Doctoral study program: Biomedical Sciences
Specialization: Molecular Medicine, type of study: full time

Supervisor: prof. RNDr. Ondřej Slabý, Ph.D.

Topic: Exosomes and exosomal long non-coding RNAs in colorectal cancer

Annotation:
Exosomes are nanosized membranous vesicles that are endogenously produced by many different cell types, including cancer cells. They play a critical role in local and distant cell-to-cell communication by carrying releasing cell-specific macromolecules and transferring them to recipient cells. Cancer-derived exosomes can affect normal cells and thus create a favorable tumor microenvironment and facilitate establishment of distant metastases by delivering cancer-specific proteins, fragments of DNA and RNA including non-coding RNAs. Our previous results showed that deregulation of long non-coding RNAs (lncRNAs) is an important feature of colorectal cancer (CRC). As lncRNA deregulation can be displayed in circulating exosomes of affected patients, exosomal lncRNAs can potentially serve as colorectal cancer biomarkers.

The aim of this PhD project will be to comprehensively analyze exosomal lncRNAs in CRC patients, and to evaluate their diagnostic and prognostic potential. The candidate will work towards identification of CRC-specific lncRNA-based biomarkers using modern molecular biology techniques. The methods will include exosome purification and exosomal RNA isolation, high-throughput RNA profiling and validation. The candidate will further analyze the potential functional role of detected lncRNAs in CRC pathogenesis using *in vitro* and/or *in vivo* systems.

Keywords:
Exosomes, colorectal cancer, long non-coding RNAs, biomarkers

Requirements on candidates:

Master's degree in Molecular biology, Biochemistry, or a similar field
Good communication and interpersonal skills
Fluency in spoken and written English is required at level B2
Previous publication activity is beneficial
Practical experience in advanced molecular biology methods (e.g. sequencing, qPCR, cellular and tissue cultivation) is an advantage, but is not required

Number of positions: 1

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