

SUBJECT TEACHING GUIDE

440 - Molecular Bases of Cell Proliferation, Differentiation and Death

University Master's Degree in Molecular Biology and Biomedicine

Academic year 2024-2025

1. IDENTIFYING DATA					
Degree	University Master's Degree in Molecular Biology and Biomedicine			Type and Year	Optional. Year 1
Faculty	Faculty of Medicine				
Discipline	Optional Subjects Module				
Course unit title and code	440 - Molecular Bases of Cell Proliferation, Differentiation and Death				
Number of ECTS credits allocated	5	Term	Semester based (1)		
Web					
Language of instruction	English	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. BIOLOGIA MOLECULAR				
Name of lecturer	JAVIER LEON SERRANO				
E-mail	javier.leon@unican.es				
Office	Facultad de Medicina. Planta: + 1. DESPACHO (1080)				
Other lecturers	MARIA DOLORES DELGADO VILLAR JOSE PEDRO VAQUE DIEZ JUAN CARLOS ACOSTA COBACHO FERNANDO CALVO GONZALEZ BERTA CASAR MARTINEZ ANA HERRERO MIER IGNACIO VARELA EGOICHEAGA MAGDALENA MARIA FOLTMAN				

3.1 LEARNING OUTCOMES

- Knowledge of the molecular mechanisms controlling cells proliferation, differentiation and death through the study of the signal transduction pathways, the molecular bases of replication, mitosis, DNA repair, oncogenic transcription factors and pathways of apoptosis

4. OBJECTIVES

To acquire basic knowledge on the molecular biology of cells proliferation, differentiation and death as well as associated pathologies, with special focus on cancer.

6. SUBJECT PROGRAM

CONTENTS

1	<p>PART 1. CELL BIOLOGY OF THE CANCER CELL</p> <ul style="list-style-type: none"> -The nature of cancer -Signalling pathways -Ras-ERK signalling and antitumoral therapy -G1 phase control and replication -Molecular control of mitosis -Molecular mechanisms in cancer: oncogenes -Molecular mechanisms in cancer: suppressor genes -Genomic instability and DNA repair
2	<p>PART 2. MOLECULAR BIOLOGY OF THE CANCER CELL</p> <ul style="list-style-type: none"> -Molecular targets in cancer therapy -Regulation of gene expression and cancer -Epigenetics and cancer -Oncogenic transcription factors and hematologic tumors -Cancer genomics -Molecular mechanisms of stem cell differentiation -Molecular biology of invasion and metastasis -Apoptosis pathways and cancer
3	<p>First block of topics: CELL BIOLOGY OF THE CANCER CELL</p> <ul style="list-style-type: none"> -The nature of cancer. Properties of cancer cells. -Molecular mechanisms in cancer: oncogenes. -Signalling pathways. -Ras-ERK signalling and antitumoral therapy -G1 phase control and replication -Molecular control of mitosis -Molecular mechanisms in cancer: suppressor genes <p>Second block of topics: MOLECULAR BIOLOGY OF THE CANCER CELL</p> <ul style="list-style-type: none"> -Molecular targets in cancer therapy -Regulation of gene expression and cancer - Epigenetics and cancer -Oncogenic transcription factors -Hematologic tumors Cancer genomics -Molecular mechanisms of stem cell differentiation -Molecular biology of invasion and metastasis -Apoptosis pathways and cancer -Genomic instability and DNA repair <p>Basic techniques in Cell Culture</p>
4	<p>Tutorial, evaluation, autonomous learning</p>

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Attendance, participation of the student during the class, discussion of scientific articles	Others	No	Yes	40,00
Oral presentation	Oral Exam	No	Yes	40,00
Attendance to class: 40% Continued evaluation (tests per class): 20% Oral presentation of a topic proposed by teachers: 40%	Written exam	Yes	No	20,00
TOTAL				100,00
Observations				
Questions related with subjects and articles. Oral presentation.				
Observations for part-time students				
Questions related with subjects and articles. Oral presentation of poster.				

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC
Robert Weinberg . The Biology of Cancer ³ ª ed 2023 Editorial W.W .Norton Gelman, E.P. et al. Molecular Oncology. 2014. Cambridge University Press.