



**Champalimaud  
Foundation**

## **Stem Cell Technologies**

**PhD Advanced Course**

**November 27- 4 December 2023**

**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

Joana Miranda

Joana Amaral

Rui Castro

Cecília Rodrigues

*Faculty of Medicine, Universidade de Lisboa*

Sara Xapelli

*Champalimaud Foundation*

Christa Rhiner

Adriana Sánchez-Danés

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 1<sup>st</sup> year Ph.D. students of FFUL and Champalimaud Foundation.

For other attendees, the registration is made through the **FenixEdu Platform** until November 20, 2024.

- Registration with evaluation: 250 €
- Registration without evaluation: 600 €

The Course will be in-person format at FFUL and Champalimaud Centre.

## COURSE CONTENT

**MONDAY – 27 November (@FFUL)**

**Stem Cells in Disease Modelling and Drug Discovery**

Chairs: Susana Solá and Christa Rhiner

09h00	<b>Welcome and Working group guidelines</b> Course organizers
9h30	<b>Core concepts in stem cell regulation and clinical potential</b> Susana Solá iMed.U LISboa, Lisbon, Portugal
10h30	<b>Stem cells and liver diseases</b> Rui Castro iMed.U LISboa, Lisbon, Portugal
11h30	<b>Break</b>

- 12h00 **Metabolism and stem cell-derived tumors: using *Drosophila* brain tumors to understand how metabolic reprogramming drives tumor formation**  
Catarina Homem  
CEDOC, Lisbon, Portugal
- 13h00 **Lunch break**
- 14h30 **Rejuvenating strategies for stem cell-based therapies in aging**  
Pedro Vitor  
iMM, Lisbon, Portugal
- 15h30 **3D Stem cell cultures for enhanced cell-based therapies**  
Joana Miranda  
iMed.Ulisboa, Lisbon, Portugal
- 16h30 **End of the day**

## TUESDAY – 28 November (@CF)

### **Stem Cells in Tissue Homeostasis and Cancer**

Chairs: Joana Amaral and Adriana Sánchez-Danés

- 09h30 **Stem cells, cancer stem cells and tumor heterogeneity**  
Adriana Sánchez-Danés  
Campalimaud Foundation, Lisbon, Portugal
- 10h30 **Local and systemic communication regulating neural stem cell activation and tissue homeostasis**  
Christa Rhiner  
Champalimaud Foundation, Lisbon, Portugal
- 11h30 **Break**
- 12h00 **Hematopoietic stem cells in health and leukemia**  
Delfim Duarte ([Zoom format](#))  
I3S, University of Porto, Portugal
- 13h00 **Lunch break**
- 14h30 **Connecting conventional dendritic cell diversity with bone marrow progenitors**  
Carlos Minutti  
Campalimaud Foundation, Lisbon, Portugal
- 15h30 **Self-study**
- 18h00 **Organoid technologies: new in-vitro models for drug discovery**  
Katharina Debowski ([Zoom format](#))  
StemCell™ Technologies, Germany
- 19h00 **End of the day**

## WEDNESDAY – 29 November (@TagusPark)

### **Engineering Stem Cells**

Chairs: Christa Rhiner and Joana Miranda

- 09h30     **Workshop:**  
**Biomaterial-based strategies for stem cell engineering and regenerative medicine applications**  
João Silva and Marta Carvalho  
IBB, IST, Tagus Park, Oeiras, Portugal
- 11h00     **Break**
- 11h30     **DEMO:**  
**3D printing: from tissue scaffolds to sustainable sushi**  
João Silva and Marta Carvalho  
IBB, IST, Tagus Park, Oeiras, Portugal
- 13h00     **Lunch break**
- 14h30     **Using brain organoids for modeling neurodevelopmental disorders**  
Margarida Diogo  
IST, Lisbon, Portugal
- 15h30     **Self-study**
- 17h00     **End of the day**

## THURSDAY – 30 November (@CF)

### **Stem Cells in Neurological Disorders**

Chairs: Sara Xapelli and Rui Castro

- 9h30     **Metabolic regulation of adult neurogenesis**  
Susana Solá  
iMed.U LISboa, Lisbon, Portugal
- 10h30     **The importance of neural stem cell behavior for spinal cord injury repair outcome**  
Leonor Saúde  
iMM, Lisbon, Portugal
- 11h30     **Break**
- 12h00     **iPSCs and brain organoids in mitochondrial research**  
Alessandro Prigione ([Zoom format](#))  
Heinrich Heine University, Dusseldorf, Germany
- 13h00     **Lunch break**
- 14h30     **Workshop:**  
**Jigsaw on benefits and risks of stem cell-based therapies**  
Christa Rhiner and Susana Solá  
iMed.U LISboa and Champalimaud Foundation, Lisbon, Portugal

16h30    **End of the day**

**FRIDAY – 4 December (@FFUL)**

**Assessment**

Chairs: Christa Rhiner, Susana Solá, Joana Amaral, Rui Castro, Sara Xapelli

9h30        **Workshop: Stem Cell-based business concepts**  
Student presentations and discussion round

12h00      **Closing remarks**

**End of course**

