UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Biochimica Generale

1819-1-H4601D004-H4601D013M

Aims

GENERAL BIOCHEMISTRY

Main goal of this module is to provide students with concepts needed to understand biological phenomena and associated energy changes. Doing this, we aim to lay down fundamentals of molecular understanding of complex processes which form the basis of metabolism of all living creatures.

Contents

GENERAL BIOCHEMISTRY

The course aims to educate students to reason, in molecular terms, the main cellular metabolisms, understand and explain at the molecular level cellular functions and tissue control systems, in particular connective, bone and tooth tissues. In addition, the course aims to provide students with fundamental knowledge about the biochemical and clinical investigations related to major alterations of organs/tissues relevant in dentistry.

Detailed program

GENERAL BIOCHEMISTRY

Enzymology: enzyme kinetics and catalysis. Significance of Vmax and Km. factors influencing enzyme activity. Inhibitors. Allostericenzymes. Isoenzymes. Diagnostic use of enzymes.

Bioenergetics: Respiratory chain and oxidative phosphorylation. High-energy molecules. The production of ATP. Oxidative phosphorylation. Inhibitors and uncoupling factors.

Glucose metabolism: Digestion, absorption and carbohydrates transport. Aerobic and anaerobic glycolysis.

Hormonal and metabolic regulation of glycolysis. Glycogen synthesis and glycogenolysis. Metabolic and hormonal regulation of glycogen metabolism. Sugars interconversion. Galactose and fructose metabolism

Lipid metabolism: Lipids. digestion and absorption. Catabolism of lipids. beta-oxidation of fatty acids. Role of carnitine. Citric acid cycle. Lipogenesis: biosynthesis of fatty acids, biosynthesis of triglycerides. Regulation of lipolysis and lipogenesis. Metabolism of cholesterol and its derivatives. Conversion of cholesterol to steroid hormones and bile salts. Metabolism of ketone bodies. Lipoprotein metabolism of plasma lipoproteins. Lipoprotein receptors.

Protein metabolism: Protein Digestion. Absorption and transport of amino acids. General metabolism of aminoacids. Gluconeogenesis and its regulation.

Purine and pyrimidine metabolism: Biosynthesis of purines and pyrimidines. Purine nucleotides recovery pathway.

Prerequisites

Aims of Preparatory Sciences course.

Teaching form

Lectures and practices.

Textbook and teaching resource

GENERAL AND SYSTEMATIC HUMAN BIOCHEMISTRY BOOKS:

1 Baynes JW and Dominiczak: Biochimica per le discipline biomediche Publishing house Ambrosiana

2 Siliprandi/Tettamanti: Biochimica Medica, Publishing house Piccin

3 Devlin T.M.: Biochimica, Publishing house Idelson-Gnocchi

Semester

First year of course, second semester.

Assessment method

Written test: 27 questions (both single answer and multiple-choice) split into three different parts of teaching program. Final discussion which is intended to evaluate knowledge and skills acquired by students.

Office hours

Reception upon appointment.