

Ph.D. Project Number	5
in Project cluster	Microbiota and Natural Products
Supervisors + Affiliations	<p>Dr. Julian Hegemann HIPS Saarbrücken, Department Microbiota-associated Natural Products https://www.helmholtz-hips.de/en/research/teams/team/microbiota-associated-natural-products/</p> <p>Dr. Chengzhang Fu HIPS Saarbrücken, Department Genome Mining for secondary metabolites https://www.helmholtz-hips.de/en/research/teams/team/genome-mining-for-secondary-metabolites/</p> <p>Prof. Dr. Matthias Laschke UKS Homburg, Department Clinical-experimental Surgery https://www.uniklinikum-saarland.de/de/einrichtungen/kliniken_institute/chirurgie/experimentalchirurgie</p>
Description research focus/environment	<p>Dr. Hegemann of the HIPS works on natural products originating from bacteria found in the human microbiota, both on the sites of mutualistic beneficial, but also pathogenic microorganisms. The goal of these studies is to leverage the interplay between the secondary metabolites of bacteria as the source for novel drug leads.</p> <p>Dr. Fu works on the application of genome mining approaches for the identification of microbial natural products with novel mechanisms of action and using bacterial gene resources in novel approaches.</p> <p>Prof. Laschke's research group at the Institute for Clinical and Experimental Surgery of USAAR has expertise in different <i>in vitro</i> assays, <i>in vivo</i> models (also pathological conditions) and imaging technologies with a focus on inflammation and angiogenesis.</p>
Project title	Identification and characterization of novel natural products from the gastrointestinal microbiota with gut protective features
Short description Ph.D. project	<p>We have access to exclusive metagenomic datasets derived from the gut microbiota of patients with various diseases and healthy individuals. Doctoral candidate (DC) 5 will search these gastrointestinal datasets for biosynthetic gene clusters producing secondary metabolites with the potential to exhibit gut-protective features and a special focus on clusters whose absence (or presence) is associated explicitly with a disease state. These clusters will be expressed heterologously to access the respective natural products, which will then be evaluated for their activity <i>in vitro</i>. Compounds with suitable biological properties that were identified this way will be further studied using fitting disease models for their potential to alleviate dysbiosis in the microbiota and as potential new drug leads. The DC will learn natural product gene-cluster identification via (meta)genome mining, how to establish and optimise their heterologous production, how to isolate and purify natural products, and how to use them in various bioactivity assays for profiling purposes.</p>
Secondment	In the secondment at MyBiotech, the DC will learn how to employ fermentation processes to obtain larger quantities of promising lead molecules for downstream applications.
Required or advantageous skills/competences	MSc (or equivalent) in life sciences, pharmacy, (bio)chemistry, (molecular or micro-)biology, or biotechnology; open-minded person motivated to work in a multidisciplinary team
Career perspectives	Scientific career in the biomedical or pharmaceutical area in academia or in industry
Contact mail for scientific questions regarding the Ph.D. project	<p>Julian.Hegemann@helmholtz-hips.de</p> <p>Chengzhang.fu@helmholtz-hips.de</p> <p>Matthias.Laschke@uks.eu</p>