



Introduction to clinical immunology

1. IMPRINT	
Academic Year	2022/2023
Department	Faculty of Dental Medicine
Field of study	English Dentistry Division
Main scientific discipline <i>(in accord with appendix to the Regulation of Minister of Science and Higher education from 26th of July 2019)</i>	Medical Science
Study Profile <i>(general academic / practical)</i>	General academic
Level of studies <i>(1st level / 2nd level / uniform MSc)</i>	Uniform MSc
Form of studies	Full-time studies
Type of module / course <i>(obligatory / non-compulsory)</i>	Obligatory
Form of verification of learning outcomes <i>(exam / completion)</i>	Completion
Educational Unit / Educational Units <i>(and address / addresses of unit / units)</i>	Department of Immunology, Transplantology and Internal Diseases Nowogrodzka 59, building 1A 02-006 Warsaw, phone: +48 22 502 16 41

Head of Educational Unit / Heads of Educational Units	Prof. Leszek Pączek, MD PhD
Course coordinator (title, First Name, Last Name, contact)	Prof. Leszek Pączek, MD PhD; leszek.paczek@wum.edu.pl
Person responsible for syllabus (First name, Last Name and contact for the person to whom any objections concerning syllabus should be reported)	Anna Burdzińska, DVM PhD; anna.burdzinska@wum.edu.pl
Teachers	Anna Burdzińska, DVM, PhD; anna.burdzinska@wum.edu.pl Agnieszka Kulesza, M.Sc; agnieszka.kulesza@wum.edu.pl Jolanta Żegarska, MD PhD; Jolanta.zegarska@wum.edu.pl

2. BASIC INFORMATION

Year and semester of studies	2nd year, 1st semester	Number of ECTS credits	2
FORMS OF CLASSES		Number of hours	ECTS credits calculation
Contacting hours with academic teacher			
Lecture (L)	10	0.33	
Seminar (S)	15	0.67	
Discussions (D)			
e-learning (e-L)			
Practical classes (PC)			
Work placement (WP)			
Unassisted student's work			
Preparation for classes and completions	30	1	

3. COURSE OBJECTIVES

O1	To familiarize students with the structure and functioning of the human immune system
O2	To familiarize students with the basic mechanisms of induction and development of the immune response and the processes underlying the development of allergic diseases, autoimmune diseases, cancer, transplant rejection as well as primary and secondary immunodeficiencies
O3	To familiarize students with the use of antibodies, cytokines and immune cells for diagnostic and therapeutic purposes

4. STANDARDS OF LEARNING – DETAILED DESCRIPTION OF EFFECTS OF LEARNING (concerns fields of study regulated by the Regulation of Minister of Science and Higher Education from 26 of July 2019; does not apply to other fields of study)

Code and number of effect of learning in accordance with standards of learning (in accordance with appendix to the Regulation of Minister of Science and Higher education from 26th of July 2019)	Effects in time
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Knowledge – Graduate* knows and understands:

C.W7.	knows and understands the structure of the immune system and its role
C.W8.	knows and understands humoral and cellular mechanisms of innate and adaptive immunity as well as mechanisms of immune hypersensitivities and autoimmune processes
C.W10.	knows and understands the basics of immunodiagnostics and immunomodulation
C.W11.	knows and understands the pathomechanism of selected hypersensitive disorders with particular emphasis on allergy, autoimmune diseases and immunodeficiencies
E.W3.	knows and understands the etiopathogenesis and symptoms of immune system disorders with particular emphasis on diseases associated with oral cavity
E.W16.	knows and understands immunological aspects of haemotherapy and transplantation

Skills– Graduate* is able to:

E.U4.	Is able to interpret the results of laboratory tests in regards to immune disorders
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* In appendix to the Regulation of Minister of Science and Higher education from 26th of July 2019 „graduate”, not student is mentioned.

