.44	
Seminars	10	0.4	
Type: Supervised			
Individual tutorials	4	0.16	9
Type: Autonomous			
Resolution of problems	10	0.4	9
Study	70	2.8	
Work Elaboration	10	0.4	9

Assessment

Module: General Histology

The evaluation system is organized in two sections, each of which is evaluated independently and will be assigned a specific weight in the final grade of the module:

Written tests (80% of the final grade of the module). There will be a written test at the end of the contents of the General Histology program. Students who have obtained a grade lower than 4 (out of 10) in this test will not be able to weigh it with the mark obtained in the seminars and, therefore, will have to take the resit exam in the final maturity test.

Seminars (20% of the final grade of the module). Attendance at seminars is mandatory. In case of missing class due to unjustified cause there will be a penalty in the seminar note:

Absence 1 session = 20% reduction of the grade.

Absence 2 sessions = 40% reduction of the grade.

Absence ≥ 3 sessions = 80% reduction in grade.

Module: General Physiology

The evaluation system is organized into two sections, which evaluated individually and has a specific weight in the final grade of the module:

•Examination of objective tests of multiple and/or written responses

(85% of the final mark). Students who obtain a qualification lower than 5 (out of 10) in this test will not be able to weigh it with the grade obtained in the presentation of problems and cases and, therefore, they will have to perform the final maturity exam.

•Evaluation of the preparation and presentation of the problems and cases (activity evaluated via Moodle) (15% of the final mark)

Partial assessments will be made of the two modules of the course. In the case of failing a module of the subject, a final maturity test will be carried out of those failed modules.

It is necessary to obtain a qualification ≥ 5 in the two modules to pass the subject.

Repeaters will only be evaluated from the specific modules that did not pass.

This exemption will be maintained for a period of three enrolments.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Preparation and presentation of the problems and cases (Histology)	10	1	0.04	7, 6, 5, 3, 4, 9
Preparation and presentation of the problems and cases (Physiology)	7.5	3	0.12	7, 6, 5, 3, 4, 9
Theory exam (Histology)	40	4	0.16	1, 8, 2, 7, 6, 5, 3, 4, 9
Theory exam (Physiology)	42,5	2	0.08	1, 8, 2, 7, 6, 5, 3, 4, 9

Bibliography

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Software

No specific software is used