

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	BIOKEMIJA
Course Title:	BIOCHEMISTRY

Študijski program in stopnja Study Programme and Level	Študijska smer Study Field	Letnik Academic Year	Semester Semester
UN Biokemija, 1. stopnja	/	2.	3.
USP Biochemistry, 1 st Cycle	/	2 nd	3 rd

Vrsta predmeta / Course Type: obvezni / Mandatory

Univerzitetna koda predmeta / University Course Code: BK116

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje Work	Druge oblike študija	Samost. delo Individual Work	ECTS
45	30	/	/	/	75	5

Nosilec predmeta / Lecturer: doc. dr. Gregor Gunčar / Dr. Gregor Gunčar, Assistant Professor

Jeziki / Languages:

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

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:

Biosignalizacija, receptorji, G-proteini, signalne kaskade Ser/Thr in Tyr kinaz, bioenergetika, principi regulacije metabolizma, katabolične poti, uravnavanje glikolize, glukoneogeneze, metabolizem glikogena, uravnavanje oksidacije maščobnih kislin in nastanka ketonskih teles, oksidativna fosforilacija in fotofosforilacija, biosinteza ogljikovih hidratov, biosinteza lipidov, metabolizem aminokislin, nukleotidov in sorodnih molekul, hormonska regulacija in integracija metabolizma pri sesalcih.

Content (Syllabus outline):

Biosignaling, receptors, G-proteins, Ser/Thr kinases, Tyr kinases, signaling cascades, bioenergetics, principles of metabolic regulation, catabolic pathways, regulation of glycolysis, gluconeogenesis, glycogen metabolism, regulation of fatty acid oxidation and ketogenesis, oxidative phosphorylation and photophosphorylation, carbohydrate biosynthesis, lipid biosynthesis, metabolism of amino acids, nucleotides and related molecules, hormonal regulation and integration of mammalian metabolism.

Temeljna literatura in viri / Readings:

- Nelson, D.L. in Cox, M.M. (Lehninger), Principles of Biochemistry, zadnja izdaja (trenutno 6. izdaja), W.H. Freeman & Co. 2013, (50% od str. 433-975).

Cilji in kompetence:

Cilji: Uporaba in nadgradnja znanja, ki so ga študenti dobili pri predmetu temelji biokemije.

Kompetence: Študenti bodo razumeli koncepte metaboličnih procesov in njihovega uravnavanja, znali bodo uporabljati informacije o metaboličnih procesih, ki so dostopne na svetovnem spletu in v preglednih strokovnih člankih.

Objectives and Competences:

Objectives: Application and upgrading of the knowledge gained by students at the course Fundamentals of Biochemistry

Competences: Students will understand concepts of metabolic processes and their regulation, they will know how to use information about metabolic processes accessible on the Internet and in scientific review articles.

Predvideni študijski rezultati:Znanje in razumevanje

Študenti bodo imeli pregled čez metabolične procese, vedeli bodo kakšen je pomen posameznih procesov, v katerih tkivih in v kakšnih metaboličnih stanjih potekajo in kako so uravnavani.

Razumevanje:

Razumevanje organizacije encimsko kataliziranih reakcij v metabolične procese, povezave med metaboličnimi procesi in njihovega uravnavanja. Razumevanje metod, ki se uporabljajo za študij metaboličnih procesov. Razumevanje povezav med motnjami v poteku metaboličnih procesov in nekaterimi obolenji.

Uporaba

Znanje, ki ga bodo študenti pridobili pri tem predmetu je osnova za druge biokemijske predmete, saj študenti pridobijo pregled o poteku in uravnavanju procesov v živih organizmih.

Refleksija

Študenti se bodo zavedali pomena poznavanja poteka in uravnavanja metaboličnih procesov za ugotavljanje delovanja različnih snovi v živih organizmih. Zavedali se bodo tudi določenih dilem na področju etike v biomedicinskih raziskavah.

Prenosljive spretnosti

Spretnosti uporabe domače in tuje literature in drugih virov, zbiranja in interpretiranja podatkov, uporaba IKT, uporaba različnih postopkov, poročanje (ustno in pisno),

Intended Learning Outcomes:Knowledge and Comprehension

Student will gain an overview of the metabolic processes, their importance, where and in what metabolic states they occur and how they are regulated.

They will understand the organisation of the enzyme catalysed reactions in the metabolic processes, metabolic pathways integration and regulation. They will also understand the methods used in metabolism research and link between metabolic disorders and diseases.

Application

Knowledge of the processes and their regulation in living organisms is fundamental for other biochemical courses.

Analysis

Students will be aware of the importance of metabolism and its regulation in knowing the pathways and modes of action of different molecules in our body. They will also be aware of the ethical concerns in biomedical research.

Skill-transference Ability

Ability to find and use current scientific literature in the field, data interpretation, use of information technologies, basic scientific writing and reporting, problem identification

identifikacija in reševanje problemov, osnove kritičnega branja raziskovalnih člankov na področju biokemije.

and solving, critical reading of the biochemistry scientific literature.

Metode poučevanja in učenja:

Predavanja, seminarji.

Learning and Teaching Methods:

Lectures, seminars.

Načini ocenjevanja:

Seminarska naloga
Pisni izpit

Delež (v %) /
Weight (in %)

Assessment:

Seminar work
Written exam

Reference nosilca / Lecturer's references:

- **GUNČAR, Gregor**, PUNGERČIČ, Galina, KLEMENČIČ, Ivica, TURK, Vito, TURK, Dušan. Crystal structure of MHC class II-associated p41 li fragment bound to cathepsin L reveals the structural basis for differentiation between cathapsins L and S. EMBO j., 1999, vol. 18, str. 793-803.

- **GUNČAR, Gregor**, PODOBNIK, Marjetka, PUNGERČAR, Jože, ŠTRUKELJ, Borut, TURK, Vito, TURK, Dušan. Crystal structure of porcine cathepsin H determined at 2.1 Å resolution: location of the mini-chain C-terminal carboxyl group defines cathepsin H aminopeptidase function. Structure (London), 1998, vol. 6, no. 1, 51-61.

- Ching-I A. Wang*, **Gregor Gunčar***, Jade K. Forwood, Trazel Teh, Ann-Maree Catanzariti, Gregory J. Lawrence, Fionna E Loughlin, Joel P. Mackay, Horst Joachim Schirra, Peter A. Anderson, Jeffrey G. Ellis, Peter N. Dodds, Boštjan Kobe, Crystal Structures of Flax Rust Avirulence Proteins Avr L567-A and -D Reveal Details of the Structural Basis for Flax Disease Resistance Specificity. Plant Cell, 2007, 19, 2898-2912. *authors contributed equally