



PRESENTACIÓN

Basic mechanisms of cell therapy

Introduction

The course “Basic mechanisms of Cell Therapy” aims to provide a general overview of the field of regenerative medicine, a relatively recent discipline looking at how tissues are formed and maintained and how can they be repaired.

We will review the role of stem cells during embryonic development and in adult tissues paying special attention to the tissue structure and the heterotypic interactions that the stem cells establish with their microenvironment. This knowledge will allow us to subsequently discuss the therapeutic strategies used to achieve curative approaches for a number of diseases in multiple organs using stem cells. We will consider the potential of stem cells isolated from different tissues and discuss the potential use of reprogramming strategies to obtain induced pluripotent stem cells or other specific cell types with highly promising regenerative potential.

Professors

- Manuel Mazo Vega, Departamento de Terapia Celular, CUN. (Responsable Asignatura, mmazoveg@unav.es)
- Froilán Granero-Moltó, Departamento de Ortopedia, CUN.
- Beatriz Pelacho Samper, Departamento de Cardiología, FIMA. (bpelacho@unav.es)
- Xabier Aranguren, Programa de Medicina Regenerativa, CIMA

Credits: 2 ECTS

Degree: Master in Biomedical Research

Module: Module II: Specialty

Area: Specialty in Regenerative Medicine and Advanced Therapies

Department and School: Cell therapy, School of Medicine

Calendar description: [Master Calendar](#)

Classroom and schedule: specified in the master calendar

Type of subject: required in the specialty of Regenerative Medicine and Advanced Therapies and elective for the other specialties

Language: english and spanish

RESULTADOS DE APRENDIZAJE (Competencias)

Basic competences



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- BC6: Possess and understand knowledgeable facts that serve as a basis or opportunity for being original in the development and/or application of ideas, frequently within the context of research.
- BC7: The students will be able to apply acquired knowledge and problem solving abilities to fields outside this program, including that which is new and scarcely known, within a more ample or multidisciplinary context related to the research, development and innovation of drugs.
- BC8: The students will be able to integrate concepts and manage the complex task of drawing valid conclusions from information which, in spite of being incomplete or limited, includes reflections regarding social and ethical responsibilities linked to the application of general knowledge, specific concepts and common sense to the research, development and innovation of drugs.
- BC9: The students will learn to relay their conclusions -and the most recent facts and reasoning supporting said conclusions- to specialized personnel and to the general public in a clear and precise manner.
- BC10: The students will have acquired learning abilities that will permit them to continue studying in a self-directed and autonomous manner.

General competences

- CG1: Ability to deal with biomedical challenges in depth, from different viewpoints, identifying the state of present-day science.
- CG2: Identification of significant questions or hypotheses regarding biomedical issues or problems and definition of the steps necessary to resolve such questions.
- CG3: Possession of creative ability and originality in order to be able to respond to the questions raised in biomedical research.
- CG4: Ability to select and use appropriate techniques in order to efficiently and accurately carry out biomedical research work.
- CG6: Possession of critical ability, both when reading scientific biomedical literature and when interpreting the results of experiments.
- CG7: Ability to orally communicate biomedical research matters or data in a fluent way, in both Spanish and English, taking into account the audience for which the presentation is intended.
- CG8: Ability to write correct, precise and well-structured texts about different types of biomedical research work.
- CG9: Ability to work in a team with allocated tasks and participate in work meetings, contributing to the solution of biomedical problems and achievement of working group objectives.

Regenerative Medicine and Advanced Therapies specialty competences

- CEE1: To have an overall view of the different types of advanced therapy drugs based on genes, cells or tissues and their different origin.
- CEE2: To know the molecular and cellular bases of advanced therapies, as well as the tools and techniques used in this type of research.
- CEE3: To know the state of science in the application of the advanced therapies to current clinical problems, as well as the limitations and the challenges that they present.
- CEE4: To delve into the molecular characteristics and basic mechanisms of stem cell differentiation.
- CEE6: To delve into the type of manipulation to which cells or tissues may be subjected for use in humans depending on the desired type of action, pharmacological, immunological, metabolic or restorative.



- CEE8: To integrate the different levels of knowledge to understand how an advanced therapy medication is generated, from basic to clinical research.

PROGRAMA

1. Introduction to Cell Therapy (Manuel Mazo) 1 hour. Wednesday 17th of September, 11:00-12:00.
2. Characteristics of stem cells I (Beatriz Pelacho) 1 hour. Wednesday 17th of September, 12:00-13:00.
3. Characteristics of stem cells II (Beatriz Pelacho) 1 hour. Wednesday 23th of September, 11:00-12:00.
4. Extracellular vesicles (Beatriz Pelacho) 1 hour. Wednesday 23th of September, 12:00-13:00.
5. Application of stem cells for transplantable organ generation (Xabier Aranguren) 1 hour. Thursday 25th of September, 11:00-12:00.
6. Hematopoietic stem cells and Cardiac stem cells (Manuel Mazo) 1 hour. Thursday 25th of September, 12:00-13:00.
7. Mesenchymal stem cells in the bone (Froilán Granero) 1 hour. Tuesday 30th of September, 11:00-12:00
8. The epithelial stem cells in the skin. (Froilán Granero) 1 hour. Tuesday 30th of September, 12:00-13:00.
9. Stem cells for cardiac diseases (Manuel Mazo) 1 hour. Tuesday 7th of October, 11:00-12:00.

JOURNAL CLUBS

1. Journal Club I (Manuel Mazo) 3 hours, Thursday 9th of October, 11:00-14:00
2. Journal Club II (Manuel Mazo) 3 hours, Tuesday 14th of October, 11:00-14:00

EXAM

Monday 20th of October, 10:00-11:00

ACTIVIDADES FORMATIVAS

"Basic Mechanisms of cell therapy" is a subject of 2 ECTS (50 h). The work is distributed as follows:

1. Face-to-face activities (18 h)

- Lecture format (11 h)
- Journal Club: select two papers on the same research topic, divide the class in two groups to read and present one of the papers, with the consequent discussion and debate (6h)
- Exam: test (1 h)

2. Personal work: (32 h)



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- Individual study and preparation of the journal clubs (32 h)

EVALUACIÓN

Assessment

- Continuous assessment (assistance and participation) 10%
- Journal Club 40%
- Final examination 50%

Re-sit examinations

- Exam: test (1 h)

Grades

8.9-10: SB

6.9-8.8: NT

5-6.8: AP

0-4.9: SS

Those students with a final grade of 9 or above are eligible for Honors.

HORARIOS DE ATENCIÓN

- Make appointment by e-mail (mmazoveg@unav.es).

BIBLIOGRAFÍA

Bibliography and resources

- *Handbook of Stem Cells*, Anthony Atala and Robert Lanza. Elsevier 2013
[Localízalo en la Biblioteca](#) (e-book)
- *Biology and Engineering of Stem Cell*, Vishwakarma and Karp Ed. Elsevier 2017
[Localízalo en la Biblioteca](#)

Specific scientific papers will be referenced in classes and linked in the internal area.