

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

Code	34697
Name	Biology
Cycle	Grade
ECTS Credits	6.0
Academic year	2017 - 2018

Study (s)

Degree	Center	Acad. year	Period
1206 - Degree in Dentistry	Faculty of Medicine and Odontology	1	First term

Subject-matter

Degree	Subject-matter	Character
1206 - Degree in Dentistry	2 - Biology	Basic Training

Coordination

Name	Department
BOIX FERRERO, JAVIER JOSE	285 - Pathology

SUMMARY**English version is not available**

La asignatura de Biología es una asignatura troncal de carácter semestral que se imparte en el primer curso de los estudios de Odontología. Esta asignatura está relacionada con otras del grado de Odontología como: Bioquímica, Fisiología, Histología y Anatomía Patológica.

Se pretende que el estudiante profundice y amplíe el estudio de la célula como unidad fundamental de los seres vivos, donde se llevan a cabo e integran las funciones vitales únicas y donde se reflejan las patologías y la respuesta del ser vivo ante las agresiones del ambiente. Se estudian los mecanismos genéticos básicos asociados a la dinámica celular y los conceptos citológicos que sientan las bases estructurales de la célula y sus procesos de proliferación y diferenciación, lo cual permitirá comprender los niveles superiores de organización del cuerpo humano.

Los conocimientos, aptitudes y lenguaje científico adquirido proporcionarán los cimientos imprescindibles para abordar posteriormente las enseñanzas clínicas que debe dominar un odontólogo



PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

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

Other requirements

OUTCOMES

1206 - Degree in Dentistry

- Comprensión conceptual necesarias para el estudio de la célula como unidad fundamental de los seres vivos.
- Conocimiento de donde se llevan a cabo e integran las funciones celulares y donde se refleja la respuesta del ser vivo ante los estímulos ambientales.
- Conocimiento de los conceptos citológicos que sienten las bases estructurales de la célula y sus procesos de proliferación y diferenciación para hacer posible la comprensión y estudio del nivel tisular subsiguiente.
- Adquisición de las habilidades metodológicas para el uso del microscopio y diagnóstico de estructuras celulares.
- Conocimiento de las tecnologías de la información y comunicación.
- Desarrollar la capacidad crítica y autocrítica en el planteamiento y resolución de problemas siguiendo el método científico.
- Adquirir la formación básica para la actividad investigadora en el campo de la Biología Celular.
- Capacidad de trabajo en equipo y desarrollo de habilidades en las relaciones personales .

LEARNING OUTCOMES

1. Knowledge of the structure and function of eukaryotic cells as the fundamental unit of life and their integration at different levels of organization of living beings.
2. Knowledge of the morphological and functional aspects of cellular organelles and the relationships established between them to ensure proper overall functioning of the cell to detect abnormalities that lead to diseases.
3. Knowledge of the intracellular filaments that allow the maintenance of cell shape and structure and its changes during motility.
4. Knowledge of the processes of proliferation and differentiation, to make possible the understanding and subsequent study of the tissue level.
5. Knowledge of basic genetic mechanisms that ensure the proper maintenance of the structure and cellular functions.
6. Knowledge of the variation, modification and repair of genetic information, and levels of regulation of



its expression.

7. Conceptual understanding of the general principles underlying the inheritance.
8. Acquisition of methodological skills for the use of optical microscope and the diagnosis of cellular structures obtained by electron microscopy.
9. Identification of human chromosomes and their alterations.
10. Recognition by light and electron microscopy, different cell types and organelles, as well as the normal and abnormal karyotypes.
11. Management of databases of specific genes and the pathology associated with them.
12. Acquisition of basic training for research in the field of Cell Biology

