Univerza v Mariboru
University of Maribor

Medicinska fakulteta
Faculty of Medicine

OPIS PREDMETA / SUBJECT SPECIFICATION	
Predmet:	Uporabna molekularna imunologija v klinični praksi
Subject Title:	Applications of Molecular immunology in clinical practice

Študijski program Study programme	Študijska smer Study field	Letnik Year	Semester Semester
Biomedicinska tehnologija Biomedical technology		2	**3 ali 4**

Univerzitetna koda predmeta / University subject code:

Predavanja Lectures	Seminar Seminar	Sem. Vaje Tutorial	Lab. Vaje Lab. Work	Teren. Vaje Field work	Samost. Delo Individ. Work	ECTS
15	20		10		105	**5**

Nosilec predmeta / Lecturer:	Prof. dr. Ivan Krajnc
Sonosilec predmeta / Co-lecturer:	Prof. dr. Uroš Potočnik

Jeziki / Languages:	**Predavanja / Lecture:**	Slovenščina / Slovene
	Vaje / Tutorial:	Slovenščina / Slovene

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

Kandidat mora imeti pred vpisom ustrezno znanje iz naravoslovnih ved z ustreznega področja na nivoju univerzitetnega študija.

Prerequisites:

Prior to entering, the candidate for postgraduate program must have an appropriate knowledge and understanding of bioscience (biology, chemistry, physics, mathematics) on the university level.

Vsebina:

Teorija:
Splošne teme
- analiza ekspresijskih profilov citokinov…
- biološka zdravila ciljana na citokine in druge imunske molekule
- vzorci citokinov v imunskih boleznih
- genski polimorfizmi citokinov pri kompleksnih (multifaktorskih) boleznih
- bioinformatika v raziskavah genetike citokinov
- citokinski receptorji in antagonisti
- genetika kemokinov in receptorjev za kemokine
- prenos signalov (signalna transdukcija) preko citokinskih receptorjev
- citokini in imunologija tumorjev-povezava z genetsko nestabilnostjo pri raku
- uporaba mišjih modelov z izbitim tarčnim genom v imunoloških raziskavah

Praktični del:
- ELISA
- ELISPOT
- FACS
- Kvantitativni PCR v realnem času
- Imunohistokemija
- cDNA in oligo DNA mikromreže (biočipi)
- tehnologije za gensko tipizacijo DNA polimorfizmov enega samega nukleotida (ang SNP) v genih imunskega odziva (citokini, kemokini, receptorji, HLA)

Contents (Syllabus outline):

Theory:
General themes
- analysis of cytokine expression explorative vs. biased approaches
- cytokine-based therapies in disease
- cytokine patterns in inflammatory diseases
- cytokine Gene Polymorphisms in Multifactorial Conditions
- bioinformatic Resources for Cytokine Genetics Research
- cytokine receptors and antagonists
- genetics of chemokines and chemokine receptors
- signal transduction through cytokine receptors
- cytokines and tumor immunology, genetic instability in cancer
- use of Gene-Targeted Knock Out Mice in Immunological Research

Practical:
- ELISA
- ELISPOT
- FACS
- Real Time – PCR
- Immunohistochemistry
- cDNA and oligo DNA arrays ((biochips)
- techologies including RFLP and Taqman for Genotyping of Single Nucleotide Polymorphisms (SNPs) in genes for cytokines, cytokine receptors, chemokines, chemokine receptors, HLA

Temeljni študijski viri / Textbooks:

Koen Vandenbroeck., editor. *Cytokine Gene Polymorphisms in Multifactorial Conditions ISBN: 0849336198.* Florida CRC press; 2006 Abbas, Abul K., and Andrew Lichtman. *Cellular and Molecular Immunology*. 6th ed. Philadelphia, PA: Saunders, 2005. ISBN: 1416023895. Immunobiology-The Immune System in Health and Disease", by C.A. Janeway, Jr. *et al.*, 4th edition, Current Biology Ltd & Garland Publishing, Inc., 1999 Rosen, Fred, and Raif Geha. *Case Studies in Immunology: A Clinical Companion*. 4th ed. New York, NY: Garland Pub., 2004. ISBN: 0815341024. (Paperback)

Cilji:	**Objectives:**
Poglobljeno razumevanje strukture, genetike, funkcije in detekcije citokinov in drugih molekul pomembnih v imunoloških sistemih s posebnim poudarkom na pomenu v patogenezi in uporabi v terapiji.	To provide a broad understanding of the structure, genetics, function and detection of cytokines and other molecules important in immunological systems, with particular reference to their involvement in disease pathogenesis and use in therapy.
Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: Osvojeno pregledno interdisciplinarno znanje o bioloških zdravilih, ciljanih na citokine in druge imunske molekule, o vzorcih citokinov v imunskih boleznih, o bioinformatiki v raziskavah genetike citokinov, o citokinski receptorjih in antagonistih, o genetiki kemokinov in receptorjih za kemokine, o prenosu signalov (signalna transdukcija) preko citokinskih receptorjev, o imunologiji tumorjev-povezava z genetsko nestabilnostjo pri raku Prenesljive/ključne spretnosti in drugi atributi: Sposobnost vključitve v poglobljeno raziskovalno delo z namenom nadaljevanja doktorskega študija in izdelave doktorata na različnih problemih biomedicine.	Knowledge and Understanding: Broad interdisciplinary knowledge of structure and function of cytokine-based therapies in disease, cytokine patterns in inflammatory diseases, bioinformatic Resources for Cytokine Genetics Research, cytokine receptors and antagonists, genetics of chemokines and chemokine receptors, signal transduction through cytokine receptors, cytokines and tumor immunology, genetic instability in cancer Transferable/Key Skills and other attributes: Ability of a student to be involved deeply in research in order to continue his/her doctoral studies leading to PhD thesis on various problems from biomedicine.
Metode poučevanja in učenja:	**Learning and teaching methods:**
Poudarek bo na poglabljanju in povezovanju teoretičnega znanja s praktičnim in laboratorijskim delom. Teoretični del bo potekal v obliki predavanj in delavnic, kjer bodo izbrane tematike obravnavane problemske tematike v okviru delavnic z diskusijskimi skupinami iz 2 ali 3 študentov. Laboratorijske metode za določanje in analizo citokinov in drugih pomembnih imunoloških molekul na kliničnih in eksperimentalnih vzorcih.	The course is based on two complementary theoretical and practical themes. The theoretical side will be in the form of lectures and discussion groups covering specific topics, with small research assignments for groups of 2-3students to present both orally and written as a short report. The practical side will incorporate training in specific cytokine detection methods using samples provided from clinical/experimental settings.

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
Način (pisni izpit, ustno izpraševanje, naloge, projekt) - seminar in ustni izpit		Type (examination, oral, coursework, project): - seminar and oral examination

Materialni pogoji za izvedbo predmeta :	***Material conditions for subject realization***
Predavanja in seminarji bodo potekala v prostorih Medicinske fakultete Univerze v Mariboru. Multimedijska oprema predavalnice; dostop na internet. Laboratorij za molekularno biologijo in genetiko	Lectures and seminars will be held in lecture rooms of Medical Faculty, University of Maribor. Multimedia equipment, access to internet. Lab for molecular biology and genetics.
Obveznosti študentov:	***Students' commitments:***
(pisni, ustni izpit, naloge, projekti) Seminarska naloga, ustni izpit	*(written, oral examination, coursework, projects):* Coursework, oral examination