5. ADDITIONAL EFFECTS OF LEARNING (non-compulsory)

Number of effect of learning	Effects of learning in time
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Knowledge – Graduate knows and understands:

W1.	The concept of health and disease, mechanisms of the development of pathological processes at the molecular, cellular, tissue and systemic level, clinical symptoms of the disease, prognosis and complications of the disease
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Skills– Graduate is able to:

S1	-
S2	-

Social Competencies – Graduate is ready for:

SC1	
SC2	

6. CLASSES		
Form of class	Class contents	Effects of Learning
Lectures (1 hour each)	<p>L1. – Lecture 1: Basic definitions. Overview of Immune response. Learning content: The role of the immune system, the division into innate and adaptive immunity and relationship between these parts, the phases of the immune response, mechanisms of communication between immune cells</p> <p>L2. – Lecture 2: Organs, tissues and cells of immune system. Learning content: Presentation of the immune cell types – from the origin to the general effector functions. Presentation of immune tissues and organs. Distinction between primary and secondary lymphoid organs. The role of lymphatic system.</p> <p>L3. – Lecture 3: Components and function of innate immunity. Learning content: The role of granulocytes, natural killer cells, complement system. The process of phagocytosis, microbicidal molecules, antiviral response – type I interferons.</p> <p>L4. – Lecture 4: Recognition of microbes by innate immunity. Learning content: Cellular receptors for microbes and damaged cells. The role of tissue resident immune cells. Major pro-inflammatory cytokines.</p> <p>L5. – Lecture 5: Leukocytes circulation and migration into tissues Learning content: The process of leukocytes extravasation – phases, molecules involved. Differences in leukocytes recruitment. Lymphocytes trafficking pattern – recirculation. Migration of naïve lymphocytes to secondary lymphoid organs.</p> <p>L6. – Lecture 6: Development and activation of T cells. Learning content: Diversity of T cell receptors. Selection of T cell precursors in the thymus. Phases of T cell activation. MHC restricted antigens recognition.</p> <p>L7. – Lecture 7: The major histocompatibility complex and its function Learning content: Structure, function, occurrence of MHC class I and MHC class II molecules, antigen processing, origin of presented peptides, polygeny and polymorphism of genes encoding MHC molecules and the biologic significance of these phenomena.</p> <p>L8. – Lecture 8: Differentiation and effector function of CD8+ and CD4+ T cells Learning content: Cytokines and their sources involved in the differentiation of T cells. The role of cytotoxic T lymphocytes (CTLs), mechanisms of target cells killing. Main subsets of effector CD4+ T cells – Th1, Th2, Th17 and their activity. Role of memory T cells.</p> <p>L9. – Lecture 9: B cell activation Learning content: Types of antigens recognized by B cell receptors. Phases of B cell activation. The role of Th cells in this process. Presentation of T follicular helper cell subset. Affinity maturation phenomenon. Antibody class switching. Migration of plasma cells. Memory B cells.</p> <p>L10. – Lecture 10: Effector mechanisms of humoral immunity. Learning content: Classes of antibodies, their main features and distribution. Role of antibodies in neutralization of microbes and toxins. Opsonization and phagocytosis. Antibody dependent cellular cytotoxicity. Activation of complement.</p>	<p>C.W7.</p> <p>C.W7., C.W8.</p> <p>C.W7., C.W8.</p> <p>C.W7., C.W8.</p> <p>C.W7., C.W8.</p> <p>C.W7., C.W8.</p> <p>C.W7., C.W8., E.W16.</p> <p>C.W7., C.W8.</p> <p>C.W7., C.W8.</p> <p>C.W7., C.W8.</p>

