COURSE DATA

DATA SUBJECT

Code: 34446
Name: Biology
Cycle: Undergraduate Studies
ECTS Credits: 6
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
1204 - Degree in Medicine	Facultat de Medicina i Odontologia	1	First quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
1204 - Degree in Medicine	Biology	BASIC

COORDINATION

MEGIAS VERICAT FRANCISCO JAVIER

SUMMARY

The goal of this subject is that the student deepen and enlarge the study of the cell as a fundamental unity of the living beings, where they are carried out and integrate unique vital functions and where the pathologies and the response of the living being to environment aggressions are reflected.

The cytological concepts that lay the structural foundations of the cells and their processes of proliferation and differentiation are studied, to make possible the integration with the molecular levels on the one hand and the tissue and organic levels on the other.

The knowledge, stances and scientific language acquired will provide the indispensable foundations to approach later on the clinical teachings that a general doctor must master.

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

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

OTHER REQUIREMENTS

Equivalent to Biology's programs 2nd high school.

COMPETENCES / LEARNING OUTCOMES

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Acknowledge diversity and multiculturality.

Be able to formulate hypothesis, gather information and evaluate it critically in order to solve problems by following the scientific method.

Capacity for communicating with professional circles from other domains.

Consideration of ethics as a fundamental value in the professional practise.

Criticism and self-criticism skills.

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.

In the professional practise, take a point of view which is critical, creative, constructive and research-oriented.

Know how to use IT in clinical, therapeutic and preventive activities, and those of research.

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.

Knows the mechanisms of information, expression and genetic regulation. Inheritance patterns.

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.

Proper organisation and planning of the workload and timing in professional activities.

Team-working skills and engaging with other people in the same line of work or different.

Understand and recognise the effects of growth, development and aging which affect individuals and their social environment.

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.

Working capacity to function in an international context.

DESCRIPTION OF CONTENTS

I. THEORY

1. Introduction. Concept of living being. Living beings functions. Structure of the living beings: molecular and cell levels.
2. Cell membrane: Morphology. Molecular organization. Fluency of lipids and proteins of the membrane.
3. Cell membrane: Differentiations. Junction complexes.
4. Cell membrane: Interaction with the environment. Adhesion molecules.
5. Cell membrane: Functions. Exocytosis and endocytosis. Receptor mediated endocytosis.
6. Endoplasmic reticulum. Ultra-structure. Molecular organization. Functions.
7. Golgi apparatus. Morphology. Functions. Vesicular transport. Biogenesis.
8. The lysosome: morphology. Functions. Biogenesis. Peroxisomes: functions. Biogenesis.
9. The mitochondrion. General characteristics. Ultra-structure. Functions. Biogenesis.
10. The cytoskeleton. Microtubules. Centriole. Cilium and flagellum. Molecular organization.
11. Actin filaments. Intermediate filaments.
12. Cytoskeleton functions. Regulation.
13. Cell nucleus in interphase I. Ultra-structure. Nuclear membrane. Chromatin.
14. Cell nucleus in interphase II. Nucleolus and ribosome. Biogenesis.
15. Metaphase Chromosome. General characteristics of the chromosomes. Structure. Molecular organization.
16. Interphase chromosome. Chromosome cycle.
17. The cell cycle. Phases. Control of the cell cycle. Cell populations.
18. Stem cells. Types and applications of stem cells.
19. Cell division. Mitosis-1.
20. Cell division. Mitosis-2.
21. Cell division. Meiosis-1.
22. Cell division. Meiosis-2. Genetic consequences of the meiosis.
23. The human genome. Sequences and transcripts. Molecular concept of gene.
24. Variability of the genetic material. Polymorphism. Mutation.
25. Record of genetic material. Reparation.
26. Genetic regulation in eukaryotes. Levels of regulation.
27. Transcriptional and post-transcriptional control.
28. Genetic engineering. Basic procedures of cloning. Applications.
29. Cell aging and death. Experiences of Hayflick. Apoptosis and necrosis.
30. Alterations in cellular compartments and structures and their relationship with disease.

