



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Biomedicina, Neuroscienze e Diagnostica avanzata		
ACADEMIC YEAR	2020/2021		
MASTER'S DEGREE (MSC)	MEDICINE AND SURGERY		
SUBJECT	IMMUNOLOGY		
TYPE OF EDUCATIONAL ACTIVITY	B		
AMBIT	50401-Patologia generale e molecolare, immunopatologia, fisiopatologia generale, microbiologia e parassitologia		
CODE	03839		
SCIENTIFIC SECTOR(S)	MED/04		
HEAD PROFESSOR(S)	DIELI FRANCESCO	Professore Ordinario	Univ. di PALERMO
	SIRECI GUIDO	Professore Associato	Univ. di PALERMO
	CACCAMO NADIA	Professore Ordinario	Univ. di PALERMO
	ROSALIA		
OTHER PROFESSOR(S)			
CREDITS	5		
INDIVIDUAL STUDY (Hrs)	75		
COURSE ACTIVITY (Hrs)	50		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	2		
TERM (SEMESTER)	1° semester		
ATTENDANCE	Mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	CACCAMO NADIA ROSALIA Tuesday 9:00 12:00 Dipartimento Bi.N.D., Corso Tukory 211. Il docente riceve per appuntamento previo contatto per email con un certo anticipo. DIELI FRANCESCO Wednesday 12:00 14:00 Central Laboratory of Advanced Diagnosis and Biomedical Research (CLADIBIOR) c/o Policlinico Universitario, Via del Vespro 129, Palermo. Il docente riceve soltanto per appuntamento, per cui e necessario contattare il docente per e.mail con un certo anticipo. SIRECI GUIDO Monday 10:00 12:00 CLADIBIOR Friday 10:00 12:00 CLADIBIOR		

PREREQUISITES	Basic knowledge in the following disciplines is mandatory: Biology and Genetics, Molecular biology, Histology, Anatomy and Cell Physiology, Chemistry and Biochemistry, Microbiology.
LEARNING OUTCOMES	Knowledge and understanding. To know the cellular and molecular mechanisms of the immune response, and their role in the defense against infectious agents and in the pathogenesis of immune-mediated reactions. Applying knowledge and understanding. To discuss and translate the mechanisms of the immune response to more general physiological and/or pathological conditions; to discuss clinical cases for their immunological implications and be aware of the methods and experimental approaches to the study of the immune system. Making judgments. To integrate acquired knowledge with a critical approach and a research oriented attitude, to prove to be able to formulate personal judgments to solve analytical problems and to be able to independently look for scientific informations. Communication skills. To know how to clearly communicate knowledge and to develop the learning skills that enable to continue to study independently. Learning ability. To update knowledge by consulting scientific literature, based on the knowledge acquired during the course and with individual study,
ASSESSMENT METHODS	Assessment is based on an oral test. The oral test consists of a 20-30 minute interview aimed at ensuring the disciplinary knowledge of the program. The following is the evaluation scheme. 30-30 and praise: excellent knowledge of the contents of the lesson, the student demonstrates high analytical-synthetic skills and is able to apply knowledge to solve complex problems. 27-29: excellent knowledge of teaching content and excellent language skills, the student demonstrates analytical-synthetic skills and is able to apply knowledge to solve problems of medium/high complexity. 24-26: good knowledge of the content of teaching and good language skills, the student is able to apply knowledge to solve medium complexity problems. 21-23: sufficient knowledge of the content of teaching, in some cases limited to the main topics, acceptable ability to use the specific language of the discipline and to apply the acquired knowledge independently. 18-20: minimum/limited knowledge of the content of the teaching, often limited to the main topics, modest ability to use the specific language of the discipline and apply the acquired knowledge independently. Insufficient: the student does not have an acceptable knowledge of the main contents of the teaching, very little or no ability to use the specific language of the discipline and to apply the acquired knowledge independently.
EDUCATIONAL OBJECTIVES	The aims of the course are to provide an understanding of core immunology and the immunological basis of some common diseases. The course will cover basic cellular and molecular aspects of immunology including innate immunity, antibodies, T cells, B cells, complement, antigen presentation and the cytokine network. We will examine how dysregulated immune reactions cause autoimmune disease and transplant rejection. We will study the dynamic nature of the immune system and the need for extensive redundancy in the face of pressure from external infectious diseases, and malignancies and autoimmune diseases which arise internally.
TEACHING METHODS	Teaching will be based on formal lectures and internship in an immunology laboratory.
SUGGESTED BIBLIOGRAPHY	- IMMUNOLOGIA CELLULARE E MOLECOLARE. Abbas – Lichtman - Pillai. Ed. Elsevier. - IMMUNOBIOLOGIA. Murphy - Travers - Walport. Piccin-Nuova Libreria Ed. Inoltre si raccomanda di utilizzare il materiale didattico (diapositive in formato Power Point) scaricabile gratuitamente dal sito di Nature Reviews in immunology, all'indirizzo Web: http://www.nature.com/nri, e le reviews in lingua inglese, su argomenti selezionati, fornite gratuitamente dal docente. It is highly recommended the use figures and images that can be freely downloaded from the Nature Reviews in Immunology Web site (http://www.nature.com/nri), and Power Point slides and reviews in English on selected topics, are made freely available.

