

**COURSE DATA****Data Subject**

Code	34443
Name	General histology
Cycle	Grade
ECTS Credits	4.5
Academic year	2022 - 2023

Study (s)

Degree	Center	Acad. year	Period
1204 - Degree in Medicine	Faculty of Medicine and Odontology	1	Second term

Subject-matter

Degree	Subject-matter	Character
1204 - Degree in Medicine	2 - Human anatomy II	Basic Training

Coordination

Name	Department
MARTIN DE LLANO, JOSÉ JAVIER	285 - Pathology

SUMMARY

The subject General Histology involves the study in depth of the basic tissues and their variants, in state of health, which form the human body, taking into account that in the subject of Special Histology, taught in the second course of the degree, the organization of these tissues that form the organs and systems in our organism is studied.

PREVIOUS KNOWLEDGE**Relationship to other subjects of the same degree**

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



Other requirements

Basic Cell Biology, Biochemistry, Physiology and Human Anatomy

COMPETENCES (RD 1393/2007) // LEARNING OUTCOMES (RD 822/2021)

1204 - Degree in Medicine

- Understand and recognise the structure and normal function of the human body, at the following levels: molecular, tissue, organic, and of systems, in each phase of human life and in both sexes.
- Understand and recognise the effects of growth, development and aging which affect individuals and their social environment.
- Know how to use the sources of clinical and biomedical information available, and value them critically in order to obtain, organise, interpret and communicate scientific and sanitary information.
- Know how to use IT in clinical, therapeutic and preventive activities, and those of research.
- In the professional practise, take a point of view which is critical, creative, constructive and research-oriented.
- Be able to formulate hypothesis, gather information and evaluate it critically in order to solve problems by following the scientific method.
- Establish a good interpersonal communication which may allow professionals show empathy and talk to the patients efficiently, as well as to their relatives, the media and other professionals.
- Organizar y planificar adecuadamente la carga de trabajo y el tiempo en las actividades profesionales.
- Capacidad para trabajar en equipo y para relacionarse con otras personas del mismo o distinto ámbito profesional.
- Criticism and self-criticism skills.
- Capacity for communicating with professional circles from other domains.
- Acknowledge diversity and multiculturality.
- Consideration of ethics as a fundamental value in the professional practise.
- Working capacity to function in an international context.
- Knows the cell structure and its function. Implication of biomolecules. Knows the metabolism, its regulation and metabolic integration.
- Knows the procedures in cell communication and the function of excitable cell membranes.
- Knows the procedures which take place in the cell cycle. Cell differentiation and proliferation.
- Knows the morphology, structure and function of skin, blood, organs and body systems: circulatory, digestive, locomotor, reproductive, excretory and respiratory systems; endocrine system, immune system, central and peripheral nervous systems.



- Knows the processes of growth, maturation and aging of the different organs and systems. Homeostasis. Adaptation to the environment.
- Handles material and the use of basic laboratory techniques.
- Recognises the morphology and structure of tissue, organs and systems through macroscopic and microscopic methods, and image techniques.

LEARNING OUTCOMES (RD 1393/2007) // NO CONTENT (RD 822/2021)

- Knowledge of the concepts and structural characteristics of the different types of tissue organisation in our organism: detailed study of basic tissues (epithelial, connective, muscular and nervous). Morphological analysis of all their variants.
- Capacity to identify at the level of images this theoretical knowledge of the tissue organization.
- Capacity to develop diagnosis abilities at the level of microscopy.

