

## COURSE SYLLABUS

### General Pathology

2021-2-I0302D007

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#### Aims

The student must be able to perform the:

- Classification and characterization of cell damage and death mechanisms- Description of vascular and general mechanisms of acute inflammation- Description of pathogenetic mechanisms of chronic inflammation
- Description of pathogenetic mechanisms of hemostasis
- Description of tissue repair and regeneration
- Description of physiopathological mechanisms of fever and hyperthermia
- Definition of cellular and molecular mechanisms of atherosclerosis
- Description of cell-mediated and humoral immunological mechanisms - Classification and description of hypersensitivity responses
- Description and characterization of preneoplastic lesions
- Description of neoplastic growth with characterization of benign and malign features
- Description of metastatic process
- Definition and characterization of oncogenes and oncosuppressor genes

- Description of cancerogenic role of physical and chemical agents
- Definition of cancerogenic role of viruses
- Explanation of the fundamentals of microbial genetic code, gene expression adjustments and nature of mutations and gene recombination.
- Description of the host-microbe relationships and the mechanisms of microbial pathogenicity.
- Description of the atypical mechanisms of inheritance
- Description of the diseases due to imprinting defects or to dynamic mutations, and mitochondrial and multifactorial diseases
- Description of clinical cancer genetics examples
- Characterization of blood cellular composition and description of main hematological and immunological diseases

## Contents

By the end of the course, the students will have acquired the general concepts and specific knowledge of: ethiopathogenesis of genetic, inflammatory, oncological and immunological diseases; microbic genetics and metabolism; pathogenesis of microbic diseases; the effects of functional alterations of haematological and immunological cells.

## Detailed program

**Etiology and pathogenesis of diseases: Cellular response to damage; irreversible damage; extrinsic etiology of the diseases: physical etiology (radiation and heat)**

**Immunology: tissue response to damage; immunity response; cells, tissue and organs of immunological system; antibodies and antibody response.**

**Immunopathology: immunodeficiencies; autoimmune diseases; immediate hypersensitivity response; delayed hypersensitivity response.**

**Inflammation: acute inflammation; chronic inflammation; atherosclerosis; systemic effects of inflammation**

**Tissue repair and wound healing**

**Cell growth and differentiation pathology.**

**General Oncology: preneoplastic lesions; cancer; cancerogenesis; oncogenes and oncosuppressors**

**Physiopathology of thermoregulation and fever**

**Physiopathology of haemostasis**

**THE BACTERIAL CELL: Features, morphology and structures. Morphology: size, shape, and grouping. Gram stain and Ziehl-Neelsen (microscopy examination and coloring). The cytoplasm. The bacterial ribosomes. Cytoplasmic membrane. The cell wall. The capsule. The flagella. The fimbriae. Mode of bacterial growth. The production and spore germination. Bacterial Classification.**

**BACTERIAL GENETICS: The bacterial chromosome. Plasmids. Insertion sequences, transposable elements and reversible. Expression of the bacterial genome. Mutations. Intercellular transfer and recombination of the genetic material. Transformation. Transduction. Lysogenic conversion. Bacterial conjugation.**

**BACTERIAL METABOLISM: Characteristics of bacterial metabolism. Biochemical tests commonly used for the identification of bacteria.**

**BACTERIA-HOST RELATIONSHIPS:**

**Colonization. Bacterial adhesion and penetration in host tissues. Toxigenic bacteria.**

**Main features and mechanism of action of exotoxin and endotoxin. Bacterial Biofilm.**

**VIRUSES: General characteristics, morphology, structures, replication and pathogenesis. Some examples.**

**FUNGI: Fungal general characteristics (morphology, structures, replication and pathogenesis). Some examples.**

**Disinfection and sterilization. Mechanisms of action of antibacterial drugs**

**Cell death markers**

**Inflammation markers**

**Haemocoagulation tests**

**Tumor markers**

**Classification and incidence of genetic diseases disorders of the autosomes and the sex chromosomes; effects on the phenotype.**

**Monogenic diseases with Mendelian inheritance and effects on the phenotype; gain and loss of function mutations - Autosomal dominant inheritance: the concepts of reduced penetrance, variable expressivity,**

**de novo mutation, germline mosaicism - Autosomal Recessive inheritance: Cystic fibrosis and mutational spectrum - X-linked inheritance: Duchenne and Becker muscular dystrophies, concepts of clinical heterogeneity, locus heterogeneity, genotype-phenotype correlation Non-mendelian inheritance: 1) unstable repeat expansion diseases (Huntington's and Fragile X syndrome ); genetic anticipation; 2) diseases associated with Genomic Imprinting: Angelman and Prader-Willi syndromes; 3) mitochondrial diseases**

**Common diseases: the role of DNA polymorphisms in genetic susceptibility**

**Cancer predisposition syndromes: predisposition to breast and colon cancer.**

**Genetic counseling and classification of genetic testing.**

**Characterization of blood cellular composition and description of main hematological and immunological diseases.**

## **Prerequisites**

## **Teaching form**

During COVID-19 emergency lessons will be performed on-line

## **Textbook and teaching resource**

- G.M. Pontieri ELEMENTI DI PATOLOGIA GENERALE E FISIOPATOLOGIA GENERALE IV ed. PICCIN
- MICROBIOLOGIA E MICROBIOLOGIA CLINICA (per i Corsi di Laurea in Professioni sanitarie) ed. PICCIN
- FONDAMENTI DI GENETICA MEDICA Tobias; M Connor; M Ferguson-Smith Ed. Pearson

Teachers will provide other didactic materials

## **Semester**

Second year- First semester

## **Assessment method**

"In itinere" written tests with multiple choice test and open questions to evaluate global knowledges about course program for "Genetic Pathology", "Microbiology" and "Blood and Immunological Diseases" modules, and final written test with multiple choice test, for the other modules.

During COVID-19 emergency written tests will be performed on-line by proctoring control

Final judgment is based on the grade point average normalized for credits obtained in each module

## **Office hours**

making an appointment

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