

27 JAN. 2025 — 07 FEB. 2025

ADVANCED
TRAINING
**CELL AND MOLECULAR
MECHANISMS OF AGING
AND ASSOCIATED
DISEASES**



WHAT IS CELL AND MOLECULAR MECHANISMS OF AGING AND ASSOCIATED DISEASES?

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.

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 health conditions associated with aging.

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

3RD EDITION

3 ECTS

Application deadline: **January 03, 2025**

LEARNING OBJECTIVES

- 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

- PhD students and PhDs in Medicine or Health
- Sciences; MDs

COURSE ASSESSMENT

- 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.

COORDINATION



Duarte Barral



Cláudia Santos



Cláudia Almeida

COURSE FACULTY

Alisson Gontijo
César Mendes
Cláudia Almeida
Cláudia Cavadas
Cláudia Santos
Duarte Barral
Hugo Miranda
João Pedro Magalhães
José Delgado Alves
Luísa Alves
Miguel Godinho Ferreira
Miguel Seabra
Nuno Mendonça
Nuno Raimundo
Otilia Vieira
Paulo Gameiro
Paulo Pereira
Sílvia Conde

PROGRAMME

BLENDED

SESSION 1

27 JAN 2025 | 16H00-19H30

Introduction to Aging and the Study of its Mechanisms

- Hallmarks of aging
- Cell senescence

SESSION 2

28 JAN 2025 | 16H00-19H30

Animal Models to Study Aging

- *Caenorhabditis elegans*
- *Drosophila melanogaster*
- Mice and rats

SESSION 3

29 JAN 2025 | 16H00-19H30

Protein Disorder in Cellular Aging

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

SESSION 4

30 JAN 2025 | 16H00-19H30

Organelle Changes Associated with Aging

- Mitochondria
- Lysosomes and autophagy

SESSION 5

31 JAN 2025 | 16H00-19H30

Genomic Modifications in Aging

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



PROGRAMME

BLENDED

SESSION 6

03 FEB 2025 | 16H00-19H30

Mechanisms of Synapse Loss in Aging-related Alzheimer's Disease

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

SESSION 7

04 FEB 2025 | 16H00-19H30

Dysmetabolism in Aging

- Pathophysiological mechanisms of metabolic diseases
- Diabetes and neurodegeneration

SESSION 8

05 FEB 2025 | 16H00-19H30

Nutrition in Aging

- Nutrition in musculoskeletal health
- Molecular nutrition and brain health

SESSION 9

06 FEB 2025 | 16H00-19H30

Cardiovascular Aging

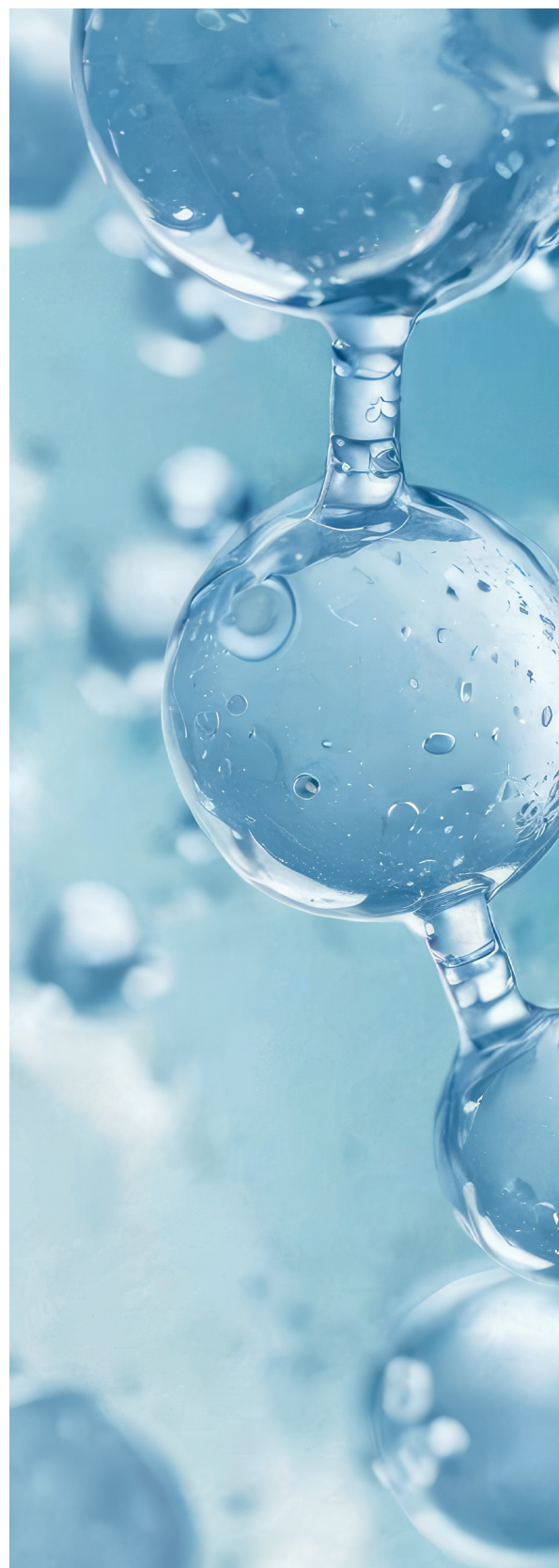
- Atherosclerosis
- Dyslipidemia

SESSION 10

07 FEB 2025 | 16H00-19H30

New therapies for Aging-Associated Conditions

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



APPLICATION DOCUMENTS

CV and transcript of records

APPLICATION CRITERIA

Curricular analysis

NUMERUS CLAUSUS

30

SELECTION PROCESS

CV evaluation

ATTENDANCE REQUIREMENTS

Mandatory attendance of 2/3 of classes

COURSE LANGUAGE

English

TUITION FEE

- Application fee **51€**
- Course fee **335€**

PROGRAM MANAGER



EDUARDO PARREIRA

INFORMATION

**For specific questions or inquiries,
please contact:**

T: (+351) 910 959 816

formacaoavancada@nms.unl.pt

WWW.NMS.UNL.PT