

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Ime predmeta: **Biologija celice**
 Course title: **Cell biology**

Študijski program in stopnja Study programme and cycle	Študijska smer Study option	Letnik Year of study	Semester Semester
Splošna medicina, enovit magistrski študijski program		Prvi	2.
General medicine, Uniform master's degree study program		First	2nd

Vrsta predmeta (obvezni ali izbirni) /
 Course type (compulsory or elective)

obvezni

compulsory

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje Clinical training	Druge oblike študija Other forms of study	Samost. delo Individual work	ECTS
45	30	AV LV RV			90	7
		45				

Nosilec predmeta / Course coordinator:

Izr. prof. dr. Saška Lipovšek

Jeziki /Languages:

Predavanja / Lectures:

slovenski/slovene

Vaje / Tutorial:

slovenski/slovene

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

Prerequisites for enrolling in the course or for performing study obligations:

Vsebina (kratek pregled učnega načrta):

Razumevanje biologije celice je temeljno za razumevanje drugih področij biologije in medicine.

Pri predmetu se študenti seznajajo s sodobnimi raziskovalnimi metodami. Študenti spoznajo kemijsko sestavo celic, značilnosti prokariotskih in evkariotskih celic. Poudarek je na študiju struktur in organelov evkariotskih celic ter njihovih funkcijah.

Kratek povzetek vsebin:

1. Organizacija evkariotske in prokariotske celice; celice kot eksperimentalni modeli
2. Molekularna sestava celic
3. Metode proučevanja celic
4. Celične membrane in transport snovi
5. Receptorji
6. Ekstracelularni matriks
7. Mitohondriji in mehanizem oksidativne fosforilacije
8. Endoplazemski retikulum in Golgijev aparat

Content (syllabus outline):

Understanding of the cell biology is an area of research that is fundamental to all of the biological and medical sciences. This subject provides an introduction to the methods for studying cells. It focuses on the chemical structure of the cells, main characteristics of the prokaryotic and the eukaryotic cells, especially structures and organelles of the eukaryotic cells and their function.

Short abstract of contents:

1. Organisation of eukaryotic and prokaryotic cell; cells as experimental models
2. The molecular composition of cells
3. Tools of cell biology
4. Cell membranes and membrane transport
5. Receptors
6. Extracellular matrix
7. Mitochondria and the mechanism of oxidative phosphorylation

9. Lizosomi in peroksisomi
10. Citoskelet in gibanje celice
11. Jedro, kromatin in kromosomi
12. Celični ciklus, mitotična in mejoza
13. Medcelične komunikacije
14. Apoptoza in nekroza
15. Celice imunskega sistema
16. Maligno transformirane celice
17. Razmnoževanje in razvoj

8. Endoplasmic reticulum and Golgi Complex
9. Lysosomes and peroxisomes
10. The cytoskeleton and cell movement
11. The nucleus, chromatin and chromosomes
12. Cell cycle, mitosis and meiosis
13. Cell to cell interaction
14. Apoptosis and necrosis
15. Cells of the immune system
16. Malignant transformation
17. Reproduction and development

Temeljni literatura in viri / Reading materials:

- Alberts, B., Johnson, A., Lewis, J., Raff, M., Roberts, K., Walter, P., 2014: Molecular Biology of the Cell 8th Ed.. Garland Science, Taylor & Francis Group, New York.
- Becker, M. W., Kleinsmith, L. J., Hardin, J., 2004: The World of the Cell (5th Ed.). The Benjamin/Cummings Publishing Company, San Francisco.
- Cooper, G. M., R. F. Hausman, 2009: The Cell: a molecular approach (5th Ed.). ASM Press, Washington, D. C.
- Junqueira, L. C. and Carneiro, J., 1996: Histologie – Zytologie, Histologie und mikroskopische Anatomie des Menschen. Springer-Verlag Berlin, Heidelberg.
- Lodish, H., Berk, A., Matsudaira, P., Kaiser, C. A., Krieger, M., Scott, M. P., Zipursky, S. L., Darnell, J., 2010: Molecular Cell Biology 6th Ed.). W. H. Freeman and Company, New York.
- Dariš B., Lipovšek S.: Biologija celice: navodila za laboratorijske vaje. Maribor: Univerza v Mariboru, Univerzitetna založba, 2021

Cilji in kompetence:

- Študenti razumejo strukturo, funkcijo in molekularno organizacijo celice.
- Pridobijo poglobljena znanja na specifičnih področjih biologije celice.

Objectives and competences:

- Students understand the structure, the function and the molecular organisation of the cell.
- Students acquire advanced knowledge in specific fields in cell biology.

Predvideni študijski rezultati:

Znanje in razumevanje:

- Študenti razumejo dosežke s področja biologije celice, ki so nujno potrebni na drugih področjih biologije in medicine.
- Študenti spoznajo nekatera področja medicine, kjer uporabljamo znanja biologije celice.

