Helmholtz-Zentrum für Infektionsforschung GmbH

HELMHOLTZ ZENTRUM FÜR INFEKTIONSFORSCHUNG

As a member of the Helmholtz Association, the Helmholtz Centre for Infection Research, based in Braunschweig, conducts top-level research in the field of infectious diseases. Our scientists develop novel methods and strategies to fight infectious diseases faster and more effectively. Our common goal is to develop novel approaches for the prevention, diagnosis and treatment of infectious diseases. Our research focuses on bacterial and viral pathogens, their interaction with the human immune system and new effective substances and vaccines.

Master Thesis in the area of human microbiome research

"Characterization of Phage–Bacteria Dynamics in the Human Gut Ecosystem"

City: Braunschweig; Starting date (earliest): 01/10/25; Remuneration: An expense allowance of EUR 450 per month for a maximum of 6 months; Reference number: Master Thesis; Closing date: 11/08/25

Working field

The department Microbial Immune Regulation of Prof. Dr. Till Strowig at the Helmholtz Centre for Infection Research (HZI) in Braunschweig, Germany is offering a Master Thesis in the area of human microbiome research: "Characterization of Phage–Bacteria Dynamics in the Human Gut Ecosystem"

The human gut microbiome is a complex and dynamic ecosystem comprising trillions of microorganisms, including bacteria, viruses and fungi. It plays a vital role in maintaining health by contributing to digestion, regulating the immune system, and protecting against pathogens. Disruptions to this microbial balance, known as dysbiosis, are associated with various diseases, including infections, inflammatory conditions and metabolic disorders.

One group of opportunistic pathogens that can thrive during gut dysbiosis are various Klebsiella species. These bacteria can colonize the gut without causing symptoms, but they can also cause severe infections, particularly in individuals with weakened immune systems or following antibiotic treatment. Some Klebsiella strains produce cytotoxins or carry antibiotic resistance genes, making them a growing concern in hospital and community settings alike. Bacteriophage therapy, which employs viruses that specifically infect bacteria, is a promising alternative to antibiotics for treating Klebsiella infections. Phages can target pathogenic strains with high specificity while sparing the beneficial microbiota. In the context of the gut, phage therapy may help to restore microbial balance by selectively eliminating harmful bacteria. This offers a precise way of managing infections and reducing reliance on broad-spectrum antibiotics.

Aim of the thesis:
The objective of this study is to investigate the interactions and dynamics between bacteriophages and bacteria in the human gut ecosystem. To this end, an integrated in

vitro and in vivo approach will be employed to enhance our understanding of their ecological roles and potential health implications.

Methods:

1. Phage quantification via spotting and plating assays
2. Methods for determining the host range and specificity of phages
3. Ex vivo assays with different microbiota samples, including from mice
4. Culturing of intestinal bacteria
5. Various in vitro competition assays between phages and bacteria
6. Assistance with in vivo experiments (mice and Galleria mellonella)

Requirements

advanced master's programme

What we offer

- An expense allowance of EUR 450 per month for a maximum of 6 months
- An exciting and varied role in a future-oriented research institute with an international environment on the Science Campus South in Braunschweig
- Access to state-of-the-art infrastructure and the latest technologies
- A corporate culture that promotes appreciation and equal opportunities
- Professional supervision and technical support during your master's thesis
- The opportunity to work on a current and practice-relevant topic in a scientific context and learn a lot in a friendly and international team
  If equally qualified, severely disabled persons will be given preference. To protect your rights, please clearly indicate any severe disability in your cover letter or CV.
  The HZI is committed to professional equality between women and men, and we therefore expressly welcome applications from qualified women.

For more details regarding the position, please contact Prof. Dr. Till Strowig via email: till.strowig@helmholtz-hzi.de, or by phone: +49 531 6181-4700.

Further information about the institute and the research group of Prof. Dr. Till Strowig can be found on our website: https://www.helmholtz-hzi.de/forschung/forschungsgruppen/detailseite/mikrobielle-immunregulation/

Application

When sending your application documents, please confirm that you have read our privacy policy and consent to the processing of your personal data. Please use the text module in our privacy policy for this purpose. Without these declarations, we cannot consider or process your application and will delete any application documents already received immediately after the position has been filled.

Please include a cover letter, CV, (work) references and certificates with your application documents. Please do not send a photo. Please send your application digitally by email to till.strowig@helmholtz-hzi.de.

We look forward to receiving your application!

More information at https://stellenticket.de/196193/LUH/
Offer visible until 09/08/25