SYLLABUS

Hrs	Frontal teaching
1	Cells and tissues of the immune system. Leukocyte circulation and homing into tissues.
2	Innate immunity. Cellular components of the innate immune system. Pattern recognition receptors and sensors of innate immunity. The complement system and related defects.

SYLLABUS

Hrs	Frontal teaching
2	Phagocytosis and related defects,
2	Dendritic cells and antigen presentation. Dendritic cell functions at special sites.
2	Major histocompatibility complex.
6	Differentiation and functions of different subsets of T lymphocytes. Defects in T lymphocytes and cell-mediated immunity.
4	Differentiation and functions of B lymphocytes.
4	Effector mechanisms of humoral immunity: antibodies, Fc receptors. Defects in B lymphocytes and antibody response.
3	Cardinal features of the immune response: recognition, activation, effector functions, memory generation and maintenance, apoptosis.
2	combinati. Cytokines, chemokines and their receptors. Severe combined immunodeficiencies.
2	Natural Killer and Innate Lymphoid cells.
7	Hypersensitivity reactions. Classification. Type I hypersensitivity, allergy and bronchial asthma. Type II hypersensitivity, blood groups, transfusion reactions, anti-receptor antibodies diseases. Type III hypersensitivity and immunocomplexes diseases. Type IV, delayed-type hypersensitivity, tuberculin-type hypersensitivity, granulomatous reactions, contact hypersensitivity, psoriasis.
2	Immunological tolerance, autoimmunity and autoimmune diseases.
2	Transplantation immunology and alloreactivity. Immunosuppressive drugs.
2	Acquired immunodeficiencies. Human immunodeficiency virus and the acquired immunodeficiency syndrome.
2	Vaccines and vaccination strategies.
3	Tumor immunology.
2	Monoclonal antibodies and their use in diagnostics and therapy.
Hrs	Practice
10	Laboratory techniques commonly used in immunology. Principal features of selected CD molecules.

PREREQUISITES	The student must have basic knowledge in the following disciplines: Biology and Genetics, Molecular Biology, Histology, Anatomy and Cell Physiology, Chemistry and Biochemistry, Microbiology. Suggerisci una modifica The student must have basic knowledge in the following disciplines: Biology and Genetics, Molecular Biology, Histology, Anatomy and Cell Physiology, Chemistry and Biochemistry, Microbiology.
LEARNING OUTCOMES	Knowledge and understanding skills. Know the fundamental cellular and molecular mechanisms of the immune response and their role in defense against infectious agents and immunopathogenic reactions. Ability to apply knowledge and understanding. Discuss and use the main mechanisms of functioning of the immune system in physiological and / or pathological conditions, discuss clinical cases for their immunological implications, and be familiar with experimental methods and approaches for the study of the immune system. Judgment autonomy. Ability to integrate acquired knowledge for a critical approach and research-orientated attitude, demonstrating that they are able to formulate personal judgments to solve analytical problems and to independently seek out scientific information. Communicative Skills. Know how to communicate clearly the acquired knowledge and develop the learning skills that enable them to continue studying independently. Learning Skills. Based on what has been acquired during the course and with the individual study, the ability to independently update their knowledge by consulting the scientific publications of these fields.
ASSESSMENT METHODS	The evaluation is based on an oral test. The oral test consists of a generally 20-30 minute interview aimed at ensuring the disciplinary knowledge of the program. The evaluation is expressed in thirty-five. Below is the evaluation scheme: 30 and praise-30 Excellent knowledge of the content of the lesson; the student demonstrates high analytical-synthetic capacities and is able to apply knowledge to solve problems of high complexity. 29-27 Excellent knowledge of teaching content and excellent language skills; the student demonstrates analytical-synthetic ability and can apply knowledge to solve high-medium and, in some cases, high-level problems. 26-24 Good knowledge of the content of teaching and good language skills; the student is able to apply knowledge to solve problems of medium complexity 23-21 Discreet knowledge of the content of teaching, in some cases limited to the main topics; Accepting the ability to use the specific language of the discipline and applying the acquired knowledge 20-18 Minimum knowledge of the content of the teaching, often limited to the main topics; modest ability to use the specific language of the discipline and apply the acquired knowledge autonomously. Insufficient. Does not have an acceptable knowledge of the main contents of the teaching; very little or no ability to use the specific language of the discipline and to apply the acquired knowledge independently.
EDUCATIONAL OBJECTIVES	The purpose of the course is to provide the basis for understanding the mechanisms that regulate the immune response. At the end of the course the student should have basic knowledge about the functioning of the immune system. Such knowledge is also the basis of advancement in the study of various pathologies.
TEACHING METHODS	Lectures and practical laboratory exercises of immunology.
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SYLLABUS

