Sveučilište u Rijeci
University of Rijeka

Odjel za biotehnologiju
51000 Rijeka, Radmile Matejčić 2
Tel. +385 51 584 550
Fax. +385 51 584 599
e-mail: ured@biotech.uniri.hr

Syllabus for the elective course:

Neuroimmunology

Academic year: 2020/2021

Program: Graduate programs: Biotechnology in Medicine, Drug Research and Development, Medicinal Chemistry, and Biotechnology for the Life Sciences
Max – 20 students

Course code: EBIL164

ECTS points: 3

Language of the course: English

Teaching hours: 30 hours (15 lectures + 12 seminars + 3 practical exercises)

Prerequisite for enrolment: basic knowledge in immunology and neurobiology

Course leader and contact information:
Title and name: Associate Professor Ivana Munitić
Address: Department of Biotechnology, O-220, R. Matejčić 2, Rijeka
phone: ++385 51 584 579
e-mail: ivana.munitic@biotech.uniri.hr

Time period: February 15- February 26

Teachers:

Associate Professor Ivana Munitić (12L+ 7S)
Assistant Professor Jelena Ban (3L)
Dr. sc. Marin Dominović (9S)
Mag. Nikolina Prtenjača (6S+2E)
Mag. Josip Peradinović (2S+2E)

Literature

1. Basic Immunology 6th Edition, Abul Abbas Andrew H. Lichtman Shiv Pillai, Elsevier 2019.
2. Online textbook: https://philschatz.com/anatomy-book/ (Chapters 12-15; special focus on chapters 12, 13.2, 13.3 i 15.1)

BIOtech
Odjel za biotehnologiju
51000 Rijeka, Radmile Matejčić 2
Tel. +385 51 584 550
Fax. +385 51 584 599
e-mail: ured@biotech.uniri.hr

3. Recently published original scientific papers.

Recommended additional literature:
Selected scientific papers.

Course objectives:
The aim of the course "Neuroimmunology" is to enable students to understand the importance of the interaction between the immune and nervous systems in both health and disease. Cellular and molecular mechanisms of neurodegenerative and neuroinflammatory diseases will be discussed as well as potential immunotherapeutic approaches for targeting them.

Learning outcomes:
By the end of the course, students will be able to:

- Understand the importance of the immune surveillance of the CNS.
- Explain how the immune system cells enter the CNS.
- Define neuroinflammation.
- Understand the importance of neuroinflammatory processes in health and disease.
- Describe the relationship between the immune system and stress.
- Understand the molecular basis of sickness behavior.
- Understand the molecular and cellular basis of neurodegenerative diseases.
- Critically discuss the current therapeutic approaches in neurodegenerative diseases.
- Integrate previously acquired knowledge in immunology, molecular biology and neuroscience for the purpose of in proposing new immunotherapeutic approaches in neurodegenerative diseases.

General competences gained on the course:
A1, A2, A3, A5, A7, B1, B3, B4; C1, C2, C3, C4.

Detailed course content:

Lectures:
P1. Introduction to the immune and nervous systems. Course overview.
P2. CNS.
P3. Blood-brain barrier.
P4. Immune system. Immune system in the brain.
P5. Crosstalk between the immune system and the CNS.
P6. Molecular basis of neurodegenerative diseases: Alzheimer’s disease (AD), amyotrophic lateral

Odjel za biotehnologiju
51000 Rijeka, Radmile Matejčić 2
Tel. +385 51 584 550
Fax. +385 51 584 599
e-mail: ured@biotech.uniri.hr

sclerosis (ALS), Parkinson's disease (PD) and multiple sclerosis (MS).
P7. Experimental models and therapeutic approaches for neurodegenerative diseases.

Seminars:
S1. Anatomy and function of the CNS (computer model 3D Brain).
S2. Journal Club + Comprehension Test.
S3. ALS models up-close.
S4. Spinal muscular atrophy: Student presentations and debates.
S5. ALS. Student presentations and discussions.

Practical exercises:
V1. ALS models: demonstration.
V2. Q and A. Repetitions for the final exam.

Requirements, methods of assessment and evaluation:
Students are required to attend classes, seminars and practical work are required.

Qualification and grades (according to Pravilnik o studijima Sveučilišta u Rijeci):
Assessment during the course (40%); based on the average mark for all individual assignments (journal clubs, seminars, tests, etc).
Practical work (10 %). Activity during in practical exercises; written report.

Final exam - 50 %. The final exam will be written and/or oral, depending on the feasibility of holding live exams.

