

Research Project

Translocation ITN

Third-party funded project

Project title Translocation ITN

Principal Investigator(s) [Bumann, Dirk](#) ;

Project Members [Maturana, Pauline](#) ;

Organisation / Research unit

Departement Biozentrum / Molecular Microbiology (Bumann)

Department

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Multidrug resistant bacteria are now ubiquitous in both hospitals and the larger community. Drug-resistant pathogens are becoming increasingly pervasive, for example, the resurrection of tuberculosis provides one ominous example highlighting the risk associated with evolved drug resistance. Moreover, many pharmaceutical companies abandoned this field and no truly novel active antibacterial compounds are currently in clinical trials. Obviously we need new antibacterial molecules and maybe, novel strategies to develop antibiotics. The novel aspect here is to use state-in-the art techniques to quantify rate limiting steps of individual components involved antibiotic penetration and to validate them at the cellular level. Such a system biology approach identifies bottlenecks of existing antibiotics and might suggest novel antibiotic therapy. In Gram-negative bacteria, where influx and efflux systems located in the Outer Membrane represent a physical bottleneck for any antibiotic to reach a potential target. The aim is to investigate the molecular and cellular mechanisms at the basis of the influx and efflux processes and to teach scientists with different scientific background to go beyond the classical faculty boarder. Bringing nanotechnology, physics, chemistry, computer modeling, pharmacology, microbiology together will facilitate the transfer of expertise acquired within the network in both academic and industry.

To achieve these goals we propose a training program allowing young researcher to collaborate across traditional faculty boarder. Three partners from the private sector will actively participate, the first one is a SME developing unique nanodevices allowing high-throughput drug screening in the field of electrophysiology, the second one is engaged in developing novel antibiotics and the third one is working on drug screening and characterization. Moreover three global pharmaceutical companies will accept students for secondments.

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Keywords Antimicrobial resistance, Gram-negative infections, Efflux, Automatic bilayer, Electrophysiology, Antibiotics, Membrane permeability, Modelling, Transport rates

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Add publication

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Specify cooperation partners