



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze e Tecnologie Biologiche, Chimiche e Farmaceutiche		
ACADEMIC YEAR	2021/2022		
BACHELOR'S DEGREE (BSC)	BIOTECHNOLOGIES		
INTEGRATED COURSE	PATHOLOGY AND IMMUNOLOGY - INTEGRATED COURSE		
CODE	20449		
MODULES	Yes		
NUMBER OF MODULES	3		
SCIENTIFIC SECTOR(S)	BIO/12, MED/04		
HEAD PROFESSOR(S)	VASTO SONYA	Professore Associato	Univ. di PALERMO
OTHER PROFESSOR(S)	DI ROSA LUIGI	Ricercatore a tempo determinato	Univ. di PALERMO
	VASTO SONYA	Professore Associato	Univ. di PALERMO
	AGNELLO LUISA	Professore Associato	Univ. di PALERMO
CREDITS	9		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	3		
TERM (SEMESTER)	1° semester		
ATTENDANCE	Not mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	AGNELLO LUISA Monday 10:00 12:00 Sezione di Biochimica Clinica, Medicina Molecolare Clinica e Medicina di Laboratorio, Dipartimento BIND, Via del Vespro 129 Wednesday 10:00 12:00 Sezione di Biochimica Clinica, Medicina Molecolare Clinica e Medicina di Laboratorio, Dipartimento BIND, Via del Vespro 129 VASTO SONYA Monday 10:00 11:30 Dipartimento Stebicef, parco d'Orleans, Edificio 16, piano primo Wednesday 10:00 11:30 Dipartimento Stebicef, parco d'Orleans, Edificio 16, piano primo		

DOCENTE: Prof.ssa SONYA VASTO

PREREQUISITES	The student will have a basic knowledge of cell biology, biochemistry, genetics, microbiology to fully understand the physiologic mechanisms of the immune system and the pathogenic mechanisms leading to diseases and tumors and understand the methodologies of clinical biochemistry applied to human pathology.
LEARNING OUTCOMES	Knowledge and understanding: Role of the immune system towards infectious agents and tumors. Understanding the homeostasis and the alterations of human body which may lead to diseases using the methodologies of clinical biochemistry. Applying Knowledge and understanding: The newly acquired knowledge is very important to understand the human physiology and discern the aetiological events that may alter the natural homeostasis determining disease. Making judgement: Ability to synthesize and analyse. This ability will lead to the formulation of a critical thinking on the studied topics and to estimate the changes induced by the environmental factors on the human body. Acquiring a critical approach aimed at the application in immunology, pathology and clinical biochemistry methodologies. Communication: Acquiring the ability to correctly describe the human body and the related disease conditions by means of an appropriate terminology. Ability to interact with other professionals involved in diagnostic and therapeutic processes in an efficient work group Lifelong learning skills: Ability to correctly integrate the acquired knowledges of immunology, pathology and clinical biochemistry in physiology and human pathology that aims at fully understand the overall functioning of the human body and of the complex interactions between different anatomical regions. Understanding applications and limitations of the methodologies in the biomedical field.
ASSESSMENT METHODS	The student will have to answer at least 2/3 questions posed orally by the examiner and these will be related to all the topics dealt with during the course, with reference to recommended textbooks. The examination evaluation will be scored in thirties along the following scheme: 30-30 cum laude: Excellent knowledge of the topics and correct use of language, analytical skills, ability to apply the knowledge to solve the proposed problems. 26-29: Good command of the subjects and correct use of language, ability to apply the knowledge to solve the proposed problems. 24-25: Basic knowledge of the main topics, proper language skills, limited ability to apply the knowledge to solve the proposed problems. 21-23: Lack of competence in the main topics dealt with during the course although getting the basic knowledge, satisfactory language skills, but limited ability to apply the knowledge to solve the proposed problems. 18-20: minimal basic knowledge of the main topics dealt with during the course and of the technical language, very low ability to apply the knowledge to solve the proposed problems. Failure: lack of an acceptable knowledge of the topics dealt with during the course.
TEACHING METHODS	Lessons, classroom and laboratory exercises.

MODULE PATHOLOGY AND GENERAL ONCOLOGY

Prof. LUIGI DI ROSA

SUGGESTED BIBLIOGRAPHY

G.M. Pontieri a cura di Mainiero F., Misasi R., Sorice M. - Patologia generale e Fisiopatologia generale- VI Edizione, Piccin, ISBN: 978-88-299-2963-4

Rosa M. Pascale, Francesco Feo - Elementi di Oncologia Molecolare - Piccin ISBN:978-88-299-2937-5

Robbins - Basic Pathology - 10e edition Elsevier May, 10 2017 ISBN: 978-0323353175

Sono a disposizione degli studenti le presentazioni (.pdf) utilizzate durante le lezioni ed, a richiesta, articoli scientifici di approfondimento su specifici argomenti

AMBIT	10643-Attività formative affini o integrative
INDIVIDUAL STUDY (Hrs)	47
COURSE ACTIVITY (Hrs)	28

EDUCATIONAL OBJECTIVES OF THE MODULE

Understanding the causes and pathogenic mechanisms that alter the natural homeostasis through the cellular and molecular events involved. Use of advanced diagnostic methods in the field of human pathology

