



UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Fisiologia 1 A

1718-2-H4101D253-H4101D020M

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 excitable and non-excitable cells, of the cardio-circulatory, respiratory, renal, digestive, nervous system, motor functions and superior nervous functions.

Detailed program

CELL PHYSIOLOGY. Transport through the plasma membrane, diffusion, active transport and passive transport. carriers and ion channels

BASIC ELECTROPHYSIOLOGY. Membrane potential; electrical characteristics of the cell membrane; membrane channels; ion exchanges, electrical model of the cell membrane; equilibrium potential of an ion (Nerst's law). Sodium-potassium pump. Electrical events in excitable cells. Action potential; propagation of the nervous impulse. Synapses in the central nervous system. Electrical synapses and chemical synapses. Neurotransmitters. Post-synaptic potentials; facilitation and inhibition mechanisms; spatial and temporal summation.

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 regulation of the degree course

Teaching form

Lectures, exercises, laboratory

Textbook and teaching resource

KLINKE, Fisiologia EdiSES

CONTI, Fisiologia Medica, EDIERMES

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

D'ANGELO, PERES, Fisiologia, EDIERMES

GRASSI, NEGRINI, PORRO Fisiologia Medica, POLETTI EDITORE

MC ARDLE, KATCH, KATCH, Fisiologia applicata allo sport, CEA

KANDELL, SCHWARTZ, JESSEL, Principi di Neuroscienze, CEA

Semester

First Semester

Assessment method

Multiple choice quiz test as selective assessment method before the oral test

Office hours

By appointment
