UAB
Universitat Autònoma de Barcelona

Reproduction-Associated Technology   2016/2017

Code: 42946
ECTS Credits: 12

Degree	Type	Year	Semester
4313782 Cytogenetics and Reproductive Biology	OT	0	1

Contact

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Teachers

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Cristina Camprubí Sánchez

Zaida Sarrate Navas

External teachers

Aïda Pujol

Carles Giménez

Mark Grossmann

Mireia Florensa

Use of languages

Principal working language: catalan (cat)

Prerequisites

The same prerequisites for being admitted to the Master

Objectives and Contextualisation

This is compulsory module within the specialization of Reproductive Biology. It is aimed to get deeper into the knowledge of the most common methodologies used in the assisted reproduction area.

The contents of this course are organized in three main blocs:

- Submodule 1. Genetic diagnostic methods in human gametes and embryos: This section is focused to describe the currently available cytogenetic and molecular methods to analyze human gametes and embryos. The usefulness of these techniques will be discussed according to their limitations and diagnostic goals. A glimpse about the future perspectives in this area will also be included.

- Submodule 2. Immunological causes of human infertility: This section would describe the causes that determine the appearance of immunological processes of human infertility.

- Submodule 3. Human and animal reproduction-associated Technologies: This section includes a description of the most used techniques either in human or animal reproduction, as well as the involved ethical and legal aspects.

Skills

- Communicate and justify conclusions clearly and unambiguously to both specialist and non-specialist audiences.
- Continue the learning process, to a large extent autonomously.
- Design experiments, analyse data and interpret findings.
- Identify the ethical dilemmas and apply current laws governing the area of knowledge of the master's degree.
- Integrate knowledge and use it to make judgements in complex situations, with incomplete information, while keeping in mind social and ethical responsibilities.
- Recognise the origin of infertility in humans in order to recommend the appropriate assisted reproduction treatment (Specialisation in Reproductive Biology).
- Solve problems in new or little-known situations within broader (or multidisciplinary) contexts related to the field of study.
- Use acquired knowledge as a basis for originality in the application of ideas, often in a research context.
- Use and manage bibliography or ICT resources in the master's programme, in one's first language and in English.

Learning outcomes

1. Apply current laws on reproductive biology.
2. Communicate and justify conclusions clearly and unambiguously to both specialist and non-specialist audiences.
3. Continue the learning process, to a large extent autonomously.
4. Design experiments, analyse data and interpret findings.
5. Identify and describe the cellular bases responsible for infertility processes in humans.
6. Identify the ethical dilemmas associated with reproductive biology techniques in the clinical field and the field of animal production.
7. Integrate knowledge and use it to make judgements in complex situations, with incomplete information, while keeping in mind social and ethical responsibilities.
8. Recognise genetic diagnosis techniques associated with assisted human reproduction laboratories.
9. Recognise techniques of assisted human reproduction and their indications.
10. Solve problems in new or little-known situations within broader (or multidisciplinary) contexts related to the field of study.
11. Use acquired knowledge as a basis for originality in the application of ideas, often in a research context.
12. Use and manage bibliography or ICT resources in the master's programme, in one's first language and in English.

Content

SUBMODULE 1: Genetic diagnostic methods in human gametes and embryos

1.1- Cytogenetic and molecular methodologies for human gametes analysis

- Cytogenetic and molecular methods for spermatocytes and testicular biopsy analysis. Diagnostic utility and limitations

    Classical approaches

    Immunofluorescence studies

    Fluorescence in situ hybridization (FISH) studies

- Cytogenetic and molecular methods for spermatozoa analysis. Diagnostic utility and limitations

    Chromosome-banding - Hamster test

    Sperm DNA Fragmentation

    Sperm FISH studies

        - FISH studies in reorganization carriers

        - FISH studies in carriers of numerical anomalies

        - FISH studies in infertile individuals with normal karyotype

- Cytogenetic and molecular methods for oocyte analysis. Diagnostic utility and limitations

Oocyte FISH studies

        - Aneuploidy detection

        - Structural chromosome anomalies detection

    Clinical cases

1.2- Cytogenetic and molecular methods for embryo analysis.

- General aspects of Preimplantational Genetic Diagnosis (DGP)
- DGP- techniques

1.3- New developments and future perspectives in the analysis of human gametes and embryos

- Transcriptome studies
- Methylomestudies

<spanstyle="text-decoration: underline;">SUBMÒDUL 2: <u>Immunological causes of human infertility</u>

2.1- Immunological infertility causes related to the male reproductive system

2.2- Immunological infertility causes related to the female reproductive system

<u>SUBMÒDUL 3:</u> <u>Human and animal reproduction-associated Technologies</u>

3.1- Human reproduction-associated Technologies

- Basic semen analysis
- Embryo transfer
- In vitro fertilization (IVF)
- Intracytoplasmic sperm injection (ICSI)
- Embryo assessment

3.2- Risks associated to Assisted Reproductive Tecnology (ART)

- Genetic risks in ART
- Epigenetic risks in ART

3.3- Freezing technologies

- Gonadal tissue freezing
- Gamete freezing
- Embryo freezing

3.4- Animal reproduction-associated Technologies

- Artificial insemination
- Embryo transfer
- In vitro embryo production
- In vivo embryo production
- Gamete and embryo Freezing
- Embryo commercialization
- Transgenesis
- Cloning: embryo splitting and nuclear transfer

3.5- Ethical and legal aspects of Assisted Reproductive Tecnology

- Legal aspects of the use of human embryos for research
- Ethical aspects of the use of human embryos for research

Methodology

This course will be taught mainly in the form of master classes by UAB professors and external collaborators with high expertise in the topics included program. Teachers will make available to the students the supplemental audiovisual material needed to complement their classes throughout the Virtual Campus.

