UNICAMILLUS

DEGREE IN MIDWIFERY

Integrated Teaching: GENERAL PATHOLOGY AND PHYSIOPATHOLOGY
SSD: MEDS-02/A, MEDS-03/A , MEDS-02/B
Responsible Professor: Gabriella D'Orazi E-mail: gabriella.dorazi@unicamillus.org
Credits: 6

MODULE: General Pathology
SSD: MEDS-02/A
Professor: Gabriella D'Orazi CFU:1 E-mail: gabriella.dorazi@unicamillus.org
Professor: Andrea Cardillo CFU:1 E-mail: andrea.cardillo@unicamillus.org
Professor: Elisa Carpico CFU:1 E-mail: elisa.carpico@unicamillus.org
Number of credits: 3

MODULE: Microbiology
SSD: MEDS-03A
Professor: Claudia Vuotto CFU:2 E-mail: claudia.vuotto@unicamillus.org
Number of credits: 2

MODULE: Clinic Pathology
SSD: MEDS-02/B
Professor: Silvia Consalvi CFU:1 E-mail: silvia.consalvi@unicamillus.org
Number of credits: 1

PREREQUISITES

In order to follow the course profitably it is expected that students have preliminary knowledge of the basic principles of biology, anatomy, biochemistry, physiology, histology, anatomy and physiology.

LEARNING OBJECTIVES

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 etiology diseases. In addition, knowledge of bacterial, viral, mycotic or protozoal infections of gynaecological and obstetric interest will be indispensable in order to identify potential clinical problems during professional activity.
Moreover, the course introduces to the understanding of the mechanisms and phenomena that underlie human pathologies, in particular the changes in the state of health, the main exogenous and endogenous causes of disease, the fundamental mechanisms of disease and the biological mechanisms of defense, reaction to damage, regeneration and repair, as well as knowledge of the main aspects of the

pathophysiology of organs and systems with particular reference to particular biological needs during pregnancy.
The course's aim is to allow the students 1) to learn on aspects of cell pathology and of the alterations of the integrated functions of tissues, organs, and systems, which may turn useful in the technical setting, and 2) to provide the knowledge of the main biomarkers for the evaluation of physiology and pathological conditions of the human body.

LEARNING OUTCOMES

The specific learning outcomes of the program are coherent with the general provisions of the Bologna Process and the specific provisions of EC Directive 2005/36/EC. They lie within the European Qualifications Framework (Dublin Descriptors) as follows.
At the end of this teaching, students will be able to:

Knowledge and Understanding

- List the criteria of bacterial and virological classification
- Describe the architecture of the bacterial, fungal and protozoal cell and the structure of the viral particles
- Explain the metabolism and bacterial growth: the production of bacterial spores
- Describe the basics of bacterial and viral genetics: transformation, transduction, bacterial conjugation, viral genetic variability
- Describe the pathogenic action of bacteria and viruses: transmission routes and stages of the infectious process
- Explain the process of toxin production and explain the mechanisms of action of exotoxins and endotoxins
- Describe the general characteristics of viral polymerases e viral genetic variability
- Explain the basics about innate immunity and cell-mediated immunity
- Describe the characteristics of immune sera and vaccines
- Explain the general principles for the diagnosis of diseases caused by pathogenic microorganisms
- Describe the main congenital and sexually transmitted infections caused by viruses, bacteria, fungi, and protozoa
- Describe the basics of microbiological pharmacology: notes on anti-bacterial and antiviral drugs and resistance mechanisms
- Describe the exogenous and endogenous causes of diseases
- Explain the mechanisms of disease, biological defense, reaction to cell and tissue damage, tissue responses, regeneration, and repair, together with their principal alteration
- Describe the state of disease resulting from the interaction of the causes with the body's regulatory mechanisms

Applying Knowledge and Understanding

- Apply the principles of midwifery to selected cases, problems, and a variable range of situations

- Use the tools, methodologies language and conventions of midwifery to test and communicate ideas and explanations

Communication Skills
- Understand the scientific language used in written tests
- Present the topics orally in an organized and consistent manner
- Use a proper scientific language coherent with the topic of discussion

Making Judgements
- Recognize the importance of an in-depth knowledge of the topics consistent with a proper education
- Identify the importance of a proper theoretical knowledge of the topic in the clinical practice

Learnings Skills

The student will have acquired skills and learning methods suitable for deepening and improving his/her knowledge and skills in the field of general and clinical pathology, as well as physiopathology.

