UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

System Physiology

2021-3-E1301Q068

Aims

The course aims to provide the student in biological sciences with an overview of the structure (anatomy) and the mechanisms that govern the function of the organic systems.
In particular, at the end of the course the student will have acquired the following skills:
1) knowledge and understanding: to have an integrated view of the organic systems from the functional point of view in order to better understand the organ physiology in the whole human organism;
2) applied knowledge and understanding: to be able to translate cellular physiology information to the organ physiology and apply what has been learned in basic physiology courses to the system physiology
3) making judgments: to be able to evaluate what has been learned with great critical point of view
4) communication skills: to communicate what has been learned with a correct scientific terminology
5) learning skills: to learn critically a large part of the scientific literature about the system physiology of the higher organisms

Contents

The course illustrates the function of most human organ systems, such as the somatic (sensorial and motor) nervous system, the autonomic nervous system, the endocrine, cardiovascular, respiratory, renal and digestive systems.

Detailed program

-Somatic nervous system: general concepts, nutrition and protection, glial cells. Anatomy of the sensory and motor system. Sensory neuron: transduction, transmission and coding of the sensory stimulus. Somatosensory system. Photoreceptors, light signal transduction, retinal circuits and visual pathway. Ear, transduction and transmission of the sound signal. Motor system: planning and execution of voluntary movement. pyramidal and extrapriramidal

tracts. Parallel systems in the control of voluntary movement (cerebellum and nuclei of the base). Spinal reflexes.
-Autonomic nervous system: Orthosympathetic and Parasympathetic systems.
-Endocrine system: hormones and intracellular signals. Hypothalamic-hypophysis axis and related glands (thyroid, adrenal gland).
-Cardiovascular System: Heart, electrophysiology and mechanical function. Arterial and venous circulation. Capillary exchanges. Integrated homeostasis of arterial pressure and intravascular volume.
-Respiratory system: Respiratory mechanics. Alveolus-capillary exchanges. Gas transport in the blood. Pulmonary circulation and its regulation.
-Excretory system: Anatomo-functional organization of the renal parenchyma. Glomerular filtration mechanism and its regulation. Reabsorption and tubular secretion mechanisms. Renal clearance. Role of the kidney in the acid / base balance. Volume control, osmolarity and electrolyte concentrations.
-Digestive System: Digestion (cephalic, gastric, intestinal phases). Exocrine pancreas. Liver and bile formation. Absorption: sugars, amino acids, lipids, water. Transport of lipids in the blood.

Prerequisites

Knowledge of biochemistry, physics and general physiology

Teaching form

Remote synchronous lesson at the link

https://unimib.webex.com/meet/marcella.rocchetti

Textbook and teaching resource

Textbook: "Fisiologia – Molecole, cellule e sistemi", D'Angelo E. & Peres A Eds, Edi Ermes.
Course slides on e-learning platform

Semester

Second semester

Assessment method

Oral exam. The test is based on several questions to understand if the student has learned the physiology of a specific organ and if he has acquired an integrated view of the organ physiology.

Office hours

E-mail appointment