

Kratek opis usposabljanja mladega raziskovalca (*Short description of the Young Researcher's training*)

1. Raziskovalna organizacija (*Research organisation*):

Univerza v Ljubljani, Biotehniška fakulteta

2. Ime, priimek in elektronski naslov mentorja (*Mentor's name, surname and email*):

Polona Mrak, polona.mrak@bf.uni-lj.si

3. Šifra in naziv raziskovalnega področja (*Research field*):

1.03.01 Biologija / Zoologija in zoofiziologija

4. Kratek opis usposabljanja mladega raziskovalca (*Short description of the Young Researcher's training*):

Navedite tudi morebitne druge zahteve, vezane na usposabljanje mladega raziskovalca (npr. znanje tujih jezikov, izkušnje z laboratorijskim delom, potrebne licence za usposabljanje...).

slo:

Pojasnitev procesov morfogeneze med razvojem organizmov in s tem povezane diferenciacije celic je eno bistvenih področij raziskav za razumevanje bioloških sistemov. Tvorba tkiv in organov med razvojem je sklop kompleksnih procesov, ki vključujejo tudi oblikovanje povezav med celicami v tkivu. Epiteli so temeljni tip tkiv v morfogenetskih procesih in zagotavljajo pregrado in hkrati potek reguliranih transportov snovi med zunanjim in notranjim okoljem organizma. Za integriteto in mehansko odpornost teh tkiv je ključnega pomena omrežje medceličnih stikov in citoskeletnih elementov. Medcelični stiki so dinamični kompleksi, ki se preoblikujejo v povezavi z morfogenezo med embrionalnim razvojem organizma in med obnavljanjem tkiva, vendar so ti procesi le deloma pojasnjeni. V osnovi bo področje raziskovalnega dela mladega raziskovalca proučevanje diferenciacije ektodermalnih in endodermalnih epitelov med embrionalnim in postembrionalnim razvojem živali z različnimi mikroskopskimi pristopi. Raziskava bo usmerjena v analize preoblikovanja medceličnih stikov, stikov z zunajceličnimi matriksi ter s tem povezane spremembe v organizaciji citoskeleta med procesi morfogeneze epidermisa ter epitelov prebavila, predvsem v intaktnih nevretenčarskih embrionalnih in postembrionalnih stadijih. Rezultate karakteristik diferenciacije celic bomo interpretirali v kontekstu razvoja celotnega tkiva, organa in organizma. Metodologija raziskovalnega dela bo obsegala predvsem različne tehnike mikroskopije, vključno s fluorescenčno in DIC mikroskopijo ter elektronsko mikroskopijo, v kombinacijami z lokalizacijo izbranih celičnih komponent. Zaželeno so izkušnje kandidata na področju histoloških in drugih tehnik za pripravo bioloških vzorcev za mikroskopske analize ter s področja raziskav morfogeneze med razvojem živali. Pričakujemo, da bo novo znanje nadgradnja razumevanja procesov tvorbe tkiv med razvojem živali, zlasti diferenciacije in preoblikovanja medceličnih stikov in citoskeleta.

eng:

Elucidation of the processes of morphogenesis during organism development with related cell differentiation is the essential issue in the research of biological systems. Formation of tissues

and organs during development comprises complex processes, including also formation of the connections between cells within tissue. Epithelia are a fundamental tissue type in morphogenetic processes and simultaneously provide barrier and regulated transport of material between the exterior and interior environment of the organism. The system of cell junctions and cytoskeletal elements is the key component contributing to the integrity and mechanical resistance of the epithelia. Cell junctions are dynamic complexes, which reorganize in relation to morphogenesis during embryonic development and during tissue renewal, but these processes are only partly understood. The core area of the young researcher work will be the examination of ectodermal and endodermal epithelia differentiation during animal embryonic and postembryonic development using different microscopical approaches. The research will focus on the analyses of reorganization of cell junctions and cell-extracellular matrix junctions with related cytoskeleton reorganization during morphogenetic processes of epidermis and digestive system epithelia, mainly in intact invertebrate embryonic and postembryonic stages. The obtained results of cell differentiation will be interpreted in the context of whole tissue, organ and organism development. Metodology applied in the research will mainly involve different microscopy techniques, including fluorescence and DIC microscopy and electron microscopy, in combination with localization of selected cellular components. The experiences in the field of histological and other techniques of biological samples preparation for microscopical analysis and in the research field of morphogenesis during animal development would be appreciated. The new knowledge obtained in this work is expected to upgrade the understanding of tissue formation processes during animal development, especially differentiation and reorganization of cell junctions and cytoskeleton.