

The research group of Prof. Dr. Michael Kolbe at the Centre for Structural Systems Biology (CSSB) in Hamburg (Germany) is offering one

PhD position: “Understanding the transport of bacterial virulence factors across the type three secretion system using high-end structural biology techniques”

The Helmholtz Centre for Infection Research (HZI) with outstation at the Centre for Structural Systems Biology (CSSB) in Hamburg focuses on the initial steps of Gram-negative bacterial infections employing state-of-the-art biophysics and imaging techniques including cryo-electron microscopy. This position is oriented towards talented students with background in biophysics and/or molecular microbiology, who are willing to work in the wet lab handling infectious agents.

Project description:

The major aim of our research is the discovery of novel target proteins and virulence mechanisms for future development of anti-infective drugs against Gram-negative bacteria. The type three secretion system (T3SS) is a syringe-like nanomachine conserved among many clinically relevant Gram-negative pathogens that is essential for pathogenicity and virulence, and thus representing a promising candidate for antimicrobial design. The T3SS is a syringe-like multiprotein assembly with a molecular weight of about 3.5 MDa. Pathogenic bacteria utilize T3SS to deliver effector proteins directly into host cells to establish infection. Transport of effector proteins through T3SS is highly regulated and requires additional protein complexes in the bacterial cytosol. Since the discovery of the T3SS many T3SS subunit components have been identified and structurally characterized but the underlying molecular mechanisms of assembly and effector transport are still poorly understood.

The candidate will employ imaging methods (i.e: live cell fluorescence microscopy and cryo-electron microscopy) and biophysical techniques such as X-ray crystallography, IR-spectroscopy, binding studies in combination with cell culture and microbiological protocols to analyze protein secretion through the T3SS at high spatial and temporal resolution during the course of an infection.

Qualifications:

- Master/Bachelor in Physics or Life Science (biophysics, molecular microbiology, biochemistry, cell biology or a related field) obtained with the grade of distinction.
- A strong interest in structural biology and microbiology is a prerequisite, background in X-ray crystallography or other biophysical methods and protein chemistry is an advantage.
- Excellent communication and reporting skills in English language.
- Strong analytical skills and motivation to solve complex biological problems.
- Excellent experimental and organizational skills.
- A strong desire to do research with high self-motivation and enthusiasm and integrate methods from different life science disciplines.
- Ability and willingness to co-supervise master students.

We offer:

- An exciting interdisciplinary research project in which we aim to identify novel target proteins to combat multi-resistant Gram-negative pathogens.
- A highly motivated international research team.

- A stimulating multidisciplinary international research environment at the recently established Centre for Structural Systems Biology (CSSB) on the DESY campus in Hamburg with a focus on infectious diseases.
- Well-equipped laboratories with state-of-the-art technology.
- The possibility to participate in international workshops and conferences.

Equal Opportunities are part of our personnel policy – qualified women are especially invited to apply. With equal professional qualification, severely disabled persons will be prioritized. We encourage asylum-seeking, refugee scientists and researchers with an immigrant background to apply for this vacancy.

Starting date: at earliest possible
- Initial contract for 3 years – .

Salary: TVöD E13 (65%)

Probation period: 6 months

Application: <https://online-application.helmholtz-hzi.de/>
Single PDF file of maximal 5MB size including a cover letter outlining briefly your career goals and motivation for this position, the name of at least one professional referee, a summary of your Master thesis and a complete curriculum vita.

For questions regarding the PhD project, please contact Prof. Dr. Michael Kolbe via e-mail michael.kolbe@helmholtz-hzi.de or phone +49-40-8998-87550.

Further information:

HZI is a member of the Helmholtz Association of German Research Centers, the largest scientific organization in Germany. The HZI offers a unique research environment in the field of infection biology, excellent state-of-the-art equipment, a stimulating scientific community and intensive training of scientific and personal skills. Further information about the HZI institute and the research group of Prof. Dr. Michael Kolbe can be found on our website: https://www.cssb-hamburg.de/research/michael_kolbe/index_eng.html.