DESCRIPTION OF CONTENTS

1. THEORETICAL ISSUES

1. Histology: concept and methods of study. Concept classification and tissue differential morphological characters.
2. Epithelial tissue. Lining epithelium. Cytology of the lining epithelium.
3. Glandular epithelium. Exocrine and endocrine glands. Cytology of gland epithelium.
4. Connective tissue: cells and matrix.
5. Fibers of the connective tissue and basement membrane.
6. Classification and variants of the connective tissue. Adipose tissue.
7. Melanin pigmentary tissue. Cartilage.
8. Bone tissue. General structure. Cell component. Bone matrix. Mineralization.
9. Histologic types of bones. Laminar and non-laminar bone. Endosteum and periosteum.
10. Ossification. General characters.
11. Bone modeling and remodeling. Osteochondral complex and joint system.
12. Skeletal striated muscle tissue.
13. Heart striated muscle tissue. Smooth muscle tissue. Specialized variants.
14. Nervous tissue. Neuron. Neuronal soma and dendrites.
15. Axon. Synapse.
16. Glia of the nervous system.
17. Nerve fibre. Myelinated and unmyelinated fibres. Myelination.
18. Blood. Erythrocyte. Platelet.
19. Leukocytes: granulocytes and lymphocytes.
20. Monocyte-macrophage system.
21. Hematopoiesis.
22. Formation, renewal and ageing of the tissues. Tissue engineering.

**2. LABORATORY PRACTICES**

1. Lining and glandular epithelia.
2. Connective tissue.
3. Cartilaginous and bone tissues.
4. Muscle and nerve tissues.
5. Practical exam.

3. SEMINARS

1. Epithelial tissue. Lining and glandular epithelia.
2. Connective tissue. Non-modeled and modeled variants (cartilage and bone). Blood.
3. Muscle and nervous tissues.

4. SUPERVISED WORK GROUPS OF GUIDED DIAGNOSIS

Identification of histological structures in a collection of microphotographic images (light and electron microscope).

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	25,00	100
Laboratory practices	10,00	100
Seminars	6,00	100
Tutorials	4,00	100
Development of group work	10,00	0
Development of individual work	10,00	0
Study and independent work	14,00	0
Readings supplementary material	2,00	0
Preparation of evaluation activities	14,00	0
Preparing lectures	10,00	0
Preparation of practical classes and problem	7,50	0
TOTAL	112,50	

TEACHING METHODOLOGY



In this subject, 22.5 hours of theory lessons and 20 hours of practice lessons are combined. In the theory credits, the teacher exposes the contents, methods and techniques required for the development of the knowledge and skills that students must acquire. In the practice lessons, activities of laboratory of microscopy are carried out, where visualization of histological preparations of the different organs of our organism is performed. The training activities include the diagnosis of histological images, as well as the presentation of thematic seminars by the students, in order to develop the ability to work with new information, communication and bibliographic research technologies.

THEORY LESSONS

They consist of the explanation of a topic by the teacher for 50 to 55 minutes. Through these lessons, both verbal and iconographic information is provided to a large number of students, saving time and resources, emphasizing the important aspects of the subject and delving into the concepts of more difficult assimilation. In addition, in our discipline we can take advantage of the projection of histological images to try to make the students describe the images, thus facilitating their active participation. In order to make easier the follow-up of the speech during the lesson, the teacher can provide the students with a summary of the class, which is uploaded to Aula Virtual before the lesson.

PRACTICE LESSONS

The practices provide the students with direct contact with the reality of the discipline, allowing them to learn the basic histological techniques and applying and developing the knowledge acquired in theory teaching, thus being useful at the same time to reinforce it. In our discipline, practice teaching acquires a major importance, given the morphological character of our subject, which requires a great visual learning. Therefore, the visualization of microscopic preparations and the handling of microscopic images, illustrations, diagrams and/or photographs help to understand the subject just as it does the text of a book or the theory lesson.

Within the practice teaching, there are various activities carried out in this subject: microscopy practices, thematic seminars and supervised work groups, and guided diagnosis.

Microscopy practices

They constitute a teaching element of first order in our discipline since they allow the autonomous personal observation, although supervised, of the tissues and histological organs using the microscope. The microscopy practices are carried out in groups of 40 students, supervised by several teachers, which allows a more personalized and smoother teacher-student relationship. Each student has a microscope and a tray with the preparations that will be studied in each practice.



The teacher observes with the microscope the same preparation that the students will observe, and projects images of it, while explaining the characteristics and objectives of each histological preparation, providing the students with practical advice on how to approach them. Then the students observe the preparation in their microscope, consulting the teachers all the aspects that they consider, as well as the difficulties and curiosities that these preparations may cause them. Voluntarily (however, this might be assessed), students develop a personal notebook of practices, where they reflect their observations, considering the usefulness of the activity itself and the possible future use that can be made of this notebook as a complement to the theory lessons.

