MAX PERUTZ LABS VIENNA

Djinovic Lab

Postdoctoral Position in Protein Characterisation Facility of Cluster of Excellence: Microbiomes Drive Planetary Health

About the Project

The **Cluster of Excellence "Microbiomes Drive Planetary Health"** (CoE MicroPlanet) unites microbiome research in Austria, which already possesses strengths in many highly relevant areas of microbiome research, from the human microbiome to global change microbiology. Our goal is to understand how microbes underpin planetary health and to unlock their potential to improve it.

Genes of particular interest revealed by the CoE MicroPlanet projects will be heterologously expressed (or native proteins and complexes purified directly from bacterial cultures) and their structures analyzed using integrative structural biology approaches. Kristina Djinovic-Carugo (University of Vienna, Max Perutz Labs) will coordinate these efforts for cytoplasmic proteins. The Djinovic Lab has access to a blend of state-of-the-art molecular biophysics and structural biology techniques and is equipped for protein expression and purification. Leonid Sazanov at the Institute of Science and Technology Austria (ISTA) will focus on selected membrane proteins. The Sazanov Lab has access to state-of-the-art cryo-EM facilities including a high-end 300 kV TEM Titan Krios for collection of high-resolution datasets, a 200 kV TEM Glacios for optimisation of cryo-EM grids and preliminary data collection, and cryo-FIB/SEM Aquilos for preparation of samples for cryogenic electron tomography.
In addition, Ruth Birner-Grünberger (Technische Universität Wien) will support selected projects with her expertise on enzyme discovery and profiling. These experimental approaches will be complemented by Thomas Rattei (University of Vienna) with in-silico predictions, e.g., on secreted proteins by microbiome members using deep learning models trained on sequence and structural features.

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A joint venture of
universität wien
MEDIZINISCHE UNIVERSITÄT WIEN
Part of
Vienna BioCenter

About the position and project in the Djinovic Lab

The CoE microbiome project will generate a realm of core molecular data ranging from genomes, proteomes, metabolomes, transcriptomes to microbiomes. We anticipate a high fraction of "dark matter" in terms of function: that is, proteins and macromolecular assemblies with elusive or entirely unidentified function.
In order to gain a mechanistic understanding of the processes in which selected representative proteins or macromolecular assemblies are involved, we will biochemically and biophysically characterise them and generate structural models using an integrative structural biology approach. The topics in which the Djinovic lab currently regards enzymes from complete ammonium oxidation pathway, as well as selected metabolic enzymes from Comammox bacteria, in particular *N. inopinata*. Close collaboration with the workpackages focused on chemical perturbations and microbiome functioning, and particular on studies on impact of drugs on microbiomes in humans and wastewater treatment is planned. *S*tructural, biochemical and biophysical studies of key enzymes will be carried out to assess substrate selectivity, pharmacological and biotransformation product inhibition, and potential for biotechnological optimisation.

About the Host Institution

The successful applicant will work in the Djinovic Lab, a stimulating scientific environment in the Department for Structural and Computational Biology at the Max Perutz Labs, a joint venture between the University of Vienna and the Medical University of Vienna. The Labs are located at the Vienna BioCenter, the largest molecular life science hub in Austria. We are equipped with *state-of-the-art* research infrastructure for experimental and computational work and have access to scientific facilities at the Vienna Biocenter Core Facilities, including mass-spectrometry, a blend of protein technologies and electron microscopy instruments (Glacios, Krios). The Djinovic group has in addition access to cryo-EM Titan-Krios through BAG at ESRF and to major European synchrotron high-brilliance X-ray sources.

Candidates

The applicant should hold a PhD degree in a relevant field and two years of post-doctoral experience in a structural biology lab. Strong background in molecular cloning, expression, and purification of protein complexes is essential. Prior knowledge of crystallography and/ or single-particle electron microscopy is needed. Excellent written and spoken English is required.

Application

- A concise description of the research experience, including a list of published peer-reviewed articles.
- A copy of the PhD diploma (or equivalent).
- Contact details for **three references**, of which one should be your PhD supervisor.

Please apply through the CoE MicroPlanet application platform AND send the **application as a single package as PDF**, to admin.vbc5@univie.ac.at, subject "Postdoctoral position for MicroPlanet in Djinovic Lab".
Deadline of application: review of applications begins immediately and will continue until the position is filled.

Duration of contract: **3 years**
Planned starting date: **ASAP**
Place of work: **University of Vienna**
Main supervisor: **Kristina Djinovic Carugo**
Supervision team: Leonid Sazanov, Ruth Birner-Grünberger, Thomas Rattei

Websites

- https://www.microplanet.at/
  https://microplanet.at/mf
- https://www.maxperutzlabs.ac.at/research/research-groups/djinovic
- https://structbio.univie.ac.at/
- https://www.viennabiocenter.org/

Contact

For details on the project please contact: Kristina Djinovic Carugo
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