



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

**Open PhD Position at Freie Universität Berlin,
offered only to Chinese CSC scholarship candidates 2026**

Department/Institute: | Veterinary Medicine, Veterinary Physiology |

Subject area: | Cell and Organ Physiology |

Name of Supervisor: | Professor Salah Amasheh |

Number of open PhD positions: | 1 |

Type of the PhD Study: | Fulltime |

Project title: | Effects of secondary plant compounds on epithelia |

PhD Project description:

The intestinal epithelium serves as a critical barrier, regulating the selective absorption of nutrients while preventing the entry of harmful substances and pathogens. Disruption of this barrier is associated with various gastrointestinal disorders, including inflammatory bowel disease (IBD) and leaky gut syndrome. Secondary plant metabolites (SPMs), such as polyphenols, flavonoids, and alkaloids, have gained attention for their potential to modulate intestinal barrier function due to their anti-inflammatory, antioxidant, and antimicrobial properties. This PhD project aims to explore the effects of SPMs on the barrier properties of the intestinal epithelium using advanced in vitro cell culture models, innovative tissue engineering approaches, and ex vivo tissue samples.

The research will begin by screening a library of SPMs for their impact on intestinal epithelial cell (IEC) viability, proliferation, and barrier integrity using established cell lines. Transepithelial electrical resistance (TEER) and paracellular permeability assays will be employed to assess changes in barrier function. Additionally, the expression and localization of tight junction proteins (e.g., occludin, claudins, and ZO-1) will be analyzed using immunofluorescence and Western blotting to elucidate the molecular mechanisms underlying SPM-induced effects.

To enhance the physiological relevance of the study, novel 3D cell culture models, including organoids will be developed. These models will mimic the complex architecture and microenvironment of the intestinal epithelium, allowing for a more comprehensive evaluation of SPMs under conditions that closely resemble the in vivo setting. Furthermore, the project will incorporate ex vivo experiments using human and animal intestinal tissue samples to validate findings from in vitro models and assess interspecies differences.

The project will also investigate the role of the gut microbiota related effects on intestinal barrier function. Co-culture systems of IECs will be established to study the interplay between SPMs, microbial metabolites, and epithelial barrier integrity.

The findings from this project will provide valuable insights into the mechanisms by which SPMs enhance intestinal barrier function and their potential as dietary interventions or therapeutic agents for gastrointestinal disorders. By integrating cutting-edge technologies and multidisciplinary approaches, this research aims to advance our understanding of the complex interactions between plant-derived compounds, and the intestinal epithelium, ultimately contributing to the development of novel strategies for maintaining gut health.

Language requirements:

FUB-CSC Program, language requirements:

- *If PhD study in English: our certificate requirements are IELTS 6,5 or TOEFL 95 ibt.*
- *If PhD study in German: our certificate requirements are Test DaF 16 or DSH 2*

Bitte suchen Sie sich als Voraussetzung Englisch- oder Deutschkenntnisse aus. Diese Vorgaben sind vom CSC, an die wir uns gerne halten, da die Erfahrung zeigt: je besser die Sprachkenntnisse, desto einfacher ist der Einstieg und die Integration. Abgesehen von Germanisten sind kaum Deutschkenntnisse von den Bewerbern zu erwarten.

- IELTS: 6,5 oder TOEFL: 95 ibt

Academic requirements:

Master degree in animal science or related fields, publications.

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

Prof. Salah Amasheh, the head of the research group, brings extensive expertise in the field of barrier research and a proven track record in mentoring scientific projects. With a career spanning over two decades, Prof. Amasheh has established himself as a leading authority in the study of epithelial and endothelial barriers, particularly in the context of the gastrointestinal tract. His research focuses on understanding the molecular mechanisms underlying barrier function and dysfunction, with a special emphasis on tight junction proteins and their regulation.

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 December 15th, 2025.