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Dr Falk/Guts UK Awards 2021

MEDICAL STUDENT PRIZE WINNER: **Petra Paiz**



PROJECT:

Developing a direct mass spectrometric assay for the identification of early disease biomarkers for colorectal cancer.

Ms Petra Paiz undertook this research at the Department of Metabolism, Digestion, and Reproduction at Imperial College London, whilst completing a PhD (translational biomarker discovery research into gastrointestinal diseases). She is now back in her clinical training, having re-joined her penultimate Year at the Imperial College London Medical School.

Ms Paiz explains:

'Early on in medical school I developed an interest in gastroenterology and research. I found the breadth of the specialty fascinating, and I saw first-hand how novel research in the field improved patients' quality of life. I chose gastroenterology and hepatology as my BSc, which I further expanded on this interest by pursuing a PhD in the optimisation of novel assays for biomarker discovery in gastrointestinal diseases. Bowel cancer is the 4th most common cancer in the UK, accounting for 11% of all new cancer cases and early detection increases the chances of survival. Although colonoscopy is the gold standard for detection it is invasive and unpleasant for the patient. The faecal immunochemical test (FIT) although cheap, is not completely reliable for detecting early cancer. There is, therefore, an unmet need for more robust testing for biomarkers associated with early bowel cancer detection.'

'Metabolomics has emerged as a novel, rapidly growing technology and faecal metabolomics presents a non-invasive avenue for investigation of the GI tract. Rapid Evaporative Ionisation Mass Spectrometry (REIMS), an ambient MS technology, can identify precancerous lesions and colorectal cancer (CRC) with high diagnostic accuracy based on analysis of lipid profiles of tissues. Laser Assisted - Rapid Evaporative Ionisation mass spectrometry (LA-REIMS) is a technique that allows samples to be assessed in a large volume with little-to-no sample preparation - an ideal technique for a screening investigation of the gut.'

'This research examined the use of LA-REIMS for the reliable detection of small molecules which may indicate pre-cancerous and cancerous growths in faecal samples. Our aims were to optimise the mass spectrometry assay as a tool for faecal sample testing, to determine the accuracy of the optimised mass spectrometry assay for early cancer detection (as compared to controls) and identify small molecule biomarkers – molecules which can indicate the presence of cancer related processes.'

'We also looked to examine how patient diet, age, BMI, gender, ethnicity, comorbidities, and medication may affect the LA-REIMS analysis of faeces. Finally, we wanted to investigate how sample collection technique and storage conditions of faecal samples could influence the general applicability of this test.'

'The impact of this research will be to reduce the incidence of cancer by improving early detection of adenomas and we aim to use this assay to reduce endoscopic time and economic burden, as well as waiting times.'

Ms Paiz's Project Supervisor, Mr. James Kinross Senior Lecturer in Colorectal Surgery comments:

'I have worked with Petra for the last four years, and I have supervised her as she has progressed from a medical student into her PhD programme. She is an exceptional student, with an outstanding ability for analytical thought. Petra is committed to translational science that will ultimately benefit patients. She has made a very 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 very significant contributions to the field of metabolic profiling through her own independent innovations.'

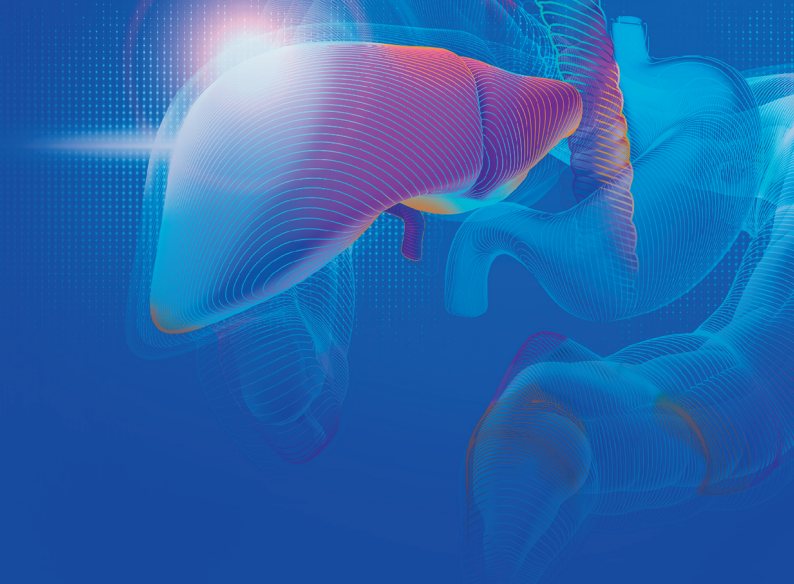
Ms Paiz states:

'It is a true honour to share my work through the GUTS UK/ Dr Falk 2021 Medical Student Prize 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 the field of cancer research and gastroenterology.'



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