

SYLLABUS

The academic year when the cycle of instruction is commenced 2019-2025 [INT]

Module/course name:	Clinical Immunology		Module code	LK.3.C.001
Faculty:	Faculty of Medicine MUL			
Major:	Medical			
Specialty:				
Level of study:	I (Bachelor studies) <input type="checkbox"/> II (Master studies) <input type="checkbox"/> Integrated Master studies X Doctoral studies <input type="checkbox"/>			
Mode of study:	full-time X part-time (extramural) X			
Year of study:	I <input type="checkbox"/> II <input type="checkbox"/> III X IV <input type="checkbox"/> V <input type="checkbox"/> VI <input type="checkbox"/>	Semester:	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 X 6 <input type="checkbox"/> 7 <input type="checkbox"/> 8 <input type="checkbox"/> 9 <input type="checkbox"/> 10 <input type="checkbox"/> 11 <input type="checkbox"/> 12 <input type="checkbox"/>	
Module/course type:	obligatory X elective <input type="checkbox"/>			
Language of instruction:	Polish <input type="checkbox"/> English X			
Form of education	Hours			
Lecture	5			
Seminar				
Laboratory class	50			
E-learning				
Practical class				
Internship				
Other				
TOTAL				
Student's work input (participation in class, preparation, evaluation, etc.)	Student's hourly workload			
1. In class	55			
2. Student's own work including: 1 Preparation for class 2 Preparation for partials and finals	20			
Summary of the student's workload	75			
ECTS points for module/course	3			
Educational objectives: Students must gain the basic knowledge of basic immunology, immunopathology, skills to perform and analyses immunological tests as well as ability treatment using biological drugs (e.g. monoclonal antibodies). We focus on diseases with strong immunological background .e.g. rheumatological ones or allergy.				
The matrix of learning outcomes for module/ subject with reference to verification methods of the intended educational outcomes and forms of instruction:				

Learning outcome code	A student who has obtained a credit for the module/course has the knowledge/skill to:	Methods of verifying the achievement of the intended learning outcomes:	Form of instruction * provide the symbol
W01 B.W17	knows the methods of intercellular communication, communication between a cell and extracellular matrix and the signal transmission paths in a cell as well as examples of disturbances in these processes, leading to development of cancers and other diseases	MCQ presentation	Lecture Lab class
W02 B.W18	knows such processes as: cell cycle, proliferation, differentiation and aging of cells, apoptosis and necrosis and their significance for the body functions	MCQ presentation	Lecture Lab class
W03 B.W19	has basic knowledge on stem cells and their application in medicine	MCQ presentation	Lecture Lab class
W04 B.W29	knows the principles of research work, observations and experiments and the in vitro studies in service of progress in medicine	MCQ presentation	Lecture Lab class
W05 C.W7	can describe autosomal and heterosomal aberrations causing diseases, including cancer, oncogenesis	MCQ presentation	Lecture Lab class
W06 C.W21	knows the development principles and function mechanisms of immune system; including specific and non-specific humoral and cellular defense mechanisms	MCQ presentation	Lecture Lab class
W07 C.W22	can describe major histocompatibility complex	MCQ presentation	Lecture Lab class
W08 C.W23	knows hypersensitive response types, kinds of immune deficiency and basics of immunomodulation	MCQ presentation	Lecture Lab class
W09 C.W24	knows issues in the scope of cancer immunology	MCQ presentation	Lecture Lab class
W10 C.W25	determines genetic basis for donor and recipient selection and fundamentals of transplant immunology	MCQ presentation	Lecture Lab class
W11 C.W42	knows the basic trends in the development of therapy, in particular, the possibilities offered by cellular, genetic and targeted therapy in specific diseases	MCQ presentation	Lecture Lab class
W12 E.W3	knows and understands the causes, symptoms, principles of diagnosing and therapeutic procedures of most common children's diseases: c/ acute and chronic diseases of upper and lower respiratory tract, congenital respiratory defects, tuberculosis, mucoviscidosis, asthma, allergic rhinitis, rash, anaphylactic shock, angioedema, i/ the most common pediatric infectious diseases	MCQ presentation	Lecture Lab class

