Faculty of Medicine in Rijeka

Curriculum
2024/2025

For course

The Role of HLA Genes in Organ Transplantation and Diagnostics of Autoimmune Diseases

Study program:	**Medical Studies in English (R)** (elective) University integrated undergraduate and graduate study
Department:	**Department of Clinical Laboratory Diagnostics**
Course coordinator:	**doc. dr. sc. Katalinić Nataša, dr. med.**
Year of study:	**3**
ECTS:	**1.5**
Incentive ECTS:	**0 (0.00%)**
Foreign language:	**Possibility of teaching in a foreign language**

Course information:

Kolegij **Uloga gena HLA u transplantaciji organa i dijagnostici autoimunih bolesti** je izborni kolegij na trećoj godini Integriranog preddiplomskog i diplomskog sveučilišnog studija Medicina i sastoji se od 5 sati predavanja, 5 sati vježbi i 15 sati seminara, ukupno 25 sati, 1,5 ECTS. Kolegij se izvodi u prostorijama Medicinskog fakulteta i Laboratorija za tipizaciju tkiva Kliničkog bolničkog centra Rijeka.

Cilj kolegija je usvajanje osnovnih znanja o glavnom sustavu tkivne podudarnosti u čovjeka odnosno sustavu HLA (Hum Leucocyte Antygen) koji predstavlja najpolimorfniji genski sustav u čovjeka.

Sadržaj kolegija:

Upoznati sustav HLA i njegovu ulogu u presadbi organa i koštane srži, u genetici, u određivanju spornog očinstva, u sudsk medicini, u ispitivanju nasljeđivanja, u ispitivanju sklonosti prema različitim bolestima, u transfuzijskom liječenju.

Izvođenje nastave:

Nastava se izvodi u obliku predavanja, seminara i vježbi. Predviđeno vrijeme trajanja nastave je ukupno 1 - tjedna ovisno o slobodnim terminima studenata. Tijekom seminara i vježbi nastavnik sa studentima raspravl o temama vezanim uz kolegij i izvodi različite vježbe kako bi im približio složenost i polimorfizam sustava HLA. Na kraju nastave održat će se obavezni pismeni (prema potrebi usmeni) završni ispit. Izvršavanjem svi nastavnih aktivnosti te pristupanjem obveznom kolokviju i završnom ispitu student stječe 1,5 ECTS bodova

List of assigned reading:

NK Mehra (ed.). The HLA Complex in Biology and Medicine: A Resource Book. New Delhi: Jaypee Brothers Medical Publisher Ltd, 2010

Janeway C.A., Travers P., Walport M., Shlomchik M.J. Immunobiology 5, The Immune system in health and disease. New York: Garland Publishing, 2001.

List of optional reading:

Choo SY. The HLA System: Genetics, Immunology, Clinical Testing, and Clinical Implications. Yonsei Med J. 2007 Feb 28;48(1):11-23.

Batool Mutar Mahdi BM. A Glow of HLA Typing in Organ Transplantation. Clin Transl Med. 2013 Feb 23;2(1):6.

Mosaad YM. Clinical Role of Human Leukocyte Antigen in Health and Disease. Scand J Immunol. 2015 Oct;82(4):283-306.

Brown CJ, Navarrete CV. Clinical Relevance of the HLA System in Blood Transfusion. Vox Sang. 2011 Aug;101(2):93-105.

Časopisi: HLA, Human Immunology, Clinical Kidney Journal

Curriculum:

Practicals list (with titles and explanation):

V1. Isolation of lymphocytes

Principles of cell isolation, practical performance of the test using density gradient, determination of the number and viability of lymphocytes, adjustment of lymphocyte suspension for testing, freezing and storage of cell suspension.

V2. Complement-dependent lymphocytotoxicity test – HLA typing

Practical performance of HLA class I antigen typing, interpretation of results.

V3. Isolation of DNA

Manual isolation of DNA from peripheral blood samples with a commercial kit. Determination of DNA concentration and purity by spectrophotometer.