Prenesljive/ključne spretnosti in drugi atributi:

- Študenti pridobijo izkušnje in laboratorijske spretnosti, ki so nujno potrebne pri samostojnem laboratorijskem delu.
- Znajo uporabljati znanstvene prispevke in zahtevnejšo študijsko literaturo.

Intended learning outcomes:

Knowledge and Understanding:

- Students understand achievements in cell biology which is essential for other fields of biology and medicine.
- Students get acquainted with the areas of medicine in which cell biology is applied.

Transferable/Key Skills and other attributes:

- Students acquire experience and laboratory skills which are essential for an autonomous laboratory work.
- They understand articles in scientific journals and advanced text-books.

Metode poučevanja in učenja:

Learning and teaching methods:

• Predavanja • Laboratorijske vaje • Seminar	• Lectures • Laboratory excersises • Seminar
--	--

Načini ocenjevanja:	Delež (v %) / Share (in %)	Assessment methods:
Način (pisni izpit, ustno izpraševanje, naloge, projekt)		Type (examination, oral, coursework, project):
Pisni praktični kolokvij (30%)	30	Written practical examination (30%)
Seminar (10%)	10	Seminar (10%)
Pisni izpit (60%)	60	Written final examination (60%)
ŠTUDIJSKE OBVEZNOSTI ŠTUDENTOV		
Prisotnost na vajah		ACADEMIC OBLIGATIONS OF STUDENTS:
Napisani protokoli		Each student has to:
Opravljen kolokvij, seminar in izpit		- be present on each practical course;
		- write down the protocol on each practical course;
		- pass written practical examination, written seminar and written final examination.
POGOJI ZA PRISTOP K POSAMEZNEMU PREVERJANJU ZNANJA		
Pogoj za pristop h kolokviju:		REQUIREMENTS FOR ACCESS TO INDIVIDUAL KNOWLEDGE CHECKING:
-opravljene vaje;		- performed practical courses;
-napisani protokoli.		-written protocols.
Pogoji za pristop k izpitu:		CONDITIONS FOR WRITTEN FINAL EXAM:
-opravljen kolokvij, seminar		-performed written practical exam and seminar.
Pozitivna ocena: doseženih 50 % in več		

Reference nosilca / Course coordinator's references:

LIPOVŠEK DELAKORDA, Saška, NOVAK, Tone, JANŽEKOVICH, Franc, WEILAND, Nina, LEITINGER, Gerd. Malpighian tubule cells in overwintering cave crickets <i>Troglophilus cavicola</i> (Kollar, 1833) and <i>T. neglectus</i> Krauss, 1879 (Raphidophoridae, Ensifera). <i>PLoS one</i> , ISSN 1932-6203, 2016, vol. 11, iss. 7.
LIPOVŠEK DELAKORDA, Saška, NOVAK, Tone. Autophagy in the fat body cells of the cave cricket <i>Troglophilus neglectus</i> Krauss, 1878 (Raphidophoridae, Saltatoria) during overwintering. <i>Protoplasma</i> , ISSN 0033-183X, 2016, vol. 253, iss. 2, str. 457-466.
LIPOVŠEK DELAKORDA, Saška, NOVAK, Tone, JANŽEKOVICH, Franc, LEITINGER, Gerd. Changes in the midgut diverticula in the harvestmen <i>Amilenus aurantiacus</i> (Phalangidae, Opiliones) during winter diapause. <i>Arthropod structure & development</i> , ISSN 1467-8039, 2015, vol. 44, iaa. 2, str. 131-141.
LIPOVŠEK DELAKORDA, Saška, JANŽEKOVICH, Franc, NOVAK, Tone. Autophagic activity in the midgut gland of the overwintering harvestmen <i>Gysa annulatus</i> (Phalangidae, Opiliones). <i>Arthropod structure & development</i> , ISSN 1467-8039, 2014, vol. 43, iss. 5, str. 493-500.
LIPOVŠEK DELAKORDA, Saška, LETOFISKY-PAPST, Ilse, HOFER, Ferdinand, PABST, Maria Anna, DEVETAK, Dušan. Application of analytical electron microscopic methods to investigate the function of spherites in the midgut of the

larval antlion *Euroleon nostras* (Neuroptera: Myrmeleontidae). *Microscopy research and technique*, ISSN 1059-910X, 2012, vol. 75, iss. 4, str. 397-407.

NYQVIST, Daniel, SPEIER, Stephan, RODRIGUEZ-DIAZ, Rayner, MOLANO, R. Damaris, LIPOVŠEK DELAKORDA, Saška, RUPNIK, Marjan, DICKER, Andrea, ILEGEMS, Erwin, ZAHR-AKRAWI, Elsie, MOLINA, Judith, LOPEZ-CABEZA, Maite, VILLATE, Susana, ABDULREDA, Midhat, RICORDI, Camillo, CAICEDO, Alejandro, PILEGGI, Antonello, BERGGREN, Per-Olof. Donor islet endothelial cells in pancreatic islet revascularization. *Diabetes*, ISSN 0012-1797, 2011, vol. 60, no. 10, str. 2571-2577.