

Degree programme	Type	Course
Cytogenetics and Reproductive Biology	OP	1

Contact lecturer

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Group languages

You can consult this information at the [end](#) of the document.

Prerequisites

Previous basic knowledge of reproductive biology is recommended.

Objectives

This is a compulsory theoretical module in the Reproductive Biology specialization of the master's degree.

The objective of this module is to provide students with a solid knowledge of pre-implantation, and post-implantation embryo development, and foetal development in mammals, as well as of the processes of totipotency and cell differentiation that occur during development. This knowledge will allow students to understand the basis of pathologies associated with reproduction and of assisted-reproduction and cell-therapy techniques. The module will also cover the main legal and ethical aspects related to the application of these technologies.

Learning outcomes

- CA20 (Design scientific experiments in the field of embryology and stem cells, selecting appropriate

methodologies to test research hypotheses.) Design scientific experiments in the field of embryology and stem cells, selecting appropriate methodologies to test research hypotheses.

- KA26 (Describe the cellular and molecular foundations of pre-implantation and post-implantation embryonic development in mammals.) Describe the cellular and molecular foundations of pre-implantation and post-implantation embryonic development in mammals.
- KA27 (Describe the origin and characteristics of the different types of stem cells.) Describe the origin and characteristics of the different types of stem cells.
- KA28 (Identify the origin of infertility in humans due to causes related to embryonic and foetal development.) Identify the origin of infertility in humans due to causes related to embryonic and foetal development.
- KA29 (Explain the socio-economic and innovative impact of research in the field of embryology and regenerative medicine, as well as its ethical, legislative and technological implications.) Explain the socio-economic and innovative impact of research in the field of embryology and regenerative medicine, as well as its ethical, legislative and technological implications.
- SA29 (Apply current legislation and regulatory principles in the field of embryology and stem cells, when carrying out the scientific and professional activity .) Apply current legislation and regulatory principles in the field of embryology and stem cells, when carrying out the scientific and professional activity .
- SA30 (Identify the possible ethical dilemmas associated with scientific practice and experimental professional practice in the field of embryology and stem cells.) Identify the possible ethical dilemmas associated with scientific practice and experimental professional practice in the field of embryology and stem cells.

Contents

Unit 1. Pre-implantation embryo development. Zygote activation. Embryonic metabolism. Pre-implantation gene expression. Embryo cleavage. Formation of the morula and the blastocyst. Hatching. Implantation.

Unit 2. Post-implantation embryo and foetal development in humans. Embryonic period: bilaminar embryo, gastrulation, trilaminar embryo and organogenesis. Foetal period. Mechanisms of implantation and placenta. Congenital abnormalities and prenatal diagnosis. Practical session on the observation of embryonic and foetal images.

Unit 3. Stem cells. Definition and types of stem cells. Culture and characterization of stem cells. Derivation methods. Differentiation. Applications. Ethical and legal issues.

Learning activities and methodology

Title	Hours	ECTS	Learning outcomes
Classroom practical session	2	0.08	
Theoretical classes	28	1.12	
Literature research and reading	20	0.8	
Individual study	94	3.76	

The module will consist of lectures and a practical session on image observation (corresponding to Unit 2). Class attendance is compulsory and will be monitored.

Annotation: within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continuous assessment activities

Title	Weight	Hours	ECTS	Learning outcomes
Class attendance and participation	10%	0	0	CA20, KA26, KA27, KA28, KA29, SA29, SA30
Written exam Unit 2	30%	2	0.08	CA20, KA26, KA28
Multiple-choice test Unit 3	30%	2	0.08	CA20, KA27, KA29, SA29, SA30
Multiple-choice test Unit 1	30%	2	0.08	CA20, KA26, KA28, KA29

Assessable activities will consist of multiple-choice tests for the contents of Units 1 and 3 (one test for each Unit) and an objective written exam for the contents of Unit 2. Assessable activities are mandatory, and each will have a weight of 30% in the final grade of the module. The aim of these activities is to assess that the students have acquired the conceptual knowledge for each unit and that they have understood and know how to integrate this information.

Class attendance will also be considered in the assessment (10% of the final grade). Any absence should be duly justified by the student. Non-justified absences will affect the final mark of the module as follows: 1 absence -0.5 points; 2 absences -1 point. If the number of non-justified absences is higher than 2, the student will not be able to pass the module.

