

## PhD Project Advertisement

**Project title:** Exploring the Impact of Anthocyanin-rich Diets on Human Gut Microbiome Composition and its Role in Menopause-Related Health Issues: Population-Based and Mechanistic Studies

**Project No:** FBS2024-065-Hunt-sr

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**Project description:**

This project focuses on anthocyanins, natural compounds found in fruits & vegetables, which have shown encouraging potential for promoting healthy aging. Anthocyanins have protective, anti-inflammatory, anti-oxidant and brain-supporting properties. They may also positively affect the gut's microbial community, resulting in the production of beneficial metabolites like short-chain fatty acids

The research is especially significant for older individuals, particularly women who are approaching the menopause, who often experience unfavourable changes in their gut microbiome. By improving our understanding of how anthocyanins impact the gut, we may find new ways to alleviate menopausal symptoms such as sleep issues and mood changes, as well as reduce the risk of osteopenia/osteoporosis in post-menopausal women. This research is of great importance, considering healthcare and economic challenges associated with menopausal symptoms and osteoporosis. It's especially pertinent in our aging society, where women tend to live longer than men, leading to a predominantly female older population.

We will also examine if the relationship between anthocyanin consumption and indices of bone health differs among various ethnic populations, considering that gut health plays a vital role in this process. We will use existing previously funded population-based data (FSA, BBSRC, MRC, EU projects) to investigate these connections.

In vitro fermentation experiments (that mimic the gut microbial environment) will evaluate the effect of different anthocyanin sources on gut microbiota and identify the product with the greatest potential to improve gut health.

We will conduct a randomised controlled trial to i) determine the capacity for anthocyanin consumption to offset age-related bone loss, sleep disturbances and mental health issues during the menopause and ii) assess whether health outcomes are linked to changes in gut microbiome

This PhD study will:

1. Investigate the association between anthocyanin consumption and bone health in menopausal women from different ethnic backgrounds using available datasets (including FSA, BBSRC, MRC funded studies and the UK Biobank)
2. Analyse different sources of anthocyanins to identify those with the most significant impact on gut health, bone metabolism and brain protection.
3. Conduct a controlled trial to assess how anthocyanin consumption affects the gut microbiome and its connections to bone health, sleep quality and mental well-being in menopausal women.

The research aims to shed light on the potential of anthocyanins to enhance the well-being of menopausal women by studying relationships between anthocyanins, gut microbiome and menopausal health through both large-scale data analyses and mechanistic studies.

### **Training opportunities:**

The student will gain valuable experience in basic science techniques (in vitro and in vivo) and clinical skills. They will learn how to perform culture independent microbiology, HPLC / LCMS methods and molecular techniques such as PCR and FISH. They will undertake training in good clinical practice and RCT conduct. We will provide support for fundamental academic and research skills, such as academic writing, conducting systematic reviews and meta-analyses, utilising existing RCT data, working with Big Data, data management and statistical analysis. Additionally, we will offer guidance on professional development, including career planning. This support will be facilitated through access to a Research Methods module from the MSc Nutritional Medicine program and the University of Surrey's Research Development Programme.

### **Student profile:**

We encourage students with a passion for nutritional science and integrated physiology to apply for this project. We welcome students with a background in health, nutrition and food sciences or a related life-science (e.g. biochemistry or biomedical sciences, sport & exercise sciences). The student should have good laboratory skills and ideally some practical physiology experience

### **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](#).**