



UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	FARMACEVTSKA BIOTEHNOLOGIJA
Course title:	PHARMACEUTICAL BIOTECHNOLOGY

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
BIOMEDICINSKA TEHNOLOGIJA BIOMEDICAL TECHNOLOGY		1	1, 2

Vrsta predmeta / Course type

1006

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Laboratory work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
20	40	-	15	-	225	10

Nosilec predmeta / Lecturer:

doc. dr. Uroš Maver

Sonosilci predmeta / Lecturer

prof. dr. Uroš Potočnik

Jeziki /

Predavanja / Lectures: Slovenski, angleški/Slovene, English

Languages:

Vaje / Tutorial: Slovenski, angleški/Slovene, English

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:

- LADME sistem (predklinična obravnava zdravilnih učinkovin)
- Biomedicinsko inženirstvo
- Osnove biomedicinske analitike
- In vitro testiranje varnosti in učinkovitosti zdravilnih učinkovin in medicinskih pripomočkov
- Tehnologija rekombinantne DNA
- Najpomembnejši rekombinantni biofarmacevtiki
- Priprava in uporaba monoklonskih protiteles
- Gensko zdravljenje rakavih in ostalih obolenj
- Sistemi vnosa genov v organizem

Content (Syllabus outline):

- LADME system (preclinical drug evaluation)
- Biomedical Engineering
- Basic biomedical analytics
- In vitro testing of the safety and efficacy of drugs and medical devices
- Recombinant DNA technology
- The most important recombinant biopharmaceuticals
- Preparation and use of monoclonal antibodies
- Gene therapy of cancer and other diseases
- Introduction to gene delivery into the body

Temeljni literatura in viri / Readings:

- Sandy B. Primrose, By (author) Richard Twyman : Principles of Gene Manipulation and Genomics; 8th Revised edition; Wiley-Blackwell (an imprint of John Wiley & Sons Ltd), 2016
- Crommelin J.A., Sindelar R.D.: Pharmaceutical Biotechnology, Third edition. CRC Press, New York, 2007
- Hunt S.P., Livesey, F.J. : Functional Genomics. A practical approach, Oxford University Press, 2000.
- Licinio J, Wong MA-Li: Pharmacogenomics. Wiley-VCH, Germany, 2002.
- Goodman L.S., Gilman A.G., The pharmacological basis of therapeutics, 12th edition, McGraw-Hill, New York, 2011.
- Alberts B., Johnson A., Lewis J., Raff M., Roberts K., Walter P., Molecular Biology of the Cell, 5th edition, Garland Science, 2007.

- Periodične publikacije: Advanced Healthcare Materials, Tissue Engineering - Part B: Reviews

Cilji in kompetence:

- Pridobiti znanja molekularne biologije, molekularne genetike in predvsem razumevanje novih načinov terapij in tarč, ki izhajajo iz spoznavanja človeškega genoma.
- Spoznavanje najpomembnejših kompleksnih zdravilnih učinkovin iz področja biofarmaceutikov.
- Razširiti znanje s področja priprave novih zdravil in medicinskih pripomočkov, vključno s testiranjem njihove varnosti in učinkovitosti.

Predvideni študijski rezultati:

Znanje in razumevanje:

- Z razumevanjem sestave in delovanja biofarmaceutikov in uporabe genske terapije se poveča praktično znanje o biofarmaceutikih, glavnih terapevtskih učinkih in razumevanje nastajanja neželenih učinkov.
- S spoznavanjem novih pristopov k razvoju zdravil, medicinskih pripomočkov in njihovega testiranja, se povečajo možnosti za inovativno razmišljanje študentov v smeri razvoj novih terapevtskih pristopov.

Prenesljive/ključne spretnosti in drugi atributi:

- Iskanje podatkov po svetovnih bazah podatkov, aplikacija v prakso (iskanje primerov)

Metode poučevanja in učenja:

Objectives and competences:

- Acquire knowledge of molecular biology, molecular genetics and understanding of novel approaches to gene therapy derived from human genome sequencing.
- Getting to know the most important active substances in the field of biopharmaceuticals.
- Expand knowledge on the preparation of new drugs and medical devices, including testing their safety and efficacy.

Intended learning outcomes:

Knowledge and understanding:

- By understanding the composition and functioning of biopharmaceuticals and the use of gene therapy to increase the practical knowledge of biopharmaceuticals main therapeutic effects and understanding the emergence of side effects.
- By learning new approaches of the development of medicines, medical devices and their testing to increase opportunities for innovative thinking in students towards the development of new therapeutic approaches.

