UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Biochemistry and Molecular Biology

2021-2-H4101D006

Aims

BIOLOGICAL CHEMISTRY-The module main objective is to provide students with the concepts necessary for understanding biological phenomena and the energetic variation associated with them. The course will focus on how to place the molecular basis for understanding the complex processes underlying the metabolism of living creatures. MOLECULAR BIOLOGY- 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. BIOCHEMISTRY OF NUTRITION- The module aims to describe the nutritional aspects as a source of energy in life.

Contents

BIOLOGICAL CHEMISTRY Enzymology. Diagnostic use of enzymes and isoenzymes. Bioenergetics: respiratory chain and oxidative phosphorylation. Glucose metabolism: digestion, absorption. Aerobic and anaerobic glycolysis. Regulation of glycolysis. Glycogen synthesis and glycogenolysis and regulation. Galactose and fructose metabolism. Lipid metabolism: digestion and absorption. Catabolism of lipids. Citric acid cycle. Lipogenesis. Regulation of lipolysis and lipogenesis. Metabolism of cholesterol and its derivatives. Metabolism of ketone bodies. Lipoprotein metabolism of plasma lipoproteins. Protein metabolism: digestion, absorption and transport of amino acids. General metabolism of amino acids. Urea cycle. Gluconeogenesis and its regulation. Purine and pyrimidine metabolism. MOLECULAR BIOLOGY- Regulation of blood glucose: liver and muscle glycogen. Insulin, glucagon. Hormones and hypothalamic pituitary. Hormones in the adrenal cortex. Sex hormones. Nervous tissue biochemistry. Blood biochemistry. Hemoglobin and myoglobin oxygen transport. The blood coagulation cascade. Biochemistry of the liver: mechanisms of liver detoxification. Biochemistry of skeletal muscle and myocardium. Biochemistry of connective tissue. Homeostasis and the regulatory role of Calcium and Phosphorus: Calcitonin, Vitamin D, Parathyroid hormone. BIOCHEMISTRY OF NUTRITION- Biochemical aspects of digestion and absorption of nutrients. Basal metabolic rate. Principles of power and fat-soluble vitamins. Homeostasis of carbohydrates, lipids and proteins. The fasting feeding cycle

Detailed program

Prerequisites

Knowledge of the introductory courses indicated in the regulation of the degree course

Teaching form

During the Covid-19 emergency period, lessons will take place remotely asynchronously with some events in synchronously and some in physical presence.

During the period of the lessons, groups in presence will be organized to discuss topics and group exercises in presence and / or online synchronously

Textbook and teaching resource

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 27 quizzes, of which about 24 single-answer and the remaining multiple-choice. Time of one hour for the written test is assigned.

The student is admitted to the oral exam if the answers score reaches a minimum of 17; The oral is carried out the same day and following, after the correction of the writing and takes about 20 minutes for each candidate.

The questions proposed in the written test aim at evaluating the comprehension of the topics covered in lesson, with particular reference to the acquisition of knowledge concerning cell and organ metabolism and to the correct use of laboratory tests in the various diagnostic fields.
In the oral examination, taking into account the written test, the student is asked to explain / deepen some of the answers provided (both those provided wrong and correct), in order to verify the correct interpretation of the question and the reasoning that led to the answer. It also evaluates the knowledge of the main metabolic pathways, and of the biochemical interactions between the cells or in the different organs / tissues and of the dysfunctions

Office hours

by appointment