MOLECULAR CYTOLOGY

Identification of mechanisms involved in regulation of the side population-phenotype in tumors
supervisor: prof. RNDr. Peter Fedoročko, CSc.
study form: full time
Annotation: The rising incidence of cancers worldwide is the driving force for the clarification of the most serious aspects of tumor diseases, i.e., metastasis, therapy-resistance and relapse. In the light of the latest findings, these aspects are being linked with the existence of so-called cancer stem-like cells (CSLC). Putative CSLC can be identified in vitro via enhanced efflux activity of transporter proteins (side population analysis, SP). Presence of SP cells in tumor might serve as tool for predicting treatment resistance. Thus, the SP-elimination could be applied as an attractive approach enhancing the therapy effectiveness.
The aim of the study will be:
analysis of the molecular mechanisms involved in the regulation of the SP phenotype, using cancer cell lines of different histological origin;
analysis of the impact of different experimental conditions (hypoxia, normoxia, administration of natural drugs) on the incidence and features of SP cells.
To fulfill the goals of the study, flow cytometry, sorting and molecular-biology methods, will be applied (e.g. RT-PCR, Western blot, fluorescence and confocal microscopy).

The role of blood vessels in developmental processes occurring in the central canal area in the rat spinal cord and their involvement in the response to spinal cord injury.
Supervisor: doc. RNDr. Zuzana Daxnerová, CSc.
konsultant: RNDr. Anna Alexovič-Matiašová, PhD.
denná forma
Annotation: The main goal of the doctoral study is to investigate the time-course of angiogenesis and its relationship to neurogenesis and gliogenesis occurring in the central canal lining of the rat spinal cord during development. Description of the blood vessel arrangement as the prospective migratory route outside of the CC lining for the newly formed cells during development and in the response to the traumatic injury of the spinal cord.

Physiological and molecular mechanisms of adaptation in polyextremotolerant bacteria
supervisor: doc. RNDr. Peter Pristaš, CSc.
study form: full time
Annotation: During evolution many bacteria become adapted to multiple extreme environments and frequently bacteria are the only life forms able to survive under particular extreme conditions. While mechanisms of adaptation are relatively well understood for bacteria living under single stress factor there are limited data on physiological and molecular mechanisms of adaptation in polyextremotolerant bacteria, living in environments with multiple stressors. In frame of the project mechanisms of adaptation in bacteria living in environments with at least two stressors (pH, salinity, increased levels of heavy metals and antibiotics) in order to identify potentially new mechanisms of adaptation.