



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## COURSE SYLLABUS

### General Pathology

2324-3-E0201Q067

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#### 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 of diseases to identify potential diagnostic and therapeutic targets will be developed.

#### Knowledge and understanding

The student will gain knowledge on the fundamental pathogenetic and pathophysiological mechanisms; the student will be able to recognize the most common molecular pathways altered in arteriosclerosis-related pathologies, in tumours, in pathologies related to the immune system; the student will know the most common methods applied to the study of human pathologies

#### Applying knowledge and understanding

At the end of the course the student must be able to apply the acquired knowledge to methodologies applied in research or in molecular diagnostics.

#### Making judgements

The student must be able to elaborate what he/she has learned to contribute to the development of new knowledge in the field of molecular medicine in the context of multidisciplinary teams.

#### Communication skills

At the end of the course the student will be able to describe pathologies using an appropriate language.

#### Learning skills

At the end of the course the student will be able to make search in databases (es pubmed). The student will develop skills in literature reading and understanding , and will be able to apply the knowledge acquired to pathophysiology, immune-pathology and molecular medicine research.

## **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. Tumors. Genetic pathologies.

## **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, hyperthermia, 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.

### **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.

### **GENETIC PATHOLOGIES**

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

## **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**

Lectures "in attendance".

## **Textbook and teaching resource**

Resources distributed during the course by the teachers.

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 of the individual parts of the course content.

There will not be in itinere examinations.

## **Office hours**

By appointment (email request)

**Sustainable Development Goals**

GOOD HEALTH AND WELL-BEING

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