

Ph.D. in “Life Course Research” – Biomedical curriculum

Academic Year 2024-2025

Course: **Cellular Biology**

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Objectives:

The aim of the course is to introduce students to the basics of pathological aging mechanisms. The approach will be descriptive, starting from the basic knowledge about aging and then will try to decipher the relation between molecular mechanisms and environment interaction in aging.

Program:

Lesson 1

- A general introduction about the cells and we start to talk about the aging as a biological process, related to the well-known genetic variants in aging
- Hallmarks of aging
- We will talk about the epigenetic role in aging

Lesson 2

- Waddington coined the term “epigenetic” to attempt to explain the complex, dynamic interactions between the developmental environment and the genome
- Excursus in animals genetic modified
- Reprogramming stem cells (PSC) in animals and then in humans as a therapeutic approach
- Modeling aging through calories restriction and its effects on energetic cell metabolism

Lesson 3

- The role of mitochondria as a regulator of autophagy and their link with inflammation
- The characteristics of apoptosis and senescence in cells from molecular view
- A study model: Progeria syndrome
- Hallmarks of senescence and their role in aging and the events that lead to this process
- Senolytics drugs that can be used to target the senescent cells
- cGAS-STING signaling

Suggested lecture:

Articles related

Requirement:

Notion of molecular biology