

Degree course in Physiotherapy

Integrated Teaching: GENERAL PATHOLOGY AND MICROBIOLOGY

CFU: 3

SSD: MED/07- MED/04

Coordinator: Daniele Armenia e-mail: daniele.armenia@unicamillus.com

MODULE: Microbiology and Clinical Microbiology

NUMERO DI CFU: 2

SSD: BIO/07

Professor: Daniele Armenia e-mail: daniela.armenia@unicamillus.org

MODULE: General Patology

CFU: 1

SSD: MED/04

Professor: Andrea Cardillo e-mail: andrea.cardillo@unicamillus.org

PREREQUISITES

Microbiology and Clinical Microbiology

Even though no prior exams passed are necessary to follow the course, in order to understand the course, the student should have basic knowledge of biology, histology and biochemistry.

General Patology

Knowledge of biochemistry, anatomy and physiology are required for expected disciplines.

LEARNING OBJECTIVES

Microbiology and Clinical Microbiology

Knowledge of the following objective will be essential: structure of different microorganisms, microbial pathogenicity, interactions between micro-organism and host, causes and mechanisms of onset of the main microbial aetiology diseases. In addition, general knowledge on microbiological diagnostics will be essential for the identification of bacteria, viruses, fungi and protozoa. These objectives will be achieved through frontal lectures, seminars and interactive teaching activities, designed to facilitate learning and improve the ability to address and solve the main questions of Clinical Microbiology.

General Patology

Knowledge of the origin and physiopathological mechanisms underlying the infectious, inflammatory, metabolic, degenerative and neoplastic processes of the human pathology. Knowledge of the environmental and genetic causes of the main human diseases and the study of the fundamental mechanisms of cellular and tissue damage of etiological agents and health changes.

Knowledge of the disease status and the main causes of cellular and tissue damage; the reaction of the organism in response to cellular and tissue damage: the cellular adaptation processes and inflammation, with the related regeneration, healing and repair processes. The mechanisms underlying the development of tumor growths and the characteristics of neoplastic cells. The

stages of the development of neoplasms and the differences between benign and malignant neoplasms.

LEARNING OUTCOMES

Microbiology and Clinical Microbiology

Knowledge and understanding

At the end of this course the student should know:

- The criteria of bacterial and virological classification.
- The architecture of the bacterial, fungal and protozoal cell and the structure of the viral particles.
- The metabolism and bacterial growth: the production of bacterial spores.
- The basics of bacterial and viral genetics: transformation, transduction, bacterial conjugation, viral genetic variability.
- The pathogenic action of bacteria and viruses: transmission routes and stages of the infectious process.
- The process of toxin production and explain the mechanisms of action of exotoxins and endotoxins.
- The general characteristics of viral polymerases e viral genetic variability
- The basics about innate immunity and cell-mediated immunity.
- The characteristics of immune sera and vaccines.
- The general principles for the diagnosis of diseases caused by pathogenic microorganisms
- The main pathogens associated with infection of orthopedic/physiotherapeutic interest
- The basics of microbiological pharmacology: notes on anti-bacterial and antiviral drugs and resistance mechanisms

Applying knowledge and understanding

At the end of the course the student will be able to:

- To use the acquired knowledge for the autonomous deepening of aspects related to the specific field to which the student will devote himself within the professional activity;

Communication skills

At the end of the course, the student should know :

- Use specific scientific terminology in an appropriate manner.

Making judgements

At the end of the course, the student should know:

- Carry out general assessments of the topics covered.

Patologia Generale/ general Patology

MODULE: General Patology

Knowledge and understanding

The student will know a cellular and molecular vision of pathology and immunology; the mechanisms that regulate the body's responses to cellular damage; the main mechanisms of the functioning of the immune system and alterations of immune responses.

COURSE SYLLABUS

Microbiology and Clinical Microbiology

Characteristics of the main infection agents. Vital associations: commensalism, mutualism, parasitism. Associated microbial flora. Generalities on infection diseases: infectious ratio, infection and disease, endogenous infection, exogenous infections, opportunistic infections.

IMMUNOLOGY - Concept of innate immunity and acquired immunity. Role of the immune response in different infections. Survival of infection agents to immunity mechanisms. Principles of microbiological diagnostics.

BACTERIOLOGY - The bacterial cell: structure and essential functions. Gram negative and Gram positive. The bacterial spore. Cultivation of bacteria: growth and development of bacterial populations. Elements of bacterial genetics: mutations and mechanisms of genetic recombination. Principles of pathogenicity and virulence. Bacterial toxins: exotoxins and endotoxins. Mode of action of the main antibacterial drugs. Resistance to chemotherapy and antibiotics. Examples of bacteria of orthopaedic/physiotherapeutic interest and associated pathologies.

