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

Open PhD Position at Freie Universität Berlin, offered only to Chinese CSC scholarship candidates 2024

Department/Institute: Institute for Animal Hygiene and Environmental Health

Subject area: Microbiology

Name of Supervisor: Prof. Dr. Uwe Rösler

Number of open PhD positions: 1

Type of the PhD Study: Full-time only

Project title: **Impact of the udder microbiome composition on virulence in the pathogenic alga *Prototheca* spp.**

PhD Project description:

Prototheca spp. are the causative agent of prothotecal mastitis in cattle, a treatment-resistant chronic infection of the udder that inflicts pain on the animal and increasing economic losses on dairy farmers. This infection is likely accompanied by biofilm formation in the udder. However, little is known about the mechanism or triggers of biofilm formation, nor why *Prototheca bovis* is the most common *Prototheca* species identified in protothecal mastitis. Uniquely, *Prototheca spp.* are microalgae that have lost their photosynthetic machinery and have become obligate heterotrophs. Recent studies have suggested that the bacterial microbiome in the udders of cows with protothecal mastitis is altered, containing distinct species of bacteria not present in healthy cows. As biofilm formation in the closely related alga *Chlorella vulgaris* is known to require the presence of bacteria, we aim to investigate the contribution of the altered mastitic microbiome on *Prototheca* biofilm formation. Information on changes in the udder microbiome during protothecal mastitis is currently limited, so the first project aim is to perform sequencing of affected cattle microbiomes to identify mastitis-associated bacterial species. These species would then be used in *in vitro* assays to investigate the ability of exopolymeric substances and other factors secreted by the bacterial community to enhance biofilm formation in *Prototheca,* potentially taking successful combinations forward into perfused cow udder models and identifying candidate virulence factors. This project offers the opportunity to get in-depth experience with broad microbiological techniques including genomics, genetic manipulation, and fluorescence microscopy.

Language requirements:

- IELTS: 6,5 or TOEFL: 95 ibt

Academic requirements:

Bachelor or Master degree (Master preferred) in biology, microbiology, biochemistry, or a related field. Alternatively, a degree in veterinary medicine with experience in microbiology.

Information of the professor or research group leader (website, awards etc.):

Prof. Dr. Uwe Rösler, DVM, Dipl. ECVM, Dipl. ECVPH; Managing Director of the Institute for Animal Hygiene and Environmental Health; Dean of the School of Veterinary Medicine of FUB; Deputy Head of FAO RC AMR of FUB Berlin; Ellenberger Prize for the best doctoral thesis in veterinary medicine at the University of Leipzig in 2002, Stockmeyer Science Prize in 2007. Website: https://www.vetmed.fu-berlin.de/einrichtungen/institute/we10/mitarbeiter/roesler_uwe/index.html

Please Note: In a first step, the complete application should be uploaded to the online portal (https://fuberlin.moveon4.de/form/60acfece5d328710e40bdbd5/eng) for evaluation by January 15th, 2024. Please do not contact the professor before. He/she will get in contact with you after having received the complete application via the International Office of Freie Universität Berlin in January.