	Role of antibodies in parasitic infections.	
Seminars (S1-S7 - 2 hours each), S8 – 1 hour	<p>S1. – Seminar 1: Mucosal Immunity Learning content: The significance of mucosal immunity. Features of oral mucosa. Physical and chemical mechanisms of mucosal protection. Role of commensals. Dysbiosis – definition, significance in mucosal pathology. The role and organization of mucosal associated lymphatic tissues (MALT). Effector elements of mucosal adaptive immunity – IgA, intraepithelial lymphocytes. MALT as a system. Oral tolerance phenomenon and its underlying mechanisms.</p> <p>S2. Seminar 2: Immunological aspects of wound healing and regeneration Learning content: Healing stages. Scar vs scar free healing. Differences in regenerative capacities in various species. Current views on the relationship between the development of the immune system and the ability to regenerate. The role of macrophages in regeneration process. Subsets of macrophages and their activity.</p> <p>S3. Seminar 3: Immunological hypersensitivities and allergic diseases Learning content: Types of hypersensitivities with particular emphasis on type I hypersensitivity. Mechanism of allergic reaction. Sensitisation and effector phase. Role of Th2 cells, IgE, mast cells and eosinophils. Determinants of atopy. Anaphylaxis. Basic of immunotherapy of allergic diseases.</p> <p>S4. Seminar 4: Immunodeficiencies Learning content: Primary and secondary immunodeficiencies including dental aspects. Diagnosis of immunodeficiencies. Acquired immune deficiency syndrome (AIDS).</p> <p>S5. Seminar 5: Immunologic tolerance and autoimmunity Learning content: Central and peripheral mechanisms of self-tolerance. Factors contributing to the development of autoimmune diseases. Pathomechanism of selected autoimmune diseases. Sjögren Syndrome.</p> <p>S6. Seminar 6: Immunology in transplant medicine and in haemotherapy Learning content: History and main achievements of transplantology. Types of transplants and their applications. allograft rejection mechanisms. MHC in transplant medicine. Blood group antigens. Transfusion reactions.</p> <p>S7. Seminar 7: Fundamentals of immunodiagnostic and immunomodulation Learning content: Methods of obtaining monoclonal antibodies, modifications of monoclonal antibodies for diagnostics and therapy, diagnostic techniques using antibodies (ELISA, Western blotting, immunoprecipitation, immunofluorescence microscopy, immunoelectron microscopy, immunohistochemical techniques), - examples of therapeutic applications of monoclonal antibodies in the treatment of human diseases.</p> <p>S8. Seminar 8: Final test</p>	<p>C.W8., E.W3.</p> <p>C.W8.</p> <p>C.W8.,C.W11., E.W3., E.U4.</p> <p>C.W11., E.W3., E.U4.</p> <p>C.W8.,C.W11,E.W3.E.U4.</p> <p>E.W16.</p> <p>C.W10.,E.U4.</p>

7. LITERATURE

Obligatory

Abul K. Abbas et al. "Basic Immunology. Functions and Disorders of the Immune System" (6th edition, 2019, Elsevier)

Supplementary

Abul K. Abbas et al. „Cellular and Molecular Immunology”(10thedition,2021, Elsevier),

8. VERIFYING THE EFFECT OF LEARNING		
Code of the course effect of learning	Ways of verifying the effect of learning	Completion criterion
<i>e.g. G.K1, G.S1, K1</i>	<i>This field defines the methods used for grading students e.g. pop quiz, test, written report etc.</i>	<i>e.g. threshold number of points</i>
C.W7., C.W8., C.W10., C.W11., E.W3., E.W16., E.U4.	Mid-term test (single choice test, 10 questions), second term – maximum 2 weeks after the first term in the same form	correct answer to min. 60% of questions
	Final test (single choice test, 30 questions), second term – the same form as the first term	correct answer to min. 60% of questions and maximum two inexcusable absences on seminars

9. ADDITIONAL INFORMATION (information essential for the course instructor that are not included in the other part of the course syllabus e.g. if the course is related to scientific research, detailed description of, information about the Science Club)
Presentations will be available on e-learning platform, will be available to students during the period specified in the schedule. In case of epidemic restrictions, seminars will be conducted on the microsoft teams platform in a live formula according to the schedule

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