W13 E.W7	<p>knows and understands the causes, symptoms, diagnostic principles and therapeutic procedures in respect to the most common internal diseases in adults and their complications:</p> <p>b/ respiratory disorders, including: diseases of the respiratory tract, chronic bronchial asthma, obstructive pulmonary disease, bronchiectasis, mucoviscidosis, infections of the respiratory tract, interstitial diseases of the lungs, pleura, mediastinum, obstructive and central sleep apnea, respiratory failure (acute and chronic), malignancies of the respiratory system.</p> <p>f/ disorders of the hematopoietic system, including bone marrow aplasia, anemia, granulocytopenia and aglanulocytosis, thrombocytopenia, acute leukemia, myeloproliferative and myelodysplastic- myeloproliferative tumors, myelodysplastic syndromes, tumors from mature B and T lymphocytes, bleeding diathesis, thrombophilia, life threatening conditions in hematology, blood disorders in diseases of other organs, blood donation and blood therapy, bone marrow transplantation;</p> <p>g/ rheumatic disorders, including systemic disorders of connective tissue, systemic vasculitis, arthritis involving the vertebral column, metabolic diseases of bones, in particular, osteoporosis and deformative arthrosis, gout;</p> <p>h/ allergic diseases, including anaphylaxis and anaphylactic shock, angioedema</p>	MCQ presentation	Lecture Lab class
W14 E.W34	knows and understands the causes, symptoms, principles and management methods in the most common bacterial, viral, parasitic and fungal disorders, including pneumococcal infections, viral hepatitis, acquired immune deficiency syndrome, sepsis and nosocomial infections	MCQ presentation	Lecture Lab class
W15 E.W35	knows the basic characteristics, environmental and epidemiological background of most common human disorders of the skin	MCQ presentation	Lecture Lab class
W16 E.W39	knows the types of biological materials used in laboratory diagnostics and the principles of specimen collection	MCQ presentation	Lecture Lab class
U01 B.U13	can plan and carry out simple research study, interpret the results and draw conclusions	presentation	Lab class
U02 C.U3	is capable of taking decision on the need to perform cytogenetic and molecular tests	presentation	Lab class
U03 C.U8	makes use of the antigen-antibody reaction in current modifications and techniques for diagnostics of infectious, allergic, autoimmune, blood and malignant diseases	presentation	Lab class
U04 C.U12	analyses the reactive, defense and adaptation response and control disorders caused by an etiological factor	presentation	Lab class
U05 E.U27	can qualify patient for inoculations	presentation	Lab class
U06 E.U32	can plan specialist consultations	presentation	Lab class
K01	Actively participates in theoretical and practical part of classes	an extended observation by a supervisor/tutor	Lab class

K02	Cooperates within the group	an extended observation by a supervisor/tutor	Lab class
K03	Maintains high standards of behaviour	an extended observation by a supervisor/tutor	Lab class

EXAMPLES OF METHODS VERIFYING THE ACHIEVEMENT OF THE INTENDED LEARNING OUTCOMES:

In terms of knowledge: Oral exam (*non-standardized, standardized, traditional, problem-based*).

Written exam – the student produces/identifies answers)essay, report; structured short-answer questions /SSQ/; multiple choice questions /MCQ/; multiple response questions /MRQ/; matching test; true/false test; open cloze test)

In terms of skills: practical exam; Objective Structured Clinical Examination /OSCE/; Mini-CEX (mini – clinical examination); completion of a given assignment; project, presentation.

In terms of social competences:

A reflective essay; an extended observation by a supervisor/tutor; 360-degree assessment (feedback from teachers, peers, patients, other co-workers); self-assessment (portfolio included).

Course content: (use keywords referring to the content of each class following the intended learning outcomes):

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T cells and cellular response. Flow cytometry.

