

Doctoral study program: Biomedical Sciences

Form: doctoral present

Department: Department of Biology, Medical Faculty MU

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

Ph.D. position: Study of episomes as a possible tool for long-term transfection of mammalian cells

Annotation: Despite the promise of in vivo gene therapies at the end of the 20th century, to date this field is only a minority in therapeutic approaches aimed at treating genetic diseases. In practice, vectors based on viruses are widely researched and used, which are limited by the immunogenicity of the vector, by random integration into the genome or by the size limitation of the delivered therapeutic DNA.

Episomal gene therapy has emerged as an alternative to these treatments. Episomes are synthetic non-integrating extrachromosomal plasmids that enable long-term transfection of mammalian cells with the help of regulatory sequences from the mammalian genome. However, episomes themselves suffer from low stability across the cell cycle compared to viral vectors. It is therefore necessary to improve them further and to better understand the principles that will enable permanent extrachromosomal transfection of mammalian cells. Such a system can then become a prototype for a new type of safer gene therapy.

The main goal of the work is therefore to describe the mechanisms related to episomal retention and use this information to improve and eventually test the episomal construct as a possible tool for gene therapy.

Funding of the research: On top of the scholarship, PhD student will receive 0,5 contract that will be covered by the finances of the research group

Information on funding PGS positions: The program requires that all PhD students have some means of financial support of min. 25 000 CZK per month. This is often a combination of various sources (grants, scholarship etc.)

Requirements for the student according to the Board for the PhD studies in Healthcare

Simulation at MU: The student's minimum publication activity within the course of study is one first-author publication with an IF value above the median in the field or 2 first-author publications in journals with an IF value in the 3rd quartile in the field (Q3). A condition for successful completion of the studies is also a foreign internship of at least 1 month, which is an inseparable part of the studies. As part of their studies, students will also participate in the teaching. An excellent knowledge of the English language is assumed.

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