UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Pathology and Medicine

1819-2-H4102D011-H4102D035M

Aims

The course aims to introduce the student to the knowledge of the causes of human diseases, the students will be able to understand the fundamental pathogenetic and pathophysiological mechanisms. During the course, topics for in-depth knowledge on the molecular mechanisms underlying the disease pathogenesis to identify potential therapeutic targets will be developed.

Contents

Introduction to General pathology

Physical, chemical and biological agents as a cause of illness

Tissue changes in response to chronic and acute pathological stimuli

The inflammatory process

The healing and repair process

Cardiovascular Disorders

The body’s response to infection

Neoplastic growth

Environmental and Nutritional Diseases

Detailed program

Concepts of health, pathological process and disease. Etiology, pathogenesis, evolution, course, outcomes. Intrinsic and extrinsic pathogenic factors: causes of physical, chemical, biological nature. Alterations of DNA, RNA, proteins.
Cellular pathology. Alterations of cell growth and differentiation. Atrophy, hypertrophy, hyperplasia, metaplasia, dysplasia. Cell Aging. Cellular bases of aging; Reduction of cell replication; Accumulation of metabolic and genetic damage; Premature aging syndromes: Werner's syndrome, Hugthinson-Gilford syndrome, Bloom's syndrome, Xeroderma pigmentosum, Cockayne's syndrome;

Molecular mechanisms of cell damage. Oxidative stress: origin of free radicals, lipid peroxidation, oxidation of proteins and DNA. Antioxidant defenses of the cell. Hypoxic damage. Reperfusion damage.

Necrosis. Causes of necrosis. Types of necrosis: simple, coagulative, colliquative. Apoptosis. Causes of apoptosis. Morphological, biochemical and molecular aspects of necrosis, apoptosis. Other types of cell death: ferroptosis, pyroptosis, autophagy. Reaction to damage: inflammatory processes. Acute inflammation and chronic inflammation: phenomena (hyperemia, inflammatory exudate, leukocyte migration, infiltrate, tissue damage), mechanisms, cells, mediators, types, evolution. Inflammatory lesions: abscesses, ulcers, granulomas. Defects and excesses of the inflammatory response. Reaction to damage: the reparative process and its alterations. Fibrosis.
Molecular pathology. Neurodegenerative diseases: Amyloidosis; Alzheimer's disease; Prion diseases; Parkinson's disease; Multiple Sclerosis.
The response to infections. The main transmission pathways of infections. Structural defenses against infection. Escape mechanisms. The susceptibility to infections. Antibiotic resistance and bacterial resistance prevention strategies. How viral agents develop resistance to antiviral agents.
Cardiovascular disorders. Vascular occlusion and thrombosis. Atherosclerosis and hypertension. Circulatory failure.
Oncology: Introduction, nomenclature, epidemiology. Molecular oncology: cell cycle and related control mechanisms; protooncogenes, oncogenes and oncoproteins; tumor suppressor genes and their products; alterations of DNA repair mechanisms; altered genetic control of apoptosis. Etiological factors: chemical carcinogenesis, carcinogenesis by physical agents, DNA and RNA oncogenic viruses, presence of carcinogens in the environment, tumor heredity. Immuno-surveillance mechanisms. Tumor-host interaction. Environmental and nutritional disorders. Environmental effects, climate change and environmental pollution on health. Occupational health risks. Effects of alcohol and drugs. Nutritional disorders.

Prerequisites

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

Teaching form

Frontal lectures and support videos. Interactive lessons based on computer simulations of pathological clinical questions

Textbook and teaching resource

- Robbins e Cotran: The pathological bases of diseases. X edizione. Elsevier

Semester

I semester

Assessment method

The exam includes a written test with multiple choice questions on General Pathology topics. The questions will assess the degree of depth achieved by the student. In the specific case of GENERAL PATHOLOGY, questions are asked on all the fundamental aspects of the individual parts of the Program above. The test will also include an open-ended question that will assess the ability to link the different topics covered.
The exam is considered passed only if at least 60% of the questions including exactly the open question are answered.

Office hours

Monday morning by appointment