

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	MONOKLONSKA PROTITELESA
Course Title:	MONOCLONAL ANTIBODIES

Študijski program in stopnja Study Programme and Level	Študijska smer Study Field	Letnik Academic Year	Semester Semester
MAG Biokemija, 2. stopnja	/	1.	2.
USP Biochemistry, 2 nd Cycle	/	1 st	2 nd

Vrsta predmeta / Course Type: izbirni strokovni / Elective Professional

Univerzitetna koda predmeta / University Course Code: BI2109

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje Work	Druge oblike študija	Samost. delo Individual Work	ECTS
30	15	15 LV + 15 SV	/	/	75	5

Nosilec predmeta / Lecturer: prof. dr. Vladka Čurin-Šerbec /
Dr. Vladka Čurin-Šerbec, Full Professor

Jeziki / Languages:

Predavanja / Lectures:	slovenski / Slovenian
Vaje / Tutorial:	slovenski / Slovenian

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:

Študent oz. kandidat mora imeti predmet opredeljen kot študijsko obveznost.

Prerequisites:

The course has to be assigned to the student.

Vsebina:

Splošne značilnosti imunskega sistema. Antigeni. Zgradba in vloga protiteles. Monoklonska protitelesa. Osnove dela s celičnimi kulturami. Delo z živalmi in zakonski predpisi. Reakcije med antigeni in protitelesi. Pregled imunoloških metod. Določanje epitopov. Humana, kimerna in humanizirana protitelesa. Priprava protiteles z izražanjem na fagu. Transgene miške pri pripravi protiteles. Dobra laboratorijska in dobra proizvodna praksa. Proizvodnja protiteles. Farmakovigilanca. Uporaba monoklonskih protiteles v diagnostične namene. Uporaba protiteles v terapevtske namene. Antiidiotipska monoklonska protitelesa.

Content (Syllabus outline):

Properties of the immune system. Antigens. Structure and biological role of the antibodies. Monoclonal antibodies. Cell cultures - the principles of work. Experiments on animals and regulation. Reactions between antigens and antibodies. Immunological methods - an overview. Determination of the epitopes. Human, chimeric and humanised antibodies. Phage display antibodies. Transgenic mice and production of the antibodies. Good laboratory practice, good manufacturing practice. Pharmacovigilance. The use of monoclonal antibodies for diagnostic purposes. The use of monoclonal antibodies for therapy. Antiidiotypic monoclonal antibodies.

Laboratorijske vaje:

Delo v laboratoriju za celične kulture. ELISA. Western blot. Dot blot. Določanje afinitete protiteles. Pretočna citometrija.

Seminarji: Projektno delo, seminarji.

Practical: Work in the cell culture laboratory, ELISA, western blot, dot blot, determination of the affinity of antibodies, flow cytometry. Project work and seminars.

Temeljna literatura in viri / Readings:

- Vozelj, M. Temelji imunologije. DZS, Ljubljana (2000).
- Abbas, A.K., Lichtman, A.H. Cellular and Molecular Immunology. Updated Edition. Elsevier Saunders, Philadelphia (2005).
- Ritter, M.A., Ladyman, H.M. Monoclonal antibodies. Production, engineering and clinical application. Cambridge University Press, published in association with the Royal Postgraduate Medical School, University of London (2005).
- Tekoča periodika / Articles.

Cilji in kompetence:

V okviru predmeta bodo slušatelji pridobili najprej teoretična znanja s področja priprave protiteles (mišjih in humanih monoklonskih, kimernih, humaniziranih ter izraženih na fagu), spoznali bodo tudi primere uporabe različnih protiteles v raziskovalne, diagnostične in terapevtske namene (zlasti na primerih uspešno izvedenih in tekočih projektov v Sloveniji). Svoje znanje bodo nadgradili z eksperimentalnim delom ter seminarji, v okviru katerih bodo poskušali načrtovati različne projekte. Slušatelji naj bi spoznali področje do takšne mere, da bodo pridobljeno znanje lahko uporabljali pri svojem delu (v raziskovalne, diagnostične ali pa terapevtske namene). Predmet omogoča reševanje problemov, razmišljanje in povezovanje.

