



PhD Program between the Freie Universität Berlin (FUB) and the China Scholarship Council (CSC)

Open PhD position at FUB for CSC scholarship candidates 2018

Please note: the PhD position is only offered to Chinese PhD candidates for application in the framework of the FUB-CSC PhD Program.

<u>Department/Institute:</u>	Department of Biology, Chemistry, Pharmacy / Institute of Biology-Microbiology
<u>Subject area:</u>	Proteomics of <i>Staphylococcus aureus</i>
<u>Name of Supervisor:</u>	Prof. Dr. Haike Antelmann
<u>Number of open PhD positions:</u>	2
<u>Type of the PhD Study:</u>	Full-time
<u>Project title:</u>	Extracellular and cell wall proteome analysis of human and zoonotic <i>Staphylococcus aureus</i> isolates

PhD Project description:

Staphylococcus aureus is a major human pathogen, which colonizes the skin and anterior nares of one quarter of the human population, but can also cause life-threatening infections when it enters the bloodstream. The success of the pathogen is mediated by many different virulence factors and quickly emerging multiple antibiotic resistance strains. Many important virulence factors are secreted into the extracellular medium or are anchored at the surface of *S. aureus* that can be identified using extracellular proteome analysis. These virulence factors and antibiotics resistance determinants show great variation between *S. aureus* isolates from human and animal sources that enables this pathogen to extend the host-spectrum. In this PhD thesis, the secreted virulence factors and surface-anchored proteins of emerging epidemic *S. aureus* isolates from human and zoonotic infections of sequence types ST398, ST22 and ST8 will be analyzed using extracellular and surface proteome analysis. The profile of secreted virulence factors will be related to the pathogenicity of the *S. aureus* isolates in macrophage infections assays. The PhD students will also identify novel virulence factors and study their role in the virulence and host-pathogen interactions of *S. aureus* using detailed genetic, molecular biological and biochemical methods.

Language requirements:

IELTS 6.5 or TOEFL 95 ibt.

Academic requirements:

Subject areas suitable for student applications are microbiology, infection biology, biochemistry, molecular biology or molecular medicine. Candidates should have some practical experiences in basic microbiology and molecular biological techniques from courses during their study. A Bachelor's degree is sufficient for full time doctorate of 4 years.

Information of the professor or research group leader:

Our group is working in the subject Molecular Microbiology at the Freie University of Berlin. Our research is based on proteomic, transcriptomic, biochemical and genetic approaches to study regulatory mechanisms, targeting, modifications, damage, aggregation and repair mechanisms of proteins in model Gram-positive bacteria, like *Bacillus subtilis* and also more recently in microbial human pathogens, such as *Staphylococcus aureus* and Mycobacteria. Using gel-based proteomics, we defined different subproteomic fractions such as extracellular, membrane- or cell wall-associated proteins to get insights into protein targeting and secretion mechanisms in *Bacillus subtilis*, *S. aureus* and other pathogens. Recent research is also focused are the molecular mechanisms of oxidative and electrophilic stress responses in Gram-positive bacteria. We investigate the changes in the transcriptome and post-translational thiol-modifications caused by ROS and RES in Gram-positive bacteria in the thiol-redox

proteome and the regulatory mechanisms of novel redox-sensing regulators. We are further interested in the physiology and thiol-modifications caused by bacillithiol and mycothiol in different Gram-positive bacteria. We found that bacillithiol and mycothiol play important roles in redox regulation and protection of essential and conserved proteins against irreversible oxidation by protein S-bacillithiolation and protein S-mycothiolation.

For more detailed information about our research and group of Molecular Microbiology, please visit our website:

<http://www.haike-antelmann.de/>

http://www.bcp.fu-berlin.de/en/biologie/arbeitsgruppen/mikrobiologie/ag_antelmann/index.html

Please note: In a first step, the complete application must be submitted to the Beijing Office for evaluation by January 4th, 2018. Please do not contact the professor before. He/She will get in contact with you after having received the complete application via the Beijing Office in January.