

IZBRANA POGLAVJA IZ BIOMEDICINSKE KEMIJE

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Izbrana poglavja iz biomedicinske kemije
Course title:	Selected topics in biomedical chemistry
Članica nosilka/UL Member:	UL FKKT

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Biokemija, druga stopnja, magistrski	Ni členitve (študijski program)	1. letnik, 2. letnik		izbirni

Univerzitetna koda predmeta/University course code:	0072194
Koda učne enote na članici/UL Member course code:	BI2I07

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
30	15	30 LV			75	5

Nosilec predmeta/Lecturer:	prof. ddr. Boris Turk
-----------------------------------	-----------------------

Vrsta predmeta/Course type:	izbirni strokovni/Elective Professional
------------------------------------	---

Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

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:

Molekularne osnove bolezni. Osnove razvoja zdravil. Metode identifikacije in validacije tarč. Uporaba živalskih modelov kot osnova za humane bolezni. Metode z visoko zmogljivostjo (HTS metode). Biomarkerji. Izbor, optimizacija in selekcija novih potencialnih zdravil. Proteini kot tarče za zdravila. Encimi (proteaze, kinaze, ostali encimi). G-proteini in receptorji. Ionski kanali. Apoptotoza kot možnost za terapevtsko intervencijo. Strategije zdravljenje raka. Strategije zdravljenja nevrodegenerativnih obolenj. Kardiovaskularna obolenja. Metabolne bolezni (diabetes, ...). Infektivne bolezni. Priprava seminarjev in projektov.

Content (Syllabus outline):

Molecular basis of disease. Basics of drug development. Target identification and validation methods. Use of animal models of disease as a basis for human disease. High-throughput methods. Biomarkers. Selection and optimization of potential new drugs. Proteins as targets for drugs. Enzymes (proteases, kinases, other enzymes). G-proteins and receptors. Ion channels. Apoptosis as a potential for therapeutic intervention. Strategies for anticancer therapy. Strategies for neurodegeneration therapies. Cardiovascular diseases. Metabolic diseases (diabetes, ...). Infectious diseases. Preparation of seminars and projects.

Temeljna literatura in viri/Readings:

- Tekoče revije: Nature Reviews Drug Discovery, Current Pharmaceutical Design, ... /
- Current journals: Nature Reviews Drug Discovery, Current Pharmaceutical Design, etc.

Cilji in kompetence:

Cilj predmeta je nadgradnja dosedanjega znanja iz temeljnih predmetov in poglobitev na področju biomedicine. Študenti bodo spoznali osnove sodobnega razvoja zdravil in se na nekaterih primerih bolj podrobno spoznali s strategijami njihovega razvoja. Študenti bodo sposobni napisati predlog projekta in ga tudi kritično ovrednotiti.

Objectives and competences:

Ability to understand the theoretical background of strategies of modern drug discovery. Upgrade of the knowledge from compulsory courses. Ability to link theoretical knowledge with possible transfer of the knowledge in praxis (project preparation) in the field of development of drugs and biofarmaceuticals.

Predvideni študijski rezultati:

Znanje in razumevanje
Študent pri predmetu pridobi osnove o sodobni biomedicinski znanosti in njeni vlogi pri načinu in postopkih sodobnega razvoja zdravil. Skozi praktične primere iz literature spoznava pomembnost razumevanja delovanja bioloških sistemov in poznavanja tehnologij.
Uporaba
Pri študiju tega predmeta gre za povezovanje med pridobljenim znanjem (teoretičnim) in možnimi načini prenosa tega znanja v prakso (poskus priprave projekta) pri razvoju zdravil in biofarmaceutikov.
Refleksija
Pri predmetu gre predvsem za refleksijo lastnega razumevanja predmeta ter poskus kritičnega ovrednotenja uporabnosti modernih tehnoloških metod in aplikacij na področju razvoja zdravil.
Prenosljive spretnosti
Študent pridobi spretnosti uporabe domače in tuje literature in drugih virov, zbiranja in interpretiranja podatkov, uporabe različnih didaktičnih pripomočkov, kritične analize dela kolegov, pisanja tekstov in projektov ter poročanja o njih.

Intended learning outcomes:

Knowledge and Comprehension
Through the course student acquires basic knowledge about modern biomedical research and its role in the modern drug discovery and development. Through practical examples from literature student learns the importance of comprehension of biological system functioning and knowledge about technologies.
Application
This course links the theoretical knowledge acquired with possible ways of transferring it into praxis for the development of drugs and biopharmaceuticals (an attempt to write a project).
Analysis
One of the goals of this course is to contribute to an analysis of understanding the course and an attempt to critically evaluate the usefulness of modern technological approaches and their applications in the field of drug discovery and development.
Skill-transference Ability
Student acquires the ability to use domestic and foreign literature and other sources, to manage data collection and interpretation, to use different didactic accessories, to critically analyse the work of colleagues, to write texts and projects and to report about them.

Metode poučevanja in učenja:

Predavanja, seminarji, laboratorijske vaje

Learning and teaching methods:

Lectures, seminars, laboratory practical course

Načini ocenjevanja:

Opravljene vaje so pogoj za pristop k izpitu.
Seminarska naloga Ustni izpit

Delež/Weight

Assessment:

Completed laboratory course is prerequisite for the exam. Seminar work Oral examination

Reference nosilca/Lecturer's references:

- **TURK, Boris.** Targeting proteases : successes, failures and future prospects. Nature reviews drug discovery, 2006, vol. 5, str. 785-799. JCR IF 20.97
- MIKHAYLOV, Georgy, MIKAC, Urška, MAGAEVA, Anna A., ITIN, Volia Isaevich, NAIDEN, Evgeniy P., PSAKHYE, Ivan Sergeevich, BABES, Liane, REINHECKEL, Thomas, PETERS, Christoph, ZEISER, Robert, BOGYO, Matthew, TURK, Vito, PSAHKYE, Sergej G., **TURK, Boris***, VASILJEVA, Olga*. Ferri-liposomes as an MRI-visible drug-delivery system for targeting tumours and their microenvironment. Nature nanotechnology, 2011, vol. 6, no. 9, str. 594-602, doi: 10.1038/nnano.2011.112. JCR IF 27.27

- **TURK, Boris**, TURK, Dušan, TURK, Vito. Protease signalling : the cutting edge. EMBO journal, 2012, vol. 31, no. 7, str. 1630-1643, doi: 10.1038/emboj.2012.42. JCR IF 9.82

ULBRIK