

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Izbrana poglavja iz molekularne imunobiologije
Course title:	Selected Topics in Molecular Immunobiology

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Nanoznanosti in nanotehnologije, 3. stopnja	Bioznanosti	1	1
Nanosciences and Nanotechnologies, 3 RD cycle	Biosciences	1	1

Vrsta predmeta / Course type Izbirni / Elective

Univerzitetna koda predmeta / University course code: NANO3-894

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
15	15			15	105	5

**Navedena porazdelitev ur velja, če je vpisanih vsaj 15 študentov. Drugače se obseg izvedbe kontaktnih ur sorazmerno zmanjša in prenese v samostojno delo. / This distribution of hours is valid if at least 15 students are enrolled. Otherwise the contact hours are linearly reduced and transferred to individual work.*

Nosilec predmeta / Lecturer: Doc. dr. Nataša Kopitar Jerala

Jeziki / Languages: **Predavanja / Lectures:** slovenski / angleški
Slovene / English
Vaje / Tutorial:

Pogoji za vključitev v delo:
Končan študij druge stopnje biokemije, biologije, medicine ali katerekoli druge naravoslovne smeri.

Prerequisites for the students:
Second cycle degree in biochemistry, biology, medicine or any other natural sciences discipline.

Vsebina predmeta:
Študij zajema naslednje teme:

- Celice imunskega sistema
- Naravna imunost
- Vnetja
- Prepoznavanje antigenov
- Pridobljena imunost
- Procesiranje antigenov
- Imunski odziv na infekcije

V majhni diskusijski skupini bomo kritično analizirali originalne članke. Članke bomo analizirali glede na ozadje, hipotezo, primerno uporabo eksperimentalnih metod ter objektivno interpretacijo rezultatov.

Contents of the Course:
The subject comprises the following themes:

- Cells of immune system
- Innate immunity
- Inflammation
- Antigen Recognition
- Adaptive immunity
- Antigen processing
- Immune response to infection

Critical analysis of original research articles in an intensive small group discussion format. Papers will be analysed in terms of background, hypothesis, appropriate use of experimental methods and objective interpretation of results.

Temeljna literatura in viri / Basic literature and sources:

Učbeniki /Textbooks:

- Cellular and Molecular Immunology, 8th Edition, Abbas & Lichtman & Pillai, Saunders, 2014, ISBN : 9780323222754
- Janeway's Immunobiology, 2011 Kenneth Murphy

Ključni članki /Key articles to study:

Broz, P., and Dixit, V.M. (2016). Inflammasomes: mechanism of assembly, regulation and signalling. *Nat Rev Immunol* 16, 407-420.

Deretic, V., Kimura, T., Timmins, G., Moseley, P., Chauhan, S., and Mandell, M. (2015). Immunologic manifestations of autophagy. *The Journal of Clinical Investigation* 125, 75-84.

Ip, W.K.E., Hoshi, N., Shouval, D.S., Snapper, S., and Medzhitov, R. (2017). Anti-inflammatory effect of IL-10 mediated by metabolic reprogramming of macrophages. *Science* 356, 513-519.

Shibutani, S.T., Saitoh, T., Nowag, H., Munz, C., and Yoshimori, T. (2015). Autophagy and autophagy-related proteins in the immune system. *Nat Immunol* 16, 1014-1024.

Yang, J., Zhao, Y., and Shao, F. (2015). Non-canonical activation of inflammatory caspases by cytosolic LPS in innate immunity. *Curr Opin Immunol* 32, 78-83.

Roche, P.A., and Furuta, K. (2015). The ins and outs of MHC class II-mediated antigen processing and presentation. *Nat Rev Immunol* 15, 203-216.

Zaradi hitrosti razvijajočega se področja so temeljni študijski viri objavljeni članki v zadnjih letih, predvsem v revijah Science, Nature, Nature Immunology, Immunity, Nature Reviews in Immunology; (kopije člankov bodo na voljo študentom).

Because of the fast pace of development in this field, the fundamental learning resources are the most recently published articles, particularly those in the journals Science, Nature, Nature Immunology, Immunity, Nature Reviews in Immunology; (copies of the articles will be available to students).

Cilji in kompetence:

Cilj predmeta je, da študentje razumejo osnove izbranih procesov, ki so ključni pri imunskem odzivu, in uporabljenih eksperimentalnih pristopov, ki omogočajo razumevanje teh mehanizmov. Študente bomo spodbujali, da sami zasnujejo eksperimente in kreativno delajo na rešitvah eksperimentalnih problemov.