VIROLOGY - Nature, methods of study and classification of viruses. Composition and architecture of the viral particle. Cultivation of viruses. Virus-cell relationship: productive infection, transforming infection. Virus-to-host relationships: acute, persistent, latent, slow infections. Pathogenic mechanisms in viral infections. Vaccines and basis of antiviral chemotherapy. Examples of viruses of medical interest and associated diseases.

MYCOLOGY - Habitat and morphology of fungi (yeasts, mycelial fungi). Fungal cell structure. Examples of fungi of medical interest and associated diseases.

PARASITOLOGY - The protozoa cell: morphology and structure. Main characteristics of Helminths and Arthropods. Examples of parasites of medical interest and associated pathologies.

General Patology

The concept of disease: the disease as an alteration of the normal state; the disease as a modification of the organism's homeostasis; illness as a loss of health. Morbid state. Syndrome. Etiology: the concept of "cause" in pathology. Pathogenesis.

General etiology. Chemical causes (environmental pollutants). Physical causes (high and low temperatures, variations in atmospheric pressure). Feeding as a cause of illness.

The cellular response to damage. Reversibility and irreversibility of cellular lesions. Cellular adaptation processes to injury (atrophy, hypertrophy, hyperplasia, metaplasia, dysplasia) and hypoxia.

Cell death. Necrosis, apoptosis and other types of cell death: morphological aspects, molecular mechanisms. Evaluation of cellular damage with serum-enzymatic techniques.

Inflammation and repair of injuries. Innate immunity and acute inflammatory reaction: tissue, vascular, cellular and molecular aspects, systemic manifestations (leukocytosis, acute phase response, fever). Chronic inflammation: role of macrophages and lymphocytes, polarized responses of type 1 and 2, granulomas. The healing of tissue lesions: tissue, cellular and molecular aspects. Fibrogenesis, fibrosis and pathological aspects of tissue repair.

General Oncology. The concept of neoplasia. Histogenetic and clinical classification criteria of benignity and malignancy. Tumor atypia. Cancer markers. Natural history of the tumor: dormant state, angiogenesis, infiltrative growth, metastasis. Metastatic pathways, metastasis organotropism. Chemical cause of tumors, experimental carcinogenesis, multi-phase carcinogenesis, concept of tumor progression. Physical cause of tumors: ionizing and exciting radiation, oncogenic DNA and RNA viruses. Cellular proto-oncogenes, tumor suppressor genes.

Regulation of normal and neoplastic proliferation. Gene that controls progression in the cell cycle and senescence. Genomic instability. Neoplastic cachexia. Epigenetic mechanisms altered in tumors. TNM classification.

COURSE STRUCTURE

Microbiology and Clinical Microbiology

The course is structured in 20 hours of frontal teaching, divided into lessons of 2 or 4 hours according to the academic calendar. Frontal teaching includes theoretical lessons and additional seminars on the topics covered.

General Pathology

The course includes 15 hours of teaching and lesson, 10 hours of individual study and 5 hours of support activities (clinical cases observation in the Emergency Department of the "Ospedale dei Castelli").

COURSE GRADE DETERMINATION

Microbiology and Clinical Microbiology

Students' skills will be verified with a written exam followed by an oral interview. The written test will consist of 30 questions with multiple-choice answers, for each exact answer a point will be assigned. The final score of the written test will be given by the sum of the partial scores assigned to each question answered correctly. To take the oral exam, the student must have scored at least 15 points. During the oral test, the Examination Committee will assess the student's ability to apply the knowledge and will ensure that the skills are adequate to support and solve problems of a microbiological nature. The following will also be assessed: making judgements, communication skills and learning skills as indicated in the Dublin descriptors.

General Pathology

The exam consists of an oral test. The final grade is given in thirtieths and it evaluated knowledge, communication skills, use of an appropriate language and critical reasoning skills.

OPTIONAL ACTIVITIES

Microbiology and Clinical Microbiology

In addition to teaching activities, students will be given the opportunity to participate in Seminars, Research Internships, Department Internships and Monographic Courses. The subjects of the activities are not exam subjects.

READING MATERIALS

Microbiology and Clinical Microbiology

Le basi della Microbiologia

Autori: Richard A. Harvey, Pamela C. Champe Bruce D. Fisher

General Pathology

Kumar, Abbas e Aster - Robbins and Cotran - Pathologic basis of disease. Elsevier.

Patologia e Fisiopatologia Generale per i corsi di Laurea in Professioni Sanitarie (G.M. Pontieri, Piccin Edizioni).