

Ph.D. Project Number	13
in Project cluster	Drug Delivery and Biological Barriers
Supervisors + Affiliations	<p>Prof. Dr. rer.nat. Claus-Michael Lehr HIPS Saarbrücken, Department Drug Delivery https://www.helmholtz-hips.de/en/research/teams/team/drug-delivery-across-biological-barriers/</p> <p>Prof. Dr. med. Thomas Vogt UKS Homburg, Department Dermatology https://www.uniklinikum-saarland.de/de/einrichtungen/kliniken_institute/hautklinik/wir_ueber_uns</p> <p>Prof. Dr. med. Michael Zemlin UKS Homburg, Department Pediatrics and Neonatology https://www.uniklinikum-saarland.de/de/einrichtungen/kliniken_institute/kinder_und_jugendmedizin/klinik_fuer_allgemeine_paediatric_und_neonatalogie</p>
Description research focus/environment	The research focus of Prof. Lehr's group at the Helmholtz Institute is on new technologies for the safe and efficient delivery of anti-infectives across biological barriers, such as the lungs, the intestinal mucosa and the skin, but also mucus, biofilms and the bacterial cell envelope. Very advantageous for this project is the intimate alliance of Prof. Lehr's drug delivery group with true bedside practical medicine of a Univ. Department for Dermatology, Saarland Medical School, with more than 25.000 patients a year, chaired by Prof. Vogt, who is highly experienced in the translational aspects of microbiome research concerning skin disease and models thereof. Professor Zemlin, Director of the Department of General Pediatrics and Neonatology has his research focus in developmental immunology, Microbiota during ontogeny and non-invasive diagnostics.
Project title	Next-generation editing and interventional reshaping of skin microbiota in health and disease – paving the way to the postantibiotic era in medicine
Short description Ph.D. project	Doctoral candidate (DC) 13 will work on in vitro modelling of pathogenic biofilm formation on bioprinted living skin models for a) Corynebacteriaceae in the follicular units, e.g., in severe acne b) Staphylococcus sp. attacking also the non-follicular epithelial barrier, e.g., in atopic, dry and aged skin c) Pseudomonas sp. particularly attacking epithelium-denuded dermal soft tissues, e.g., in surgical and pathologic wounds and burns. These models will be used to test P. aeruginosa quorum-sensing or lectin-binding pathoblockers for biofilm disruption and the efficacy of nanocarriers. The DC will learn human cell and tissue culture, microbial cultivation and bioprinting as well as characterisation and use of advanced in vitro infection models. Subsequent in-depth biological profiling including in vitro drug metabolism and pharmacokinetics investigation will be performed allowing feedback for further optimisation and drug development of actives and carriers. Interesting translational aspects can be directly tested and evaluated in real-world settings of a big research-oriented department of Dermatology and a similarly qualified department of Pediatrics.
Secondment	German Federal Institute's for Risk Assessment (BfR) Department for Pesticides Safety; supervision: Dr. Lisa Lemoine, Dr. Carsten Kneuer, Dr. Tewes Tralau The secondment will provide experience with in vitro models in the defined environment and controlled settings of an official test institution.
Required or advantageous skills/competences	MSc (or equivalent) in life sciences, pharmacy or medicine; open-minded person motivated to work in a multidisciplinary team
Career perspectives	Scientific career in biomedical or pharmaceutical area in academia or industry and also scientific-clinicomedical careers e.g. in a vibrant academic setting of an University Hospital, e.g. the Medical School of the Saarland.
Contact mail for scientific questions regarding the Ph.D. project	Claus-Michael.Lehr@helmholtz-hips.de (pharmaceutical questions) Thomas.Vogt@uks.eu and Michael.Zemlin@uks.eu (medical questions)