1. Structure of T cell receptor, genetic mechanism associated with diversity of TCR.
2. Development of T cell (progenitors and precursors of T cells, early and late phase of T cells development, positive and negative selection, MHC restriction)
3. Subpopulations of T cells (Th1/Th2, Th17, Tc, Treg)
4. Mechanisms of cytotoxic effect.

Introduction to Immunology. Isolation of Lymphocytes

1. Components of immunological system. Cells of immune system. Phases of immune response. Clonal selection.
2. Specific (humoral, cellular) and non-specific immune response. Classes of immunoglobulins.
3. Regulation of specific immune response. Cytokines (proinflammatory, Th1, Th2). System of immunological sensors (e.g. Toll-like receptors).
4. Inflammation. Circulation of immunological cells. Lymphatic organs (primary, secondary).

Inflammation. Regulation of immune response. PCR

What Is Inflammation? What Occurs With Inflammation? Inflammatory Process. Mediators of Inflammation. Lymphocyte Recirculation. Cell-Adhesion Molecules. Neutrophil, Lymphocyte Extravasations.

2. What are cytokines? Classification of cytokines Cytokine Effects Cytokines and immunoregulation Cytokine cross-regulation The concept of pro-inflammatory and anti-inflammatory cytokines
3. Role of Cytokines: IL-1, IL-2, IL-4, IL-6, IL-10, IL-12, IL-17, Interferons, TNF, TGF- β , growth factors
4. Chemokines: Key Mediators of Inflammation. Chemokine definition Chemokine structure and function

B-cells and humoral response. ELISA.

1. Development of B cells (pre-pro B, pro-B, pre-B), immature and mature B cells
2. Structure, function an genetics of antibodies.
3. Subpopulations and function of B cells, Ig cabs switching

Regulation of humoral immunoresponses, anti-idiotypic Abs, co-operation between T and B cells

Non-specific immune response. Phagotest

1. Comparison of specific and non-specific immune response. Examples of specific and non-specific immune response (humoral, cellular, anatomical).
2. Classical and lytic pathway of complement activation;
3. Alternative pathway of complement activation. Complement receptors. Regulation of complement activation.
4. Phagocytosis, intracellular killing.

Autoimmune diseases - rheumatological and connective tissue disorders

1. Definition of self-tolerance, mechanisms of self-tolerance, concept of autoimmune disease, types of autoimmune diseases. Definitions of autoantibodies, types of autoantibodies, use of autoantibodies in autoimmune disease.
2. RA (pathogenesis, clinical symptoms, diagnosing, treatment).
3. SLE (pathogenesis, clinical symptoms, diagnosing, treatment)
4. Sjogren syndrome, scleroderma (pathogenesis, clinical symptoms, diagnosing, treatment)

Allergy (asthma and others)

1. Epidemiology, environmental factors, type of hypersensitivities, hygienic theory
2. Immunopathology, early and late response, role of IgE, mast cells and eosinophils
3. diagnosing
4. symptoms and treatment

Gut and liver disorders

1. MALT, Gastritis type A/ pernicious anaemia
2. Autoimmune disease of the liver Hepatitis type A,B,C (pathogenesis, clinical symptoms, diagnosing, treatment).
3. HP infections, gastric ulcers, Chronic gastritis: pathogenesis, clinical symptoms, treatment.
4. IBD (UC,CD) (pathogenesis, clinical symptoms, diagnosing, treatment), TH1/TH2 balance in IBD

Endocrinology

1. Thyroid autoimmune diseases (Grave's disease, primary myxoedema, Hashimoto disease): pathogenesis, clinical symptoms, treatment. Hypoparathyroidism: pathogenesis, clinical symptoms, treatment.
2. Adrenal disorders (Addison's disease, Cushing syndrome): pathogenesis, clinical symptoms, treatment.
3. Insulin Dependent Diabetes Mellitus: pathogenesis, clinical symptoms, treatment.
4. Lymphocytic hypophysitis: pathogenesis, clinical symptoms, treatment. Polyglandular Autoimmune Syndromes.

Skin disorders.

