

3 ECTS

Postgraduate course

CELL AND MOLECULAR MECHANISMS OF AGING AND ASSOCIATED DISEASES

ONLINE

APPLICATION DEADLINE

13/11/2022

COURSE DATES

28/11/2022 - 13/12/2022

DURATION

35 hours

COORDINATION

Duarte Barral
Associate Professor
NOVA Medical School

Cláudia Almeida
Assistant Researcher
NOVA Medical School

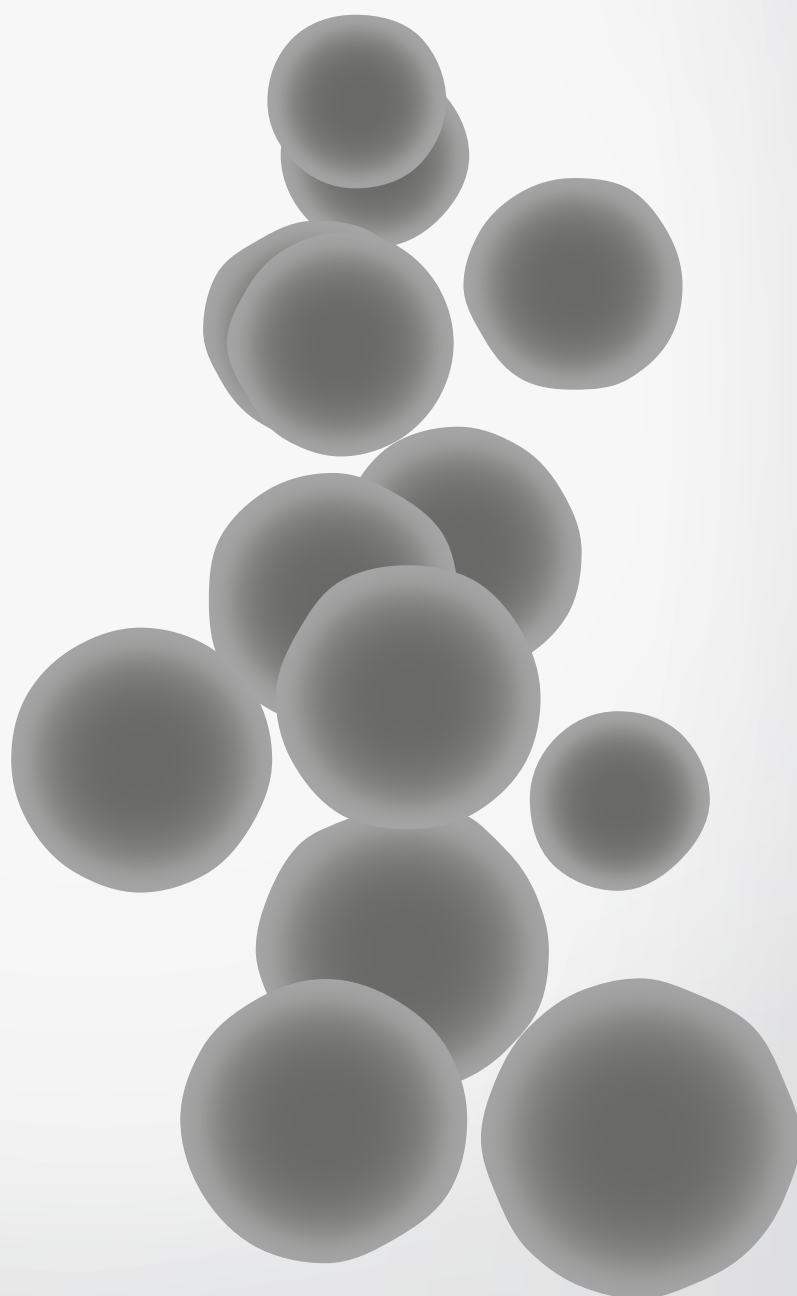
Cláudia Santos
Principal Investigator
NOVA Medical School

CONTACTS

+351 218 803 066

posgraduacao@nms.unl.pt

www.nms.unl.pt



COURSE PRESENTATION

Aging is one of the most important societal challenges and will remain so in the coming decades. Indeed, the worldwide population aged 60 years or over is predicted to reach 2.1 billion in 2050, outnumbering children and adolescents aged 10-24. Moreover, the number of people aged 80 years or over is predicted to reach 425 million in 2050 (source: WHO).

