

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	ENCIMATIKA
Course Title:	ENZYMOLGY

Študijski program in stopnja Study Programme and Level	Študijska smer Study Field	Letnik Academic Year	Semester Semester
UŠP Biokemija, 1. stopnja	/	3.	5.
USP Biochemistry, 1 st Cycle	/	3 rd	5 th

Vrsta predmeta / Course Type: obvezni / Mandatory

Univerzitetna koda predmeta / University Course Code: BK132

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. dr. Brigita Lenarčič / Dr. Brigita Lenarčič, Full Professor

Jeziki / Languages:

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

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.
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Vsebina:

Nomenklatura in klasifikacija encimov: razredi encimov, reakcije, izoenzimi, ribozimi, abzcimi. Encimska kataliza: teorija prehodnega stanja, različne oblike kataliz, eksperimentalni pristopi za določanje mehanizma reakcije, primeri. Osnove encimske kinetike: pridobivanje in obdelava kinetičnih podatkov, encimske enote, simboli, kinetika enosubstratnih in dvosubstratnih reakcij, kinetika predravnotežnega stanja. Regulacija encimske aktivnosti: inhibitorji, razpoložljivost substrata, ireverzibilne in reverzibilne kovalentne modifikacije, inhibicija s končnim produktom, kontrola aktivnosti preko vezave liganda (alosterični in

Content (Syllabus outline):

Nomenclature and classification of enzymes: classes of enzymes, types of reactions, isoenzymes, ribozymes, abzymes. Enzyme catalysis: transition state theory, different forms of catalysis, experimental approaches to the determination of enzyme mechanisms, examples. An introduction to enzyme kinetics: obtaining and analysing the kinetic data, enzyme units, symbols, kinetics of one-substrate and two-substrate reactions, pre-steady state kinetics. The control of enzyme activity: inhibitors, substrate availability, irreversible and reversible covalent modifications, end-product inhibition, control of activity by ligand-induced

kooperativni efekt), primeri.
Encimi v organiziranih sistemih: klasifikacija multiencimskih sistemov, primeri.
Razgradnja proteinov: lizosomska in nelizosomska pot (ubikvitinacija, proteasom).

conformational changes (allosteric and cooperative effects), examples.
Enzymes in organized systems: classification of multienzyme systems, examples.
Protein degradation: lysosomal and non-lysosomal pathways (ubiquitination, proteasome).

Temeljna literatura in viri / Readings:

- Fundamentals of Enzymology, Price N.C. & Stevens L., 3rd ed, Oxford University Press, 1999. 478 strani (60 %)

Cilji in kompetence:

Študentje spoznajo lastnosti in delovanje encimov. Na izbranih primerih se na strukturnem nivoju spoznajo z različnimi mehanizmi encimske katalize in tudi z različnimi strategijami kontrole njihove aktivnosti.

Študent bo sposoben samostojno izvesti encimske teste s pomočjo pripravljenih protokolov in kritično ovrednotiti rezultate.

Objectives and Competences:

Objectives:

Learning the functional properties of enzymes. Familiarizing students with the structural basis of the mechanisms of enzyme catalysis and regulation in selected examples.

Competences:

Ability to independently perform enzyme reaction experiments according to prepared protocols and to critically evaluate the obtained results.

Predvideni študijski rezultati:

Znanje in razumevanje

Pridobljeno znanje omogoča razumevanje encimsko kataliziranih reakcij in njihove regulacije na nivoju strukturno-funkcijskih lastnosti encimov.

Uporaba

Poznavanje delovanja encimov ima široko uporabnost v vseh panogah, kjer so vključeni encimi (znanost, medicina, industrija).

Refleksija

Študent poveže pridobljeno znanje s strategijami uporabnosti encimov.

Prenosljive spretnosti

Sposobnost uporabe domače in tuje literature, kritično branje raziskovalnih člankov, sposobnost ustnega in pisnega poročanja.

Intended Learning Outcomes:

Knowledge and Comprehension

Acquired knowledge enables the understanding of enzyme-catalysed reactions and their regulation at the structural and functional levels.

Application

Knowledge of enzyme function is widely applicable in various fields, such as research, medicine and industry.

Analysis

Students are able to link the acquired knowledge with the strategies of the use of enzymes.

Skill-transference Ability

Ability to use Slovenian and foreign literature, critical reading of scientific papers, ability of oral and written reporting.

Metode poučevanja in učenja:

Learning and Teaching Methods:

Predavanja, raziskovalni seminar, laboratorijske vaje	Lectures, research seminar, laboratory courses
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Delež (v %) /

Načini ocenjevanja:

Weight (in %) **Assessment:**

Opravljene vaje so pogoj za pristop k izpitu. Seminarska naloga Pisni izpit Ocene: 6-10 (pozitivno), 1-5 (negativno)		Completed laboratory course is prerequisite for the exam. Seminar work Written exam Grades: 6-10 (positive), 1-5 (negative)
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Reference nosilca / Lecturer's references:

- NOVINEC, Marko, **LENARČIČ, Brigita**, BAICI, Antonio. Clusterin is a specific stabilizer and liberator of extracellular cathepsin K. *FEBS letters*, 2012, 586, 1062-1066.

- NOVINEC, Marko, GRASS, Robert N., STARK, Wendelin J., TURK, Vito, BAICI, Antonio, **LENARČIČ, Brigita**. Interaction between human cathepsins K, L, and S, Mechanism of elastinolysis and inhibition by macromolecular inhibitors. *The Journal of Biological Chemistry*, 2007, 282, 7893-78902.

- MEH, Primož, PAVŠIČ, Miha, TURK, Vito, BAICI, Antonio, **LENARČIČ, Brigita**. Dual concentration-dependent activity of thyroglobulin type-1 domain of testican: specific inhibitor and substrate of cathepsin L. *Biological chemistry*, 2005, 386, 75-83.