UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Physiology 1 B

2122-2-H4101D253-H4101D021M

Aims

It is essential that all medical students receive sufficient exposure to the physiological concepts underlying the functions of the human body that will provide the basis for further studies in pharmacology, pathology, pathophysiology and medical clinics and surgery. Curricular objectives are mainly focused on the normal function of the body, however, the material is presented in a context that prepares students for their role as doctors. Therefore, whenever possible, clinical examples will be used to illustrate physiological baseline principles.

Contents

The course is based on the systematic presentation of physiological concepts based on the functions of the human body. The mechanism leading to an imbalance of function cannot be appreciated without a deep understanding of the biophysical and physiological basics. Therefore, such mechanisms that ensure the functions at the cellular level, tissues, organs and apparatus and at the integrated level will be introduced. In particular, the course will address the physiology of cardiovascular system

Detailed program

Physiology of the Heart. Structural and functional characteristics of the myocardium. Cardiac automation. Adjustment of heart rate. Rhythmic excitation processes and excitation-contraction coupling. Nervous control of cardiac activity. Cardiac pump mechanics. Cardiac output. Self-regulation of cardiac output (Starling's law). Measurement of cardiac output. Relationship between oxygen consumption and cardiac output (Fick's principle).

The cardiac cycle. Energetics and work of the heart. Mechanisms of intrinsic and extrinsic regulation of the heart. Heart tones.

Circulatory System. Blood and its rheology, biophysics of circulation: Bernouilli's principle, Poiseuille's law. Mechanical properties of vessels: arteries, arterioles, capillaries, veins. Distensibility and 'compliance' of the vessels. Laplace's law. Blood speed. Arterial pressure and its control. Systemic and pulmonary circle. The venous system. Coronary circulation. Splanchnic circulation. Pulmonary circulation. Renal circulation

Prerequisites

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

Teaching form

Lectures will be held in presence. In case of emergency the lessons may be held in blended mode: asyncronous/syncronous and recorded.

Whenever possible, clinical case analyzes will be proposed for the evaluation of the specificphysiological parameters.

Textbook and teaching resource

KLINKE, Fisiologia EdiSES

CONTI, Fisiologia Medica, EDIERMES

GUYTON & J.E. HALL, Fisiologia medica, Piccin

GRASSI, NEGRINI, PORRO Fisiologia Medica, POLETTO EDITORE

Semester

First Semester

Assessment method

There will be no ongoing tests. The exam consists in an oral test. Open questions will be posed to the student in order to evaluate the general knowledge of the topics. Moreover, the student will be asked to answer to questions that require the analysis of a complex phenomenon, its rationalization and the application of specific physiology principles and to solve simple exercises. Finally, a clinical case may be presented which will require the analysis of the interconnections between different physiological variables in the light of the theoretical paradigms.

In the Covid-19 emergency period, the exams will be carried out electronically through the platforms made available by the University

Office hours

The professors receive by appointment upon agreement by e-mail