

Affiliation: Masaryk University, Faculty of Medicine
Study program: PhD program Biomedical Sciences
Specialization: Biochemistry and Molecular Biology
Workplace: International Clinical Research Center- Center for Translational Medicine (CTM), Studentská 812/6, 625 00 Bohunice

Supervisor: Jan Fröhlich, jan.frohlich@fnusa.cz

I work as junior principal researcher at FNUSA-ICRC, and for the past five years I have the privilege of working on several projects exploring liver pathophysiology, obesity and epigenetics mechanism in metabolism and cancer (Publications: 34; sum of citations 286 and h-index: 10). My research is focused on investigating the molecular mechanisms underlying hepatic steatosis and its progression to MAFLD/NASH/fibrosis, as well as identifying new potential therapeutic/diagnostic targets (proteins GDF11 and SIRT6) and methods. In the recently awarded grant n. NU23-03-00318 from Czech Ministry of Health we plan to utilize advanced molecular techniques and analyzing patient samples with aim to identify key molecular drivers and potential therapeutic targets for preventing and treating HCC and children brain tumors. During the years, our lab established many worldwide collaborations, which reached fruition by publication in respected international journals.

Lab's website: <https://www.fnusa-icct.com/>

Title: Free Circulating Histone Variants and Their Complexes in Biofluids as Novel Markers of Diseases

Brief annotation (max 200 words):

Biomarker research has transformed disease diagnosis and prognosis by identifying specific molecules indicating various health conditions. The use of histone variants and complexes as potential biomarkers has gained attention for their uniqueness and relevance in diseases, after they have been found in bio-fluids like blood, urine, and cerebrospinal fluid. Their interest lies in their involvement in disease processes, including inflammation, DNA damage, and various cancer diseases. Detecting them in bio-fluids indicates ongoing pathological events in affected tissues. Identifying these histone signatures can revolutionize disease diagnosis, prognosis, and can improve outcomes and allow personalized treatment.

The proposed PhD project is based on recently awarded grant n. NU23-03-00318 from Czech Ministry of Health, which focuses on the development of novel methods to study free circulating histones and histone complexes in "liquid biopsies" samples. This study focuses on free circulating histone variants and their complexes in bio-fluids (CSF, Plasma/Serum) of children with brain tumors, which can serve as novel disease biomarkers. The PhD. applicant will use extensively *in vitro* methods including cancer lines to uncover, how histones are released into bio-fluids and which molecular/cellular mechanisms are involved. Exploring these molecular signatures offers new paths for early disease detection and personalized medicine.

Masaryk University, Faculty of Medicine

Kamenice 753/5, 625 00 Brno, Czech Republic

T: +420 549 49 2910, E: info@med.muni.cz, www.med.muni.cz

Bank account: KB Brno, Ref. No.: 85636621/0100, ID: 00216224, Tax ID: CZ00216224

Please quote the Reference Number in your reply.

Funding for the research

Currently, the project is funded till end of 2026 from Ministry of Health of the Czech Republic AZV grant n. NU23-03-00318 Total budget of (11 568 K CZK in total for project; FNUSA-ICRC 6064 K CZK), where the student will be awarded with the contract of 0.4-0.5 FTE during the whole period of the project (till end of 2026). The Ph.D. student is encouraged to apply for external funding like Brno's Ph.D. talent. Also, it is possible that once the pilot data is generated, more funding can be applied at the National and European Union levels.