



Teaching Guide

Identifying Data				2014/15
Subject (*)	Regulación da expresión xénica	Code	610441006	
Study programme	Mestrado Universitario en Bioloxía Molecular , Celular e Xenética			
Descriptors				
Cycle	Period	Year	Type	Credits
Official Master's Degree	1st four-month period	First	Obligatoria	3
Language	SpanishEnglish			
Prerequisites				
Department	Bioloxía Celular e Molecular			
Coordinador	Cerdan Villanueva, Maria Esperanza	E-mail	esper.cerdan@udc.es	
Lecturers	Cerdan Villanueva, Maria Esperanza Freire Picos, María Ángeles	E-mail	esper.cerdan@udc.es maria.freirep@udc.es	
Web	ciencias.udc.es/bcm			
General description	Estúdanse os mecanismos de regulación da expresión xénica nuclear e citosólica así como as maquinarias celulares implicadas			

Study programme competences

Code	Study programme competences
A5	Skills of understanding the functioning of cells through the structural organization, biochemistry, gene expression and genetic variability.
A9	Skills of understanding the structure and dynamics of proteins to individual and proteomic level, as well as the techniques that are necessary to analyze them and to study their interactions with other biomolecules.
A11	Skills of understanding the structure, dynamics and evolution of genomes and to apply tools necessary to his study.
A13	Skills to understand, detect and analyze the genetic variation, knowing genotoxicity processes and methodologies for its evaluation, as well as carrying out diagnosis and genetic risk studies.
A15	Skills of using Biocomputer science tools at the level of user.
A18	Skills to become a professional in health, pharmacy, veterinary, animal production, biotechnology or food sectors
B1	Analysis skills to understand biological problems in connection with the Molecular and Cellular Biology and Genetics.
B3	Skills of decision making for the problem solving: that are able to apply theoretical knowledges and practical acquired in the formulation of biological problems and the looking for solutions.
B5	Correct oral and written communication on scientific topics in the native language and at least in another International diffusion language.
B6	Skills of team work: that are able to keep efficient interpersonal relationships in an interdisciplinary and international work context, with respect for the cultural diversity.
B8	Critical reasoning skills and ethical commitment with the society: sensitivity in front of bioethical problems and to the ones related to the natural resource conservation
B9	Skills of preparation, show and defense of a work.
C3	Skills of Using basic tools of the information technologies and communications (ICT) necessary to the exercise of his profession and for the apprenticeship over his life.
C6	Considering critically the knowledge, technologies and the available information to solve problems with which should face.
C7	Assuming as a professional and citizen the importance of the apprenticeship over the life.
C8	Considering the importance that the investigation has, the innovation and the technological development in the socioeconomic advance and cultural of the society.

Learning outcomes

Subject competencies (Learning outcomes)	Study programme competences



Skills of using Biocomputer science tools at the level of user	AR3	BR1	CC3
Skills of understanding the functioning of cells through the structural organization, biochemistry, gene expression and genetic variability	AR6	BR3	CC6
	AR8	BR5	CC7
Analysis skills to understand biological problems in connection with the Molecular and Cellular Biology and Genetics	AR9	BR6	CC8
Skills of understanding the functioning of cells through the structural organization, biochemistry, gene expression and genetic variability	AR11	BR8	
	AR13	BR9	
Skills of decision making for the problem solving: that are able to apply theoretical knowledges and practical acquired in the formulation of biological problems and the looking for solutions.			

Contents	
Topic	Sub-topic
Topic 1	Introduction to techniques and methodology to study the regulation of gene expression.
Topic 2	The transcriptional machinery in eukaryotes. Transcriptional general factors (TFII) and TAFs. The mediator complex and the complex SRB10 kinase.
Topic 3	The complexes that remodel chromatin. ATP-hydrolyzing complexes. SWI/SNF and ISWI complexes.
Topic 4	SAGA complex and counterparts. Acetylation and regulation of gene expression: HATs. The gene repression processes and deacetylation. The repression mechanisms of gene methylation.
Topic 5	Specific transcription factors. The signaling cascades and specific transcription factors. Nuclear receptors and transcriptional control.
Topic 6	New concepts in the regulation of gene expression. Transcription factories and other models.
Topic 7	RNA processing and nucleous-cytoplasm transport: the machinery of RNA cleavage and polyadenylation, transport across the Nuclear Pore Complex and factors involved. Cytosolic polyadenylation.
Topic 8	RNA secondary structures and protein-factors with RNA-binding domains in the regulation of mRNA levels. mRNA stability.
Topic 9	RNA and protein translation. Local protein translation. The 3'-UTRs in the translation efficiency process. RNA Editing.
Topic 10	micro and siRNAs in the regulation of Gene Expression: basic and applied aspects.

