

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 45			90	7

**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 seznanijo 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. Mitochondriji in mehanizem oksidativne fosforilacije

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

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

- 7. Mitochondria and the mechanism of oxidative phosphorylation
- 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 spremnosti in drugi atributi:

- Študenti pridobijo izkušnje in laboratorijske spremnosti, 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:

<ul style="list-style-type: none"> Predavanja Laboratorijske vaje Seminar 	<ul style="list-style-type: none"> Lectures Laboratory excercises Seminar
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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		 ACADEMIC OBLIGATIONS OF STUDENTS:
Prisotnost na vajah		Each student has to:
Napisani protokoli		- be present on each practical course;
Opravljen kolokvij, seminar in izpit		- write down the protocol on each practical course;
 POGOJI ZA PRISTOP K POSAMEZNEMU PREVERJANJU ZNANJA		 - pass written practical examination, written seminar and written final examination.
Pogoji za pristop h kolokviju: -opravljene vaje; -napisani protokoli.		 REQUIREMENTS FOR ACCESS TO INDIVIDUAL KNOWLEDGE CHECKING: - performed practical courses; -written protocols.
Pogoji za pristop k izpitu: -opravljen kolokvij, seminar		 CONDITIONS FOR WRITTEN FINAL EXAM: -performed written practical exam and seminar.
Pozitivna ocena: doseženih 50 % in več		

Reference nosilca / Course coordinator's references:

LIPOVŠEK DELAKORDA, Saška, LEITINGER, Gerd, JANŽEKOVIC, Franc, KOZEL, Peter, DARIŠ, Barbara, PERC, Matjaž, DEVETAK, Dušan, WEILAND, Nina, NOVAK, Tone. Towards understanding partial adaptation to the subterranean habitat in the European cave spider, *Meta menardi* : an ecocytological approach. *Scientific reports*. 2019, vol. 9, art. no. 9121, str. 1-15. ISSN 2045-2322. DOI: [10.1038/s41598-019-45291-z](https://doi.org/10.1038/s41598-019-45291-z). [COBISS.SI-ID [24633608](#)]

LIPOVŠEK DELAKORDA, Saška, KOZEL, Peter, LEITINGER, Gerd, NOVAK, Tone. Malpighian tubules in harvestmen. *Protoplasma*. 2021, vol. 258, iss. 5, str. 1145-1153, ilustr. ISSN 0033-183X. DOI: [10.1007/s00709-021-01634-0](https://doi.org/10.1007/s00709-021-01634-0). [COBISS.SI-ID [57977603](#)]

LIPOVŠEK DELAKORDA, Saška, NOVAK, Tone, DARIŠ, Barbara, HOFER, Ferdinand, LEITINGER, Gerd, LETOFSKY-PAPST, Ilse. Ultrastructure of spherites in the midgut diverticula and Malpighian tubules of the harvestman *Amilenus aurantiacus* during the winter diapause. *Histochemistry and cell biology*. Jan. 2022, vol. 157, iss. 1, str. 107-118, ilustr. ISSN 0948-6143. DOI: [10.1007/s00418-021-02046-0](https://doi.org/10.1007/s00418-021-02046-0). [COBISS.SI-ID [83684611](#)]

SKELIN, Maša, DOLENŠEK, Jurij, VALLADOLID-ACEBES, Ismael, STOŽER, Andraž, LIPOVŠEK DELAKORDA, Saška. Application of transmission electron microscopy to detect changes in pancreas physiology. V: MHADHBI, Mohsen

(ur.). *Electron microscopy*. London: IntechOpen, 2022. Str. 1-22, ilustr. ISBN 978-1-80355-946-9, ISBN 978-1-80355-947-6. <https://www.intechopen.com/chapters/81936>, DOI: [10.5772/intechopen.104807](https://doi.org/10.5772/intechopen.104807). [COBISS.SI-ID [118338051](#)]

SUNKARA, Sowmya, RADULoviĆ, Snježana, LIPOVŠEK DELAKORDA, Saška, BIRKL, Christoph, EGGENREICH, Stefan, BIRKL-TOEGLHOFER, Anna Maria, SCHINAGL, Maximilian, FUNK, Daniel, STÖGER-POLLACH, Michael, HAYBAECK, Johannes, GÖSSLER, Walter, ROPELE, Stefan, LEITINGER, Gerd. Autolysis affects the iron cargo of ferritins in neurons and glial cells at different rates in the human brain. *Applied biochemistry and biotechnology*. 2023, 15 str., ilustr. ISSN 0273-2289. DOI: [10.1007/s10571-023-01332-w](https://doi.org/10.1007/s10571-023-01332-w). [COBISS.SI-ID [145448963](#)]