[Medicinski fakultet u Rijeci]

Curriculum
2024/2025

[Za kolegij]

Immunity and Aging

Study program:	**Medical Studies in English (R)** (elective) [Sveučilišni integrirani prijediplomski i diplomski studij]
Department:	**[Centar za proteomiku]**
Course coordinator:	**izv. prof. dr. sc. Brizić Ilija, mag. ing. biotechn.**
Year of study:	**3**
ECTS:	**1.5**
Incentive ECTS:	**0 (0.00%)**
Foreign language:	**Possibility of teaching in a foreign language**

Course information:

Immunity and Aging is an elective course designed for medical students in their third year of study. This course explores the impact of aging on the immune system and its associated effects. The course is structured with a combination of lectures, seminars, and practical laboratory sessions, totaling 26 hours of instruction (equivalent to 1.5 ECTS credits). Attendance in all types of classes is required.

Number of students:

To maintain the quality of practical courses, the number of students who can participate in the course should be no more than 15.

The goal of the course:

This course provides theoretical knowledge about how the immune system changes as people age and the impact of these changes on health. It also equips students with the skills needed to effectively analyze immune cells using flow cytometry and understand how immune cells change with aging.

Course content:

We will explore how the innate and adaptive immune responses change as people get older and the factors influencing these changes. The role of herpesviruses, particularly cytomegalovirus, in the aging of the immune system, as well as the unique characteristics of the immune response to cytomegalovirus infection will be presented. We'll examine the primary reasons and mechanisms behind reduced vaccination effectiveness in older individuals. We'll analyze what factors influence the immune response to pathogens and tumors as people age. Finally, we'll study immune cell analysis in the peripheral blood of older and younger donors or mice to gain insights into age-related differences.

Students obligations:

The Immunity and Aging course consists of lectures, seminars, and practical sessions. The class schedule can be found on the Teams group of the course and the Center for Proteomics website. Lectures and seminars will take place in designated lecture halls as per the schedule. Laboratory tasks will be conducted in the dedicated laboratory of the Department for Histology and Embryology/Center for Proteomics, following the provided schedule.

Attendance will be closely monitored for all students throughout the course. It's important to note that classes will start precisely as scheduled, so arriving late will be considered as an absence. Additionally, students are expected to come prepared for seminars.

List of assigned reading:

1. Students' notes from lectures and seminars.
2. Basic immunology : functions and disorders of the immune system / Abul K. Abbas, Andrew H. Lichtman, Shiv Pillai ; illustrations by David L. Baker, Aleksandra Baker, 5th Edition, Elsevier
3. Abbas AK, Lichtman AH, Pillai S. Cellular and molecular immunology, 8 th. edition, Elsevier, - will be made available by the lecturer
4. Valquiria Bueno, Janet M. Lord, Thomas A. Jackson, The Ageing Immune System and Health, Springer International Publishing, 2017. – will be made available by the lecturer

List of optional reading:

Recommended scientific papers and reviews.

Curriculum:

[Predavanja] list (with titles and explanation):

Introductory lecture

Get to know the goals and structure of the course. Review of basics of immunology, the structure of lymphoid tissues, and immune system development.

Innate immune system in older age

Get an overview of the elementary characteristics of innate immune system constituents in older age

Adaptive immune system in older age

Get an overview of the elementary characteristics of adaptive immune system constituents in older age

Cytomegalovirus and immune aging

Get an overview of the characteristics of cytomegalovirus infection, as well as characteristics of immune system adaptation caused by cytomegalovirus infection

The impact of aging on vaccination

Get a basic overview of the main causes and mechanisms of impaired vaccination success in older age will be described

The impact of aging on immune control of infections

Get to know the main characteristics of the immune response to pathogens in older age

The impact of aging on immune control of tumors

Get to know the main characteristics of the immune response to tumors in older age

[Seminari] list (with titles and explanation):

Prezentacije studenata uz raspravu, a sadržaj kojih predstavlja dio ispitnog gradiva

Student će biti osposobljen da kritički analizira i raspravlja o promjenama u imunološkom sustavu tijekom starenja kao podlozi za razvoj bolesti.

[Vježbe] list (with titles and explanation):

Analiza limfocita perferne krvi donora ili miševa starije i mlađe životne dobi protočnom citometrijom

Student će biti osposobljen da opiše osnove metodologije analize limfocita protočnom citometrijom i razlike u stanicama imunološkog sustava ovisne o starosti.

Student obligations:

Regular class attendance (lectures, seminars, labs), writing, and presenting the seminar, taking the final exam.

