UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Pathology and Immunology

2425-3-H4101D038

Aims

The course, on the whole, aims to provide tools necessary for comprehension of biological mechanisms of defense and pathological mechanisms of immune system, for comprehension of etiopathogenesis of human diseases. To acquire notions useful to face functional problems. In the present module these aspects are referred in particular to neoplastic pathology.

Contents

In the present module acquisition of knowledge and competence on:

Aging. Alteration of the Cell Homeostasis. Definition of neoplasm; benign and malignant tumors; molecular basis of tumors; oncogenes and tumor suppressors; epigenetics and tumors; biological, chemical, physical carcinogenesis; viral carcinogenesis; tumor metastasis; hypoxia and angiogenesis; tumor microenvironment; tumor epidemiology; tumor markers; preneolastic conditions and lesions; gender oncology; in vivo and in vitro models of tumorigenesis; tumor and immunity. Immunosurveillance

Detailed program

AGING
- Definition, features of aging, primary and secondary aging.
- Mechanisms of aging in cells and tissues. Morphological and functional modifications of organs.
- Theories of aging process.

GENERAL ONCOLOGY
- Precancerous lesions, hyperplasia, metaplasia, dysplasia

- Tumors. Benign, malignant tumors. Invasiveness and metastasis. Histogenetic classification. Clinical classification criteria: gradation and staging.
- Carcinogenesis. Carcinogenesis due to chemical agents. Carcinogenesis from physical agents. Ionizing radiations. Ultraviolet radiation. Carcinogenesis by biological agents. Oncogenic viruses: DNA and RNA.
- Multiphasic carcinogenesis. Initiation. Promotion. Progression. Driver and passenger mutations. Precision medicine. Molecular events. Natural history of tumors. Inheritance.
- Oncogenes and tumor suppressor genes. Role of oncogenes and tumor suppressor genes in the regulation of the cell cycle, in programmed death (apoptosis), in tumor transformation. Alterations of cellular proliferation and differentiation in tumors.
- Metastatic process. Chemoresistance.
- Tumor metabolism and cachexiaMetabolismo tumorale e cachessia.
- Hypoxia and angiogenesis. Molecular mechanisms related to hypoxia. Normal and tumoral vasculogenesis and angiogenesis.
- The tumor microenvironment: cellular composition, cell-cell and matrix-cell interactions, and fibroinflammatory mediators (cyto and chemokines). Tumor/host interactions
- Solid and systemic tumors. Tumor epidemiology. Tumors and environment. Environmental oncogenic risk. Occupational oncogenic risk. Iatrogenic oncogenic risk. Food oncogenic risk. Discretionary oncogenic risk.
- Impact of sex and gender on the development of tumors. Study of hormone- and non-hormone-related differential mechanisms.
- Tumor markers: the ideal marker and markers available for clinical practice
- Immunity and tumors. Immunosurveillance. Tumor-specific and tumor-associated antigens. Immunodiagnosis and immunotherapy.

Prerequisites

Knowledge concerning the previous preparatory courses in biology and physiology.

Teaching form

Ex cathedra lessons: lessons of 2h each

Textbook and teaching resource

- Patologia generale e fisiopatologia:
“Le basi patologiche delle Malattie" Robbins e Cotran, X edizione, Edra;
“Patologia Generale” Pontieri, Russo, Frati. V ed. Piccin;
“Cellule, tessuti e malattia- Principi di Patologia Generale” Majno e Joris, ed. CEA.
- Immunologia e immunopatologia:
Roitt, Immunologia, Zanichelli;
Abbas, Immunologia cellulare e molecolare, X edizione, Edra;
Abbas, le basi dell'immuniologia, V edizione, Edra
Kuby, Immunologia, UTET.
- Others: scientific papers, slides et similia

Semester

First semester, III year

Assessment method

Oral exam, as detailed in the general Syllabus which intensively evaluates the candidate's preparation on the entire teaching program carried out in class and on the exam texts, with a request for further information and connections.

Office hours

By appointment.
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Sustainable Development Goals

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