COURSE DATA

DATA SUBJECT

Code: 46488
Name: Stem Cells: Biology, study and applications
Cycle: Master's Degree
ECTS Credits: 3
Academic year: 2026-27

STUDY (S)

Degree	Center	Acad. year	Period
2254 - Master's Degree in Molecular Approaches in Health Sciences	Facultat de Medicina i Odontologia	1	First quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
2254 - Master's Degree in Molecular Approaches in Health Sciences	Molecular technologies for research in health sciences	COMPULSORY

COORDINATION

GALAN ALBIÑANA AMPARO

O'CONNOR BLASCO JOSE ENRIQUE

TORRES IBAÑEZ JOSE MANUEL

SUMMARY

In the Stem Cells: Biology, Study and Applications course, the student will become familiar with the biological conce
Lessons will address the molecular mechanisms that regulate the cell cycle, proliferation, differentiation, and apopt
The biological aspects of embryonic stem cells, induced pluripotent cells, adult stem cells and tumor stem cells wil
Current cellular and molecular techniques and the main animal models in stem cell research will be reviewed.
The concept of Regenerative Medicine will be addressed by first describing the organic and tissue failures that bene
Through laboratory sessions, the student will face in vitro experimental studies typical of research on stem cells in

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PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

There are no specified enrollment restrictions with other subjects of the curriculum.

OTHER REQUIREMENTS

No enrollment restrictions have been specified with other subjects in the curriculum.

COMPETENCES / LEARNING OUTCOMES

2254 - Master's Degree in Molecular Approaches in Health Sciences

Aprender a identificar, manejar y presentar adecuadamente en informes y exposiciones públicas, conocimientos existentes sobre células madre, usando como vehículo la lengua inglesa.

Conocer, comprender y manejar en la práctica métodos de estudio de las células madre.

Conocer en profundidad y comprender la organización a nivel molecular de células, sistemas y procesos de relevancia en las Ciencias de la Salud.

Conocer en profundidad y comprender las bases moleculares de la enfermedad.

Conocer en profundidad y comprender las metodologías de investigación básica aplicables a las Ciencias de la Salud.

Conocer y comprender los conceptos básicos y las aplicaciones en investigación básica y clínica de las células madre.

Students should apply acquired knowledge to solve problems in unfamiliar contexts within their field of study, including multidisciplinary scenarios.

Students should be able to integrate knowledge and address the complexity of making informed judgments based on incomplete or limited information, including reflections on the social and ethical responsibilities associated with the application of their knowledge and judgments.

Students should communicate conclusions and underlying knowledge clearly and unambiguously to both specialized and non-specialized audiences.

Students should demonstrate self-directed learning skills for continued academic growth.

Students should possess and understand foundational knowledge that enables original thinking and research in the field.

Tener capacidad de analizar y sintetizar un problema.

Tener capacidad de comunicación oral y escrita en una segunda lengua científica.

Tener capacidad de desarrollar un trabajo interdisciplinar.

Tener capacidad de localizar información.

Tener capacidad de trabajar en equipo

DESCRIPTION OF CONTENTS

1. BLOCK 1. Introduction to the Subject. Introduction to Stem Cells and Regenerative Medicine.

2. BLOCK 2. Organic failure and the origin of human chronic diseases

3. BLOCK 3. Characteristics and Sources of Human Stem Cells

4. BLOCK 4. Omics Technologies in Stem Cell Research

5. BLOCK 5. Applications of Stem Cells in Regenerative Medicine

6. BLOCK 6. Stem Cells and Cancer

7. BLOCK 7. Practical Aspects of the Work with Stem Cells

8. BLOCK 8. Laboratory Practicals

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	16,00
Laboratory	4,00
Group work	10,00
Total hours	**30,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	0,00
Independent study and work	0,00
Preparation of lessons	0,00
Preparation for assessment activities	0,00
Resolution of case studies	0,00
Total hours	**0,00**

TEACHING METHODOLOGY

EVALUATION

The evaluation of student learning will be carried out by evaluating the following sections:
1. Evaluation of the theoretical and practical contents of the subject, with questions of different formats. This test will be worth up to 50% of the final mark and will be carried out by means of a written test at the end of the first semester.
2. Presentation of a written work on the technological or biomedical relevance of Stem Cells. This part will have a value of up to 40% of the final grade.
3. Student interest in the subject, expressed as the participation in organized discussions, the answers to questions to the subject. These concepts will add up to 10% in the final grade of the subject.
e subject.

REFERENCES

- - Lanza, R.Essentials of Stem Cell Biology. Academic Press (2009) - Stem Cell Biology in Normal Life and Diseases https://www.intechopen.com/books/stem-cell-biology-in-normal-life-and-diseases - Stem Cells in Clinic and Research https://www.intechopen.com/books/stem-cells-in-clinic-and-research - Regenerative Medicine and Tissue Engineering https://www.intechopen.com/books/regenerative-medicine-and-tissue-engineering - Cells and Biomaterials in Regenerative Medicine https://www.intechopen.com/books/cells-and-biomaterials-in-regenerative-medicine

- - The Stem Book. http://www.stembook.org - Euro Stem Cell. http://www.eurostemcell.org/ - Tissue Regeneration - From Basic Biology to Clinical Application https://www.intechopen.com/books/tissue-regeneration-from-basic-biology-to-clinical-application - Autoimmune Diseases - Contributing Factors, Specific Cases of Autoimmune Diseases, and Stem Cell and Other Therapies https://www.intechopen.com/books/autoimmune-diseases-contributing-factors-specific-cases-of-autoimmune-diseases-and-stem-cell-and-other-therapies 43096 Células Troncales: Biología, estudio y aplicaciones 5 BORRADOR Guía Docente 43096 Células Troncales: Biología, estudio y aplicaciones - Diabetes Mellitus - Insights and Perspectives https://www.intechopen.com/books/diabetes-mellitus-insights-and-perspectives - Cardiomyopathies - Types and Treatments https://www.intechopen.com/books/cardiomyopathies-types-and-treatments - Liver Regeneration https://www.intechopen.com/books/liver-regeneration -

Advanced Understanding of Neurodegenerative Diseases https://www.intechopen.com/books/advanced-understanding-of-neurodegenerative-diseases - Células Madre y Terapia regenerativa. F de Pablo y M Cascales, eds., Monografías de la Real Academia Nacional de Farmacia, Monografía XXVII (2009) https://www.analesranf.com/index.php/mono/issue/view/360