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## Dr Falk/Guts UK Awards 2024

### F1/F2 RESEARCH AWARDS WINNER: **DR PETRA PAIZ**

#### PROJECT:

**Intestinal Microbiota Transplant (IMT) in recurrent *Clostridioides difficile* infections (rCDI): An investigation into gut microbiome-metabolome-host interactions.**



*Dr Paiz is undertaking this research at the Department of Metabolism, Reproduction and Digestion, Imperial College London. Dr Paiz is currently an academic Foundation Year 1 Doctor at the London Northwest University Healthcare NHS Trust.*

#### Dr Paiz explains:

'*Clostridioides difficile* infection (rCDI) is a leading cause of antibiotic associated diarrhoea. About one third of patients with rCDI experience prolonged or recurrent infection and it is associated with high mortality. Recently, intestinal microbiota transplant (IMT) has emerged as a viable treatment for the condition. However, whilst we know that IMT is related to changes in gut microbiome-related metabolites, we do not yet fully understand the mechanics of exactly how IMT is effective against rCDI.

'Sulfatides are multifunctional molecules which support various biological pathways, including bacterial infection. Sulfatides impact upon toxin/ bacterial binding to epithelial cell and may have a role in helping the CD toxin to be more effective in cell damage.

'Previous data has already demonstrated that successful IMT in rCDI is associated with the degradation of sulfatides and the restoration of arylsulfatase functionality in the gut lipidome, therefore sulfatides may be contributory to CDI pathogenesis. This project, which will be carried out over a four-month period, will explore the impact of IMT for rCDI upon the gut lipidome.

'The primary aim will be to validate the ability of arylsulfatase to protect epithelial cells from CD toxin pathogenicity by using in vitro modelling. We will then use imaging with mass spectrometry technologies to compare the localisation of lipids, specifically sulfatides in biopsy samples from pre-IMT rCDI colonic biopsy samples and healthy colonic mucosa samples. If, as we hypothesise, sulfatides do impact

on CD toxin, targeted restoration of arylsulfatases may therefore be a therapeutic target in rCDI.

'Research into the gut microbiota has enormous potential for improving the understanding of gastrointestinal disease pathophysiology, which most importantly, can lead to the design of improved treatment options for gastrointestinal conditions. Thus, if we are able to identify the specific molecules that drive IMT's success, we can use this knowledge to go to develop more effectively directed therapies.

'I am particularly interested in this project as it explores gut microbiome-related metabolites and how these relate to the mechanisms behind IMT's efficacy. Ultimately, this research aims to gain a better understanding of the role of IMT in rCDI and from that, we can utilise this knowledge to design better treatment options for rCDI and to improve outcomes for patients.'

**Dr Paiz's Project Supervisor Professor Zoltan Takats Professor of Analytical Chemistry at the Department of Metabolism, Reproduction and Digestion, Imperial College London comments:**

'I have supervised Dr Paiz as she has progressed from a medical student to PhD to Foundation Training. She is an exceptional researcher, with an outstanding ability for analytical thought. Petra is committed to translational science that will benefit patients. She has made a significant contribution to the experimental design of her work, and she is a highly capable scientist who has performed all her own experiments. Most importantly, she has made significant contributions to the field of metabolic profiling through her own independent innovations.'

#### Dr Paiz states:

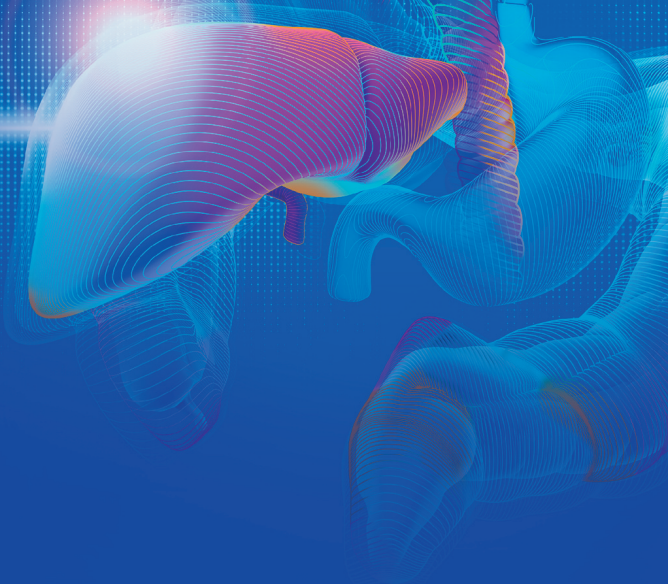
'It is a real honour to share my work through the 2024 Dr Falk- Guts UK F1/F2 Research Award and be recognised by a charity I hold in the greatest regard. This award gives me an opportunity to share my research findings and expand on my training in science as well as clinical medicine. In the future, I am hoping to combine my passions for research and clinical practice and become an academic clinician. Although I am still early on in my career, I have a true passion for research in the field of gut microbiome and metabolomics.'



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Dr Falk Pharma UK Ltd  
Unit K, Bourne End Business Park  
Cores End Road  
Bourne End SL8 5AS  
Tel: +44 (0) 1628 536 600  
Email: [office@dralkpharma.co.uk](mailto:office@dralkpharma.co.uk)

Company Registration Number: 2307698

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