

UČNI NAČRT PREDMETA / COURSE SYLLABUS

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| Predmet: | IZBRANA POGLAVJA IZ BIOMEDICINSKE KEMIJE |
| Course Title: | SELECTED TOPICS FROM BIOMEDICAL CHEMISTRY |

| Študijski program in stopnja Study Programme and Level | Študijska smer Study Field | Letnik Academic Year | Semester Semester |
|---|-------------------------------|-------------------------|----------------------|
| MAG Biokemija, 2. stopnja | / | 2. | 3. |
| USP Biochemistry, 2 nd Cycle | / | 2 nd | 3 rd |

Vrsta predmeta / Course Type: izbirni strokovni / Elective Professional

Univerzitetna koda predmeta / University Course Code: BI2107

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

Nosilec predmeta / Lecturer: prof. ddr. Boris Turk / Ddr. Boris Turk, Full Professor

Jeziki / Languages:

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

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

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| Študent oz. kandidat mora imeti predmet opredeljen kot študijsko obveznost. | Prerequisites: The course has to be assigned to the student. |
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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 neurodegenerativnih 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: | Delež (v %) / Weight (in %) | Assessment: |
|---|--------------------------------|---|
| Opravljene vaje so pogoj za pristop k izpitu. Seminarska naloga Ustni izpit | | 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, PSAKHYE, 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