Planning			
Methodologies / tests	Ordinary class hours	Student's personal work hours	Total hours
Seminar	3	6	9
Laboratory practice	10	20	30
Guest lecture / keynote speech	10	14	24
Problem solving	3	6	9
Objective test	2	0	2
Personalized attention	1	0	1

(*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies	
Methodologies	Description
Seminar	The students will prepare a scientific presentation about a subject related to the mechanisms of gene expression regulation and will present it to the class. The presentation will be followed by a debate.



Laboratory practice	Experimental work in the laboratory about genetic engineering and gene expression analysis.
Guest lecture / keynote speech	Magister lectures about the principal topics of the learning program
Problem solving	Learning based on problem solving. The students will have to solve a problem with the aid of previous information about the subject.
Objective test	The exam will include questions based in multiple option selection and also problems. This will allow to modulate the final qualification of each student

Personalized attention

Methodologies	Description
Seminar Laboratory practice Problem solving	<p>Students will be oriented before and during the preparation of seminars and the development of the practical course. They will involve interpretation of results. The problems and case solving will also need an orientation from the teachers.</p> <p>Titotial schedules: Pfra. Esperanza Cerdán Tuesday, wednesday and Thursday from 13.00 to 15.00</p> <p>Pfra. M^a Angeles Freire Monday 13-15 or previous appointment by e-mail. Some doubts may also be solved directly by e-mail.</p>

Assessment

Methodologies	Description	Qualification
Seminar	<p>Students give their peers a seminar about sppecific aspects of work of other scientists on an issue related to regulation of gene expression.</p> <p>Half-presential students will have a specific activity combining the seminar contents and the problem solving</p> <p>Competencies to be assesed: A6 A8 B1 B3 B5 B6 B7 B9</p>	15
Laboratory practice	<p>The collection and management of information from databases and scientific suits available on the web. A practical case will be carried out by students.</p> <p>It will also be a laboratory session focussed on a transcriptional regulation experiment.</p> <p>Competencies to be assesed: A1 A2 A3 A8 B1 B3 B6 B7</p>	25
Guest lecture / keynote speech	<p>Although the theorethical knowledges will be taught and ellaborated in magister clases, we will take into consideration the assistance to the theorethical clases and the student's participation.</p>	10
Problem solving	<p>We will present problems on different subjects related with the gene expression regulation to verify if the students are able to use the infomation that was given to them, or other that they find, in order to solve them.</p> <p>Half-presential students will have a specific activity combining the seminar contents and the problem solving</p> <p>Competencies to be assesed: A6 A8 B1 B5 B8</p>	25
Objective test	<p>It will consist in an exam that may include multiple answer questions, or case solving and will allow to mudulate the student final evaluation note.</p> <p>Competencies to be assesed: A6 A8 A11</p>	25

Assessment comments

Half-presential students will have a specific activity combining the seminar contents and the problem solving (40%)

Sources of information

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Basic	<ul style="list-style-type: none">- Lodisch et al., (2005). Biología Molecular de la célula . Panamericana- Watson, Baker, Bell et al., (2006). Biología Molecular del Gen, 5º Ed. Panamericana- Lodish, Berk, et al (2013). Molecular and Cellular Biology 7th Ed. WH Freeman- Meister, G. (2011). RNA Biology. Wiley-VCH
Complementary	

Recommendations

Subjects that it is recommended to have taken before

Subjects that are recommended to be taken simultaneously

Técnicas Moleculares/610441002

Biología Celular Avanzada/610441003

Microbiología Molecular/610441010

Dinámica e Estructura de Proteínas/610441011

Bioinformática e Modelado de Biomoléculas/610441020

Subjects that continue the syllabus

Other comments

Is important that the students attend to the personal tutorials to solve doubts.

(*)The teaching guide is the document in which the URV publishes the information about all its courses. It is a public document and cannot be modified. Only in exceptional cases can it be revised by the competent agent or duly revised so that it is in line with current legislation.