



Open position for the LSM call of applications

Department/Institute: LMU Faculty of Biology, Microbiology

Subject areas/Research fields: Microbiology, Molecular Biology

Keywords: acid stress, *Escherichia coli*, transcriptional regulation, sensing

Name of supervisor: Prof. Dr. Kirsten Jung

Project title: Acidification of the cytoplasm as a poorly understood stimulus for the activation of stress adaptation in *Escherichia coli*

Project description:

On Earth, there are many habitats with low pH, such as the gastrointestinal tract of vertebrates or areas with acidic soils. Although most bacteria are neutrophiles, they are able to survive in acidic environments. Acid stress sensing and adaptation allow these bacteria to maintain a constant intracellular pH under moderate acid stress.

In our preliminary work, we exposed *Escherichia coli* to different degrees of acid stress, and measured the changes in synthesis rates of all proteins using RiboSeq. We found that the intracellular pH of *E. coli* decreases by about one pH unit under strong acid stress, which significantly affects the protonation states of all biological molecules and influences their charge, conformation and function. It will be the aim of the project to characterize novel regulators and sORFs and their biological significance under strong acid stress. In addition, the interconnectivity between acid stress response and antibiotic resistance will be investigated.

Experience with microbiological techniques, e.g., construction of mutants and reporter strains, and molecular and biochemical techniques, e.g., purification and characterization of RNA and proteins, is required.

References:

Schumacher K, Gelhausen R, Kion-Crosby W, Barquist L, Backofen R, Jung K: Ribosome profiling reveals the fine-tuned response of *Escherichia coli* to acid stress. *bioRxiv* 2023. <https://doi.org/10.1101/2023.06.02.543275>

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(LSM).