Objectives and Competences:

. Objective of the course is that students understand the mechanistic basis of selected processes that are central to the immune response and the experimental approaches used to elucidate these mechanisms. Students will be encouraged to design the experiments and to creatively work on the solutions of experimental problems.

Predvideni študijski rezultati:

Znanje in razumevanje:

Študentje se bodo naučili razumeti mehanizme izbranih procesov, ki so ključni pri imunskem odzivu, in eksperimentalne pristope, ki so bili uporabljeni, pri pojasnitvi delovanja le-teh.

Splošni rezultati:

- Študent bo obvladal raziskovalne metode, postopke in procese v molekularni in celični imunologiji.
- Študent se bo naučil kritično obravnavati primarno literaturo.
- Razvoj komunikacijskih sposobnosti in spretnosti,

Intended learning outcomes:

Knowledge and Understanding

The student will learn to understand the mechanistic basis of selected processes that are central to the immune response and the experimental approaches used to elucidate these mechanisms.

General Outcomes:

- The student will master research methods, procedures and processes in molecular and cellular immunology.
- The student will learn how to critically evaluate primary literature .
- The student will develop communications skills to

<p>posebej komunikacije v mednarodnem okolju.</p> <ul style="list-style-type: none"> • Kooperativnost, delo v skupini (in v mednarodnem okolju). • Seznanil se bo z multidisciplinarnim pristopom k reševanju znanstvenih problemov. <p><u>Predmetnospecifični rezultati:</u></p> <ul style="list-style-type: none"> • Predmet pripravlja študente za delo na temeljnih in aplikativnih raziskavah. • Pridobljeno znanje pa je uporabno tudi v biotehnologiji in farmacevtski industriji. • Daje molekularne osnove za razumevanje bolezni – povezava z medicino. 	<p>present research achievement in the international environment.</p> <ul style="list-style-type: none"> • Work in team (in international environment). • He/she will gain insight in multidisciplinary approach to solve scientific problems. <p><u>Course Specific Outcomes:</u></p> <ul style="list-style-type: none"> • This course prepares students to work in basic and applied research projects. • The knowledge is important for biotechnology and pharmaceutical industry. • It provides a molecular understanding of some diseases – related to medicine.
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<p>Metode poučevanja in učenja:</p> <ul style="list-style-type: none"> • Predavanja • Individualne konzultacije • Seminarji (pregled literature) • Laboratorijsko delo (samo v primeru mentorstva) 	<p>Learning and teaching methods:</p> <ul style="list-style-type: none"> • Lectures • Individual consultations • Seminar work (overview of the literature) • Laboratory work (if supervising the student)
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Načini preverjanja znanja:	Delež / Weight	Assessment:
<ul style="list-style-type: none"> • seminar • ustno preverjanje 	50 % 50 %	<ul style="list-style-type: none"> • seminar • oral assessment

Izbrane reference nosilcev / Selected references of the lecturers:

<ul style="list-style-type: none"> • KOPITAR-JERALA, Nataša. The role of interferons in inflammation and inflammasome activation. <i>Frontiers in immunology</i>, ISSN 1664-3224, 2017, vol. 8, str. 1-9, doi: 10.3389/fimmu.2017.00873. • KOPITAR-JERALA, Nataša. Innate immune response in brain, NF-kappa B signaling and cystatins. <i>Frontiers in molecular neuroscience</i>, ISSN 1662-5099, 2015, vol. 8, str. 73-1-73-9, doi: 10.3389/fnmol.2015.00073. • KOPITAR-JERALA, Nataša. The role of stefin B in neuro-inflammation. <i>Frontiers in cellular neuroscience</i>, ISSN 1662-5102, 2015, vol. 9, str. 458-1-458-8. • MAHER, Katarina, JERIČ, Barbara, BUTINAR, Miha, MIKHAYLOV, Georgy, MANČEK KEBER, Mateja, STOKA, Veronika, VASILJEVA, Olga, TURK, Boris, GRIGORYEV, Sergei A., KOPITAR-JERALA, Nataša. A role for stefin B (cystatin B) in inflammation and endotoxemia. <i>The Journal of biological chemistry</i>, ISSN 0021-9258, 2014, vol. 289, no. 46, str. 31736- • MAHER, Katarina, ZAVRŠNIK, Janja, JERIČ, Barbara, VASILJEVA, Olga, TURK, Boris, KOPITAR-JERALA, Nataša. Decreased IL-10 expression in stefin B-deficient macrophages is regulated by the MAP kinase and STAT-3 signaling pathways. <i>FEBS letters</i>, ISSN 0014-5793. [Print ed.], 2014, vol. 588, no. 5, str. 720-726