To pass the module, students must obtain an overall grade equal to or higher than 5 points. Students will be graded as "No Avaluable" (Not Assessable) if the weighting of all assessable work carried out is less than 67% of the final grade.

Single assessment

This module does not include the option for single assessment.

Reassessment

If the grade is lower than 5, students will need to retake the failed assessable activity/activities. Reassessment tests and exams will be similar to those within the continuous assessment.

To be eligible for reassessment, students should have previously been evaluated in a set of activities equal to at least two thirds of the final grade of the module.

Use of AI

In this module, the use of Artificial Intelligence (AI) technologies is permitted as an integral part of the development of assignments, provided that the final result reflects a significant contribution from the student in terms of analysis and personal reflection. The student must clearly identify which parts have been generated with this technology, specify the tools used, and include a critical reflection on how these have influenced the process and the final outcome of the activity. Lack of transparency regarding the use of AI will be considered academic dishonesty and may result in a penalty in the activity's grade, or more severe sanctions in serious cases.

Irregularities in assessment activities

The commission of any irregularity in an assessment activity (academic fraud, plagiarism, or undue use of AI, unless such use is expressly authorized in the teaching guide) that could lead to a significant variation in the mark, implies that this activity will be graded with a 0. In the event that the teaching guide stipulates that passing the subject requires a minimum grade in that specific assessment activity, or if multiple irregularities occur in the assessment activities of the same subject, the final grade for that subject will be 0. Aside from this, disciplinary proceedings may be initiated against any student who commits any of these irregularities.

Bibliography

General bibliography:

Atala A and Lanza R. Handbook of Stem Cells. Elsevier/Academic Press. 2nd Edition, 2012. ISBN: 9780123859426.

Access through the UAB library service:

https://bibcercador.uab.cat/permalink/34CSUC_UAB/1eqfv2p/alma991010886502406709

Atala A and Lanza R. Essentials of stem cell biology. Academic Press. 3rd Edition, 2014. ISBN: 9780124095038.

Access through the UAB library service:

https://bibcercador.uab.cat/permalink/34CSUC_UAB/1eqfv2p/alma991010399784106709

Barressi MJF and Gilbert SF. Developmental Biology. Oxford University Press. 13th Edition, 2023. ISBN: 9780197574614.

Carlson BM. Human Embryology and Developmental Biology. Elsevier. 7th Edition, 2023. ISBN: 9780323881685.

Access through the UAB library service (Spanish edition):

https://bibcercador.uab.cat/permalink/34CSUC_UAB/1eqfv2p/alma991011063033306709

Johnson MH. Essential Reproduction. Wiley. 8th Edition, 2018. ISBN: 978-1-119-24639-8.

Access to the 7th edition (2013) through the UAB library service:

https://bibcercador.uab.cat/permalink/34CSUC_UAB/1eqfv2p/alma991010484814606709

Access to the "Student Companion Website" of the 8th edition:

<https://bcs.wiley.com/he-bcs/Books?action=index&itemId=1119246393&bcsId=11164>

Mummery C, van de Stolpe A, Roelen B, Clevers H. Stem Cells. Scientific Facts and Fiction. Elsevier/Academic Press. 3rd Edition, 2021. ISBN: 9780128203378.

Access through the UAB library service:

https://bibcercador.uab.cat/permalink/34CSUC_UAB/1eqfv2p/alma991010400262006709

Slack JMW. The Science of Stem Cells. Wiley. 2018. ISBN:9781119235156.

Access through the UAB library service:

https://bibcercador.uab.cat/permalink/34CSUC_UAB/1eqfv2p/alma991010353535106709

Specific bibliography:

During the module, teachers will provide students with updated specific bibliography in the form of scientific papers.

Web links:

ISSCR Guidelines for Stem Cell Research and Clinical Translation. 2025 Update.
<https://www.isscr.org/policy/guidelines-for-stem-cell-research-and-clinical-translation>

Software

No specific software will be used.

Course groups and languages

The information provided is provisional until November 30. After this date, you will be able to consult the language of each group through this [link](#). To access the information, you will need to enter the course CODE

Type of teaching	Group	Language	Semester	Shift
(TEm) Theory (master)	1	Catalan	first semester	morning-mixed
(PAULm) Classroom practices (master)	1	Catalan	first semester	morning-mixed