Faculty Proposal for a Research Project – JUNIOR_2025 Fund

FACULTY PROPOSAL FOR A RESEARCH PROJECT – JUNIOR_2025 FUND	
Faculty:	Faculty of Medicine in Pilsen
Title of the research project:	Integrated Biomarker Discovery for Predicting Response and Toxicity to Immune Checkpoint Inhibitors in Melanoma
Description of the project:	in Melanoma This research project focuses on the identification and validation of novel predictive biomarkers for both immune-related adverse events (irAEs) and therapeutic response in patients with malignant melanoma treated with immune checkpoint inhibitors (ICIs). Although ICIs have revolutionized cancer treatment and significantly improved outcomes in melanoma, their use is often associated with unpredictable responses and potentially severe irAEs. In contrast to kinase inhibitors (so-called targeted therapies), whose efficacy is closely linked to the knowledge of predictive biomarkers, strong predictors have not yet been established for immunotherapy. The same applies to immune-related adverse events. To address this needs in melanoma ICIs treatment, the project will employ a comprehensive approach combining immunohistochemistry (tissue) and liquid biopsy (blood) analyses. First, IHC (on FFPE tissue) will be used to characterize the composition and spatial distribution of tumor-infiltrating immune cells (panel of CD markers) within the tumor microenvironment. This data will help elucidate the role of local immune context in treatment response and toxicity. Second, multiplex assays will be applied to analyze circulating cytokines and soluble immune checkpoint molecules in peripheral blood. These circulating factors may serve as non-invasive biomarkers reflecting systemic immune activation or dysregulation associated with both therapeutic efficacy and irAEs. Third, an ultrasensitive ddPCR-based method will be used to detect BRAF and NRAS mutations in circulating of tumor genetic dynamics. ctDNA may provide an additional layer of information regarding tumor burden, treatment resistance, or disease progression. By integrating these methodologies, the project aims to generate a robust and feasible panel of biomarkers that can improve clinical decision-making, guide risk stratification, and support the development of personalized immunotherapy strategies for melanoma
	The project builds on our previous published results in treatment prediction. Project will also utilize our biobank of tissue and blood samples from melanoma
	sampling of new patients.

What do we offer?	We offer the opportunity to join a research team with experience in biomarker discovery for precision oncology. Our laboratory specializes in translational cancer research with a strong focus on targeted therapy, immunotherapy and liquid biopsy. You will gain hands- on experience with cutting-edge molecular genetics methods, including digital PCR for ctDNA detection, multiplex cytokine profiling, and immunohistochemical analysis of tumor-infiltrating immune cells. We provide access to modern laboratory infrastructure, expert mentorship, and an environment that supports innovation, collaboration, and the transfer of research findings into clinical practice.
Profile of an ideal candidate:	 Ph.D. (or equivalent) degree in medicine, life sciences, or related fields. Max. 5 years from graduation Technical skills in molecular biology (e.g., reverse transcription-qPCR, digital PCR, tissue sectioning, immunohistochemistry, NGS) Technical skills in histology (e.g., tissue sectioning, microscopy, immunohistochemistry, immunofluorescence High motivation, ability to conduct collaborative research Track record of publications in peer-reviewed journals, which include skillness of required methods Excellent English communication skills both in written and oral form
Workplace:	Department of Biology
Supervisor:	doc. Ing. et Ing. Jiří Polívka, Ph.D. prof. RNDr. Martin Pešta, Ph.D.
E-mail:	Jiri.polivka2@lfp.cuni.cz
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Position available from:	January 1, 2026
Deadline for applications:	July 31, 2025

Applicants must submit required	internationaloffice@lfp.cuni.cz and
documents to:	<u>liri.polivka2@lfp.cuni.cz</u> and <u>martin.pesta@lfp.cuni.cz</u>