Faculty of Medicine in Rijeka

**Curriculum**
**2025/2026**

For course

# Nutrition, Metabolism, Aging, and Aging-related Diseases

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| Study program: | **Medical Studies in English (R)** (elective)<br>University integrated undergraduate and graduate study |
| Department: | **Department of Molecular Medicine and Biotechnology** |
| Course coordinator: | **prof. dr. sc. Volarević Siniša, dr. med.** |
| Year of study: | **4** |
| ECTS: | **1.5** |
| Incentive ECTS: | **0 (0.00%)** |
| Foreign language: | **Possibility of teaching in a foreign language** |

## Course information:

The course aims to introduce the students to the current understanding of the link between metabolism, cancer, and accelerated aging at the molecular level. Particular emphasis will be put on the role of unhealthy habits regarding eating and nutrition on cancer pathogenesis and accelerated aging. Students will also be informed about the implications of this knowledge for the prevention and treatment of aging-related diseases, particularly cancer and neurodegenerative disorders.

## List of assigned reading:

Lodish H, Berk A, Zipursky SL, Matsudaira P, Baltimore D, Darnell JE. (1999) Molecular Cell Biology. 4th edition, W H Freeman & Co.

## List of optional reading:

Deleyto-Seldas N and Efeyan A. The mTOR-autophagy axis and the control of metabolism. Front Cell Dev Biol, 9:655731 (2021)

Vander Heiden MG et al. Understanding the Warburg effect: the metabolic requirements of cell proliferation. Science, 324:1029-1033 (2009)

de Cabo, and Mattson MP. Effects of Intermittent fasting on health, aging, and disease. N Engl J Med. 381:2541-2551 (2019)

Longo VD and Anderson RM. Nutrition, longevity, and disease: from molecular mechanisms to interventions. Cell. 185:1455-1470 (2022)

## Curriculum:

### Lectures list (with titles and explanation):

**Metabolic reprogramming in cancer**

Metabolic reprogramming in cancer.

### Seminars list (with titles and explanation):

**Dysregulation of energy metabolism in cancer**

Dysregulation of energy metabolism in cancer.

**The key role of the insulin receptor-PI3K-mTORC1 signaling pathway in cancer and aging**

The key role of the insulin receptor-PI3K-mTORC1 signaling pathway in cancer and aging

**Dysregulated protein synthesis drives cancer pathogenesis and accelerates aging**

Dysregulated protein synthesis drives cancer pathogenesis and accelerates aging

**Unhealthy habits regarding eating and nutrition, metabolism, aging, and cancer**

Unhealthy habits regarding eating and nutrition, metabolism, aging, and cancer

**Healthy habits regarding eating and nutrition in cancer prevention and treatment**

Healthy habits regarding eating and nutrition in cancer prevention and treatment.

**Healthy habits regarding eating and nutrition in slowing down the aging process**

Healthy habits regarding eating and nutrition in slowing down the aging process

## Student obligations:

Classs attendance 70%.

## Exam (exam taking, description of the written/oral/practical part of the exam, point distribution, grading criteria):

Classs attendance 70%.

## Other notes (related to the course) important for students:

1. Metabolic reprogramming in cancer
2. Dysregulation of energy metabolism in cancer
3. The key role of the insulin receptor-PI3K-mTORC1 signaling pathway in cancer and aging
4. Dysregulated protein synthesis drives cancer pathogenesis and accelerates aging
5. Unhealthy habits regarding eating and nutrition, metabolism, aging, and cancer
6. Healthy habits regarding eating and nutrition in cancer prevention and treatment
7. Healthy habits regarding eating and nutrition in slowing down the aging process

## COURSE HOURS 2025/2026

Nutrition, Metabolism, Aging, and Aging-related Diseases

| **Lectures**<br>(Place and time or group) | **Seminars**<br>(Place and time or group) |
|---|---|
| **18.05.2026** | |
| Metabolic reprogramming in cancer:<br>• P09 - TEACHING IN ENGLISH (15:00 - 18:45) [154]<br>  ○ NMAAAD | |
| prof. dr. sc. Volarević Siniša, dr. med. [154] | |
| **19.05.2026** | |
| | Healthy habits regarding eating and nutrition in cancer prevention and treatment:<br>• P01 (13:00 - 19:00) [154]<br>  ○ NMAAAD<br><br>Healthy habits regarding eating and nutrition in slowing down the aging process:<br>• P01 (13:00 - 19:00) [154]<br>  ○ NMAAAD |
| prof. dr. sc. Volarević Siniša, dr. med. [154] | |
| **20.05.2026** | |
| | Dysregulated protein synthesis drives cancer pathogenesis and accelerates aging:<br>• P06 (13:00 - 17:30) [154]<br>  ○ NMAAAD<br><br>Unhealthy habits regarding eating and nutrition, metabolism, aging, and cancer:<br>• P06 (13:00 - 17:30) [154]<br>  ○ NMAAAD |
| prof. dr. sc. Volarević Siniša, dr. med. [154] | |
| **26.05.2026** | |
| | Dysregulation of energy metabolism in cancer:<br>• P07 (13:00 - 17:30) [154]<br>  ○ NMAAAD<br><br>The key role of the insulin receptor-PI3K-mTORC1 signaling pathway in cancer and aging:<br>• P07 (13:00 - 17:30) [154]<br>  ○ NMAAAD |
| prof. dr. sc. Volarević Siniša, dr. med. [154] | |

### List of lectures, seminars and practicals:

| LECTURES (TOPIC) | Number of hours | Location |
|---|---|---|
| Metabolic reprogramming in cancer | 5 | P09 - TEACHING IN ENGLISH |

| SEMINARS (TOPIC) | Number of hours | Location |
|---|---|---|
| Dysregulation of energy metabolism in cancer | 4 | P07 |

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|---|---|---|
| The key role of the insulin receptor-PI3K-mTORC1 signaling pathway in cancer and aging | 2 | P07 |
| Dysregulated protein synthesis drives cancer pathogenesis and accelerates aging | 3 | P06 |
| Unhealthy habits regarding eating and nutrition, metabolism, aging, and cancer | 3 | P06 |
| Healthy habits regarding eating and nutrition in cancer prevention and treatment | 4 | P01 |
| Healthy habits regarding eating and nutrition in slowing down the aging process | 4 | P01 |

**EXAM DATES (final exam):**

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