SYLLABUS

Hrs	Frontal teaching
2	Disease as an alteration of natural homeostasis, molecular mechanism of damage.
4	The inflammatory response. Acute inflammation:vascular changes, edema. Cytokines as molecular mediator of inflammatory responses and their receptors. Systemic effects of cytokines: fever, pathophysiology and different types of fever, the acute phase response. Chronic inflammation: cellular infiltration, different types of infiltration.
4	Hypersensitivity reactions: classification, activation and effector mechanisms
4	Neoplasia: nomenclature, molecular aetiology of tumors, molecular mechanisms of neoplastic transformation, oncogenes and tumor suppressor genes. Molecular markers in oncology. Cancer and inflammation. Tumor angiogenesis.
2	Anti tumor immunity: cells, mediator, tumor specific and tumor associated antigens. Use of monoclonal antibodies in human anti tumor therapy
Hrs	Practice
4	Applications in laboratory diagnostics of antigen-antibody reaction.
4	Applications of molecular biology in clinical diagnostics
4	Real time PCR: genotyping with fluorescence-labeled probes

MODULE CLINICAL BIOCHEMISTRY

Prof.ssa LUISA AGNELLO

SUGGESTED BIBLIOGRAPHY

M. Ciaccio. Trattato di Biochimica Clinica e Medicina di Laboratorio. EdiSES, Edizione 2021. ISBN 9788836230440
M. Ciaccio. Elementi di Biochimica Clinica e Medicina di Laboratorio. EdiSES, Edizione 2020. ISBN-10 8836230105
ISBN-13 978-8836230105
M. Laposata. Laposata's Laboratory Medicine Diagnosis of Disease in Clinical Laboratory. McGraw-Hill Education. Third Edition. 2019. ISBN-13 978-1260116793

AMBIT	10643-Attività formative affini o integrative
INDIVIDUAL STUDY (Hrs)	47
COURSE ACTIVITY (Hrs)	28

EDUCATIONAL OBJECTIVES OF THE MODULE

Acquisition of basic and applied concepts of clinical biochemistry in order to evaluate methods and clinical applications of laboratory tests critically. Specific aim of the course is to be able to identify the correct tests in relation to clinical conditions of the patients and to be able to understand them in relation to the diagnosis. Particularly, the students must: • know the main laboratory tests and the biological, molecular and pathological basis for their use in medicine; • interpret lab results with regard to the uncertainty of measurement and biological variability; evaluate the diagnostic accuracy of laboratory investigations. • have information on the characteristics and limitations of the most important methods used in Clinical.

SYLLABUS

Hrs	Frontal teaching
4	Laboratory tests: definition, types, requests. Pre-analytical phase: preparation of the patient, collection of biological samples, processing and identification of biological samples.
2	Analytical phase: the biochemical and clinical analytical process: general laboratory techniques. Post-analytical phase: data collection, calculation, automatic processing. Analytical variation, analytical error, quality control systems. Intra-individual and inter-individual biological variation, reference values, nomenclature and reporting of laboratory tests. Clinical sensitivity and specificity, predictive laboratory tests.
4	Metabolism of lipids: Fatty acids, cholesterol, HDL-cholesterol, LDL-cholesterol, triglycerides, phospholipids. Lipoprotein. Dyslipidemia. Hypercholesterolemia. Atherosclerosis and cardiovascular diseases. Myocardial infarction: risk factors, biochemical modification in the necrotic area; clinical enzymes, new markers of myocardial infarction. Biomarkers in heart failure. Metabolism of glucose: Diabetes: biochemistry of DMT1 and DMT2. Hypoglycemia: clinical biochemistry.
3	Clinical Biochemistry of liver diseases. Clinical Biochemistry of jaundice.
3	Metabolism of proteins: Plasma proteins. Electrophoresis of plasma proteins: interpretation of results. Laboratory evaluation of kidney function. Clinical biochemistry of kidney disease. Urinalysis.
Hrs	Workshops
12	Clinical molecular biology: diagnostic techniques used for the diagnosis of the main genetic diseases. Monogenic diseases and DNA typing. DNA mutations analysis by direct and indirect analyzes (restriction polymorphism). PCR reaction (polymerase chain reaction) for the amplification of abnormal DNA sequences. Practical exercises on the simulator arm of the venous drawing.

MODULE IMMUNOLOGY

Prof.ssa SONYA VASTO

SUGGESTED BIBLIOGRAPHY

- Le basi dell'immunologia. Fisiopatologia del sistema immunitario
Abul K. Abbas, Andrew H. Lichtman, Shiv Pillai, V edizione, 2017, EDRA
ISBN: 978-0-323-39082-8
Basic Immunology 6th Edition Functions and Disorders of the Immune System
Authors: Abul Abbas Andrew H. Lichtman Shiv Pillai
Paperback ISBN: 9780323549431
eBook ISBN: 9780323639095

Review e articoli scientifici forniti dal docente.

AMBIT	10643-Attività formative affini o integrative
INDIVIDUAL STUDY (Hrs)	51
COURSE ACTIVITY (Hrs)	24

EDUCATIONAL OBJECTIVES OF THE MODULE

The aims of the module are to provide an understanding of core immunology and the immunological basis of some common diseases. The students, at the end of the course, should understand the cellular and molecular mechanisms of the immune response and their role in defense against infectious agents in the pathogenesis of immune-mediated reactions.

SYLLABUS

Hrs	Frontal teaching
6	Properties and Overview of Immune Responses. Cells and Tissues of the Immune System: cells and their receptors. Complement system activation, function, receptors and complement regulatory proteins. Phagocytosis, dendritic cells and antigen presentation, Major Histocompatibility Complex.
4	Antibodies and antigens: structure and functions. Fc receptors. Cytokines, chemokines and their receptors.
6	T lymphocytes: Lymphocyte Development and their activation and differentiation. Functions of CD4+ Effector T Cells, Functions of CD8+ Effector T Cells and DN T cells. Mechanism of apoptosis.
2	B Cell Activation and Antibody Production: Effector Mechanisms of Humoral Immunity.
4	Natural killer cells, gamma delta T lymphocytes, NKT cells, lymphoid innate cells: antigen recognition and effector functions.
2	Mechanisms of central and peripheral Tolerance of T and B lymphocytes.