DESCRIPTION OF CONTENTS

1. Theoretical lessons (1)

1. Introduction. Concept of living being. Functions of living beings. Structure of living beings: cellular and molecular level. Prokaryotic and eukaryotic cells.
2. Cell membrane: Morphology. Molecular organization. Fluidity of cell membrane lipids and proteins.
3. Cell membrane. Differentiations. Cell junctions.
4. Cell membrane: Adhesion molecules. Exocytosis and endocytosis. Receptor-mediated endocytosis.
5. Endoplasmic reticulum. Ultrastructure. Molecular organization. Functions.
6. Golgi apparatus. Morphology. Functions. Vesicular transport. Biogenesis.
7. Lysosome: Morphology. Functions. Biogenesis. Peroxisomes: Functions. Biogenesis.
8. Mitochondria. General characteristics. Ultrastructure. Functions. Biogenesis.
9. Cytoskeleton. Microtubules. Centrioles. Cilia and flagella. Molecular organization.
10. Cytoskeleton. Contractile filaments. Intermediate filaments. Cytoskeleton functions.
11. The interphase nucleus. Ultrastructure. Nuclear envelope. Chromatin.
12. Nucleolus and ribosome: Structure. Function. Biogenesis.
13. General characteristics of chromosomes. Structure. Molecular organization. Chromosome cycle.
14. Cell division. General characteristics of mitosis. Methods of study. Phases of mitosis.
15. Cell division. Meiosis. Biological cycles. Phases of meiosis.



2. Theoretical lessons (2)

16. Genetic consequences of meiosis Comparison between mitosis and meiosis.
17. Gametogenesis. Spermatogenesis and oogenesis. Phases and morphology.
18. Fertilization. Characteristics of egg and sperm. Activation of the egg. Amphimixia. Anomalies of fertilization.
19. Cell cycle. Phases. Control of cell cycle.
20. Cell aging and cell death. Hayflick experiments. Apoptosis and necrosis. Morphology. Molecular basis.
21. The genome of living beings. General characteristics of procaryote and eukaryote genomes.
22. Genetic engineering. Basic procedures of gene cloning. Applications.
23. Variability of genetic material. Polimorphisms. Mutation.
24. Mendelian genetics. Historical introduction. Mendel's laws. Chromosome theory of heredity. Linkage and recombination.
25. Monogenic diseases. Autosomal transmission patterns. Autosomal dominant inheritance. Autosomal recessive inheritance.
26. X-linked inheritance. X-chromosome inactivation. Disease X-linked recessive.
27. Monogenetic diseases. Changes in transmission patterns. Modifying factors.
28. Study of the human karyotype. Determining the number of chromosomes. Methodology.
29. Medical cytogenetics. Numerical chromosomal abnormalities. Clinical phenotypes.
30. Medical cytogenetics. Structural chromosomal abnormalities. Deletion. Duplication. Isochromosome. Dicentric chromosomes. Inversion. Chromosomal translocation.

3. Practical lessons

PRACTICAL SESSIONS

Microscopy lab

1. Basis and use of the optical microscope.
2. Adaptation techniques: staining. Cytochemical techniques.
3. Cell types
4. Cell culture.
5. Cell division: mitosis
6. Gametogenesis



4.

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	33,00	100
Classroom practices	15,00	100
Laboratory practices	12,00	100
Development of individual work	15,00	0
Study and independent work	50,00	0
Readings supplementary material	5,00	0
Preparing lectures	9,00	0
Preparation of practical classes and problem	9,00	0
Resolution of case studies	2,00	0
TOTAL	150,00	

TEACHING METHODOLOGY**English version is not available****EVALUATION****English version is not available****REFERENCES****Basic**

- Alberts, Johnson, Lewis, Raff, Roberts, Walter. Biología Molecular de la Célula. Garland Science NY, 5ª edición
- Alberts, Johnson, Lewis, Raff, Roberts, Walter. Molecular Biology of the cell. Biología Molecular de la Célula. Garland Science NY, 6ª edición
- Thompson & Thompson. Genética en Medicina. Ed. Masson, 7ª edición
- Jorde, Carey, Bamshad. Genética Médica. Ed. Elsevier, 4ª edición



- Calvo, Alfonso. *Biología Celular Biomédica*. Editorial Elsevier, 2015

