

ADVANCED TRAINING

2<sup>ND</sup> EDITION

# CELL AND MOLECULAR MECHANISMS OF AGING AND ASSOCIATED DISEASES

5 ECTS

## COORDINATION



Duarte Barral  
Associate Professor



Cláudia Almeida  
Principal Investigator



Cláudia Santos  
Principal Investigator

## APPLICATIONS UNTIL

15.10.2023

## DATES

6.11.2023 – 17.11.2023



### **COURSE PRESENTATION**

Aging is one of the most important societal challenges and will remain so in the coming decades. Therefore, it is crucial to understand the cellular and molecular processes involved in cellular senescence associated with aging, as well as develop novel strategies to prevent the health conditions associated with aging.

### **LEARNING OUTCOMES**

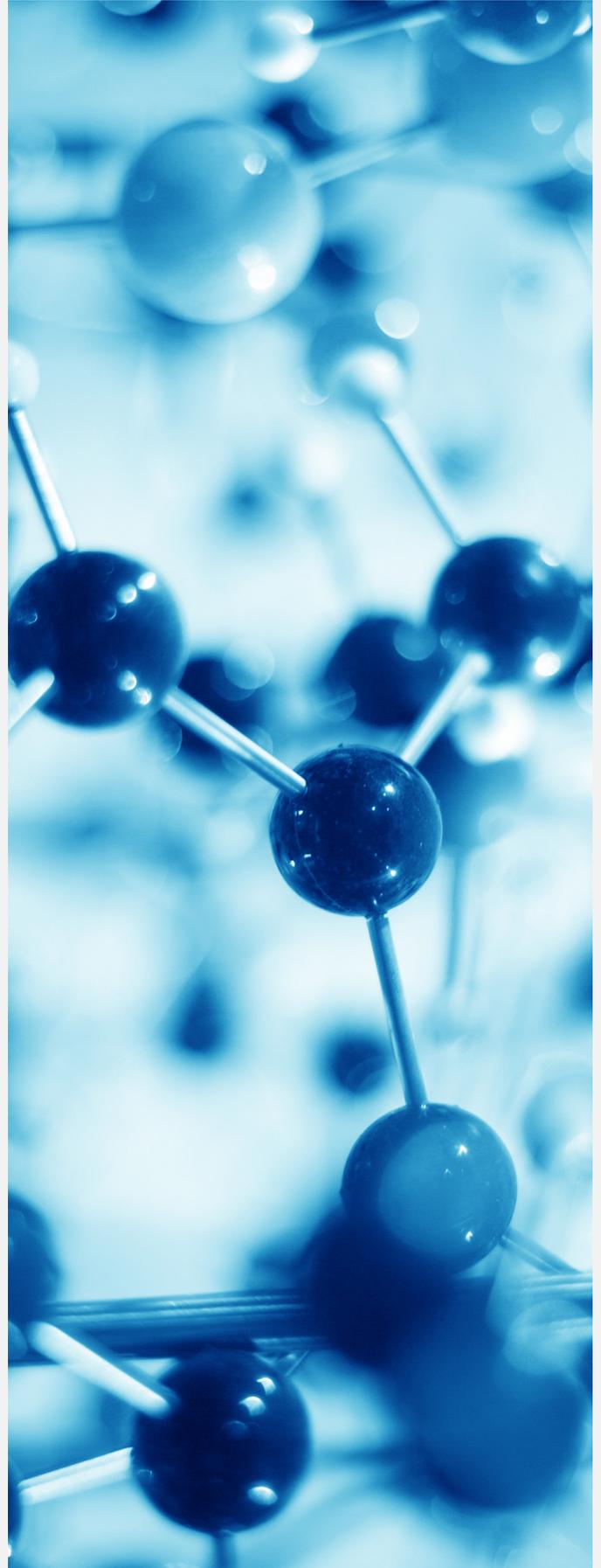
This course aims to deepen students' knowledge of the cellular and molecular mechanisms involved in aging and associated chronic diseases. In particular, students should acquire knowledge about the cellular and molecular changes that accompany aging, both at the genome level and at the level of proteins and organelles. They should also learn about cellular and animal models used to study aging.

### **TEACHING METHODOLOGIES**

The teaching methodologies combine seminars with the presentation of papers by the students. This will encourage their participation. The seminars will be given by fundamental researchers and clinicians, specialists in the topics covered. Whenever possible, the same topic will be approached from a fundamental and translational perspective.

