



Universitat de Lleida

DEGREE CURRICULUM  
**MODEL ORGANISMS IN  
BIOMEDICINE**

Coordination: Enric Herrero

Academic year 2015-16

## Subject's general information

<b>Subject name</b>	Model Organisms in Biomedicine
<b>Code</b>	14703
<b>Semester</b>	First Semester
<b>Typology</b>	Optative
<b>ECTS credits</b>	4
<b>Groups</b>	1
<b>Theoretical credits</b>	3
<b>Practical credits</b>	1
<b>Coordination</b>	Enric Herrero
<b>Office and hour of attention</b>	Contact with professor
<b>Department</b>	Basic Medical Sciences / Experimental Medicine
<b>Teaching load distribution between lectures and independent student work</b>	40 hours on-site 60 hours autonomous work
<b>Modality</b>	Presencial
<b>Important information on data processing</b>	Consult <a href="#">this link</a> for more information.
<b>Language</b>	90% English 10% Catalan
<b>Degree</b>	Master in Biomedical Research
<b>Distribution of credits</b>	3 ECTS Theory 0,5 ECTS Problems 0,5 ECTS Seminars
<b>Office and hour of attention</b>	Contact with professor
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## Learning objectives

1. Knowledge of the biochemical and cellular basis of unicellular and multicellular organisms employed as biological models
2. Knowledge of the methodologies for the molecular, biochemical, cellular and genetic analyses in studies with model organisms
3. Knowledge of the signalling mechanisms which regulate the biological functions of model organisms, and their evolutionary conservation
4. Knowledge of the biomedical implications of the studies with model organisms, by establishing relationships between alterations in such model organisms and human pathophysiological alterations
5. Acquisition of the ability to analyse and communicate scientific information

## Competences

CB1 Acquire knowledge and understanding providing a basis or opportunity for originality in developing and / or applying ideas, often within a research context

CB3 Being able to integrate knowledge and handle complexity, and formulate judgments based on information that was incomplete or limited, including reflexion on social and ethical responsibilities linked to the application of their knowledge and judgments

CB4 Being able to communicate conclusions, and the knowledge and rationale underpinning these, to specialist and non-specialist audiences in a clear and unambiguous language

CB5 Possessing learning skills to enable them to continue studying in a way that will be largely self-directed or autonomous

CG1 Knowing how to select and apply different analytical methods at the molecular, biochemical, cellular, genetic and phenotypic level for the diagnosis and study of the diseases.

CG4 Capacity for critical thinking and creative with the own work and that of other researchers

CG5 Ability to acquire, process and interpret the results rigorously and applying appropriate technologies

CE1 Being able to recognize and value the importance of studies in various unicellular and multicellular organisms as experimental models which are essential to the advancement of Medicine and Biomedical Sciences

SC7 To identify the molecules and processes important in the functioning of cells and recognize the mechanisms of integration of external signals that regulate complex functions such as differentiation, proliferation and survival

CT1 Having a correct oral and written expression

CT2 Mastering a foreign language

CT4 Respect the fundamental rights of equality between men and women, to the promotion of human rights and the values of a culture of peace and democratic values

## Subject contents

### 1. *Saccharomyces cerevisiae* as model organism (12h classroom sessions)

- Cellular and molecular biology of *Saccharomyces cerevisiae*
- Mechanisms of genetic manipulation
- Genomic analyses in yeasts
- Signal transduction pathways and responses to stress
- Actin cytoskeleton and morphogenesis
- Redox regulation of cell functions
- Cellular homeostasis
- Control of cell cycle: comparative studies with higher eukaryotes

### 2. Chicken and mouse as model organisms (12h classroom sessions)

- Brain structure, basic functions and development in chicken and mouse
- Brain alterations related to human disorders and diseases
- Manipulating the mouse genome: applications in the study of the nervous system development, connectivity and disease
- Etiopathology and treatment of neurodegenerative diseases such as ELA: mouse and rat models

### 3. Other model organisms: *E. coli*, *C. elegans*, *D. melanogaster*, zebra fish (6h classroom sessions)

- Molecular biology and genetic manipulation
- Examples of studies with biomedical applications

## Methodology

El procés d'ensenyament-aprenentatge es durà a terme mitjançant:

- Classes magistrals
- Resolució de problemes
- Seminaris: treball individual de preparació i presentació d'un article científic
- Exposició oral

## Development plan

Activitat formativa:

Teoria: 30 hores amb 100% de presencialitat

Problemes: 5 hores amb 100% de presencialitat

Seminaris: 5 hores amb 100% de presencialitat

Treball autònom: 60 hores sense presencialitat

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## Evaluation

Avaluació continuada: assistència i participació. Ponderació del 20%

Prova oral: seminari impartit per l'alumne. Ponderació del 30%

Examen teòric. ponderació del 50%

## Bibliography

- Saccharomyces Genome Database ([www.yeastgenome.org](http://www.yeastgenome.org))
- Dickinson JR and Schweizer M (eds) The Metabolism and Molecular Physiology of Saccharomyces cerevisiae. CRC Press (2004)
- Encyclopedia of Neuroscience, 10 volume set (<http://www.sciencedirect.com/science/referenceworks/9780080450469>) Larry R. Squire (ed.) Elsevier Ltd. (2009). ISBN: 978-0-08-045046-9