PhD Project Advertisement

Project title: Dietary protein, the microbiota and gut barrier function: a gatekeeper of metabolic & immune health

Project No: FBS2022-72 Robertson sr

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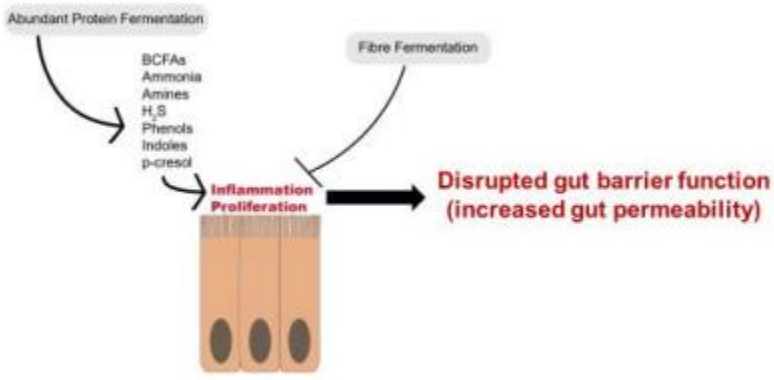
Project description:

The gut barrier functions to prevent the passage of bacteria and bacterial products into the systemic blood circulation. If the gut barrier fails, bacterial products can infiltrate bodily tissues, causing metabolic and immune dysfunction. The best example of this effect occurs in inflammatory conditions that lead to a translocation of bacterial lipopolysaccharide (LPS) from the gut to the liver, where LPS has been implicated in promoting the accumulation of ectopic fat and non-alcoholic fatty liver disease, a common condition that contributes to the development of cardiovascular and terminal liver diseases. We have new evidence to show that gut barrier function, as measured by an increase in gut permeability, is also impaired in healthy men, a phenomenon known as 'leaky gut'. While there may be different causes of this condition, there is emerging evidence to suggest that the fermentation products of dietary protein may impair gut barrier function in the colon, especially in the absence of fermentable carbohydrate. If this link can be substantiated, it would have major implications for the over consumption of protein in the UK population, especially with respect to proposed dietary recommendations to increase protein intake in middle-aged adults.



Detrimental effects excess protein intake on gut barrier function may have implications for chronic diseases such as type 2 diabetes and non-alcoholic fatty liver disease (NAFLD).

Our research proposal aims to determine the relationship between gut permeability, diet protein and immune and metabolic health using in vitro and human intervention studies in a collaborative project between the Universities of Surrey and Reading. The fermentation profile of dietary food proteins will be investigated in an in vitro digestion system that reflects the human colon. Dietary proteins will be further examined in vivo, in a human dietary intervention study to investigate the effects on the gut barrier, gastrointestinal inflammation, the microbiota and health. The results of these studies will

provide unique evidence for a causal link between dietary protein and impaired gut barrier function, and new mechanistic insights into the role of the gut microbiota in human health and disease.

Training opportunities:

There will be training available in human, laboratory, microbiological and in vitro-based model systems at both the University of Surrey and the University of Reading.

The industrial partner (Quorn Foods) will provide hands-on training in employability skills with a specific focus on working in business and industry.

Since this is a paired PhD project with the University of Reading, there will be additional valuable opportunities for gaining expertise animal intervention trials, depending on the interest of the successful candidate.

Student profile:

This project would be suitable for a student with a degree in dietetics/human nutrition, microbiology or any biomedical discipline with a keen interest in learning new laboratory and human-based clinical techniques. The minimum entry requirement for a FoodBioSystems DTP is a BSc honours degree at upper second class level (or equivalent).

Pay:

FoodBioSystems DTP students receive an annual tax free stipend that is paid in installments during the year. For 2022/23 this will be £16,062 and this will increase slightly each year at rate set by UKRI.

Equality Diversity and Inclusion:

The FoodBioSystems DTP is committed to equality, diversity and inclusion, to building a doctoral researcher 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.