Eligibility for final exam:
• Students scoring between 0 and 24.9% will not be allowed to approach the final exam
• Students scoring between 25% and 50% will be allowed to approach the final exam

The final exam is taken in writing, and contains 20 questions that are scored individually. If no points are earned, the exam will be graded FX.

Examination deadlines:

1. The final exam will be 26.06.2021. at 10 am – place will be determined later.
2. The final exam, second round (for those who need to retake the test) will be on 12.3.2021 at 10 am.

BIOtech
Odjel za biotehnologiju
51000 Rijeka, Radmile Matejčić 2
Tel. +385 51 584 550
Fax. +385 51 584 599
e-mail: ured@biotech.uniri.hr

3. Additional final exams (maximum two more) will be by arrangement between the students and teacher.

Final grades
The following grades will be awarded based on the final score:

Percentage score	ECTS grade	Numerical grade
90% do 100%	A	Excellent (5)
75% do 89,9%	B	Very good (4)
60% do 74,9%	C	Good (3)
50% do 59,9%	D	Satisfactory (2)
0% do 49,9%	F	Unsatisfactory (1)

The final grade is based on the sum of percentage points accumulated during the course and on the final exam. Passing grades are excellent (5), very good (4), good (3) and satisfactory (2).

To complete the course students must attain a passing mark for the entire course (50% or higher) as well as achieving at least 50% at the final exam.

Additional information:
Academic integrity
Students are required to respect the principles of academic integrity, and refer to the following documents: Ethical rules of the University of Rijeka and Ethical rules for students.

Schedule of classes:

Date	Class type	Topic	Hours	Group	Teacher	Time and place
5.7. 2021.	L1	Introduction to the immune and nervous systems. Course overview.	3	all	Assoc. Prof. Ivana Munitić	9-11.30 online
6.7. 2021.	L2	CNS.	2	all	Assist. Prof. Jelena Ban	9-11 online
6.7. 2021.	L3	Blood-brain barrier.	1	all	Assist. Prof. Jelena Ban	11-12 online

BIOtech
Odjel za biotehnologiju
51000 Rijeka, Radmile Matejčić 2
Tel. +385 51 584 550
Fax. +385 51 584 599
e-mail: ured@biotech.uniri.hr

7.7. 2021.	S1	Anatomy and function of the CNS (computer model 3D Brain).	2	A and B	Dr. sc. Marin Dominović Mag. Nikolina Prtenjača	9-11 online
7.7. 2021.	L4	Immune system. Immune system in the CNS.	1	all	Assoc. Prof. Ivana Munitić	13-14 online
7.7. 2021.	L5	Crosstalk between the immune system and the CNS. Sickness behavior.	1	all	Assoc. Prof. Ivana Munitić	14-15 online
8.7. 2021.	L6	Molecular basis of neurodegenerative diseases: Alzheimer's disease (AD), amyotrophic lateral sclerosis (ALS), Parkinson's disease (PD) and multiple sclerosis (MS).	4	all	Assoc. Prof. Ivana Munitić	9-12.30
9.7. 2021.	S2	Journal Club + Comprehension test.	3	A and B	Assoc. Prof. Ivana Munitić Dr. sc. Marin Dominović	9-12
12.7. 2021	L7	Experimental models and therapeutic approaches for neurodegenerative diseases.	3	all	Assoc. Prof. Ivana Munitić	9-11.30
13.7. 2021.	S3	Experimental neuroimmunology.	1	all	Mag. Nikolina Prtenjača	9-11
13.7. 2021.	E1	ALS models: demonstration.	2	all	Mag. Nikolina Prtenjača Mag. Josip Peradinović	11.30-12.30
14.7. 2021.	S4	Spinal muscular atrophy: Student presentations and debates.	3	2	Mag. Nikolina Prtenjača; Dr. sc. Marin Dominović; Assoc. Prof. Ivana Munitić	9-12
15.7. 2021.	S5	ALS. Student presentations and discussions.	3	2	Assoc. Prof. Ivana Munitić, Dr. sc. Marin Dominović, Mag. Josip Peradinović	9-12
15.7. 2021	E2	Q and A. Repetitions for the final exam.	1	svi	Assoc. Prof. Ivana Munitić Dr. sc. Marin Dominović	12-13

Odjel za biotehnologiju
51000 Rijeka, Radmile Matejčić 2
Tel. +385 51 584 550
Fax. +385 51 584 599
e-mail: ured@biotech.uniri.hr

16.7. 2021		Final exam.	1		Assoc. Prof. Ivana Munitić Dr. sc. Marin Dominović	10-12