



Universitat de Lleida

DEGREE CURRICULUM  
**ANIMAL EXPERIMENTATION**

Coordination: PIÑOL FELIS, MARIA CARMEN

Academic year 2017-18

## Subject's general information

|   |  |        |            |                  |
|---|--|--------|------------|------------------|
| <b>Subject name</b>   | ANIMAL EXPERIMENTATION   |        |            |                  |
| <b>Code</b>   | 14704  |        |            |                  |
| <b>Semester</b>   | 1st Q(SEMESTER) CONTINUED EVALUATION   |        |            |                  |
| <b>Typology</b>   | Degree   | Course | Typology   | Modality         |
|   | Master's Degree in Biomedical Research   | 1      | COMPULSORY | Attendance-based |
| <b>ECTS credits</b>   | 8  |        |            |                  |
| <b>Groups</b>   | 1GG  |        |            |                  |
| <b>Theoretical credits</b>  | 2.3  |        |            |                  |
| <b>Practical credits</b>  | 0  |        |            |                  |
| <b>Coordination</b>   | PIÑOL FELIS, MARIA CARMEN  |        |            |                  |
| <b>Department</b>   | CIENCIAS MEDIQUES BASIQUES, CIÈNCIA ANIMAL, MEDICINA, MEDICINA EXPERIMENTAL  |        |            |                  |
| <b>Teaching load distribution between lectures and independent student work</b> | Theory: ..... 40 hours (attendance required)<br>Laboratory Practices: .....24 hours(attendance required)<br>Mentored activities :.....<br>Computer Practices:.....<br>Autonomous tasks: .....120 hours (not attendance required)<br><br>TOTAL HOURS: 80 h attendance required +120 h attendance not required |        |            |                  |
| <b>Important information on data processing</b>                                 | Consult <a href="#">this link</a> for more information.  |        |            |                  |
| <b>Language</b>   | Catalan<br>Spanish<br>English  |        |            |                  |
| <b>Distribution of credits</b>  | Teoria: 2.3 crèdits Conchi+ xxx Carme<br>Pràctiques: XXXX Carme<br>Activitats tutelades: XXXX Carme  |        |            |                  |
| <b>Office and hour of attention</b>   | To be agreed between the student and the teacher   |        |            |                  |

| Teaching staff                | E-mail addresses           | Credits taught by teacher | Office and hour of attention |
|-------------------------------|----------------------------|---------------------------|------------------------------|
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## Subject's extra information

### COMPETENCES

CB2 Being able to apply the acquired knowledge and have the ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their field of study

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

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.

CG2 Knowing how to plan and execute a research project by following the scientific method and appropriate technology with high degree of initiative and commitment.

CG7 Being able to present scientific papers and scientific articles that may be considered for publication in international journals

CE5 Being able to describe the national and European legislation about animal experimentation and being able to develop an animal experimental procedure that can be favourably evaluated by the Animal Experimentation Ethics Committee

CE8 Being able to design and execute experiments on animals with the criterion of reducing the number of animals, minimizing the suffering and application of alternative techniques

CT1 Having a correct oral and written expression

CT3 Mastering ICT

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

## OBJECTIVES

1. Being able to design experiments involving experimentation animals, according to the minimal number criteria and reducing the pain inflicted to the animal to the minimum. Application of alternative techniques.
2. Knowing the Spanish and the European legislation
3. To elaborate an animal experimentation procedure eligible for positive evaluation by an Ethical Committee.
4. Getting to know new in vivo, non invasive, imaging systems and their applications.
5. Behavioral phenotyping of experimentation animals.
6. Genotyping and phenotyping of experimentation animal models by flow cytometry.
7. Designing experimental approaches using experimentation animals to study pathologies or physiological processes in Biomedicine.

## PROFESSORATE

### Coordinators:

Dr. Conchi Mora (e-mail: [conchi.mora@mex.udl.cat](mailto:conchi.mora@mex.udl.cat))

### Professorate:

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## SUBJECT CONTENTS

1. Animal Experimentation. Spanish and European Legislation. Protocol design and endpoint protocols. Monitoring pain during the course of the experiment. Alternative techniques. **(Theory, Seminars, Exercise: elaboration of a written protocol)**
2. Sanitary levels in animal experimentation husbandry. Fighting infections. Manipulation of Experimentation Animals to administer substances or to retrieve samples from them. Surgical procedures. Euthanasia **(Theory. Practical class)**
3. Genetic manipulation of experimentation animals. **(Theory. Practical class)**
4. In vivo, non invasive, imaging systems of experimentation animals. **(Theory)**
5. Behavioral phenotyping of animal models. **(Theory)**
6. Animal models for diverse human pathologies: immunopathologies, physiopathologies, methabolic pathologies. **(Theory)**
7. Genotyping and phenotyping experimentation animal models by flow cytometry. **(Theory. Practical class)**
8. Designing experimental approaches using experimentation animals to study pathologies or physiological processes in Biomedicine.**(Theory)**