There are four microscopy practices, two-hours long each, which are carried out after the subject matter in each of the sessions has been exposed in the theory lessons.

Thematic seminars

The seminar is based on the presentation by a group of students (usually 4 or 5) of a topic which covers complementary aspects to the theory lessons and the practice lessons of microscopy, covering also subjects in which there has not been an in-depth study of the theory lessons, either a histological structure itself or considering modifications and normal variants of these structures.

Related to this last point, it is emphasized that they should search for information regarding possible age variations or, from the point of view of gender perspective, potential differences depending on the sex of the individual. In addition, they must dedicate a part of the presentation (about at least 20% of it) to presenting and explaining at least one research paper, published in a scientific journal in English, related to that histological structure or to tissue engineering studies performed on it. The structure of the seminars differs radically from the theory lessons, since the students are the speakers and therefore the active actors in the exchange of knowledge and, where appropriate, the discussion of what has been shown, always with the aim of stimulating participation and critical approaches. The students, as has been indicated previously, in groups of 4 or 5, prepare a topic related to the subject of study (proposed by the teachers) and expose it to their classmates and two teachers, who will assess it. In this practice activity, self-learning is fostered, as well as the ability to work in teams, the critical search for contrasted information, communication skills and the defense of ideas. Although tutored and guided by the teacher, the students are those who have the initiative.

The seminars are held in groups of 40 students (those who correspond to a group of practices) and are developed in three sessions of two hours each, in which 9 topics selected by the teachers from all the topic in the theory syllabus (3 in each session) are exposed, chosen in a balanced way considering the syllabus and the moment in which they should be both prepared and exposed. The presentation must be adjusted to 30 minutes, so that each student has an average of 6-7 minutes to present the part that he or she has prepared from the corresponding topic.

Apart from assessing the work done by each group of students (through an individual assessment of each of its components), the assessment of practice activities includes five questions related to the topics discussed in the thematic seminars.

*Supervised work group and guided diagnosis*

This practice work is developed in 3 sessions of 80 minutes each. In them, two different activities are carried out. The first one consists in supervising the groups with respect to the topic of the seminar that they will present, indicating them the aspects that they must address or look for information of, where they can find that information and how to select it, helping them realize that their task must really be a group work and not a sum of individual works, etc.

The second activity consists of a guided diagnosis of various histological images. The students are provided with a series of images in advance, which they must analyze and interpret based on the knowledge acquired in the theory lessons and the other practice activities, through searching and comparing them with images from books and histological atlases, etc. The histological images are obtained from preparations observed both with light and electron microscopy, with various staining techniques, both conventional and more specific, and immunohistochemistry, with the aim that the student can differentiate the different aspects of tissue structure and assess how the image obtained from the histological structure varies depending on the technique used for its preparation and observation. During the three sessions all the images are studied in depth, and they should preferably be described and analyzed by the students, since this activity should be a participatory one, which requires that the student performs, prior to the sessions, the analysis and study of them.

EVALUATION

The final mark will be established by the joint evaluation of activities and written and oral tests performed in relation to the theoretical and practical content. The content of the written test will be the same for all groups.

Theoretical assessment

It will be the 60% of the final mark. It will be done by a written test about the content of the theoretical program and it will aim to evaluate the acquisition of knowledge:

- 4 points: 40 multiple choice test (5 possible answers, 1 true/4 false). Assessment criteria: 0,1 points/right answer; 0,025 points will be subtracted by each wrong answer.
- 2 points: 4 written questions of limited extension. Assessment criteria: from 0 to 0,5 points/question.

