



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## SYLLABUS DEL CORSO

### Biologia Molecolare 2

2526-2-H4101D006-H4101D018M

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#### Aims

The module aims to describe the biochemical and molecular language, the correlation between function and molecular structure, the complex patterns of communication, interaction and control of cell and tissue functions

#### Contents

Control of cellular-gene metabolism  
Hunger and satiety hormones and regulation of body weight  
Metabolic syndrome  
Supplements, phytochemicals and health  
Biochemistry of the tumor cell  
Effect of air pollution on human health  
Nanomedicine

#### Detailed program

Cellular-gene metabolism control- Analysis of cellular pathways activated by cellular energy levels; mechanisms of gene activation and inhibition regulated by cellular nutrient levels.

Hunger and satiety hormones and regulation of body weight - Role of adipose tissue; leptin, ghrelin, insulin, adiponectin, and resistin in the control of hunger/satiety and body weight.

Metabolic syndrome - Analysis of the biochemical alterations (hyperglycemia, dyslipidemia, hypertension) that contribute to the establishment of this pathology. Obesity and notes on the microbiota and its importance in human

health.

Supplements, phytochemicals and health - Legislation of supplements, their importance, cases of confirmed deficiencies, truths and legends. Plant compounds and action on well-being.

Tumor cell biochemistry - Changes in biochemical pathways in tumor tissues; bionergetics, enzymatic alterations, role of oxidative stress

Effect of air pollution on human health - The main air pollutants and their mechanisms of action at the cellular level (oxidative stress and inflammation), their negative effect on health and related pathologies.

Nanomedicine-. Nanomedicine aims to provide a set of research tools and clinically useful devices in the near future. Nanomedicine uses the tools of nanotechnology (i.e., biocompatible nanoparticles and nanorobots) to deliver drugs, diagnose disease, and perform in vivo imaging. Nanotechnology has improved drug delivery by targeting specific organs to optimize the efficacy and safety profiles of individual drugs.

The exercises will cover the following topics:

- blood sugar regulation and related biochemical-clinical analyses
- discussion of clinical cases on pathologies of carbohydrate and lipid metabolism
- analysis and commentary of food plans

## **Prerequisites**

To take the Biological Chemistry and Molecular Biology exam, it is necessary to pass the Propedeutic Sciences

## **Teaching form**

DE- 6 lessons of 2 hours carried out in presence mode

DI- 5 exercises of 2 hours carried out in interactive mode in presence plus 1 exercise of 2 hours carried out in remote delivery mode

## **Textbook and teaching resource**

1. La Biochimica di TM DEVLIN- VI ed. (2024) EDISES Università
2. Biochimica Medica- Siliprandi and Tettamanti V ed. Piccin
3. Le Basi della Biochimica- Ermine Ercikan Abali III ed. Zanichelli

## **Semester**

Second year, I semester

## **Assessment method**

All students have access to a written test followed by an oral interview.

The written test consists of 4 quizzes, of which 3 single-answer and 1 a multiple-choice. (CLOSED ANSWER TEST).

## **Office hours**

By appointment:

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## **Sustainable Development Goals**

ZERO HUNGER | GOOD HEALTH AND WELL-BEING | QUALITY EDUCATION

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