In relation to specific contents of the module, students will be asked to actively participate in the class execution. These activities can consist in the elaboration of oral presentations based on specific research papers, the organization of debates to discuss particular aspects of the contents, the resolution of practical exercises...

Activities

Title	Hours	ECTS	Learning outcomes
Type: Directed			
Theoretical classes	66	2.64	1, 4, 6, 5, 10, 2, 7, 8, 9, 11
Type: Supervised			
Tutorial	46	1.84	1, 4, 6, 5, 10, 2, 7, 3, 8, 9, 11, 12
Type: Autonomous			
Individual study	184	7.36	3, 12

Evaluation

The evaluation of the module will be based on two aspects:

1-Class attendance

Attendance to the theoretical classes of this module is compulsory and accounts for the 30% of the final grade. Lack of justified* absences will represent a penalization according to the following criteria:

- Lack of assistance to 4-8 hours of class will imply a 5% reduction of the class attendance mark.

- Lack of assistance to 8-12 hours of class will imply a 25% reduction of the class attendance mark.

- Lack of assistance to 12-16 hours of class will imply a 50% reduction of the class attendance mark.

- Lack of assistance to >16 hours of class will imply failing the module

* ONLY will be considered as justified absences: illness, death of first-degree relatives, and accident UPON PRESENTATION OF PROOF

2- Theoretical contents

The contents of the three submodules will be evaluated separately. The contribution of each one of the obtained grades to the final mark of the module will be proportional to the weight of the contents: submodule 1 accounts for 30%, submodule 2 accounts for 10%, and submodul 3 accounts for 30%.

The contents of the submodule 1 (Genetic diagnostic methods in human gametes and embryos) and 3 (Human and animal reproduction-associated Technologies) will be evaluated by two separated partial tests. Each one of these tests will consist in a set of questions about the respective contents that the students will have to answer individually upon finalization of the corresponding submodule. The objective of these tests is not only to evaluatethe acquisition of the corresponding concepts by the students but also their ability to interrelate and integrate them.

The contents of the submodule 2 (Immunological causes of human infertility) will be evaluated through the orally presentation and discussion of some specific scientific papers. This set of papers will be provided to thestudents by the teachers responsible of the corresponding submodule.

Students will have to obtain a minimal qualification of ≥4 points (out of 10) as a weighted mean of the three theoretical evaluable parts (there is not a minimal grade specific for each submodule) in order to include this mark into of the final grade of the module (that is, to add it at the obtained assistance mark).

Summary of the evaluable activities:

EVALUABLE ACTIVITY	WEIGHT IN THE FINAL MARK	MINIMAL REQUIREMENTS
Class attendance	30%	>75% class attendance
Submodule 1 evaluation: partial test	30%	Minimal qualification of ≥4 points (out of 10) as a weighted mean of the three parts
Submodule 2 evaluation: scientificpapers presentation and discussion	10%	
Submodule 3 evaluation: partial test	30%	

To sum up, in order to pass the module, it is necessary to attend to >75% of the classes, to get ≥4 points (out of 10) as a weighted average mark of the three theoretical evaluable parts, and finally, to obtain a final grade (class assistance and theoretical contents) of ≥5 points (out of 10).

OTHER ASPECTS TO CONSIDER

Definition of "Ungraded": A student will get the qualification of "Ungraded" when the number of evaluable activities performed is lower than 50% of the programmed ones for the subject.

Justified absence to the evaluation tests: In case of justified absence to a partial test (ONLY will be considered as justified absences: illness, death of first-degree relatives, and accident UPON PRESENTATION OF PROOF), students will be entitled to perform the test in an alternative date. This change will be organized by the Master Coordinator and the Module Coordinator.

Module repeaters: If a student does not pass the module in a given academic course, the obtained grades will be saved for two extra academic years when the skills associated to these activities had been accomplished (obtainment of >5 points out of 10). Otherwise, the student will have to repeat the corresponding evaluations in order to get the corresponding marks.

Evaluation activities

Title	Weighting	Hours	ECTS	Learning outcomes
Class attendance	30%	0	0	10, 2, 3, 12
Partial test related to the contents of Submodule 1	30%	2	0.08	1, 4, 6, 5, 10, 7, 8, 9, 11
Partial test related to the contents of Submodule 3	30%	2	0.08	1, 4, 6, 5, 10, 7, 8, 9, 11
Presentation of scientific papers related to the contents of Submodule 2	10%	0	0	1, 4, 5, 10, 2, 7, 8, 9, 11, 12

Bibliography

Bibliography related to specific contents of the module will be provided by the corresponding teachers upon request.