Practical assessment

It will be the 40% of the final mark. It will be carried out by evaluating the observation and analysis of preparations and microscopic images, the presentation of thematic seminars and the continuous assessment of the participation on the different activities. The acquisition of skills related with the general and specific competencies will be valued:



- 1 point: recognition of 5 histological structures of the preparations studied in the practices of microscopy (0,2 points/structure), by a *compulsory* practical exam.
- Up to 1 point: exposition of a thematic seminar.
- Up to 0,5 points: continuous assessment by the elaboration of a laboratory notebook.
- 1 point: diagnosis of 20 structures from the microphotographic laminas (0,05 points/structure; 5 possible answers, 1 true/4 false). Assessment criteria: 0,05 points/right answer; 0,0125 points will be subtracted by each wrong answer.
- 0,5 points: resolution of 5 problems referring to the thematic seminars (0,1 point/problem; 5 possible answers, 1 true/4 false). Assessment criteria: 0,1 points/right answer; 0,025 points will be subtracted by each wrong answer.

The subject will be passed with a mark equal to or greater than 5, as long as it is achieved at least 3 points in the theoretical part and 2 points in the practical one.

To qualify for the Honors it is compulsory that the student has presented the laboratory notebook and that this one has been favorably qualified.

Attendance to practical sessions is mandatory. Unjustified non-attendance to more than 20% of the sessions will make it impossible to pass the course.

Students are reminded of the importance of carrying out evaluation surveys on all the teaching staff of the degree subjects.

REFERENCES

Basic

- PAWLINA W. Ross Histología. Texto y Atlas. Correlación con Biología Molecular y Celular (8ª edición). Editorial Wolters Kluwer, 2020.
- BRÜEL A, CHRISTENSEN EI, TRANUM-JENSEN J, QVORTRUP K, GENESER F. Geneser Histología (4ª edición). Editorial Médica Panamericana, 2015.
- WELSCH U. Sobotta Histología (3ª edición). Editorial Médica Panamericana, 2014.
- KIERSZENBAUM AL, TRES LL. Histología y Biología Celular (5ª edición). Editorial Elsevier, 2020.
- Recursos e-Salut: ClinicalKey Student. Elsevier (Scopus, ScienceDirect).
uv-es.libguides.com/RecursosSalut/BibliotecaSalut

Additional

- LIBROS DE CONSULTA:
 - GARTNER LP. Histología: Atlas en Color y Texto (7ª edición). Editorial Wolters Kluwer, 2018.
 - JUNQUEIRA LC, CARNEIRO J. Histología Básica: Texto y Atlas (12ª edición). Editorial Médica Panamericana, 2015.
 - LOWE JS, ANDERSON PG, ANDERSON SI. Stevens y Lowe Histología Humana (5ª edición). Editorial Elsevier España, 2020.
 - ROSS MH, PAWLINA W, BARNASH TA. Atlas de Histología Descriptiva. Editorial Médica



Panamericana, 2012.

- KÜHNEL W. Atlas Color de Citología e Histología (11ª edición). Editorial Médica Panamericana, 2005.
- VILLARO AC. Histología para estudiantes. Editorial Médica Panamericana, 2021.
- SHEEDLO HJ. USMLE Road Map para Histología. Editorial McGraw Hill, 2007.
- GARTNER LP. Biología Celular e Histología (serie Revisión de Temas) (8ª edición). Editorial Wolters Kluwer. 2020.
- YOUNG B, O'DOWD G, WOODFORD P. Wheater Histología funcional. Texto y atlas en color (6ª edición). Elsevier, 2014.
- MARTÍN-LACAVE I, UTRILLA J, FERNÁNDEZ-SANTOS JM, GARCIA-CABALLERO T. Atlas de Histología. Microscopía óptica y electrónica. Editorial Universidad de Sevilla, 2020.
- MARTÍN-LACAVE I, GARCÍA-CABALLERO T. Atlas de Inmunohistoquímica (ebook). Editorial Díaz de Santos, 2012.

- PÁGINAS WEB

- <http://www.histologyguide.com/>
- <http://histology.medicine.umich.edu/>
- <http://www.drjastrow.de/WAI/EM/EMAtlas.html>
- <http://www.facmed.unam.mx/deptos/biocetis/atlas2013A/>
- <https://www.histologia.uchile.cl/>
- <http://wzar.unizar.es/acad/histologia/>
- <https://mmegias.webs.uvigo.es/>
- <http://www.ujaen.es/investiga/atlas/>
- <https://www.proteinatlas.org/>
- HistoChanel: <https://www.youtube.com/channel/UC5hWcueyKssy2tVz1uOJW3Q>