

Summer Research Internship Project Proposal

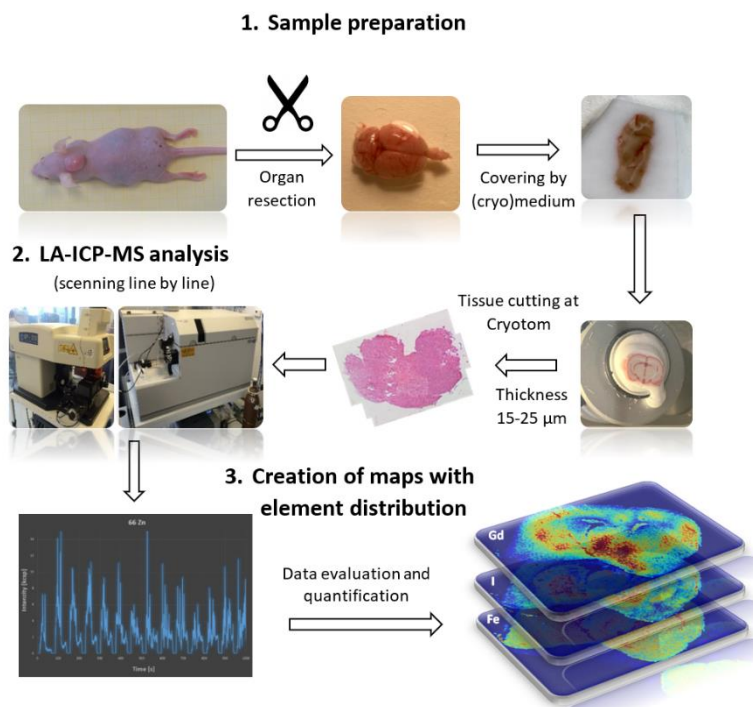
Project Topic	Nanoparticles as a new tool for the diagnosis and treatment of ischemic stroke		
Name	Mgr. Michaela Kuchynka, Ph.D.	Field	Pharmacology
Department	Department of Chemical Drugs	Keywords	Theranostic, nanoparticles, stroke, imaging

Description of the Project (overview, expected outcomes, reason for research, proposed outcomes for student(s))

Stroke is one of the leading causes of mortality and disability worldwide. The application of proper imaging methods for early detection of ischemic stroke is necessary to improve the accuracy and efficiency of clinical practice.

The intravital, real-time blood clots imaging can provide essential information to choose the correct strategy of vascular restoration - thrombolysis vs. thrombectomy. Polymeric iodine nanoparticles (IoNPs) help visualize clots and provide the basis of a modern theragnostic approach to treatment. IoNPs can be a complement to conventional contrast agents.

This project is focused on testing of pharmacokinetics properties of new IoNPs (as a new potential tool for diagnosis and treatment of ischemic stroke) and their imaging in biological tissues (mainly brain) by a unique method - laser ablation with inductively coupled plasma and mass spectrometry (LA-ICP-MS). In the recent decades, there has been an increase in interest in imaging the distribution of elements/metals, especially in pharmaceutical, biomedical or life science with application to a specific problem/disease. This technique opens the opportunity to explore a new potential drug, in addition to information on tissue distribution and behaviour.



Student Requirements (prerequisites, experience, acceptable fields of study, etc.)

- some experience work in a chemical laboratory, interest in research activities

Proposed responsibilities of the student(s)

- be a part of our scientific team, teamwork
- perform scientific work responsibly

Additional important information (max. number of students, additional staff/faculty involved, etc.)

- max. number of students - 3
- the participant will have the opportunity to learn and understand this analytical technique with very good spatial resolution and detection limit (at Faculty of Science) as well as sample preparation (Concerning the drug application to mice, resection organs, or cryo-cutting at Faculty of Pharmacy) and data evaluation