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

Evaluation and assessment will be done in accordance with the Book of rules on Assessment and evaluation of student work of the Medical Faculty in Rijeka, which are based on the Book of rules on studies on University of Rijeka, and Decision of Medical Faculty council.
Students will be graded using ECTS points and will receive numbered grades (1-5). Grading will be performed using absolute distribution and according to undergraduate criteria of grading.

The course Immunity and aging will be held during 3d year of study and is comprised of lectures (9 hours), seminars (8 hours) and practical course (8 hours)

Final exam
The final exam of the Immunity and aging course is written (40% grade).

Final grade:
The final grade of students will be a sum of final exam grades and grades assigned during the course and the student's seminar work.

90 – 100 %	A (excellent - 5)
75 – 89 %	B (very good - 4)
60 – 74 %	C (good - 3)
50 – 59 %	D (dovoljan - 2)

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

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COURSE HOURS 2024/2025

Immunity and Aging

[Predavanja] (Place and time or group)	**[Vježbe]** (Place and time or group)	**[Seminari]** (Place and time or group)
10.04.2025		
Introductory lecture: • [P09 - NASTAVA NA ENGLESKOM JEZIKU] (16:15 - 17:45) [202] ◦ IAA		
izv. prof. dr. sc. Brizić Ilija, mag. ing. biotechn. [202]		
11.04.2025		
Innate immune system in older age: • [ONLINE] (09:30 - 11:00) [202] ◦ IAA		
izv. prof. dr. sc. Brizić Ilija, mag. ing. biotechn. [202]		
18.04.2025		
Adaptive immune system in older age: • [ONLINE] (09:30 - 11:00) [202] ◦ IAA		
izv. prof. dr. sc. Brizić Ilija, mag. ing. biotechn. [202]		
23.04.2025		

Cytomegalovirus and immune aging:
• [ONLINE] (16:00 - 16:45) [202]
  ◦ IAA
 	
The impact of aging on vaccination:
• [ONLINE] (16:45 - 17:30) [202]
  ◦ IAA
 	
The impact of aging on immune control of infections:
• [ONLINE] (17:30 - 18:15) [202]
  ◦ IAA		

izv. prof. dr. sc. Brizić Ilija, mag. ing. biotechn. [202]		
24.04.2025		
The impact of aging on immune control of tumors: • [ONLINE] (16:15 - 17:00) [180] ◦ IAA		
prof. dr. sc. Lenac Roviš Tihana [180]		
07.05.2025		

	Analiza limfocita perferne krvi donora ili miševa starije i mlađe životne dobi protočnom citometrijom: • [Centar za proteomiku] (08:00 - 11:00) [1240] [202] ◦ IAA	
izv. prof. dr. sc. Brizić Ilija, mag. ing. biotechn. [202] · Mihalić Andrea [1240]		
08.05.2025		
	Analiza limfocita perferne krvi donora ili miševa starije i mlađe životne dobi protočnom citometrijom: • [Centar za proteomiku] (10:00 - 12:15) [1240] [202] ◦ IAA	Prezentacije studenata uz raspravu, a sadržaj kojih predstavlja dio ispitnog gradiva: • [P04] (16:00 - 20:00) [202] ◦ IAA
izv. prof. dr. sc. Brizić Ilija, mag. ing. biotechn. [202] · Mihalić Andrea [1240]		
09.05.2025		
	Analiza limfocita perferne krvi donora ili miševa starije i mlađe životne dobi protočnom citometrijom: • [Centar za proteomiku] (08:00 - 09:30) [1240] [202] ◦ IAA	Prezentacije studenata uz raspravu, a sadržaj kojih predstavlja dio ispitnog gradiva: • [ONLINE] (09:30 - 10:00) [202] ◦ IAA
izv. prof. dr. sc. Brizić Ilija, mag. ing. biotechn. [202] · Mihalić Andrea [1240]		

List of lectures, seminars and practicals:

[PREDAVANJA] (TOPIC)	Number of hours	Location
Introductory lecture	2	[P09 - NASTAVA NA ENGLESKOM JEZIKU]
Innate immune system in older age	2	[ONLINE]
Adaptive immune system in older age	1	[ONLINE]
Cytomegalovirus and immune aging	1	[ONLINE]
The impact of aging on vaccination	1	[ONLINE]
The impact of aging on immune control of infections	1	[ONLINE]
The impact of aging on immune control of tumors	1	[ONLINE]

[VJEŽBE] (TOPIC)	Number of hours	Location
Analiza limfocita perferne krvi donora ili miševa starije i mlađe životne dobi protočnom citometrijom	8	[Centar za proteomiku]

[SEMINARI] (TOPIC)	Number of hours	Location
Prezentacije studenata uz raspravu, a sadržaj kojih predstavlja dio ispitnog gradiva	8	[ONLINE] [P04]

EXAM DATES (final exam):