

Dietary strategies to target adipose tissue inflammation in ageing

Supervisory team:

Main supervisor: Prof Dylan Thompson (University of Bath)

Second supervisor: Prof Francis Stephens (University of Exeter)

Dr James Turner (University of Bath)

Host institution: University of Bath

Project description:

Demographic shifts in population ageing represent one of the greatest health challenges facing most countries. By 2041, nearly 30% of the UK population will be >65 years old. Thus, finding ways to improve ageing and “healthspan” will be a global priority in the coming decades.

Our recent research has shown that adipose tissue from older people is “proinflammatory” even if people remain lean and physically active. Adipose tissue inflammation impacts multiple aspects of health – including the risk of chronic diseases and susceptibility to acute infections. It also impacts the ability to synthesise muscle and thus predisposes people to sarcopaenia, which then causes frailty and reduced functional independence.

The aim of this studentship is to explore whether we can use diet to target adipose tissue inflammation and the ability to synthesise muscle in older people.

This PhD will combine in vivo and ex vivo approaches with highly sophisticated analytical methods. Laboratory techniques will include; cell culture, advanced 12-colour immuno-phenotyping and cell function measurements with flow cytometry (immunology), multiplex assays, molecular techniques (e.g., RT-PCR, immunoblotting) and stable isotopes (tracers). The studies will be conducted in humans and will include intervention studies (Randomised Controlled Trials); with sophisticated tissue-specific (e.g., adipose and muscle biopsies) and whole-body (e.g., protein turnover) measurements. There will also be the opportunity to develop bioinformatics skills using existing RNAseq datasets in adipose and muscle from older people. Thus, this studentship is an excellent training opportunity to develop well-rounded multicomponent bioscientific skills.

The project draws together supervisory expertise in adipose tissue (Bath) and muscle protein synthesis (Exeter). The main location for research will be Bath, with visits to Exeter as required. The supervisory team has a 100% record for the successful completion of PhD students, and the research environment in both Bath and Exeter have strong research teams working in human physiology and nutrition.

This studentship would suit someone who is interested in integrative human physiology (broadly) as well as dietary (and other interventional strategies) to mitigate the negative impacts of ageing. This project brings together two major BBSRC priorities – “Food, nutrition and health” and “Healthy Ageing”.

If dietary enrichment with specific nutrient compounds successfully targets adipose inflammation and improves ageing this would have profound implications given the millions of older people in the UK and around the world. Thus, this project is very well placed to generate real-world impact now and in the future.