ETIOPATHOGENIC BASES OF DISEASES (OPR079)

1. language

Italian.

2. course contents

Coordinator: Prof. CALVIELLO GABRIELLA
Year Course: II year
Semester: I semester
UFC: 7
Modules and lecturers:

- Immunology and Immunopathology (OPR128) - 2 **UFC** - ssd MED/04
Prof. Mariapaola Marino

- General Pathology (OPR127) - 5 **UFC** - ssd MED/04
Prof. Gabriella Calviello

3. BIBLIOGRAPHY

General Pathology:
-ROBBINS-COTRAN, *Le basi patologiche delle malattie*, vol. I e II, Ed. EDRA Masson, X Edizione, 2021.
-MAINIERO, MISASI, SORICE, PONTIERI. *Patologia generale e fisiopatologia generale* I e II (2 volumes). Ed. Piccin, 2018 e 2019
Parola – *Patologia generale ed Elementi di Fisiopatologia*, II Edizione, EdiSES 2020

Immunology and Immunopathology
-AMADORI - ZANOVELLO, *Lezioni di Immunologia e Immunopatologia* Ed. Piccin, 2021.

It is necessary for the students to have a textbook of *General Pathology* among those recommended or another textbook, after the teacher approval, and the recommended textbook of *Immunology*.

4. LEARNING OBJECTIVES

The course of *Basi Eziopatogenetiche delle Malattie* includes the *General pathology* module, which studies the morphological and functional modifications which are at the basis of the biological alterations of the homeostasis, and that are essential for the development of the different diseases. In particular, it studies the causes (etiology) responsible for the different pathologies and the mechanisms (pathogenesis) whereby a disease arises and evolves. Moreover, it is focused on the modifications of the functions of organs and systems in pathological conditions. In this setting, the *Immunology and Immunopathology* module particularly focuses on the physiological mechanisms of reaction of innate and acquired immunity and their malfunctioning.

Knowledge and understanding - (Dublin 1): By the end of the Course, the students will the students will acquire the knowledge of the causes at the basis of cellular and molecular damages, as well as the mechanisms of reaction (innate and adaptative immunity, healing, and repair), and the basic pathological processes that may follow (acute and chronic inflammation, carcinogenesis, degenerative processes), both at mechanistic and morphologic levels.
***Applying knowledge and understanding – (Dublin 2)*:** By the end of the Course, the students will know how to apply the acquired knowledge. They will understand how basal pathological processes may alter the functions of organs and systems and mediate the passage from the

damage occurring in cells and tissues to the development of a complex disease. search; know the most used bibliometric criteria. Moreover, the student will be able to apply such knowledge for the comprehension of the dental disorders.
Making judgements - (Dublin 3): By the end of the Course, the students will know how to integrate the acquired knowledge and competences, in order to be able to identify the manifestations of the pathological processes and the diseases studied, and their possible consequences in the dental field.
Communication skills (Dublin 4): By the end of the Course, the students will know how to communicate what they have learned on the causes and mechanisms involved in the development of pathological processes and different diseases. Moreover, they will be able to clearly communicate knowledge and personal judgments both to experts and non-experts.
Learning skills (Dublin 5) - By the end of the course students will develop better study skills and strategies aimed at multi-source, self-directed and ongoing learning. In particular, they will gain the capacity to deepen and update their knowledge by capitalizing on bibliographic searches and on use of web-based electronic databases.

5. prerequisites

Key prerequisites include the knowledge of:

a) the fundamentals of Physics;

b) the structures of organic and inorganic molecules, as well as of biochemical and molecular pathways in which they are involved;

c) the structures of cells, tissues, organs and systems;

d) the physiologic mechanisms involved in the functioning of cells, tissues, organs and systems.

It is mandatory for the students to have passed the exam of *Fisiologia* to be admitted to the exam of
Basi Eziopatogenetiche delle Malattie.

6. TEACHING METHODS

The topics of the lectures will be scheduled in detail. The schedules of the two modules of *General Pathology* and *Immunology and Immunopathology* will be available for the students at the beginning of the respective lectures.

The Course will be taught through:
-Interactive frontal lectures. The topics treated are constantly updated and examples of specific situations of patients and pathologies will be examined. During the lessons there will be a constant active engagement of the students through questions on the treated topics. Moreover, the students will be invited to freely ask questions to obtain clarifications. The constant teacher-students dialogue will allow a better achievement of adequate knowledge, communication skills and ability to make judgments.

-Theoretic-practical lessons where the students will have the opportunity of practicing in interpretation and identification of the morphological substrates of some pathological processes.

Teaching methods - (Dublin 1) The teaching methods described above will allow the students to achieve an adequate knowledge that makes them able to understand how the basal pathological processes can: a) alter the functions of the organs and systems, b) mediate the passage from the damage occurring in cells and tissues to the development of complex diseases.

Applying knowledge and understanding - (Dublin 2) and Making judgements (Dublin 3)

The teaching methods described above allow the students to critically organize the acquired knowledge starting from the etiological agents and the mechanisms involved in the pathological processes, and then considering the diseases that can follow, as well as the organs and systems implicated in the diseases and the possible clinical presentations.
Communication skills - (Dublin 4) The level of interaction obtained by using these teaching methods will allow the students to clearly communicate the knowledge and the personal judgments both to experts and non-experts.
Learning skills (Dublin 5): **-** By the end of the course the students, thanks to the indications of the teachers, as well as the formal and practical lessons attended, the students will be able to develop skills and strategies aimed at multi-source, self-directed and ongoing learning. Moreover, they will gain the capacity to deepen and update their knowledge by capitalizing on bibliographic searches and on use of web-based electronic databases.

