# Stem Cell Technologies

**PhD Advanced Course**

**17- 24 March 2025**

**ECTS: 6; Classes 22.5 hours**


**Course Coordinators:**

Susana Solá, Faculty of Pharmacy, *Universidade de Lisboa*

Christa Rhiner, Champalimaud Foundation

**Organizing Committee:**

***Faculty of Pharmacy, Universidade de Lisboa***

Susana Solá

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Carlos Minutti


## Introduction

Stem cell-based therapies are thriving. In fact, pharmaceutical companies are increasingly investing in stem cell technology to develop innovative and potentially valuable new treatments for severe human diseases, including cancer and neurological disorders, such as multiple sclerosis, Alzheimer´s and Parkinson´s disease, mood disorders, brain tumors and even stroke. Moreover, although seminal advances have occurred in understanding stem cell biology, further work is still needed to bridge the current gap between stem cell technologies and effective treatments for brain-related disorders. Stimulating the scientific interest in the topic will certainly accelerate and improve the successful transfer of stem cell-based discoveries from the bench to the bedside.

## Goals and Learning Outcomes

The overall goal of the Stem Cell Technologies course is to train a new generation of researchers with the knowledge necessary to understand stem cell plasticity and consider innovative stem cell-based strategies for the treatment of a range of devastating disorders.

Specific competencies will be acquired to:

- Understand the biology of stem cells, and their role in tissue homeostasis, cancer and regeneration;
- Discuss their potential in biomedical research and the challenges of developing better stem cell-based therapies;
- Recognize cutting-edge stem cell tools and models to tackle human disease;
- Understand how pharmacology, toxicology and biomedical applications benefit from emerging scale-up stem cell technologies.

## Assessment

Assessment will be based on active participation in the seminars and workshops.
The last workshop on Stem Cell-based business concepts will be an interactive forum in groups, where students will explain and discuss the technology and application of two biotechnology companies with stem cell-based concepts.

## Registration and Fees

This course is free for 1st year Ph.D. students of FFUL and Champalimaud Foundation.

For other attendees, the registration is made through the **FenixEdu Platform** until March 10, 2025.

- Registration with evaluation: 250 €
- Registration without evaluation: 200 €

The course will be **in person** at FFUL, Champalimaud Centre and iBB – TagusPark campus.

# COURSE CONTENT

### MONDAY – 17 March

room D.2.1 @FFUL

### Stem Cells in Drug Discovery

09:00 **Welcome and working group guidelines**
Course organizers

09:30 **Core concepts in stem cell regulation and clinical potential**
Susana Solá

10:30 **Stem cell stories and tools**
Christa Rhiner

11:30 **Break**

12:00 **Ethical issues in stem cell-based biomedical applications**
José Bragança
*Universidade do Algarve*

13:00 **Lunch break**

14:30 **3D Stem cell cultures for enhanced cell-based therapies**
Joana Miranda

15:30 ICEBREAKER ACTIVITY
**Think outside the Lab**

16:30 **End of the day**

## TUESDAY – 18 March
seminar room 2nd floor @CF

### Stem Cells in Tissue Homeostasis and Cancer

09h30 **Stem cells, cancer stem cells and tumor heterogeneity**
Adriana Sánchez-Danés

10h30 **Rejuvenating strategies for stem cell-based therapies in aging**
Pedro Vitór
*Fundação GIMM, Lisbon*

11h30 **Break**

12h00 **Targeting pancreatic cancer cell plasticity**
Giuseppe Diaferia
*Botton-Champalimaud Pancreatic Cancer Centre, Lisbon*

13h00 **Lunch break**

14h30 **Connecting conventional dendritic cell diversity with bone marrow progenitors**
Carlos Minutti

15h30 **Self-study**

18h00 **End of the day**

## WEDNESDAY – 19 March
room D.2.1 @FFUL

### Stem Cells in Tissue Regeneration and Repair

10h00 Workshop II:
**Jigsaw on benefits and risks of stem cell-based therapies**
Christa Rhiner and Susana Solá

12h00 **Break**

12h30 **Mesenchymal stem cells on the path to becoming an ATMP – a peripheral artery disease (PAD) and musculoskeletal conditions case studies**
Miguel Santos
*ITQB NOVA, Oeiras*

13h30 **Lunch break**

14h30 **Stem cells and liver diseases**
Rui Castro

15h30 **Workshop I:**
**Liver stem cells in action: a case study**
Rui Castro and André Simão

17h30 **End of the day**

## THURSDAY – 20 March
classroom 2nd floor @CF

### Stem Cells in Neurological Disorders

9h30 **Local and systemic communication regulating neural stem cell activation and tissue homeostasis**
Christa Rhiner

10h30 **Improving epigenetic fidelity of stem cell-based models for disease modelling**
Simão Rocha
*iBB, IST, Oeiras*

11h30 **Break**

12h00 **Structures and signals in the neurogenic niche - Title TBA**
Pauline Spéder
*Intitut Pasteur, France*

13h00 **Lunch break**

14h30 **Self-study**

17h30 **End of the day**

## FRIDAY – 21 March
room 1.39 @iBB, TagusPark Campus

### Engineering Stem Cells

09h30 **Workshop III:**
**Biomaterial-based strategies for stem cell engineering and regenerative medicine applications**
João Silva and Paola Alberte
*IBB, Tagus Park, Oeiras*

10h30 **Break**

11h00 **DEMO:**
**3D printing: from tissue scaffolds to sustainable sushi**
João Silva and Paola Alberte
*IBB, IST, Tagus Park, Oeiras*

12h30 **Lunch break**

14h00 **Innovating the manufacturing of stem/progenitor cell-based therapies**
Claudia Lobato
*IBB, IST, Lisbon*

15h30 **Nature-inspired bioprocesses to accelerate the manufacturing of hPSC-based therapy products: bridging biology and engineering**
Margarida Serra *(Zoom format)*
*iBET, Oeiras*

16h30 **End of the day**

## MONDAY – 24 March
room D.2.1 @FFUL

09h30 **Stem Cell-based business concepts**
Student presentations and discussion round

**Closing remarks**