V4. HLA typing by PCR-SSP method

Low resolution HLA-typing using commercial diagnostic kits.

V5. HLA typing by PCR-SSP method – gel electrophoresis, interpretation of results

Electrophoresis of DNA samples amplified by PCR-SSP reaction in agarose gel - principle, practical execution of the test. Interpretation of HLA class I and class II typing results.

Lectures list (with titles and explanation):

P1 . Introduction and historical review

Get to know the purpose of the course The role of HLA genes in organ transplantation and diagnosis of autoimmune diseases, get to know and acquire knowledge about the historical facts.

P2-4. HLA System

To adopt the basics of immunogenetics and the clinical relevance of the HLA system in organ transplantation, assays that are used in the H&I laboratory.

P5. HLA associated diseaseas

Get to know the importance of HLA in diagnosis of various diseases, especially autoimmune diseases.

Seminars list (with titles and explanation):

SEM 1. Global Estimates of Kidney Transplantations in World Countries and Regions

Get to know about kidney transplantations in the world.

SEM 2. Celiac Disease - HLA Genetics

Get to know about HLA genetics in the celiac disease.

SEM 3. Polymorphism of HLA and Susceptibility of Breast Cancer

Find out more about the association between human leukocyte antigen (HLA) and breast cancer.

SEM 4. Immunogenetics of xenotransplantation

To find out more about immunogenetics of xenotransplantation.

SEM 5. Genetic and Epigenetic Aspects of Type 1 Diabetes Mellitus

To know more about the role of risk HLA haplotypes and a number of other candidate genes and loci, identified

through genome-wide association studies, in the development of DM type I and the contribution of differential DNA methylation and the role of microRNAs in the formation of the molecular pathogenesis of this disease.

SEM 6. Association of HLA gene polymorphisms with Helicobacter pylori related gastric cancer

To review the evidences linking HLA polymorphisms with the risk of Helicobacter pylori related GC.

SEM 7. Diagnosis and Treatment of Ankylosing Spondylitis

A deeper comprehension of the genetic landscape, mainly the functions of HLA-B27 locus in early diagnosis of AS and interdisciplinary therapies that can improve patient outcomes and quality of life.

SEM 8. Immunological platelet transfusion refractoriness current insights from mechanisms to therapeutics

To understand regulatory role of the immune system in the activation and clearance of allogeneic platelets and outlines the progress in alternative approaches to treat and prevent human leukocyte antigen (HLA) alloimmunization in platelet transfusion refractoriness.

SEM 9. Human leukocyte antigen alloimmunization prevention mechanisms in blood transfusion

To find more about a common complication of transfusion therapy: HLA alloimmunization as a result of contaminating white blood cells (WBCs) present in the product.

SEM 10. Complement-activating donor-specific anti-HLA antibodies in solid organ transplantation

To undestend a role of a complement-activating donor-specific anti-HLA antibodies in solid organ transplantation.

SEM 11. Non-invasive molecular biomarkers for monitoring solid organ

To get acquainted with non-invasive biomarkers that are increasingly being recognized as valuable tools for aiding in the detection of graft rejection, monitoring graft status and evaluating the efficacy of immunosuppressive therapy.

SEM 12. Crossmatch assays in transplantation Physical or Virtual

To find out more about crossmatch assays in kidney transplantation.

SEM 13. Role of Human Leukocyte Antigen Class II in Antibody Mediated Skin Disorders

To finad out more about the role of HLA Class II antigens in antibody mediated skin disorders.

SEM 14. Immunogenetics of infectious disease

To comprehend the role of the immunogenetics in infectious diseases.

SEM 15. Tyssue Typing Methods

To find out more about assays that are performed in Tissue Typing Laboratory.

Student obligations:

Studenti su obvezni redovito pohađati i aktivno sudjelovati u svim oblicima nastave.