7. OTHER INFORMATIONS

Continuous feedback is provided to students during classes, at intervals and at the end of each lesson. Teachers are available for consultation by e-mail or in person upon appointment.

8. METHODS FOR VERIFYING LEARNING AND FOR EVALUATION

During the Course, there will be an optional on-going written test of *Patologia generale* that will be performed through the Blackboard platform. The students will be asked to download the Respondus Lockdown Browser in their PC and to take the written test consisting of 50 multiple choice questions having just one correct answer out of five provided. The questions are focused on all the topics treated in the lectures: *Etiology, Cellular pathology*, *Inflammation/Healing and repair, Oncology.* The modulation of the questions allows to evaluate how much the student was able to understand (**Understanding skills - Dublin 1**), apply the knowledge and skills provided by the Course to the specific dentistry area (**Applied understanding skills - Dublin 2**). To each correct answer is assigned a score equal to 0.6. To each incorrect or unanswered question is assigned a score equal to zero. The score is expressed in thirtieth and the minimal score for passing the tests is 18/30 (corresponding to 30 correct answers).

At the end of the Course, there will be a final oral exam consisting in total of at least three questions regarding the program of the frontal lessons of *General Pathology* and *Immunology and Immunopathology* modules. The students that did not sat for or passed the optional on-going written test of *General Pathology,* will be also examined on the topics relative to the on-going test by asking additional questions.

The questions of the final oral exam will allow the teachers to comprehend if the students:

A) have achieved the knowledge and competence according to the objectives detailed above (***Knowledge and understanding: Dublin 1-Applying knowledge and understanding: Dublin 2;***

A) are able to integrate the acquired knowledge and competences by organizing in a transversal way what they have learned during the Course for each single topic (***Making judgements: Dublin 3)***;

B) clearly communicate using a correct terminology (***Communication skills: Dublin 4);***

C) have deepened and updated their knowledge by capitalizing on bibliographic searches and use of web-based electronic databases (***Learning skills: Dublin 5).***

All the scores obtained (in the oral exam and in the on-going test) will be considered to formulate the final score. The results of the on-going test will be kept and considered valid until the extraordinary session of December of the following year of course.
The maximal score (30/30) can be obtained in the case the students show to possess all the

requisites described above (***Dublin 1-5***) at the maximal degree in the oral exam and if they have obtained a score of at least 23/30 in the on-going test. It will be possible to obtain the *laudem* by the students that are able to expose the topics with absolute precision, self-confidence and excellence. The agreement of the entire Examination Board is required as well.

9. program

General Pathology

-Introduction to the Course. The concept of health and disease, etiology, and pathogenesis.
-Etiology: classification and characteristics of the main pathogens.
Genetic and epigenetic basis of diseases.
Cellular Pathology: Mechanisms of cellular injury and cellular response to it. Cellular adaptation. Degenerative diseases, intracellular accumulations. Biological bases of cellular aging. Cellular death.
Inflammation: etiology and classification. Signs of inflammation: vascular and cellular reaction; chemical mediators of acute inflammation; Cellular migration and phagocytosis; Exudate: composition, functions, and development. Chronic inflammation; Granulomatous inflammation; Systemic effects inflammation. Resolution of the inflammatory response; Tissue repair, wound healing, fibrosis. Recognition of the basic morphological signs of acute and chronic inflammation in microscopic sections of diseased tissues
-Oncology: Pathologic cell growth. Cancer epidemiology. Malignant and benign tumors. Tumor classification. The neoplastic phenotype. Morphological characteristics of tumors. Recognition and analysis of the morphological features of benign and malignant tumors in microscopic tissue sections.
Biological features of neoplastic cells. Tumor-host relationships: microenvironment, angiogenesis, invasion and the metastatic process. Carcinogenic agents. Carcinogenesis and its phases. Oncogenes and tumor suppressor genes.
-Blood pathophysiology: anemia; bleeding disorders.
-Cardiovascular pathophysiology; thrombosis; embolism; infarction; arteriosclerosis and atherosclerosis; hypertension; shock.
-Pathophysiology of Metabolism: Glycemic control and its altered regulation. Diabetes mellitus. Metabolic syndrome.
- Fluid, electrolyte and acid-base imbalances.
-Liver pathophysiology: Liver functions. Mechanisms of hepatic damage, fibrosis, and cirrhosis. Portal hypertension. Hepatic failure. Jaundice. Hepatitis.
-Thermoregulation and fever
-Smoke, alcohol, and related diseases

Immunology and Immunopathology

The innate immune system: physical barriers, chemical and environmental barriers, biological barriers. Cells of the innate immune system. Function of innate immunity: recognition, soluble defense mechanisms, cellular defense mechanisms.
- The adaptive immune system: Molecules of adaptive immunity (immunoglobulins, molecules of the major histocompatibility complex, T cell receptors, cell interaction molecules). Cells and organs of the immune system: lymphocytes, tissues, and lymphoid organs. Immune diversity generation: rearrangement of T cell receptors, B cell receptors. Development of T lymphocytes, development of B lymphocytes. Activation of lymphocytes (antigen presentation, T cell activation, B cell activation). Effector functions of lymphocytes: cell-mediated immunity, humoral immunity, immunological memory.
- Immunopathology: Hypersensitivity reactions (type I, II, III, IV). Immunodeficiencies. Autoimmunity (tolerance to 'self', loss of tolerance to 'self', major points of autoimmune diseases). Immunity and tumors.