1. Gell and Coomb's classification. Involvement of skin in human diseases. Urticaria: pathogenesis, clinical symptoms, treatment.
2. Pemphigus Vulgaris: pathogenesis, clinical symptoms, treatment. Bullous Pemphigoid: pathogenesis, clinical symptoms, treatment.
3. Vasculitides: erythema nodosum, erythema multiforme, pathogenesis, clinical symptoms, treatment. Contact dermatitis and atopic dermatitis: pathogenesis, clinical symptoms, treatment.
4. Psoriasis: pathogenesis, clinical symptoms, treatment.

AIDS and HIV infection

1. Epidemiology, transmission of HIV, protection against HIV infections, AIDS as a occupational diseases
2. structure of HIV, M-T-tropic strains of HIV, life cycle of HIV, treatment of HIV
3. Stages of HIV infection (cellular), HIV- testing (rapid, ELISA, western-blot, PCR)
4. course of HIV infection (clinical), criteria of AIDS

Neurology

1. Definition of neuroimmunology. Immune privileges of CNS.
2. Multiple sclerosis: pathogenesis (role of BBB, immune cells involved in disease, role of CNS cells, viral infections)

), epidemiology, clinical symptoms, treatment (immunosuppression, immunomodulation).

3. Parainfectious Encephalomyelitis: pathogenesis, clinical symptoms, treatment. Guillain-Barre Syndrome: pathogenesis, clinical symptoms, treatment. Sub-Acute Sclerosing Pan-Encephalitis: pathogenesis, clinical symptoms, treatment.

4. Creutzfeldt-Jacob Disease: pathogenesis, types of disease, clinical symptoms, treatment. Myasthenia Gravis: pathogenesis, role of thymus, clinical symptoms, treatment.

Immunodeficiencies

1. Immunodeficiencies (epidemiology, clinical symptoms, pathology treatment (including Ig substitution)

2. Common Primary Immunodeficiencies:

Selective IgA deficiency

IgG2 subclass / selective antibody deficiency

Transient hypogammaglobulinemia of infancy

Di George syndrome

3. uncommon Primary Immunodeficiencies:

B-cell disorders (XLA 1:100,000; CVID 1:75,000)

T-cell disorders (SCID 1:100,000)

Phagocytic disorders (CGD 1:200,000)

Complement disorders

4. Secondary Immunodeficiencies (age related, immunosuppression, neoplasm related, renal failure)

Vaccines and Immunostimulation

1. Type of vaccines.

2. Vaccination in immunodeficient patients

3. Indication and contraindications for vaccination (WHO).

4. Typical scheme of vaccination (eg in Poland or Norway or Sweden) you can compare and point the differences.

3. Malignant Transformation of Cells (Oncogenes, the induction of cancer, the tumor growth and metastasis)

4. Cellular origins of haematological malignancies. Phenotypical characteristic of leukemias. Flow cytometry for hematologic neoplasms

Tumour immunology, Neoplasia

1. Tumor Antigens (Tumor-Specific Antigens, Tumor-Associated Antigens). Immune System in Tumorigenesis (Tumor escape mechanisms)

2. Passive immunotherapy (Monoclonal antibodies – clinical utilization ex: Rituximab, Ofatumumab, Cytokines). Active Cancer Immunotherapy (cancer vaccination)

3. Malignant Transformation of Cells (Oncogenes, the induction of cancer, the tumor growth and metastasis)

4. Cellular origins of haematological malignancies. Phenotypical characteristic of leukemias. Flow cytometry for hematologic neoplasms

Immunohaematology

1. Serology of red blood cells (blood typing, blood groups antigens).

2. Transfusions of different blood components (erythrocytes, platelets, plasma)

3. Alloimmune reactions in haematology (transfusions, HDN - hemolytic disease of newborn).

4. Autoimmune reactions in haematology (autoimmune cytopenias, anaemias, haemolysis)

Transplantation

1. Immunologic Basis of Graft Rejection (The types of transplants, the role of T cells).

2. Cell-Mediated Graft Rejection (Sensitization stage and effector mechanism, clinical manifestations of graft-rejection)

3. Immunosuppressive Therapy (conventional immunosuppressive therapy – azathioprine, methotrexate, cyclosporine A, rapamycin, corticosteroids and specific immunosuppressive therapy – monoclonal antibodies, blocking of co-stimulatory signals)

4. *Clinical Transplantation (Bone marrow and organs transplantations, graft versus host disease, graft versus leukemia effect)*

Immunopharmacology.

