Charles University

XIX. Call for the Junior Fund, 2026

Proposal for a research project

Faculty/institute/unit of CU:	Second Faculty of Medicine, Charles University
Department:	Department of Medical Biophysics
Research project title:	Biosensor-Based Circulating miRNAs for Early Melanoma Diagnosis
Project description:	Cancer is a leading cause of death worldwide and its burden is increasing. Cancer therapies are currently limited to surgery, radiation, and chemotherapy. Harmful side effects and the development of drug resistance have led to major obstacles in cancer treatment. In this light, novel biotechnologies focused on biomedical investigation are among the most useful and advanced technologies in supporting precision medicine, for all aspects involving the analysis and monitoring of neoplasm growth and evolution. The development of cheap and sensitive technologies, affordable in laboratories for clinical analyses, is becoming an urgent need for cancer. These tools allow early intervention in the presymptomatic phases, responding to modern clinical needs for monitoring the progression and metastasis of tumor lesions. Recently, the detection and quantification of microRNAs is gaining a never-greater interest for their biological or clinical relevance. This project aims to develop a biosensor, such as polyacrylonitrile (PNA) and polyurethane (PUR) nanofibers for miRNAs detection, as biomarkers for the early diagnosis and prognosis of melanoma, directly in patient samples, biological fluids, especially serum, saliva, and urine. Through an advanced and innovative diagnostic tool that ensures a high level of sensitivity, specificity, and reliability for the simultaneous detection and quantification of one or more than one microRNAs involved in melanoma, we could prevent the unfavorable outcome.
What do we offer?	We can offer expertise in preparation of functionalized nanofibers and grafted glass. Our department and cooperating labs are

	equipped with all necessary apparatus for preparation of nanofiber, their functionalization both on surface and in core, their fractionalization, controlled degradation and characterization as well as for functional unification with grafted glass. We can also offer advanced knowledge of functionalization of both nanofibers and grafted glass with nucleic acids, including miRNAs. In addition, we can also offer novel technologies based on microfluidics for monitoring of healing processes.
Profile of an ideal candidate:	Ideal applicant should possess expertise in molecular biology, good skill in preparation and characterization of miRNA and ssDNA. The applicant should be interested in early detection and monitoring of oncological diseases by simple means suitable also for prevention and large-scale disease monitoring.
Position available from:	October 1, 2026
Workplace location:	Plzeňská 311, Motol, Prague
Supervisor(s):	Prof. Evžen Amler
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Application deadline:	March 31, 2026
Applicants must submit required documents to:	Prof. Evžen Amler