## PRACTICAL AND SEMINAR PROGRAM

1. Protocol design and endpoint protocols **(elaboration of a written protocol)**
2. Manipulation of Experimentation Animals to administer substances or to retrieve samples from them. Surgical procedures. Euthanasia.
3. Genetic manipulation of experimentation animals
4. Genotyping and phenotyping experimentation animal models by flow cytometry.

- Seminars on animal experimentation applications and techniques.

## EVALUATION

Students will be evaluated according with their attendance to the theory and practical sessions, elaboration of written tests, exercises and quizzes, and, finally, a written final multi-choice- question examination .

| Evaluation criteria             | Overall pouding (%) |
|---------------------------------|---------------------|
| Attendance to classes           | 20                  |
| Tests, exercises, problems      | 30                  |
| Final tests (work, examination) | 50                  |

## BIBLIOGRAPHIC AND INTERNET RESOURCES

**Current Protocols in Cytometry.** J. Paul Robinson, Managing Editor (Purdue University Cytometry Laboratories); Zbigniew Darzynkiewicz (New York Medical College); Robert Hoffman (BD Biosciences); John Nolan (La Jolla Bioengineering Institute); Alberto Orfao (Universidad de Salamanca); Peter Rabinovitch (University of Washington); Simon Watkins (University of Pittsburgh); Past Editors: Phillip N. Dean, Jurek Dobrucki, Lynn G. Dressler, Carleton C. Stewart, Hans J. Tanke, Leon L. Wheelless . Wiley InterScience. 2010.

**Current protocols in Immunology.** John E. Coligan (Rockville, MD); Barbara Bierer (Brigham and Women's Hospital and Harvard Medical School); David H. Margulies (Bethesda, MD); Ethan M. Shevach (Bethesda, MD); Warren Strober (Bethesda, MD); Richard Coico (Temple University); Guest Editors: Patricia Brown (Frederick, Maryland); John C. Donovan (Wyeth Research); Past Editor: Ada Kruisbeek (Netherlands Research Institute) . Wiley InterScience. 2010.

**Manipulating the Mouse Embryo: A Laboratory Manual . Third edition.** Andras Nagy, *Samuel Lunenfeld Research Institute*; Marina Gertsenstein, *Samuel Lunenfeld Research Institute*; Kristina Vintersten, *European Molecular Biology Laboratory*; Richard Behringer, *University of Texas M.D. Anderson Cancer Center*. 2003. CLHS Press.

**FELASA Guidelines for the Accreditation of Health Monitoring Programmes and for Testing Laboratories involved in Health Monitoring.** W Nicklas . The Royal Society of Medicine Press Limited. 2009.

**In vivo imaging of light-emitting probes.** B.W.Rice, M.D. Cable. , M.B. Nelson, Xenogen Corporation. *J. Biomed. Opt.*, Vol. 6, 432 (2001).

**Behavioral phenotyping of transgenic and knockout mice: experimental design and evaluation of general health, sensory functions, motor abilities, and specific behavioral tests.** Jacqueline N. Crawley\* . *Brain research* 835: 18-26. 1999.

**Behavioral phenotyping strategies for mutant mice.** J.N. Crawley. *Neuron* 57: 809-818 . 2008.

P. Flecknell. **Anestesia de animales de laboratorio.** Academic Press Ltd: London. 2009.

JM. Zúñiga, J.A. Tur, S.N. Milocco, R. Piñeiro. **Ciencia y Tecnología en protección y experimentación animal.** McGraw-Hill Interamericana: Madrid. 2001.

**The Federation of European Laboratory Animal Science Associations** <http://www.felasa.eu/>

**European Centre for the Validation of Alternative Methods**

<http://ecvam.jrc.ec.europa.eu/>

**Laboratory Animals. The International Journal of Laboratory Animal Science and Welfare.**

**National Centre for the Replacement, Refinement and Reduction of Animals in Research**

<http://www.nc3rs.org.uk/>

**Guidelines for the use of animals in cancer research**

<http://www.norecopa.no/norecopa/vedlegg/9Tumour-guidelines.pdf>