

Postdoc and PhD Positions in Intestinal Microbial Ecology

Division of Microbial Ecology (www.microbial-ecology.net)
Department of Microbiology and Ecosystem Science, University of Vienna

Postdoc and PhD positions are available in Vienna, Austria and Munich, Germany
as part of the D-A-CH project

Physiological interactions of *Salmonella* and the intestinal microbiota – Ecological and genetic fitness determinants in colonization resistance and inflammation

co-funded by the Austrian Science Fund (FWF) and the German Research Foundation (DFG).

Protection against bacterial pathogens is one of the most important symbiotic functions that the diverse intestinal microbiota confers to its host. Efficient nutrient competition of the many indigenous microorganisms is an ecological foundation of this protective effect. In return, disturbances in intestinal ecology, such as by antibiotic therapy, lead to vacant nutritional niches that provide colonization opportunities for foodborne pathogens, which subsequently cause inflammation to even further leverage the altered nutrient availability in the gut. For example, inflammation changes the intestinal sulfur metabolism to produce tetrathionate, a selective electron acceptor for anaerobic respiration and outgrowth of gastrointestinal *Salmonella* pathogens. Substrate use and partitioning among the different microbiota members and incoming pathogens is thus fundamental to microbial niche segregation in the intestinal ecosystem, but still insufficiently understood. This bilateral FWF-DFG project will be jointly led by Alexander Loy (Department of Microbiology and Ecosystem Science, University of Vienna, Austria) and Bärbel Stecher (Max-von-Pettenkofer Institute, Ludwig-Maximilians-University Munich, Germany) to harness existing, complementary expertise on microbial ecology and infection biology. Here, we aim to provide unprecedented detailed insights into the physiological and genetic basis of the functional interactions between individual microbiota members and the foodborne pathogen *Salmonella*. Specifically, we will identify and characterize protective microorganisms by using a new gnotobiotic mouse model for microbiota-*Salmonella* interactions and reveal if indigenous sulfur microorganisms, such as sulfate-reducing bacteria, exacerbate or mitigate *Salmonella* infections. We will apply modern single-cell stable-isotope probing approaches to quantify substrate-utilization of individual members of the complex gut microbiota and thus determine their competitive fitness during initial *Salmonella* expansion and later inflammation. Findings from this collaborative research will contribute to future therapies by defining microbial metabolic properties and physiological conditions that prevent colonization or promote clearance of the pathogen.

Required qualifications. We are looking for highly motivated and independently working scientists. Applicants should have a strong background in intestinal microbiology, and microbial ecology & evolution. Experience in the following areas/techniques is advantageous: infection biology, immunobiology, molecular microbial community analyses, genomics, bioinformatics, stable isotope probing, isotope analytics, and cultivation of anaerobic microorganisms. Proficiency in spoken and written English is mandatory.

Conditions of appointment. We offer up to 3 years of appointment according to the salary scheme of the FWF <https://www.fwf.ac.at/en/research-funding/personnel-costs/>. The University of Vienna is an equal opportunity employer.

Mode of application. To apply, please **send an email** (subject: **Postdoc** or **PhD Salmonella-Microbiota**) to Alexander Loy, loy@microbial-ecology.net containing a **single pdf-file** with a **short letter of motivation**, a **detailed CV** (including a brief description of research interests, previous employments, and publication list), **reprints of your two most important published articles**, and **contact details of at least two references** (letters of recommendation are optional).

Application deadline open until filled. **Job start** is summer/fall 2016.