1. *Role of monoclonal antibodies in therapy of human diseases: monoclonal antibodies in therapy of blood malignancies (e.g. Rituximab, Alemtuzumab), monoclonal antibodies in therapy of solid tumors (e.g. trastuzumab, denosumab, bevacizumab,*

2. *Monoclonal antibodies in therapy of autoimmune diseases (eg. Infliximab, adalimumab, certolizumab, tocilizumab, natalizumab). Soluble receptors in therapy of human diseases (e.g. etanercept, abatacept)*

3. *Immunosuppressive drugs: cyclosporin, steroids, anti-proliferative drugs (cladribine, methotrexat, azathioprine, cyclophosphamide), sirolimus, tacrolimus, mycophenolat mofetil.*

..... 4. *Immunomodulative agents: IFN-beta, statins, vit. D, Glatiramer acetate, hydroxychloroquine, PPAR-gamma agonists)*

Obligatory literature for lectures and labs:

Basic Immunology: Functions and Disorders of the Immune System, by Abul K. Abbas, Andrew H. H. Lichtman, Shiv Pillai – latest edition

Clinical Immunology: Principles and Practice, by Robert R. Rich, Thomas A Fleisher, William T. Shearer, Harry Schroeder, Anthony J. Frew, Cornelia M. Weyand

Complementary literature for lectures and labs:

Kuby Immunology by Judy Owen, Jenni Punt, Sharon Stranford- latest edition

Immunology: With STUDENT CONSULT by David Male, Jonathan Brostoff, David Roth, Ivan Roitt- latest edition,

Requirements for didactic aids (e.g. laboratory, multimedia projector, others...)

multimedia projector, microscope with camera, flow cytometer, ELISA reader, equipment for PCR, ELISPOT, lab equipment e.g. pipetes, incubators, laminar flow hood.

Conditions for obtaining a credit for the subject:

1. Students are expected to attend all lab classes according to given schedule. Students who are late more than 15 min are not allowed to attend classes.
2. Classes and lectures are mandatory; but one absence in each semester is allowed.
3. More than one absence can be justified only by medical, Dean's or Rektor's excuse notes. Students must show these notes in the Dean's office and secretary of Clinical Immunology Department within 3 days to justify the absence. Each topic of this absence must be passed according Lecturers regulations but not later than 7 days after starting of examination session.
4. Students with more than 2 absences (even justify by medical, Dean's or Rektor's excuse notes) are not allowed to pass Clinical Immunology Course. In extraordinary situation e.g. long hospitalization and only on written request of student Head of the Department of Clinical Immunology can make a decision to enable students to pass these absences.
5. Telephones must be turned off during classes
6. Students prepare and present the presentations according to given syllabus and are granted for this by 0-2 points (grades are no to be discussed).
7. Requirements for passing the Clinical Immunology Course
 - a. Students have to obey attendance policy
 - b. Students have to collect at least 60% of points (maximum 70 pts = 50 Final test + 20 classes).
8. Final test consist of 50 questions which cover Basic and Clinical Immunology (lectures and classes). Final test takes place during examination session.
9. Immunology course grading scale (maximum 70 pts = 50 exam + 20 classes):

Less than 60%	2,0 (D)
60-70%	3,0 (C)
71-79%	3,5 (C+)

80-84%	4,0 (D)
85-89%	4,5 (D+)
90-100%	5,0 (A)

10. Preferable form of retake is a test but other forms of examination are allowed, too. Activity points does not have an influence of retake grading.

The name and address of the department/clinic, where the course is taught (module/course); contact details (phone number/ email address):

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