Transferable/Key Skills and other attributes:

- Knowledge of database searching, application into practical work (case studies)

Learning and teaching methods:

Predavanja, seminarske naloge, samostojno delo

Lectures, tutorials, individual work, conversations.

Načini ocenjevanja:

Delež (v %) /

Weight (in %)

Assessment:

pisni izpit,

seminarska naloga (pisna in predstavitev)

60%

40%

written examination,

seminars (written and presented)

Reference nosilca / Lecturer's references:

1. FINŠGAR, Matjaž, PERVA-UZUNALIČ, Amra, STERGAR, Janja, GRADIŠNIK, Lidija, **MAVER, Uroš**. Novel chitosan/diclofenac coatings on medical grade stainless steel for hip replacement applications. Scientific reports, ISSN 2045-2322, Published online:24 May 2016, vol. 6, art. no. 26653, str. 1-17.
2. **MAVER, Uroš**, VELNAR, Tomaž, GABERŠČEK, Miran, PLANINŠEK, Odon, FINŠGAR, Matjaž. Recent progressive use of atomic force microscopy in biomedical applications. TrAC, Trends in analytical chemistry, ISSN 0165-9936, Jun. 2016, vol. 80, str. 96-111.
3. NARANĐA, Jakob, SUŠEC, Maja, **MAVER, Uroš**, GRADIŠNIK, Lidija, GORENJAK, Mario, VUKASOVIĆ, Andreja, IVKOVIĆ, Alan, RUPNIK, Marjan, VOGRIN, Matjaž, KRAJNC, Peter. Polyester type polyHIPE scaffolds with an interconnected porous structure for cartilage regeneration. Scientific reports, ISSN 2045-2322, Published online: 24 June 2016, vol. 6, art. no. 28695, str. 1-11.
4. STERGAR, Janja, **MAVER, Uroš**. Review of aerogel-based materials in biomedical applications. Journal of sol-gel science and technology, ISSN 1573-4846, 2016, vol. 77, iss. 3, str. 738-752.
5. NARANĐA, Jakob, GRADIŠNIK Lidija, GORENJAK Mario, VOGRIN Matjaž, **MAVER Uroš**, Isolation and characterization of human articular chondrocytes from surgical waste after total knee arthroplasty (TKA), PeerJ, 2017.
6. JOSTINS, Luke, MITROVIČ, Mitja, **POTOČNIK, Uroš**, et al. Host-microbe interactions have shaped the genetic architecture of inflammatory bowel disease. Nature, ISSN 0028-0836. [Print ed.], 2012, vol. 491, no. 7422, str. 119-124
7. KODER, Silvo, REPNIK, Katja, FERKOLJ, Ivan, PERNAT DROBEŽ, Cvetka, SKOK, Pavel, WEERSMA, Rinse K., **POTOČNIK, Uroš**. Genetic polymorphism in ATG16L1 gene influences the response to adalimumab in Crohn's disease patients. Pharmacogenomics, ISSN 1462-2416, 2015, vol. 16, no. 3, str. 191-204.
8. BERCE, Vojko, PINTO KOZMUS, Carina, **POTOČNIK, Uroš**. Association among ORMDL3 gene expression, 17q21 polymorphism and response to treatment with inhaled corticosteroids in children with asthma. Pharmacogenomics journal, ISSN 1470-269X, Dec. 2013, vol. 13, issue 6, 523-529.
9. HORVAT, Matej, **POTOČNIK, Uroš**, REPNIK, Katja, KAVALAR, Rajko, ŠTABUC, Borut. Single nucleotide

polymorphisms as prognostic and predictive factors of adjuvant chemotherapy in colorectal cancer of stages I and II. Gastroenterology Research and Practice, ISSN 1687-630X. [Online ed.], 2016.

10. DEŽELAK, Matjaž, REPNIK, Katja, KODER, Silvo, FERKOLJ, Ivan, **POTOČNIK, Uroš**. A prospective pharmacogenomic study of Crohn's disease patients during routine therapy with anti-TNF- α drug adalimumab: contribution of ATG5, NFKB1, and CRP genes to pharmacodynamic variability. Omics, ISSN 1557-8100, 2016, vol. 20, no. 5, 296-309 str.