PhD Opportunity

Decoding the molecular interactions between the gut microbiome and the immune system in autoimmune disease

This project is a collaboration between the Scottish Universities Environmental Research Centre (SUERC), the College of Science and Engineering (CoSE) and the College of Medical, Veterinary and Life Sciences (MVLS) at the University of Glasgow.

Supervisors: Dr Douglas Morrison (SUERC, CoSE), Dr Simon Milling (MVLS), Dr Umer Ijaz (CoSE), Dr Kostas Gerasimidis (MVLS).

Project Outline

There is increasing evidence that microbial communities in the gut, “the gut microbiota”, play a role in maintaining a healthy immune system, and that changes in the microbiota are associated with inflammatory diseases, including inflammatory bowel disease, psoriasis, rheumatoid arthritis and obesity (Quince et al., Am. J. Gastroenterol. 2015; Scher et al., Arthritis and Rheumatol. 2015). There is strong evidence showing short chain fatty acids (SCFAs), produced through fermentation of dietary fibres by the gut microbiota, induce immune regulation in the colon in animal models (Arpaia et al., Nature 2013). However, evidence in humans is currently lacking because of the difficulty in delivering SCFAs directly to the human colon. We have developed a novel solution to this problem by using inulin SCFA esters to deliver SCFA directly to the colon. This technology has enabled new insights into the role of one SCFA, propionate, in appetite regulation, glucose homeostasis and weight management (Chambers et al., Gut 2015).

This project aims to investigate the mechanisms by which SCFAs affect the intestinal microbiota and immune homeostasis. To achieve these aims, the student will be trained by experts in the gut microbiota, bioinformatics and intestinal immune function, with extensive experience in a combination of appropriate in vitro systems, animal and human models of disease, and investigations of the intestinal microbiota using “omics” technologies. A particular focus will be to understand whether SCFA can be exploited as potential therapies for inflammatory bowel disease and other autoimmune diseases.

This project is an excellent opportunity to embark on a research career at the forefront of scientific knowledge with a clear translational pathway to impacting upon human health. You will be supported by a multi-disciplinary team of internationally leading experts and benefit from a wealth of training opportunities in an outstanding University environment.

Funding is provided by the University of Glasgow through its prestigious Lord Kelvin Adam Smith Fellowship Scheme for up to 4 years. The stipend will be at current RCUK rates and applications are invited from Home, EU and International Students. Applicants will be expected to have an excellent first degree (1st or 2:1) in a relevant subject and possibly a Master’s degree in a related field.

Potential applicants are encouraged to contact Dr Douglas Morrison to discuss the project and for further details (douglas.morrison@glasgow.ac.uk; Tel: 01355 270134). Application deadline is 22nd January 2016.