UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Human Biochemistry

2627-1-H4602D005-H4602D00502

Aims

SYSTEMATICS HUMAN BIOCHEMISTRY

The form aims to describe the biochemical and molecular language, the complex patterns of communication, interaction and control of cell and tissue functions.

Contents

SYSTEMATIC HUMAN 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

SYSTEMATIC HUMAN BIOCHEMISTRY

Metabolic regulation of blood glucose: liver and muscle glycogen. Hormonal regulation of blood glucose.

Gastro entero pancreatich ormones: insulin, glucagon.

Hormones: Hormones and hypothalamic pituitary. Hormones release. GH. Prolactin. ACTH. Vasopressin. Oxytocin.

Thyroid hormones. Hormones in the adrenal cortex. Sex hormones. Hormones regulation hunger and satiety

Nervous tissue biochemistry: Biosynthesis and catabolism of neurotransmitters. Neurotoxins. Blood biochemistry and coagulation of the blood elements and plasma proteins. Hemoglobin and myoglobin oxygen transport. The blood coagulation cascade. Anticoagulants and fibrinolysis.

Biochemistry of the liver: Role of gluconeogenesis in the liver. Urea cycle and extra-hepatic mechanisms of elimination of ammonia. Reactions of the urea cycle. Extra hepatic elimination of ammonia. Glutamate and glutamine. Mechanisms of liver detoxification. Degradation of hemoglobin. The metabolism of ethanol. Oxidativestress and free radicals

Biochemistry of skeletal muscle and myocardium: Structure and muscle protein. Mechanism of contraction. Muscle energy metabolism. Biochemistry of connective tissue proteoglycans, glycoproteins, collagen, elastin.

Homeostasis and the regulatory role of Calcium and Phosphorus: Calcitonin, Vitamin D, Parathyroid hormone.

Biochemistry of bone and tooth: Macromolecules of the organic matrix. Mineralization of bone and tooth. Boneresorption. Growth factors and hormones that act on cells of the bone.

Biochemistry of saliva. 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.

Prerequisites

Aims of Preparatory Sciences course.

Teaching form

All lectures are conducted in face-to-face delivery mode:

- 15 (2-hour) lectures conducted in the in-presence delivery mode.

In-person group exercises will be organized during the lecture period

Textbook and teaching resource

-Siliprandi/Tettamanti: Biochimica Medica. Piccin
-Devlin T.M.: Biochimica (con aspetti clinici). Idelson-Gnocchi
-Ferrier D.: Le basi della biochimica. Zanichelli
-Nelson D.L. et al.: Introduzione alla biochimica di Lehninger. Zanichelli
-Ferguson D.B.: Biologia del cavo orale. Zanichelli/CEA
-Maccarrone M.: Fondamenti di Biochimica Umana 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 27 closed-ended tests, (20 single-answer and the remaining multiple-choice).

A 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, 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.

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

Reception by appointment
Bulbarelli Tel. Ufficio 026448 8221
alessandra.bulbarelli@unimib.it

Sustainable Development Goals

GOOD HEALTH AND WELL-BEING