



**1<sup>ST</sup> EDITION**

# **ADVANCED TRAINING IN NEW IN VITRO MODELS: ALTERNATIVES TO ANIMAL MODELS IN RESEARCH**

**3 ECTS**

## **COORDINATION**

Sandra Tenreiro, Assistant Researcher and Affiliated Prof. at NOVA Medical School  
Cláudia Nunes dos Santos, Principal Investigator and Affiliated Prof. at NOVA Medical School

## **APPLICATIONS UNTIL**

november the 4<sup>th</sup>

## **DATES**

november the 18<sup>th</sup> to november the 29<sup>th</sup>



## **COURSE PRESENTATION**

In the last decade, there has been a rapid development of innovative approaches aimed at replacing, refining and reducing dependence on animal experimentation. At the same time, there is growing public pressure as well as regulatory pressure in Europe to accelerate the adoption of non-animal models. This momentum was reinforced in 2021, when the EU Parliament issued a resolution (2021/2784(RSP)) outlining ambitious goals to promote the transition to non-animal studies in research, regulatory testing and education.

In response to this need, new methodologies are being explored, taking advantage of *in silico* analyses combined with cutting-edge artificial intelligence approaches, as well as the development of *in vitro* mini-organs based on human cells, including organoids and organ-on-chip platforms. These advances are fuelled by the integration of stem cell technologies and engineering techniques such as 3D bioprinting and microfluidic systems. Thus, these three-dimensional (3D) models have demonstrated remarkable success in replicating various organs, from the brain, heart, lung and kidney to the intestine, liver, retina and skin. They have immense potential to revolutionise the basic and translational research landscape in the coming years.

This course will provide an up-to-date overview of these robust and sophisticated models for recapitulating health and disease states. These innovative approaches offer valuable information for pre-clinical studies, marking a paradigm shift in the way research is conducted and paving the way for a more ethical and scientifically advanced era.

## **AIM OF THE COURSE**

The course aims to deepen participants knowledge of alternatives to animal models, presenting a variety of examples of applications in biomedical research and covering the latest developments in this area.

## **LEARNING OBJECTIVES**

At the end of the course, participants are expected to have a comprehensive knowledge of the strategies and models that have been developed or are being developed as alternatives to animal models and their various applications in basic and pre-clinical research. Finally, participants critical thinking will be promoted, as well as awareness of the need to replace, refine and reduce dependence on animal experimentation.

## **WHY THE NEED FOR THE COURSE?**

This course is the first in Portugal specifically dedicated to this subject. It brings together 18 researchers from 8 national institutions and a top foreign institution, with unique knowledge and involved in the development and application of various alternative models to animal experimentation, from obtaining induced pluripotent human cells from healthy donors or those with various pathologies, to organoid models, microphysiological systems, bioprinting, as well as *in silico* analyses for fundamental or preclinical studies involving different organs (retina, brain, intestine, liver, lung, skin, breast, heart, tonsil, vascular system, among others).

## **FIELD OF STUDY**

Research

## **TEACHING METHODS**

The teaching methods combine seminars with the presentation of articles by the participants. This will encourage student participation. The seminars will be given by basic and clinical researchers who specialise in the topics covered. Whenever possible, the same topic will be approached from a fundamental and translational perspective.

