

PhD Project Advertisement

Project title: Dietary driven approaches to support healthy ageing: investigating the interactions between the gut microbiota, vitamin D and bone health

Project No: FBS2024-002 -Wijeyesekera-rs

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Project description:

The human gut is inhabited by a complex ecosystem of microorganisms (referred to as the gut microbiota) which plays an important role in human health. Illness, age and changes in diet and lifestyle factors can disrupt this community of microbes, often causing gastrointestinal issues that impact upon overall health. Dietary interventions targeting the gut microbiota such as prebiotics (substrates selective for beneficial gut microbes) and probiotics (live microbial feeds) are safe and well established approaches that improve health by positively altering the gut microbiota, and producing microbially-derived metabolites that have positive local and systemic effects.

Diet is a critical factor in influencing bone health. Calcium and vitamin D are considered to be key nutrients in maintaining bone metabolism. However, recent research has identified a decline in the consumption of foods containing these nutrients, with vitamin D deficiency in particular, becoming increasingly common in the UK and worldwide. Furthermore, a few studies have identified a link between gut health and bone mineral density (BMD) hence, the gut microbiota may be an important modifiable factor to support bone health and prevent age-associated bone diseases such as osteoporosis.

This project aims to investigate the relationship between the gut microbiota, vitamin D and bone health, and ultimately, develop a novel gut microbiota-targeted functional food containing vitamin D, to improve bone metabolism and support healthy ageing.

Training opportunities:

This multidisciplinary DTP project combines expertise in gut microbiology and molecular phenotyping (University of Reading), human nutrition (University of Surrey) and UK industry (Xampla); with training opportunities available from all partners within these areas.

Applying the knowledge and expertise of the academic supervisors and industrial supervisor, this project will involve a range of cutting edge analytical methodologies. At the University of Reading, the student will learn techniques relevant to studying the gut microbiota including: setting up and running *in vitro* laboratory models of the human gut, multi-platform molecular phenotyping (microbiomics, metabolomics), and will gain experience in designing and delivering a human trial. At the University of Surrey, the student will learn methods and receive training in nutritional epidemiology, including conducting systematic reviews and meta analyses, and analysis of complex BIG data.

This is a Collaborative Awards in Science and Engineering (CASE) Studentship and the student will benefit from a 3 month placement at Xampla, where vitamin D food products for the human trial will be made and tested, providing the student with first-hand experience of the industrial research pipeline.

At the University of Reading (where the student will be based) students will be entered into a programme (based on the Researcher Development Framework), to develop academic and transferable skills (e.g. academic writing, delivering oral presentations, project management) and are encouraged to attend appropriate undergraduate and postgraduate lectures. There will also be opportunities to attend conferences and get involved in symposium organisation.

Student profile:

This project would be suitable for students with a degree in biology, chemistry, nutrition, agriculture, food science or a closely related subject. We seek a highly motivated student with an interest in cross-disciplinary research approaches to better understand the impact of dietary interventions on the gut microbiota and overall host health. This project includes in vitro laboratory research, designing and delivering a human trial, state of the art molecular phenotyping approaches and analysis of complex multi-modal data. Training in all techniques will be provided, but an ability and desire to learn new skills quickly would be advantageous.

Stipend (Salary):

FoodBioSystems DTP students receive an annual tax free stipend (salary) that is paid in instalments throughout the year. For 2023/24 this is £18,622 and it will increase slightly each year at rate set by UKRI.

Equality Diversity and Inclusion:

The FoodBioSystems DTP is committed to equality, diversity and inclusion (EDI), to building a doctoral researcher(DR) and staff body that reflects the diversity of society, and to encourage applications from under-represented and disadvantaged groups. Our actions to promote diversity and inclusion are detailed on the [FoodBioSystems DTP website](#).

In accordance with UKRI guidelines, our studentships are offered on a part time basis in addition to full time registration. The minimum registration is 50% FT and the studentship end date will be extended to reflect the part-time registration.

For up to date information on funding eligibility, studentship rates and part time registration, please visit the [FoodBioSystems website](#).