Aging is associated with cellular dysfunction and degeneration of various tissues and organs, which often lead to debilitating diseases. 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 associated health conditions.

This course will focus on the cell biology of aging and the molecular mechanisms of associated diseases, with a translational perspective.

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 in the study of aging. This course will seek to promote critical thinking about the most recent advances in this field. For this, it will be essential to discuss the existing experimental evidence and the priorities for the advancement of the knowledge beyond the state of the art. Students should also learn the frontiers of knowledge, both at a theoretical, methodological and technical level, as well as identify future priorities for research in this field.

AUDIENCE / ENTRY REQUIREMENTS

PhD students of Medicine and Health Sciences.

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. The same topic will be approached from a fundamental and translational perspective.

ADMISSION CRITERIA

Curricular analysis

COURSE ATTENDANCE REQUIREMENTS

Mandatory attendance of 2/3 of classes.

TEACHING LANGUAGE

English

NUMERUS CLAUSUS

Max: 30 | Min: 11

TUITION FEE

Application fee: 51€
Registration fee: 35€
Course fee:

- NMS PhD Students: no cost
- Other Students: 300€

COURSE SCHEDULE

4 pm - 7:30 pm

VENUE (ONLINE)

NOVA Medical School
Campo dos Mártires da Pátria 130,
1169-056 Lisbon | Portugal

PROGRAM

SESSION 1

28.11.2022

Introduction to Aging

- Hallmarks of aging
- Cell senescence

SESSION 2

29.11.2022

Brain Aging and Neurodegeneration

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

SESSION 3

30.11.2022

Protein disorder and phase separation in cellular aging

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

SESSION 4

02.12.2022

Animal Models to Study Aging

- *Caenorhabditis elegans*
- *Drosophila melanogaster*
- Zebrafish (*Danio rerio*)
- Murinae (mice and rats) to aging-related diseases

SESSION 5

05.12.2022

Organelle Changes Associated with Aging

- Lysosomes and autophagy
- Endoplasmic reticulum stress
- Mitochondria

SESSION 6

06.12.2022

Genomic Modifications in Aging

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

SESSION 7

07.12.2022

Dysmetabolism in Aging

- Pathophysiological mechanisms of metabolic diseases
- Diabetes and neurodegeneration

SESSION 8

9.12.2022

Musculoskeletal Aging

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

SESSION 9

12.12.2022

Nutrition in Aging

- Nutrition in musculoskeletal health
- Molecular nutrition and brain health

SESSION 10

13.12.2022

New therapies for Aging-Associated Conditions

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

TEACHING STAFF

- **Alisson Gontijo, PhD**
NOVA Medical School
- **Allison Bardin, PhD**
Institut Curie
- **Ana Paula Pêgo, PhD**
i3S
- **César Mendes, PhD**
NOVA Medical School
- **Cláudia Almeida, PhD**
NOVA Medical School
- **Cláudia Santos, PhD**
NOVA Medical School
- **Edgar Gomes, PhD**
Instituto de Medicina Molecular
- **Fernando Pimentel-Santos, MD, PhD**
NOVA Medical School
- **Francisco Enguita, PhD**
Instituto de Medicina Molecular
- **Helena Vieira, PhD**
NOVA School of Science and Technology
- **Hugo Miranda, PhD**
NOVA Medical School
- **Joana Costa, MD, PhD**
Lusíadas Hospital
- **Joana Neves, PhD**
Instituto de Medicina Molecular
- **João Pedro Magalhães, PhD**
University of Birmingham
- **Luísa Alves, MD, PhD**
CHLO; NOVA Medical School
- **Miguel Seabra, MD, PhD**
NOVA Medical School
- **Nuno Mendonça, PhD**
NOVA Medical School
- **Paulo Pereira, PhD**
NOVA Medical School
- **Pedro Víctor, PhD**
Instituto de Medicina Molecular
- **Sandra Tenreiro, PhD**
NOVA Medical School
- **Sílvia Conde, PhD**
NOVA Medical School
- **Susana Lopes, PhD**
NOVA Medical School

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 thus have three components: the presentation and discussion of one or two scientific articles, the writing of a small project proposal on one of the topics addressed that should be a priority (centered on the problem to be solved, on the hypothesis and on the objectives) and the participation in class.

COURSE EVALUATION

An anonymous evaluation questionnaire will be distributed to the students at the end of the course.

This questionnaire will assess several topics of the course such as its objectives and syllabus, the teaching and assessment methodologies and the Faculty.

REGISTRATION LINK

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