UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Pathology

2425-3-H4102D020-H4102D066M

Aims

Allow the student to know and understand the etiopathogenetic mechanisms of human neoplasms with particular reference to genetic and metabolic alterations. Great importance will be given to molecular oncology in order to allow the student to apply the knowledge acquired to understand the mechanisms of action of anticancer drugs and to acquire useful skills in future professional activity.

Contents

1) Cellular biochemical and molecular bases of the carcinogenic process

2) Carcinogens, classification, action, DNA mutations, oncogenes

3) Components of the tumor microenvironment : angiogenesis, stroma, matrix

4) Components of the tumor infiltrate: natural and adaptive immunity cells in the cancer field

5) Growth factors and receptors in major tumors and their microenvironment; molecular bases of targeted therapy and immunotherapy

Detailed program

Epidemiology: incidence of tumors, geographical and environmental factors, genetic predisposition to cancer, chronic inflammation and cancer. Molecular bases of neoplastic transformation: essential alterations for malignant transformation, the normal cell cycle, self-sufficiency in growth signals: oncogenes. Insensitivity to growth inhibitory

signals. Tumor suppressor genes. p53: guardian of the genome. Germline mutations of p53. The retinoblastoma protein (pRb), role in cell cycle control. Evasion of apoptosis. DNA repair defects and genomic instability in tumor cells. Unlimited replicative potential: telomerase. Metabolic alterations of the tumor cell. Development of angiogenesis. Invasion and metastasis. Routes of metastasis. Stromal microenvironment and carcinogenesis. Dysregulation of genes associated with neoplastic transformation. Tumor progression and heterogeneity. Carcinogens and their cellular interactions: chemical carcinogenesis, metabolic activation of carcinogens. Main chemical carcinogens. Initiation and promotion. Radiation carcinogenesis: ultraviolet rays, ionizing radiation. Microbial carcinogenesis: oncogenic DNA and RNA viruses, bacteria. Carcinogenesis from physical agents. Host defense against tumors: tumor immunity, tumor antigens, anti-tumor effector mechanisms. immune surveillance. Tumor antigens. Tumor markers. Hemostatic system and tumor interaction.

Prerequisites

Basic pathology course (II yrs) , preparatory courses to the Vertical Tracks according to the regulation

Teaching form

The teacher will carry out frontal lessons lasting a maximum of 2 hours for a total of 10 hours. During the lessons, slides containing program topics will be shown which will guide students in studying and learning and achieving the training objectives. In addition to the lessons, the teaching includes constant support from the teacher, both in the classroom and through e-mail or explanations during office hours.

Textbook and teaching resource

The biology of cancer. Robert A. Weinberg
Molecular Biology of the cell. Bruce Alberts

Semester

Second semester of the third year of the degree course

Assessment method

Oral exam integrated with the disciplines present in the vertical track. The following will also be assessed: independent judgement, communication skills and learning ability.

Office hours

By appointment required by mail

Sustainable Development Goals

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