COURSE SYLLABUS

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.

BATTERIOLOGY - 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. Main bacteria responsible for human infection diseases, with particular reference to diseases of obstetrical-gynaecological and maternal-foetal district (gonorrhoea, syphilis, group B streptococci infection).

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. Infections with the main sexually transmitted and vertically transmitted viruses: hepatitis B virus (HBV), hepatitis C virus (HCV), human immunodeficiency virus (HIV), human papilloma virus (HPV), herpes simplex virus (cytomegalovirus, herpes simplex virus type 1 and type 2), rubella virus and Parvovirus B19. MYCOLOGY -Habitat and morphology of fungi (yeasts, mycelial fungi). Fungal cell structure. Infections of the urogenital district by species of the genus Candida.

PARASITOLOGY - The protozoa cell: morphology and structure. Main characteristics of Helminths and

Arthropods. Protozoa of gynaecological interest: Toxoplasma gondii; Trichomonas vaginalis.

GENERAL PATHOLOGY

- General Etiology: definition of the state of health, of the body homeostasis and its variations. Intrinsic and extrinsic factors as causes of disease. Biological, chemical and physical agents as causes of disease.
- Reversible and irreversible cellular damage.
- Mechanism of cellular damage: damage from free radicals and hypoxia. Cell death: necrosis (types of necrosis) and apoptosis.
- Cellular adaptations: atrophy, hypertrophy, hyperplasia, metaplasia, dysplasia.
- Reactive response of the organism to cellular damage: Acute and chronic inflammation: definition and differences.
- Acute inflammation or angiophlogosis: the vascular-haematic phenomena of inflammation: haemodynamic changes and formation of exudate; characteristics, functions and types of exudates. Cellular phenomena of inflammation: the cells of inflammation, diapedesis of leukocytes, chemotaxis and phagocytosis. Chemical mediators of inflammation: vasoactive amines (histamine), complement, arachidonic acid metabolites, the coagulation system, cytokines, chemokines, etc. Systemic effects of inflammation: fever (types of fever), acute phase proteins, etc. Results of acute inflammation: chronicity, healing, abscess, fibrosis.
- Chronic inflammation or histophlogosis: causes of histophlogosis and cellular characteristics. Chronic granulomatous and non-granulomatous inflammation. Types of granulomas: immunological and non-immunological granuloma (from foreign body).
- Tissue repair after damage: labile, stable and perennial cells. Regeneration, healing and fibrosis. Example of tissue repair.
- Elements of Oncology: Classification of tumors on histological (epithelial and mesenchymal tumors) and biological basis (benign tumors and malignant tumors). Tumor transformation; molecular bases of cancer: oncogenes and tumor suppressors. Chemical, physical, viral and microorganism carcinogenesis. Multiphasic carcinogenesis: initiation, promotion and progression. Mechanisms of invasion and metastasis. Tumor staging and the TNM system.
- Elements of pathophysiology of hemostasis and coagulation. The platelet, hemocoagulative and fibrinolytic phase. The main disorders of hemostasis and coagulation: thrombocytopenia and thrombopathies. The main defects of the plasmatic and fibrinolytic phase (hemophilia). Embolism and thrombosis.
- Diabetes: type I and type II diabetes, gestational diabetes.
- Notes on liver physiopathology: acute and chronic hepatitis, cirrhosis and liver failure.
- Cardiovascular system physiopathology: cardiac pathology, myocardial infarction, ischemic heart disease, arrhythmias, hypertensive heart disease, valvular diseases, myocarditis.
- Respiratory system pathophysiology: atelectasis, acute respiratory distress syndrome, emphysema, chronic bronchitis, asthma, bronchiectasis, pneumonia, tuberculosis, lung tumors

CLINICAL PATHOLOGY

How to use biomarkers; biomarkers in clinical practice.
HEMATOLOGY AND HEMOSTASIS IN PREGNANCY

Composition and functions of blood. Blood count and leukocyte formula. Red blood cells: physiologyand pathology (anaemia, hemoglobinopathies); Platelets and leukocytes; Evaluation parameters of iron metabolism, ferritin, transferrin. Iron deficiency, vit B12 deficiency and folate deficiency. Blood groups, maternal-foetal incompatibility.

