PhD Position in Molecular Biology: Understanding the Molecular Mechanisms of the Cryptobiotic State of Tardigrades

Location: Max Perutz Labs, Medical University of Vienna

Duration: 4 years

Provisional Start Date: flexible, but no later than June 2025

Application Deadline: October 15, 2024

Project Description:

The Köhler lab at the Max Perutz Labs invites applications for a fully-funded PhD position focused on exploring the molecular mechanisms underlying tardigrade cryptobiotic state.

Tardigrades fascinate the public and scientific imagination due to their remarkable survival abilities and their intriguing, almost alien-like characteristics. They can withstand extreme temperatures, pressures, radiation, and even the vacuum of space. They can enter a state termed cryptobiosis, where their metabolic activities are thought to come to a standstill, that poses fundamental questions about the nature of living systems.

The Köhler lab is one of few labs worldwide that can culture the particularly extremotolerant species *Ramazzottius varieornatus* and maintain primary cells of isolated cell types. Furthermore, they have developed several methodologies to study the dynamics of the proteome when the animals enter or exit anhydrobiosis, the cryptobiotic state after dehydration.

To better understand in molecular detail what metabolic mechanisms evolved that give tardigrades their cryptobiotic capability the Köhler lab has partnered with the lab of Dr. Petrova to tap into the vast capabilities of mass spectrometry (MS) and metabolomics. Recently recruited from Harvard Medical School, Dr. Petrova is now establishing a Research Metabolomics Core Facility at Medical University of Vienna bringing extensive experience in metabolism, liquid chromatography (LC) MS, metabolomics studies, and model organisms. Employing the power of this versatile and cutting-edge technology, we will be able to

investigate, for the first time, the small molecule constituents of tardigrade biotic and abiotic states. By combining the expertise of both labs, this interdisciplinary project aims to uncover novel molecular mechanisms behind the cryptobiotic state switch, potentially revolutionizing our understanding of fundamental molecular processes and pushing the boundaries of biological science.

Responsibilities:

- Conduct research under the supervision of Dr. Köhler and Dr. Petrova, aiming to identify and characterize novel small molecule constituents and pathways underlying the cryptobiotic state of tardigrades.
- Develop and implement experimental strategies involving LC-MS and metabolomics, molecular biology, and biochemistry.
- Analyze experimental data, prepare scientific reports, and present findings at national and international conferences.
- Collaborate with interdisciplinary teams within the department and potentially with external international labs.
- Contribute to teaching and mentoring activities within the department.

Requirements:

- A Master's degree in Analytical Chemistry, Molecular Biology, Biochemistry, or a related field.
- Strong laboratory skills, particularly in analytical chemistry techniques.
- Experience with chromatography or mass spectrometry is highly desirable.
- Excellent analytical and quantitative skills.
- Proficiency in written and spoken English, with strong communication skills.

Funding Details:

The successful candidate will receive a competitive salary in accordance with university guidelines, including health insurance and travel allowances for conferences.

Application Process:

To apply, please submit required documents at the provided application link: https://training.vbc.ac.at/phd-programme/applications/

You will need to provide the following information:

- A detailed academic CV including academic background, research experience, and publications if applicable.
- A motivation letter explaining your interest in the project and how your background fits the project requirements.
- Two to three reference letters from academic or professional mentors.

Informal inquiries about the position can be made to Dr. Köhler at alwin.koehler@univie.ac.at and Dr. Petrova at boryana.petrova@meduniwien.ac.at prior to the application deadline.

The Medical University of Vienna is committed to diversity and equality in education and employment. We strongly encourage applications from all qualified individuals, including minorities and underrepresented groups.