UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Biochemistry

2627-1-I0103D001-I0103D00101

Aims

The course provides the fundamental principles of chemistry and fosters the understanding of the basic mechanisms that regulate molecular organization, biochemical reactions, cellular and subcellular morphology, and major metabolic cycles. In addition, the course aims to develop the student's knowledge of the principles of nutrition, with particular attention to their role in maintaining health and preventing disease.

Knowledge and Understanding
The student will acquire fundamental knowledge of general chemistry (atoms, chemical bonds, solutions, pH) and basic biochemistry, including the structure and function of major biomolecules (proteins, carbohydrates, lipids, nucleic acids), energy metabolism, and the regulation of metabolic pathways. This knowledge will provide the foundation for understanding the molecular mechanisms underlying human physiology and common pathological alterations.

Applying Knowledge and Understanding
The student will be able to apply acquired chemical, biochemical, and nutritional knowledge to understand biological and clinical phenomena relevant to nursing practice, such as nutrient metabolism, inflammatory responses, and the molecular effects of drugs. They will be able to interpret basic biochemical laboratory data that are useful in clinical settings.

Making Judgements
The student will develop the ability to critically evaluate the biochemical implications of common clinical conditions and recognize the importance of biochemical balance in maintaining patient homeostasis. They will be able to relate biochemical alterations to clinical signs and symptoms, supporting informed nursing decisions.

Communication Skills
The student will be able to use appropriate scientific language to describe chemical and biochemical phenomena and communicate effectively with peers, instructors, and other healthcare professionals, including within multidisciplinary teams.

Learning Skills
The student will develop effective study methods for independently exploring scientific topics, laying the groundwork for a critical and informed approach to subsequent subjects in physiology, pathology, pharmacology, and clinical nursing.

Contents

The student will learn 1) the general information on the molecules that make up living matter; 2) the structure, function, mechanism of action of enzymes and their role in metabolic regulation; 3) the mechanism by which the living organism produces energy; 4) nutritional aspects as a source of energy in everyday life and in physical exercise; 5) digestive processes, the molecules involved in energy metabolism.

Detailed program

Introduction to the course and general information on living matter. Chemistry principles. Structural biochemistry: Carbohydrates, Lipids, Proteins, Nucleotides. Biochemical reactions, enzymes, enzymatic kinetics, regulation. Bioenergetics, respiratory chain, oxidative phosphorylation. Principles of digestion and absorption of nutrients. Nutrition and Vitamins. Energy metabolism.

Prerequisites

Biology.

Teaching form

Frontal lectures.
10 lessons (2-hours/each) held in person (Monza) and in synchronous distance learning (Lecco, Sondrio and Bergamo locations).

Textbook and teaching resource

Slides of the lectured (uploaded on e-learning).

Suggested books:

- Bertoldi, M., Colombo, D., Magni, F., Marin, O., & Palestini, P. (2015). Chimica e Biochimica. EdiSES, Napoli.
- Di Giulio, A., Fiorilli, A., & Stefanelli, C. (2011). Biochimica per le scienze motorie. Casa Editrice Ambrosiana, Rozzano (MI).
- Nelson, D. L., & Cox, M. M. (2021). Fondamenti di biochimica di Lehninger. Zanichelli, Bologna. (disponibile

anche in e-book).
- Siliprandi, N., & Tettamanti, G. (2018). Biochimica medica: Strutturale, metabolica e funzionale (5ª ed.). Piccin-Nuova Libraria, Padova.

Semester

1st year, 1st semester

Assessment method

Written test. Multiple choice questions.

Office hours

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Sustainable Development Goals

GOOD HEALTH AND WELL-BEING | QUALITY EDUCATION | GENDER EQUALITY