

**Assisted Reproduction Techniques Applied to the  
Management of Laboratory Animal Strains**

Code: 103975  
ECTS Credits: 3

Degree	Type	Year	Semester
2502445 Veterinary Medicine	OT	5	0

### Contact

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### Use of Languages

Principal working language: catalan (cat)  
Some groups entirely in English: No  
Some groups entirely in Catalan: Yes  
Some groups entirely in Spanish: No

### Teachers

Manel López Béjar  
Josep Santaló Pedro

### Prerequisites

There are no prerequisites for taking this course. However, in order to ensure the proper the achievement of the learning aims, it is recommended that students have basic knowledge about reproductive technologies and techniques related to this discipline.

It is common to use sources of information in English and it is recommended that students have a good knowledge of this language.

### Objectives and Contextualisation

The aims are to provide students with updated knowledge of assisted reproduction methodologies and procedure

The main training objectives of the subject are:

- To know the techniques of assisted reproduction and the procedures of in vitro manipulation of gametes and embryos
- To understand the importance of the application of these technologies in the management of colonies and strains

### Competences

- Demonstrate generic knowledge of animals, their behaviour and the bases of their identification.

## Learning Outcomes

1. Describe the biological characteristics of the different species that are most frequently used in experimentation.

## Content

### Theoretical lessons

1. Introduction. Formation of gametes, fertilization and pre-implantation embryo development: an update
2. Reproduction of laboratory animals. Reproductive cycles in males. Reproductive cycles in females. Gestation
3. Techniques of assisted reproduction I. Superovulation. Scheduled crossings. Recovery of preimplantation embryos
4. Assisted reproduction techniques II. Artificial insemination. "In vitro" oocyte maturation. Sperm recovery. "In vitro" fertilization
5. Embryo transfer. Preparation of pseudopregnant females. Vasectomy of males. Embryo transfer procedures.
6. Cryopreservation. Characteristics of the freezing and thawing protocols. Vitrification. Cryopreservation of sperm
7. "In vitro" manipulation of preimplantation embryos. Preimplantation genetic characterization. Production of chimeras
8. Practical applications for the management of laboratory animal strains

### Practical lessons

Obtention and manipulation of gametes: superovulation, oocyte recovery epididymal sperm recovery.

Sperm capacitation

Obtention and "in vitro" culture of embryos.

Embryo manipulation: cloning by embryo blastomere isolation

Cryopreservation of gametes and embryos. Survival evaluation.

Surgical techniques: vasectomy, embryo transfer

Audiovisual tutorials

## Methodology

The subject "Tècniques de Reproducció Assistida aplicades a la gestió d'animals de laboratori" includes theoretical and practical lessons.

### Theoretical lessons

The content of the theory program will be mainly taught in the form of lectures with audiovisual support. The last topic of the program will consist in a case resolution. Presentations used by the teacher will be previously available on the UAB-Virtual Campus platform. It is highly recommended to use this material as a teaching support.

Although it is not essential to extend the content of the program, students are advised to use recommended bibliographic references to consolidate the knowledge of the subjects taught.

In addition to the attendance to the sessions, the follow-up of the subjects will imply active participation and self-learning from the student and to prepare several subjects of the program.

### Laboratory training

Practical classes are designed to acquire solid knowledge of the basic methodologies used in this field and intended to be a complement of the theoretical sessions. The students will attend 13 hours of training, distributed in 5 sessions. They will work in groups of 2 students and a questionnaire will be compiled during the lab sessions.

A syllabus of the sessions will be available on the Virtual Campus platform.

During the practical sessions, students must bring their own syllabus and their own lab coat. Students must complete the laboratory safety and biosecurity tests.

### Tutorships

Tutorship sessions will be scheduled on student's requests.

## Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Laboratory practical sessions	13	0.52	1
Lectures	12	0.48	1
Type: Supervised			
Tutorship	2	0.08	1
Type: Autonomous			
Study and self learning concepts	45	1.8	1

## Assessment

To pass the subject a weighted final grade equal to or greater than 5 points (out of 10) it will be needed. To pass the subject, attendance to the practical sessions is mandatory

### Examination of theoretical contents

The content of the theoretical part will be evaluated by a multiple-choice test. The note of this part corresponds to 50% of the final mark. The totality of the topics taught in the theoretical classes will be evaluated. A minimum score of 4 out of 10 in this examination is required to pass the course.

### Evaluation of practical sessions

The note of this part corresponds to 40% of the final mark. By the end of the laboratory practice sessions, students will need to have answered a questionnaire

Attendance to practical sessions is mandatory.

Resolution of supposition cases

The note of this part corresponds to 10% of the final. The objective of the activity is that the student integrates the knowledge acquired through the resolution of a supposition case. It will consist in the elaboration of a design to solve the case. The students will have to submit a written report developed on their own (1 to 3 students).

Retake exam

There will be a retake examination for those students who have not passed the theoretical contents exam or who have not attended the previous exam. The examination methodology may be different from the one used in previous evaluations.

A minimum score of 4 out of 10 in this examination is required to pass the course.

Non evaluable

Students who have not attend the theoretical exam, or the recovery exam, will be considered as "No evaluable"

Examination review

Exam revision will be by appointment with the teachers and on the dates suggested.

## Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Case report	10	0.5	0.02	1
Evaluation of laboratory sessions	40	1	0.04	1
Examination of theoretical sessions	50	1.5	0.06	1

## Bibliography

De Jonge C, Barratt C. (Eds). The sperm cell. Cambridge University Press. New York. 2006

Gardner D.K. et al. (Eds.). Textbook of assisted Reproductive Techniques. Martin Dunitz Pub. Hampshire. 2001.

Gupta S.K. et al. (Eds.) Gamete Biology. Emerging frontiers in Fertility and Contraceptive Development. Nottingham University Press. Nottingham. 2007.

Hafez B. and Hafez E.S.E. (Eds.).Reproduction in farm animals. 7th edition. Lippincott Williams and Wilkins. USA. 2000.

Johnson M.H. and Everitt B.J. (Eds.) Essential Reproduction. 5th Edition. Blackwell Science. Oxford. 2005.

Nagy A, Gertsenstein M, Vintersten K, Behringer R. Manipulating the mouse embryo (Third Edition). Cold Spring Harbor Laboratory Press. Cold Spring Harbor, New York. 2003.

Ruberte J, Carretero A, Navarro M. Morphological mouse phenotype: anatomy, histology and imaging. Editorial Medica Panamericana, S.A., Madrid, Spain (2017)

Reprinted edition published and distributed by Elsevier, Inc. in cooperation with Editorial Medica Panamericana (2017): <http://www.sciencedirect.com/science/book/9780128128053>.

Thibault C., Levasseur M.C., Hunter R.H.F. (Eds.) Reproduction in Mammals and Man. Ellipses, Paris. 1993.

Wolf D.P. and Zelinski-Wooten M. (Eds.). Assisted fertilization and nuclear transfer in mammals. Humana Press. New Jersey. USA. 2001.

Along the course, specific bibliography will be recommended for the preparation of sections of the syllabus by the students.

Reviews and updated papers will be recommended during the course.

Web links containing rigorous and up-to-date information will be suggested.