UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

General Pathology

2526-3-E0201Q067

Aims

The course aims to introduce students to the understanding of the causes of human diseases by interpreting their fundamental pathogenetic and pathophysiological mechanisms. During the course, specific topics will be addressed to provide an in-depth knowledge of the molecular mechanisms underlying the etiopathogenesis of diseases, with the goal of identifying potential diagnostic and therapeutic targets.

Knowledge and understanding
Students will acquire knowledge of the molecular basis of fundamental pathogenetic and pathophysiological mechanisms. They should be able to recognize the main molecular pathways altered in atherosclerosis-related diseases, cancer, and immune system disorders. Furthermore, they should be familiar with the main investigative methods used in the study of human diseases.

Applying knowledge and understanding
By the end of the course, students should be able to apply the knowledge acquired in the fields of research or molecular diagnostics.

Making judgements
The course promotes the development of critical thinking in evaluating the role of different molecular processes involved in the onset of the most common diseases.

Communication skills
By the end of the course, students will be able to describe diseases, using accurate terminology and confident presentation skills. They should also be able to communicate the knowledge acquired clearly and with appropriate technical language, both to specialists (e.g., healthcare professionals) and to non-specialists.

Learning skills
By the end of the course, students will be able to analyze, apply, and integrate the knowledge acquired, enabling them to pursue further studies with a high level of autonomy.

Contents

Introduction to general pathology. Tissue changes in response to acute and chronic pathological stimuli. The inflammatory process. The healing and repair process. Immunopathology. Neurodegenerative diseases. Genetic pathologies. Oncology.

Detailed program

ETIOLOGY AND PATHOGENESIS OF MOLECULAR DAMAGE

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. Necrosis and apoptosis. Other mechanisms of cell death

INFLAMMATION

Innate defensive responses and the triggering of the inflammatory response. Acute inflammation and chronic inflammation: phenomena (hyperemia, inflammatory exudate, leukocyte migration, infiltrate, tissue damage), mechanisms, cells, mediators, types, evolution. Defects and excesses of the inflammatory response. The reparative process and its alterations. Fibrosis. Atherosclerosis.

SYSTEMIC EFFECTS OF INFLAMMATION

Fever, iperthermia, acute phase proteins.

IMMUNOPATHOLOGY

Hypersensitivity. Allergies. Damage mediated by cytotoxic antibodies. Immune complex diseases.

NEURODEGENERATIVE DISEASES

Alzheimer's disease. Parkinson's disease. Prion diseases. Multiple sclerosis.

GENETIC PATHOLOGIES

Numerical and structural aberrations. Point mutations. Trinucleotide repeat disorders. Mitochondrial diseases. Multifactorial diseases.

ONCOLOGY

Introduction, nomenclature, epidemiology. Molecular oncology: cell cycle and related control mechanisms; proto-oncogenes, 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.

Prerequisites

Background: basics of biochemistry.
Specific prerequisites: Biochemistry.
General prerequisites: Students can take the exams of the third year after having passed all the exams of the first year of the course.

Teaching form

21 face-to-face lectures of 2 hours structured as follows:
• the majority delivered in a lecture-based teaching (didattica erogativa, DE), focused on content presentation.
• a portion in an interactive mode (didattica interattiva, DI), involving brief contributions from participants.
All teaching activities will be conducted in person, but recordings will be made available on the course's e-learning platform. The course is taught in Italian.

Textbook and teaching resource

Learning material (slides of the lessons) is available at the e-learning platform of the course.

Recommended textbooks:

- Robbins e Cotran: The pathological bases of diseases. Elsevier
- Pontieri-Russo-Frati: General Pathology. Piccin.
- Abbas A.K.: Foundations of Immunology. Functions and alterations of the Immune System. Piccin

Semester

III year I Semester

Assessment method

Oral examination.
Students are required to select and to present a topic chosen from the course content. Questions will follow about other course topics that require concise but comprehensive answers for the completion of the exam. The questions will assess the degree of understanding and comprehension of all fundamental aspects.
There will not be in itinere examinations.

Office hours

By appointment (email request)

Sustainable Development Goals

GOOD HEALTH AND WELL-BEING | QUALITY EDUCATION | GENDER EQUALITY