Haemostasis in pregnancy; evaluation of platelet function and of the fibrinolytic system; laboratory investigations for the definition of hypercoagulability states; diagnostic tests for poliabortivity.

Coombs test and RH group. Erythroblastosis fetalis.KIDNEY FUNCTION:

Markers of kidney function: creatinine, creatinine clearance, azotaemia, uric acid, electrolytes, complete urine test (chemical-physical and morphological). Laboratory tests for the diagnosis of eclampsia.

LIVER FUNCTION

Transaminases, bilirubin, and others, LDH; laboratory tests for the diagnosis of intrahepatic cholestasis in pregnancy.

GLUCOSE AND LIPID METABOLISM

Indicators of glucose metabolism: glucose, glucose tolerance curves; laboratory tests for the diagnosis of gestational diabetes. Cholesterol, HDL triglycerides, LDL, apolipoproteins.

COURSE STRUCTURE

The course consists of 84 hours of classroom teaching, structured as follows:
42 hours (3 CFU) for the General Pathology module; 28 hours (2 CFU) for the Microbiology module; 14 hours (1 CFU) for the Clinical Pathology module.
The teaching of the program topics includes classroom lessons with explanatory slide shows, any supplementary seminars on the topics covered and discussion and interpretation of data relating to specific clinical cases that will allow students to achieve the training objectives.

COURSE GRADE DETERMINATION

The exam consists in a written test and/or oral exam. The written test consists of approximately 20-30 questions with multiple choice answers. The test will be considered passed if more than 50% of the questions per module are answered. The oral exam will cover the material presented during lectures, and students will be assessed on their basic knowledge and their ability to use scientific language clearly and systematically. The type of exam will be explained at the beginning of the lessons. To pass the exam, students must have a passing grade in all three modules. The final grade will be the weighted average of the scores obtained in each module, based on the number of credits (ECTS) assigned. Through the aforementioned exam, the examining commission will evaluate the student's ability to apply the knowledge acquired during the course and will ensure that the skills are adequate to support and manage pathological and/or microbiological problems and to evaluate clinical data in the obstetric field. The following will also be assessed: making judgments, communication skills and learning skills as indicated in the Dublin descriptors.
The exam tests will be evaluated according to the following criteria:

< 18 Fail	The candidate possesses an inadequate knowledge of the topic, makes significant errors in applying theoretical concepts, and shows weak presentation skills.
18-20	The candidate possesses a barely adequate and only superficial knowledge of topic, limited presentation skills, and only an inconsistent ability to apply theoretical concepts.
21-23:	The candidate possesses an adequate, but not in-depth, knowledge of the topic, a partial ability to apply theoretical concepts, and acceptable presentation skills.
24-26	The candidate possesses a fair knowledge of the topic, a reasonable ability to apply theoretical concepts correctly and present ideas clearly.
27-29	The candidate possesses an in-depth knowledge of the topic, a sound ability to apply theoretical concepts, good analytical skills, clear argumentative clarity and an ability to synthesize.
30-30L	The candidate possesses an in-depth knowledge of the topic, an outstanding ability to apply theoretical concepts, a high level of argumentative clarity, as well as excellent analytical skills, and a well-developed ability to synthesize and establish interdisciplinary connections.

OPTIONAL ACTIVITIES

Students can request optional workshops to deepen some specific topics.

READING MATERIALS

MICROBIOLOGY

Le basi della Microbiologia. Autori: Richard A. Harvey, Pamela C. Champe Bruce D. Fisher

Microbiologia e microbiologia clinica. Per le professioni sanitarie e odontoiatria. Author: S. De Grazia - D.Ferraro - G.Giammanco. Editor: Pearson Education Italia

GENERAL PATHOLOGY

G.M. Pontieri - Elementi di Patologia e Fisiopatologia Generale - Per i corsi di Laurea in Professioni Sanitarie -Edizioni Piccin (4a Edizione, 2018)

CLINICAL PATHOLOGY

G. Federici – Medicina di laboratorio – Ed McGraw Hill – 4 Edizione

Didactic and integrative material provided by the lecturer