Exam (exam taking, description of the written/oral/practical part of the exam, point distribution, grading criteria):

Ocjenjivanje studenata provodi se prema važećem Pravilniku o studijima Sveučilišta u Rijeci (odobrenog od Senata Sveučilišta u Rijeci), te prema **Pravilniku o ocjenjivanju studenata na Medicinskom fakultetu u Rijeci** (usvojenom na Fakultetskom vijeću Medicinskog fakulteta u Rijeci).
Rad studenata vrednovat će se i ocjenjivati tijekom izvođenja nastave, te na završnom ispitu. Od ukupno 100 bodova, tijekom nastave student može ostvariti **70 bodova**, a na završnom ispitu **30 bodova.**
Ocjenjivanje studenata vrši se primjenom ECTS (A-E) i brojčanog sustava (1-5). Ocjenjivanje u ECTS sustavu izvodi se apsolutnom raspodjelom, te prema diplomskim kriterijima ocjenjivanja.

Od maksimalnih 70 ocjenskih bodova koje je moguće ostvariti tijekom nastave, student mora sakupiti minimum od 40 ocjenskih bodova da bi pristupio završnom ispitu. Studenti koji sakupe manje od 40 ocjenskih bodova imat će priliku za jedan popravni međuispit te, ako na tom međuispitu ispitu zadovolje, moći će pristupiti završnom ispitu. Studenti koji sakupe između 40 i 49,9 ocjenskih bodova (FX ocjenska kategorija) imaju pravo izaći na završni ispit, koji se tada smatra popravnim ispitom i ne boduje se, i u tom slučaju završna ocjena može biti jedino dovoljan 2E (50%). Studenti koji sakupe 39,9 i manje ocjenskih bodova (F ocjenska kategorija) moraju ponovno upisati kolegij.

Ocjenske bodove student stječe aktivnim sudjelovanjem u nastavi, izvršavanjem postavljenih zadataka i izlascima na međuispite na sljedeći način
Ocjenske bodove student stječe na sljedeći način:
I. Tijekom nastave vrednuje se (maksimalno do 70 bodova):
a) obvezni pismeni test
Pohađanje nastave se posebno ne boduje. Student može izostati s 30% nastave zbog zdravstvenih razloga što opravdava liječničkom ispričnicom.
Ukoliko student neopravdano izostane s više od 30% nastave ne može nastaviti praćenje kolegija te gubi mogućnost izlaska na završni ispit. Time je prikupio 0 ECTS bodova i ocijenjen je ocjenom F.

a) Obvezni test (do 70 bodova)

Pismeni test sastoji se od 35 pitanja, te nosi 70 ocjenskih bodova (kriterij za dobivanje ocjenskih bodova je 50% točno riješenih pitanja).

ocjena	ocjenski bodovi	točni odgovori
Nedovoljan	0	0-17
Dovoljan (E)	25-29	18-19
Dovoljan (D)	30-40	21-24
Dobar(C)	41-49	25-27
Vrlo dobar(B)	50-61	28-31
Izvrstan(A)	62-70	32-35

Završni ispit (ukupno 30 ocjenskih bodova)
Studenti koji su na obaveznom testu ostvarili više od 30 ocjenskih bodova obavezno pristupaju završnom ispitu na kojem mogu ostvariti maksimalno 30 bodova.
Studenti koji su na obaveznom testu ostvarili manje od 25 ocjenskih bodova (pripadaju kategoriji FX) mogu izaći na završni ispit, s time da moraju nadoknaditi od 0-10% ocjene i prema Pravilniku mogu dobiti samo ocjenu 2E.
Tko <u>ne može</u> pristupiti završnom ispitu:
Studenti koji nisu pristupili obaveznom pismenom testu, nemaju pravo izlaska na završni ispit (upisuju kolegij druge godine).
Završni ispit je usmeni ispit. Nosi 30 ocjenskih bodova (raspon od 15-30).

Uspjeh na završnom ispitu pretvara se u ocjenske bodove na sljedeći način:

ocjena	ocjenski bodovi
Nedovoljan	0
Dovoljan	15
Dobar	20
Vrlo dobar	25
Izvrstan	30

Za prolaz na završnom ispitu i konačno ocjenjivanje (uključujući pribrajanje prethodno ostvarenih ocjenskih bodova tijekom nastave), student na završnom ispitu mora biti pozitivno ocijenjen i ostvariti minimum od 15 ocjenskih bodova (50%).