Objectives and Competences:

Students will first achieve theoretical knowledge of monoclonal antibody production (mouse and human, chimeric, humanised, phage) and their use in research, diagnostics and therapy (also on the basis of successful projects, conducted in Slovenia). Experimental work and designing of different projects will proceed with seminars and round table discussions. At the end of the course, students should be able to use their knowledge in their work. The main goals are understanding of the problems and brainstorming.

Predvideni študijski rezultati:

Znanje in razumevanje

Študent se najprej seznanji z osnovno terminologijo, ki je pomembna za nadaljnje razumevanje snovi. Teoretičnemu pregledu sledijo primeri uspešno izvedenih projektov s področja ter vaje v laboratoriju. Predmet se zaključuje z vrsto seminarjev, v okviru katerih slušatelji pridobljeno znanje uporabijo za načrtovanje projektov. V okviru seminarskega dela in spremljajoče razprave se seznanijo z

Intended Learning Outcomes:

Knowledge and Comprehension

Knowledge and Comprehension: Students will be thought the basic terminology and some successful projects from the field will be presented. Experimental work and seminars will represent the second part, ending the course with designing of the projects.

najnovejšimi dognanji na področju.	
<u>Uporaba</u> Vsebine predmeta poleg teoretičnih znanj nudijo tudi praktična znanja. Predmet je zasnovan tako, da študente vzpodbuja k razmišljanju, k ustvarjanju, k povezovanju in k reševanju problemov.	<u>Application</u> Students will gain practical knowledge besides the theory. The content of the subject is designed in a way that encourages students to associate their knowledge, to have their own ideas, to be inventive and to solve the problems
<u>Refleksija</u> Študent pridobi občutek za način dela in razmišljanja na področju biomedicine in biotehnologije.	<u>Analysis</u> Students will gain a sense to work and brainstorm in the field of biomedicine and biotechnology.
<u>Prenosljive spretnosti</u> Izkušnje pri reševanju problemov. Analiza in interpretacija rezultatov ter njihovo kritično vrednotenje. Uporaba domače in tuje literature. Razumljivo in pregledno podajanje seminarjev ter tvorno sodelovanje pri razpravi.	<u>Skill-transference Ability</u> Experiences in solving problems. Analysis and interpretation of results and their critical evaluation. The use of adequate literature. Presentation of seminars and interaction in discussion.

Metode poučevanja in učenja:

Predavanja, laboratorijske vaje, projektno in seminarske delo.

Learning and Teaching Methods:

Lectures, seminars, project work, practical training.

Načini ocenjevanja:

Opravljene vaje so pogoj za pristop k izpitu.
Seminarska naloga
Pisni izpit
Ocene: 6-10 (pozitivno), 1-5 (negativno)

Delež (v %) /

Weight (in %) /

Assessment:

Completed laboratory course is prerequisite for the exam.
Seminar work
Written exam
Grades: 6-10 (positive), 1-5 (negative)

Reference nosilca / Lecturer's references:

ORIGINAL SCIENTIFIC ARTICLES:

- COLJA VENTURINI, Anja, BRESJANAC, Mara, VRANAC, Tanja, KOREN, Simon, NARAT, Mojca, POPOVIĆ, Mara, **ČURIN-ŠERBEC, Vladka**. Anti-idiotypic antibodies: a new approach in prion research. BMC Immunol., 2009, 10:16.
- KOSMAČ, Miha, KOREN, Simon, GIACHIN, Gabriele, **ČURIN-ŠERBEC, Vladka**. Epitope mapping of a PrP(Sc)-specific monoclonal antibody: identification of a novel C-terminally truncated prion fragment. Mol. Immunol., 2011, 48(5), 746-750.
- ŠKRLJ, Nives, VRANAC, Tanja, POPOVIĆ, Mara, **ČURIN-ŠERBEC, Vladka**, DOLINAR, Marko. Specific binding of the pathogenic prion isoform: development and characterization of a humanized single-chain variable antibody fragment. PloSone, 2011, 6(1).

REVIEW ARTICLE:

- LUKAN, Anja and VRANAC, Tanja, **ČURIN-ŠERBEC, Vladka**. TSE diagnostics: recent advances in immunoassaying prions. Clin. Dev. Immunol., 2013, doi:10.1155/2013/360604