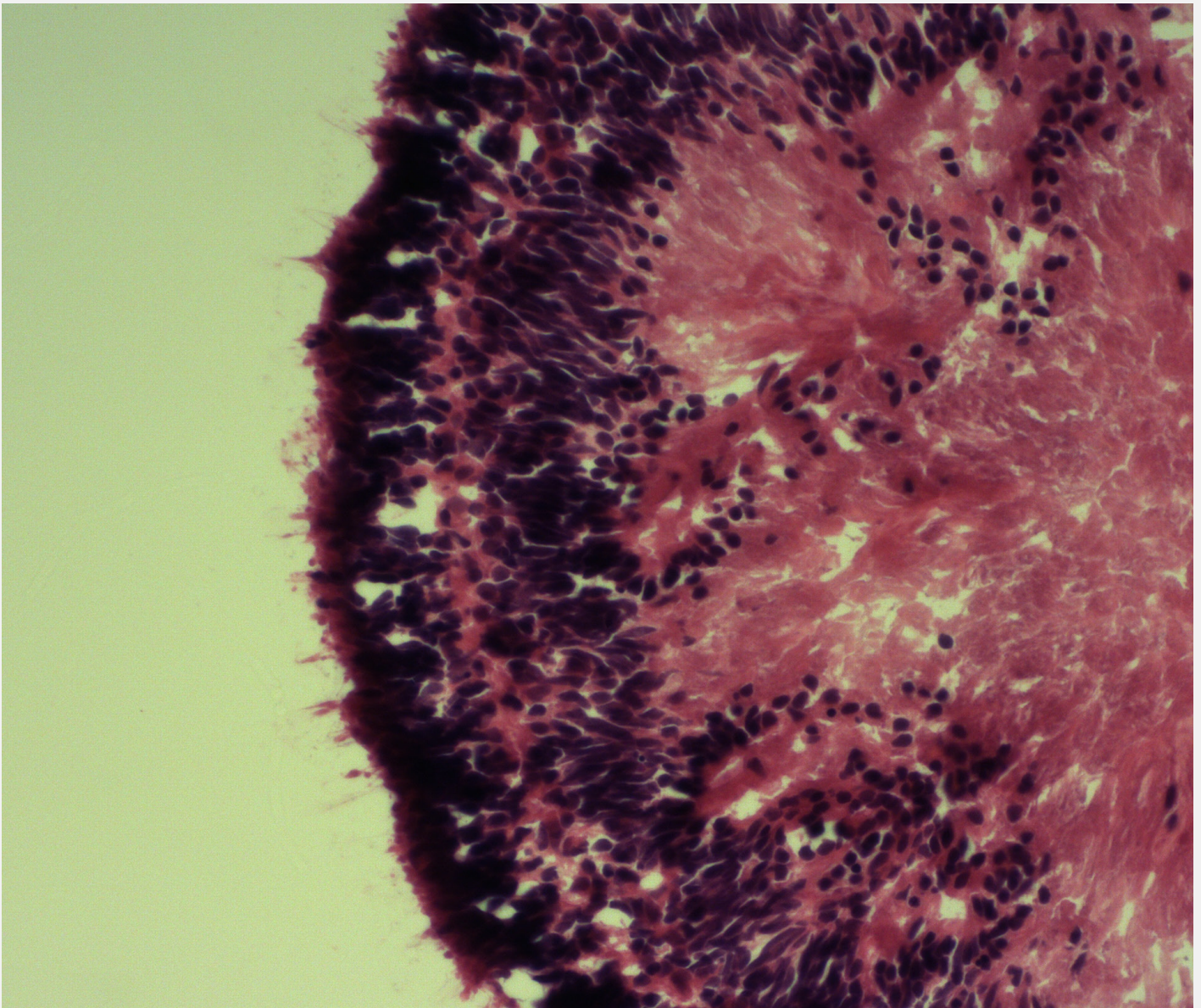


### **TEACHING METHODS**

Assessment will be centred on class participation and the work and presentations made by the participants, in which they will have to apply the knowledge acquired to concrete research situations and interpret experimental data, in addition to being tested on their fundamental knowledge. Assessment will therefore have three components: the presentation and discussion of one or two scientific articles, the writing of a short research project proposal on one of the topics covered that should be a priority (centred on the problem to be solved, the hypothesis and the objectives) and class participation.

### **TEACHING QUALITY ASSESSMENT METHODOLOGY**

At the end of the course, an anonymous FCM|NMS teaching evaluation questionnaire will be administered so that trainees can evaluate the course in terms of its objectives and programme content, teaching methodologies, assessment process and teaching staff.



## DETAILED PROGRAMME

**18 NOVEMBER | 4:00 PM – 7:30 PM (VIA ZOOM)**

Introduction to stem cells and iPSCs  
Quality control of iPSCs and obtaining isogenic lines

**19 NOVEMBER | 4:00 PM – 7:30 PM (VIA ZOOM)**

Microphysiological systems (MPS) General  
Applications of MPS

**20 NOVEMBER | 4:00 PM – 7:30 PM (VIA ZOOM)**

Multi-organ chips  
Organ-on-chip models for the study of  
microbe-host interactions

**21 NOVEMBER | 4:00 PM – 7:30 PM (VIA ZOOM)**

Retinal organoids as disease models  
Organ models on a chip

**22 NOVEMBER | 4:00 PM – 7:30 PM (VIA ZOOM)**

3D models for breast cancer research  
3D models of high-grade gliomas

**25 NOVEMBER | 4:00 PM – 7:30 PM (VIA ZOOM)**

Caenorhabditis elegans: a model system for  
biomedical research  
Brain organoids

**26 NOVEMBER | 4:00 PM – 7:30 PM VIA ZOOM)**

Cardiac organoid models  
3D (Bio-)printing technologies

**27 NOVEMBER | 4:00 PM – 7:30 PM VIA ZOOM)**

Liver models  
Exploring computational and artificial intelligence  
(AI) approaches in the search for new therapies

**28 NOVEMBER | 4:00 PM – 7:30 PM VIA ZOOM)**

Reconstructed models of pigmented skin/epidermis  
3D models of the tonsils

**29 NOVEMBER | 4:00 PM – 7:30 PM VIA ZOOM)**

3D in vitro models of vascularisation  
3D models of the intestine and lung mucosa





### TEACHING STAFF

Sandra Tenreiro, PhD  
Cláudia Nunes dos Santos, PhD  
Andreia Teixeira Castro, PhD  
Bruno Sarmiento, PhD  
Cristina Barrias, PhD  
Duarte Barral, PhD  
Evguenia Bekman, PhD  
Giacomo Domenici, PhD  
Guadalupe Cabral, PhD  
Helena Soares, PhD  
Joana Miranda, PhD  
Jorge Carvalho, PhD  
José Inácio, PhD  
Kevin Achberger, PhD  
Madalena Cipriano, PhD  
Rita Guedes, PhD  
Sarela Garcia-Santamarina, PhD  
Simão Rocha, PhD

### COURSE RECIPIENTS

PhD students in the fields of Medicine and Health Sciences; Masters (or pre-Bologna graduates) or Doctorates in Medicine and Health Sciences.

### COURSE CRITERIA

Curriculum analysis

### COURSE ABSENCE REGIME

Compulsory attendance of at least 24 hours

### TEACHING LANGUAGE

English

### NUMERUS CLAUSUS

30

### CONTACT HOURS

35

### Nº. OF WORKING HOURS REQUIRED TO COMPLETE THE COURSE

105h

### TIMETABLE

16h00 – 19h30

### APPLICATION FEE

51€

### TUITION FEE

250€ (includes tuition and application fee)

### PROGRAM MANAGER



Eduardo Parreira

### INFORMATION AND REGISTRATION

For more information, contact the Program Manager.

Tel.: **910 959 816**

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