Ocjenjivanje u ECTS sustavu vrši se apsolutnom raspodjelom, odnosno na temelju konačnog postignuća:
A – 90 - 100% bodova
B – 80 - 89,9%
C – 70 - 79,9%
D – 60 - 69,9%
E – 50 - 59,9%

Ocjene u ECTS sustavu prevode se u brojčani sustav na sljedeći način:
A = izvrstan (5)
B = vrlo dobar (4)
C = dobar (3)
D i E = dovoljan (2)
F i FX = nedovoljan (1)

Other notes (related to the course) important for students:

Nastavni sadržaj i sve obavijesti vezane uz kolegij kao i ispitni termini nalaze se na mrežnim stranicama Medicinskog fakulteta u Rijeci, Katedre za kliničko-laboratorijsku dijagnostiku.

COURSE HOURS 2024/2025

The Role of HLA Genes in Organ Transplantation and Diagnostics of Autoimmune Diseases

Lectures (Place and time or group)	**Practicals** (Place and time or group)	**Seminars** (Place and time or group)
07.04.2025		
P1 . Introduction and historical review: • P5-112 (16:00 - 21:00) [1537] ○ trohgiotadoad P2-4. HLA System: • P5-112 (16:00 - 21:00) [1537] ○ trohgiotadoad P5. HLA associated diseaseas: • P5-112 (16:00 - 21:00) [1537] ○ trohgiotadoad		
doc. dr. sc. Katalinić Nataša, dr. med. [1537]		
11.04.2025		
		SEM 1. Global Estimates of Kidney Transplantations in World Countries and Regions: • P5-112 (15:30 - 20:30) [1537] ○ trohgiotadoad SEM 2. Celiac Disease - HLA Genetics: • P5-112 (15:30 - 20:30) [1537] ○ trohgiotadoad SEM 3. Polymorphism of HLA and Susceptibility of Breast Cancer: • P5-112 (15:30 - 20:30) [1537] ○ trohgiotadoad SEM 4. Immunogenetics of xenotransplantation: • P5-112 (15:30 - 20:30) [1537] ○ trohgiotadoad SEM 5. Genetic and Epigenetic Aspects of Type 1 Diabetes Mellitus: • P5-112 (15:30 - 20:30) [1537] ○ trohgiotadoad
doc. dr. sc. Katalinić Nataša, dr. med. [1537]		
14.04.2025		

		SEM 6. Association of HLA gene polymorphisms with Helicobacter pylori related gastric cancer:
		• P5-112 (16:00 - 21:00) [1537]
		  ○ trohgiotadoad
		
		SEM 7. Diagnosis and Treatment of Ankylosing Spondylitis:
		• P5-112 (16:00 - 21:00) [1537]
		  ○ trohgiotadoad
		
		SEM 8. Immunological platelet transfusion refractoriness current insights from mechanisms to therapeutics:
		• P5-112 (16:00 - 21:00) [1537]
		  ○ trohgiotadoad
		
		SEM 9. Human leukocyte antigen alloimmunization prevention mechanisms in blood transfusion:
		• P5-112 (16:00 - 21:00) [1537]
		  ○ trohgiotadoad
		
		SEM 10. Complement-activating donor-specific anti-HLA antibodies in solid organ transplantation:
		• P5-112 (16:00 - 21:00) [1537]
		  ○ trohgiotadoad

doc. dr. sc. Katalinić Nataša, dr. med. [1537]		
16.04.2025		

		SEM 11. Non-invasive molecular biomarkers for monitoring solid organ:
		• P12 - KBC SUŠAK (16:00 - 21:00) [1537]
		  ○ trohgiotadoad
		
		SEM 12. Crossmatch assays in transplantation Physical or Virtual:
		• P12 - KBC SUŠAK (16:00 - 21:00) [1537]
		  ○ trohgiotadoad
		