Hrs	Frontal teaching
1	Anatomy and functions of lymphatic tissues. Lymphocyte recirculation, homing receptors
2	The innate immune system: cells and receptors for molecular profiles. The complement system (activation pathways, control receptors and proteins, complement functions) and their related deficits
2	Phagocytosis and related deficits.
2	Dendritic cells and antigen presentation. Functions of dendritic cells in particular districts of the organism.
2	The Major Histocompatibility Complex (MHC) : structure and functions. Classic and non classic MHC.
6	T lymphocytes: maturation, antigen recognition (TCR), functions. T lymphocyte populations (CD4, CD8, DN, NKT, MAIT, gamma/delta). Deficit of T lymphocytes and cell-mediated immunity.
4	B lymphocytes: maturation, antigen recognition (BCR), functions. B1 lymphocytes.
4	Antibodies: structure, functions, interactions with cells and factors of innate and acquired immunity. The FcR. Congenital deficits of the antibody response.
3	Phases of Immune Response: Recognition, Activation, Effector Functions, Memory, Apoptosis (AICD). Antibody production control.
2	Cytokines and chemokines. Cytokine receptors and chemokine receptors.
2	Natural Killer lymphocytes and innate lymphoid cells (ILC)
7	Hypersensitivity reactions. Classification. Type I reactions, allergy and bronchial asthma. Type II reactions, blood groups, transfusion reactions and anti-receptor antibody diseases. Type III reactions and immunocomplex diseases. Type IV reactions, delayed hypersensitivity reaction to tuberculin, granulomas, contact hypersensitivity reactions, psoriasis.
2	Immunological tolerance. Autoimmunity and autoimmune diseases.
2	Transplant immunology. Alloreactivity and rejection. Role of NK lymphocytes in bone marrow transplantation. Immunosuppressive drugs.
2	The immunodeficiencies acquired: generality. AIDS. General characteristics, proteins and cellular receptors of HIV. The HIV replication cycle. The pathogenic mechanisms of AIDS.
2	Vaccines
3	Tumor immunology
2	Monoclonal antibodies and their use in diagnostics and therapy.
Hrs	Practice
10	The immunology laboratory: main immunological techniques, how to study T and B lymphocytes. How to study phagocytosis.

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SYLLABUS

Hrs	Frontal teaching
1	Anatomy and functions of Lymphoid tissues. Lymphocyte recirculation and homing receptors
2	innate immunity: cells and Pattern recognition receptors. The Complement system (activation pathways, cellular receptors, regulation of activation by proteins) functions of the Complement system) Complement deficiencies
1	Phagocytosis and related deficiencies
2	Dendritic cells and antigen presentation. Dendritic cell functions at special sites.
3	The Major Histocompatibility Complex (MHC) classic and non classic: structure and functions
6	T lymphocytes: maturation, antigen recognition, activation. Organization of TCR genes. T lymphocytes subpopulations (CD4, CD8, Tregs, DN, NKT, MAIT, $\gamma\delta$) and functions. Deficiencies of T lymphocytes.

SYLLABUS

Hrs	Frontal teaching
4	B lymphocytes: maturation, antigen recognition, activation. Organization of BCR and Ig genes. B lymphocytes subpopulations functions
3	Antibodies: molecular structure and function, features related to effector functions. FcRs, Immunoglobulin deficiencies
4	Phases of the immune response: antigen recognition, activation, effector functions, immunological memory, apoptosis (Activation induced cell death AICD). Regulatory mechanisms in antibodies production
2	Cytokines, chemokines and receptors
2	Natural Killer cells and Innate Lymphoid cells (ILC)
2	Immunologic tolerance. Autoimmunity
2	Acquired Immunodeficiencies: General features and AIDS
2	Vaccines
7	Hypersensitivity reactions. Classification. Type I hypersensitivity, allergy and bronchial asthma. Type II hypersensitivity, blood groups, transfusion reactions, anti-receptor antibodies diseases. Type III hypersensitivity and immunocomplexes diseases. Type IV, delayed-type hypersensitivity, tuberculin-type hypersensitivity, granulomatous reactions, contact hypersensitivity.
2	Transplantation immunology and alloreactivity. Immunosuppressive drugs.
3	Tumor Immunology
2	Monoclonal antibodies and their use in diagnostics and therapy.
Hrs	Practice
10	Laboratory techniques commonly used in immunology. Principal features of selected CD molecules.