II. PRACTICES

LABORATORY PRACTICES.

1. Foundation and use of optic microscope. Use of multimedia resources.
2. Adaptation techniques: coloration.
3. Cythochemistry techniques.
4. Cell types.
5. Cell culture.
6. Cell division: mitosis.
7. Electronic microscopy: Study and interpretation of images.
8. Sub-cellular structures recognition.

9. Sub-cellular structures recognition: Biopathology.
10. Review and presentation of the practices notebook.

COMPUTER PRACTICES.

1. Databases for the study of the human genome.

TUTORIALS.

1. Presentation of a work.

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Tutorials	4,00
Theory	33,00
Laboratory	21,00
Computer classroom practice	2,00
Total hours	**60,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	20,00
Independent study and work	50,00
Preparation of lessons	15,00
Preparation for assessment activities	5,00
Resolution of case studies	0,00
Total hours	**90,00**

TEACHING METHODOLOGY

Theoretical Lessons: 30 master classes are taught with the participation of the student who understands the main aspects of the structure and function of the different cell compartments and of their integration in the biological behaviour of the human cell.

Laboratory Practical Lessons: students will have 10 practical sessions in the optic microscopes room, where students, individually, will learn the use of the microscope and its application to the study of the cell structure and function. Moreover, they will be taught the foundations of the electronic microscopy and the discrimination of the different organelles and cell elements observed in an ultra-structural level.

Computer Practical Lessons: 1 practical session is focused on the analysis of the human genome using the different databases and computer programs of public access available in the web.

Tutorials: students will fulfill an assigned and supervised work by the professor in charge about a topic included in the subject and will expose it through a presentation or using a poster.

The gender perspective, the respect for diversity, and the sustainable development goals (SDGs) will be incorporated into teaching, whenever possible.

EVALUATION

The final score will be determined through joint assessment of the activities and written tests as regards to theoretical and practical content. In order to pass the subject, students must pass both the theoretical and the practical evaluation.

Theoretical Assessment

60% of the final score. It will be done through a written test, which will consist of theoretical content, with the assessment of knowledge acquisition as an objective.

It will comprise 60 short-answer questions, with four options each one. Each wrong answer subtracts one third of the value of a correct answer.

The content in this test will be the same for all groups in the same subject.

Practical assessment: 40% of the final mark. It will be made by the assessment of the participation in the different activities:

Diagnoses of OM preparations (1 point)

Interpretation of TEM images (0.5 points)

Practices notebook (0.5 points)

Tutored work (1 point)

Practical exam: 5 short questions (1 point)

Additionally, additional activities related to the subject's content may be proposed on a voluntary basis, and up to 0.2 extra points may be awarded.

Final grade: it is necessary to pass the theoretical part and the practical part to pass the subject.

Attendance at practical activities is mandatory. The student is considered to meet this requirement if he or she has attended a minimum of 80% of these activities and has adequately justified the impossibility of attending the remaining sessions due to the occurrence of a cause of force majeure. It will be essential to comply with this requirement to pass the subject. Students are reminded of the importance of carrying out evaluation surveys on all the teaching staff of the degree subjects.

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REFERENCES

Basics

- Alberts, J., Lewis, R., Roberts, W. Biología molecular de la célula. Ed. Omega, 6ª edición.
- Calvo, A. Biología Celular Biomédica, 2ª edición. Elselvier
- Cooper, G.M. La célula. 8ª edición. Marbán.

RECURSOS e-Salut:
- ClinicalKey Student Medicina, Odontologia y Enfermería [https://uv-es.libguides.com/RecursosSalut]
- Acces Medicina [https://uv-es.libguides.com/Access_Medicina]
- Médica Panamericana [https://uv-es.libguides.com/Medica_Panamericana]