		SEM 13. Role of Human Leukocyte Antigen Class II in Antibody Mediated Skin Disorders:
		• P12 - KBC SUŠAK (16:00 - 21:00) [1537]
		  ○ trohgiotadoad
		
		SEM 14. Immunogenetics of infectious disease:
		• P12 - KBC SUŠAK (16:00 - 21:00) [1537]
		  ○ trohgiotadoad
		
		SEM 15. Tyssue Typing Methods:
		• P12 - KBC SUŠAK (16:00 - 21:00) [1537]
		  ○ trohgiotadoad

doc. dr. sc. Katalinić Nataša, dr. med. [1537]		
17.04.2025		

	V1. Isolation of lymphocytes: • Typing Department - New Sušak Hospital (16:00 - 21:00) [1537] ◦ trohgiotadoad V2. Complement-dependent lymphocytotoxicity test – HLA typing: • Typing Department - New Sušak Hospital (16:00 - 21:00) [1537] ◦ trohgiotadoad V3. Isolation of DNA: • Typing Department - New Sušak Hospital (16:00 - 21:00) [1537] ◦ trohgiotadoad V4. HLA typing by PCR-SSP method: • Typing Department - New Sušak Hospital (16:00 - 21:00) [1537] ◦ trohgiotadoad V5. HLA typing by PCR-SSP method – gel electrophoresis, interpretation of results: • Typing Department - New Sušak Hospital (16:00 - 21:00) [1537] ◦ trohgiotadoad	
doc. dr. sc. Katalinić Nataša, dr. med. [1537]		

List of lectures, seminars and practicals:

LECTURES (TOPIC)	Number of hours	Location
P1 . Introduction and historical review	1	P5-112
P2-4. HLA System	3	P5-112
P5. HLA associated diseaseas	1	P5-112

PRACTICALS (TOPIC)	Number of hours	Location
V1. Isolation of lymphocytes	1	Typing Department - New Sušak Hospital
V2. Complement-dependent lymphocytotoxicity test – HLA typing	1	Typing Department - New Sušak Hospital
V3. Isolation of DNA	1	Typing Department - New Sušak Hospital
V4. HLA typing by PCR-SSP method	1	Typing Department - New Sušak Hospital
V5. HLA typing by PCR-SSP method – gel electrophoresis, interpretation of results	1	Typing Department - New Sušak Hospital

SEMINARS (TOPIC)	Number of hours	Location
SEM 1. Global Estimates of Kidney Transplantations in World Countries and Regions	1	P5-112
SEM 2. Celiac Disease - HLA Genetics	1	P5-112
SEM 3. Polymorphism of HLA and Susceptibility of Breast Cancer	1	P5-112
SEM 4. Immunogenetics of xenotransplantation	1	P5-112

SEM 5. Genetic and Epigenetic Aspects of Type 1 Diabetes Mellitus	1	P5-112
SEM 6. Association of HLA gene polymorphisms with Helicobacter pylori related gastric cancer	1	P5-112
SEM 7. Diagnosis and Treatment of Ankylosing Spondylitis	1	P5-112
SEM 8. Immunological platelet transfusion refractoriness current insights from mechanisms to therapeutics	1	P5-112
SEM 9. Human leukocyte antigen alloimmunization prevention mechanisms in blood transfusion	1	P5-112
SEM 10. Complement-activating donor-specific anti-HLA antibodies in solid organ transplantation	1	P5-112
SEM 11. Non-invasive molecular biomarkers for monitoring solid organ	1	P12 - KBC SUŠAK
SEM 12. Crossmatch assays in transplantation Physical or Virtual	1	P12 - KBC SUŠAK
SEM 13. Role of Human Leukocyte Antigen Class II in Antibody Mediated Skin Disorders	1	P12 - KBC SUŠAK
SEM 14. Immunogenetics of infectious disease	1	P12 - KBC SUŠAK
SEM 15. Tyssue Typing Methods	1	P12 - KBC SUŠAK

EXAM DATES (final exam):

1.	24.04.2025.