### **ASSESSMENT METHODS**

The assessment will be centered on the participation of the students in class and on the work and presentation made by them, in which they must apply the knowledge acquired to specific research situations and interpret experimental data, in addition to testing their fundamental knowledge. The evaluation will involve: the presentation and discussion of a primary research paper, and the participation in class.



## PROGRAM

### SESSION 1 | 06/11

#### Introduction to Aging and the Study of its Mechanisms

João Pedro Magalhães (University of Birmingham); Alisson Gontijo (FCUL); César Mendes (NMS); Sílvia Conde (NMS)

- Hallmarks of aging
- Cell senescence
- Animal models to study aging (*Caenorhabditis elegans*, *Drosophila melanogaster*, *murinae* - mice and rats)

### SESSION 2 | 07/11

#### Protein Disorder in Cellular Aging

Paulo Pereira (NMS); Paulo Gameiro (NMS)

- Proteostasis and Unfolded Protein Response
- Protein misfolding
- Post-translational modifications

### SESSION 3 | 08/11

#### Organelle Changes Associated with Aging

Duarte Barral (NMS); Nuno Raimundo (Multidisciplinary Institute of Aging, Universidade de Coimbra)

- Mitochondria
- Lysosomes and autophagy

### SESSION 4 | 09/11

#### Genomic Modifications in Aging

Alisson Gontijo (NMS); Miguel Godinho Ferreira (Institute for Research on Cancer and Aging, Nice)

- Telomere maintenance
- DNA damage and other genomic changes
- Epigenetic and transcriptomic changes

### SESSION 5 | 10/11

#### Nutrition in Aging

Cláudia Santos (NMS); Nuno Mendonça (NMS)

- Nutrition in musculoskeletal health
- Molecular nutrition and brain health

### SESSION 6 | 13/11

#### Cardiovascular Aging

José Delgado Alves (NMS); Otília Vieira (NMS)

- Atherosclerosis
- Dyslipidemia

### SESSION 7 | 14/11

#### Dysmetabolism in aging

Hugo Miranda (NMS); Sílvia Conde (NMS)

- Pathophysiological mechanisms of metabolic diseases
- Diabetes and neurodegeneration

### SESSION 8 | 15/11

#### Musculoskeletal Aging

Joana Neves (iMM); Fernando Pimentel-Santos (NMS)

- Molecular mechanisms of muscle cell aging
- Sarcopenia and osteoporosis: from pathophysiological mechanisms to diagnosis and therapeutic approach

### SESSION 9 | 16/11

#### New therapies for Aging-Associated Conditions

Miguel Seabra (NMS); Sandra Tenreiro (NMS)

- Anti-aging drugs
- Senolytics
- Cell-based therapies
- Gene therapies

### SESSION 10 | 17/11

#### Brain Aging and Neurodegeneration

Cláudia Almeida (NMS); Luísa Alves (CHLO)

- Brain aging
- Conversion of aging-associated cognitive decline to Alzheimer's disease



#### TEACHING STAFF

Alisson Gontijo  
César Mendes  
Cláudia Almeida  
Cláudia Santos  
Duarte Barral  
Fernando Pimentel-Santos  
Hugo Miranda  
Joana Neves  
José Delgado Alves  
João Pedro Magalhães  
Luísa Alves  
Miguel Godinho Ferreira  
Miguel Seabra  
Nuno Mendonça  
Nuno Raimundo  
Otília Vieira  
Paulo Gameiro  
Paulo Pereira  
Sandra Tenreiro  
Sílvia Conde

#### TEACHING LANGUAGE

English

#### NUMERUS CLAUSUS

Maximum: 30

#### COURSE SCHEDULE

4 pm - 7:30 pm

#### ADMISSION CRITERIA

Curricular analysis

#### AUDIENCE

PhD students and PhDs in Medicine or Health Sciences; MDs

#### VENUE

Online (zoom)

#### TUITION FEE

Application fee **51€**

Course fee: **335€**

#### PROGRAM MANAGER



Dora Feijão

#### INFORMATION AND REGISTRATION

For more information, contact the Program Manager.

Tel.: **218 803 020**

**formacaoavancada@nms.unl.pt**

[www.nms.unl.pt](http://www.nms.unl.pt)