

CLINICAL IMMUNOLOGY AND IMMUNOGENETICS	
GENERAL INFORMATION	
Course teacher	Prof. Jasminka Milas-Ahić, MD, PhD
Associates	Asst. Prof. Vlatka Periša, MD, PhD Asst. Prof. Tihana Šimundić, MD, PhD Asst. Prof. Teuta Opačak-Bernardi, MSc Biol.
Study programme	Graduate University Study of Medical Laboratory Diagnostics
Course status	mandatory
Year of study, semester	1 st year, 1 nd semester
ECTS credits	5
Form of teaching (number of classes)	Lectures: 30; Seminars: 30
Expected number of students attending the course	20
COURSE DESCRIPTION	
Course objectives	
<p>Broaden the knowledge about clinical immunology as an important interdisciplinary scientific field connected to almost all clinical areas and widely implemented in laboratory diagnostics. Pathophysiological mechanisms of the origin of autoimmune diseases will be covered - from exogenous factors (molecular mimicry, stimulation by superantigens, microbial adjuvants) to endogenous immunoregulation disorders. Regarding endogenous disorders, disorders related to antigen presentation will be studied in detail (definition of immune privilege, hidden epitope presentation, changes in self-antigens, increased antigen-presenting cell activity - role of costimulatory molecules and cytokines), increased activity of lymphocytes T and B, apoptose disorder, cytokine production imbalance, immunoregulation disorder and immune tolerance. Pathogenesis of certain autoimmune diseases will be studied in detail, and test models for autoimmune diseases will be presented. Furthermore, the role of immunogenetics in transplantation will be presented and studied, as well as the HLA compatibility complex, its role in the clinical practice of organ transplantation, and the role of immune system in tumorigenesis. By this approach - from basic to clinical approach (presentations of patients) - this course aims to introduce students to the basic principles of translational medicine.</p>	
Course entry requirements and competencies needed for the course	
Completed courses at the Undergraduate Study Programme of Medical Laboratory Diagnostics or equivalent bachelor's degree (baccalaureate)	
Learning outcomes at study programme level	
1.1, 1.2, 2.1, 2.2, 2.3, 2.6, 2.7, 3.1, 3.2	
Expected learning outcomes at course level	
<p>After attending lectures, completing seminars and exercises, independent study and passing the exam, students will be able to:</p> <ol style="list-style-type: none"> 1. compare the main mechanisms of the development of autoimmune diseases 2. critically evaluate the role of the immune system in immunodeficiencies, infections, development of tumours, immunological monitoring 3. review the role of immunogenetics in transplantations, the HLA compatibility complex, its significance in clinical practice 4. present the most important disorders in certain organ-specific diseases, non-organ-specific autoimmune diseases, and lymphoproliferative disorders 5. integrate the main mechanisms of the development of diseases based on the examples of certain autoimmune diseases 6. critically evaluate the laboratory findings of immunological and immunogenetic tests. 	

Course content

Lectures: Immunogenetics of transplantations: Main complex of tissue compatibility in humans (HLA): historical overview of the discovery, research, terminology, location, and structure. Biological role of the HLA complex: peptide processing and presentation. Structure of genes and molecules of the HLA classes I and II. Genetic specificity of the HLA complex: polymorphism, phenotype, haplotype, genotype, linkage disequilibrium, recombination - crossing over. Laboratory tests for identifying the genes, antigens, and antibodies of the HLA: MLCT, PCR-SSP, PCR-SOO, sequencing. Selection of organ recipients for cadaveric organ transplantation. Selection of donors for haematopoietic cell transplantation. Role of compatibility of HLA genes and selection of typing methods in tissue and organ transplantations. Role of HLA (PRA) antibodies in tissue and organ transplantations. Clinical transplantation: transplant rejection, transplantation of lymphoid and non-lymphoid tissue and organs. Autoimmune diseases: mechanisms of development, organ-specific, non-organ-specific. Immunodeficiencies: mechanisms of development, primary, secondary. Immunity to infections, specific immunity (active, passive), immunity to various types of microorganisms and parasites. Immunological hypersensitivity: anaphylactic hypersensitivity, cytotoxic hypersensitivity, hypersensitivity caused by immune complexes, cell-mediated hypersensitivity. Tumour immunology: carcinogens, tumour antigens, immunologic response to tumours, immune evasion. Immunodiagnostics of tumours. Immunoproliferative disorders: characteristics of membranes in malignant leukaemia and lymphoma cells, immunological classification of leukaemias and lymphomas. Monoclonal antibodies in the diagnostics and treatment of leukaemias and lymphomas. Immunotherapy: immunisation, desensitisation, immunosuppression, immunomodulation.

Seminars: Immunological tests in autoimmune diseases and in rheumatoid arthritis. Immunological tests in SLE. In vitro tests in allergies. Immunology - patient reports. Interpretation of findings. Problem seminar: Goodpasture syndrome. Rejection of a transplanted kidney; Lymphoproliferative diseases - interpretation of hematological laboratory findings; HLA typing, meaning in immunological diseases; Atopic dermatitis. Chronic idiopathic urticaria; Autoimmune diseases (diabetes, asthma), interpretation of findings; Problem seminars: Pathogenesis of hemolytic anemia, Pathogenesis of immunothrombocytopenia; Flow cytometry. Electrophoresis. Immunological tests in antiphospholipid syndrome and vasculitis; Interpretation of allergy tests and tests for celiac disease.

Forms of teaching

Lectures and seminars

Students' responsibilities

Attendance is obligatory throughout all course forms, and the student has to attend all the exams. Student absence of up to 30% is considered acceptable in each teaching form. Practical work and seminars that were not completed have to be taken in the form of colloquiums.

Monitoring students' work (Connecting learning outcomes, teaching methods and evaluation)

Teaching activity	ECTS	Learning outcome	Student activity	Evaluation methods	Grade points	
					Min.	Max.
Attending classes (lectures, seminars)	1.5	1-6	Attendance, Seminar paper	Attendance records	1	5
				Writing and presenting seminar paper	7	25

Final exam	3.5	1-6	Studying for final exam	Written exam	42	70
Total	5				50	100

Evaluation of written part of final exam

Percentage of correct answers (%)	Grade points
60.00-69.99	42-50
70.00-79.99	51-56
80.00-89.99	57-62
90.00-100	63-70

Formulating the final grade:

Grade points achieved in classes are combined with points achieved in the final exam. Grading system involves absolute grading and represents one's final achievement. Grades are numerically expressed as follows: A – excellent (5): 80-100 grade points; B – very good (4): 70-79.99 grade points; C – good (3): 60-69.99 grade points; D – sufficient (2): 50-59.99 grade points

Assigned reading (available in the library and in other media)

Title	Number of copies in the library	Availability in other media
Andreis I, Batinić D, Čulo F, Grčević D, Marušić M, Taradi M, Višnjić D. Imunologija. Zagreb: Medicinska naklada, 2010	14	
Patofiziologija, Student's Book, Medicinska Naklada, Zagreb, 7th edition, 2011. Editors: Gamulin, S. Kovač Z., Marušić M.	29	
Patofiziologija. Zadatci za problemske seminare, 3 rd edition, Medicinska Naklada, Zagreb, 2011. Editors: Kovač, Z. Gamulin, S. et al.	10	
Scientific and professional papers selected by teacher		On line

Further reading

1. Milan Taradi Imunologija, 7th revised and updated edition, Medicinska naklada, Zagreb, 2009.
2. Roitt I, Delves P, Essential Immunology 10th edition, Blackwell Publishing, 2007.
3. Cecka J. M., Terasaki P. I. Clinical Transplants 2003. Los Angeles: UCLA Tissue Typing Laboratory, 2004.

Quality assurance methods that ensure the acquisition of exit competencies

Anonymous, quantitative, standardised students' opinion survey on the course and teacher's work, carried out by the Quality Assurance Office of the Faculty of Medicine in Osijek.