The interplay between microbes and host in the development of the zebra fish enteric nervous system

This project is one of a number that are in competition for funding from the South West Biosciences Doctoral Training Partnership (SWBio DTP). The DTP offers an interdisciplinary research training programme delivered by a consortium comprising the Universities of Bath, Bristol and Exeter, Cardiff University and Rothamsted Research, alongside six regional associate partners: Marine Biological Association, Plymouth Marine Laboratory, Swansea University, UCB Pharma, University of the West of England and SETsquared Bristol. The partnership has a strong track record in advancing knowledge through high quality research and teaching, in collaboration with industry and government.

Studentships are available for entry in October 2021.

All SWBio DTP projects will follow a structured 4-year PhD model, combining traditional project-focussed studies with a taught first year which includes directed rotation projects.

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Project description

Microbiome-host interactions is one of the hot-topic areas in biomedical research. There is intense interest in the interplay between animals and their resident microbiota, with particular emphasis on health and disease. A hurdle to the study of microbiome biology is the use of appropriate models. Human and mouse microbiomes have enormous complexity, making identification of specific relationships problematic, and precise manipulation of these gut microbiomes is difficult.

There is emerging interest in the development of simpler vertebrate models. Zebrafish are important model organisms for the study of a wide range of fundamental processes including development and genetic diseases. A number of recent studies have revealed important interactions between the zebrafish gut microbiome and aspects of gut homeostasis and developmental pathways, demonstrating the importance of the gut microbiome in zebrafish biology. This project will utilise the newly refurbished and expanded zebrafish facility at Bath, along with the expertise of the Kelsh group in zebrafish biology in a novel collaboration with the Preston group. This project will characterise the gut microbiome of the Bath zebrafish facility and use this information to produce different gut microbiomes with altered functions. The effect of these perturbations on zebrafish embryo development and function will be analysed to establish direct cause and effect associations. This will involve multidisciplinary approaches combining functional genomics and bioinformatics, molecular microbiology, cell and developmental biology. The student will receive expert training across these areas.

The project will develop an important new model to investigate the role of microbiome bacteria in the physiology of a complex host animal. Findings from this project will be informative for the understanding of fundamental processes such as development, and for investigating complex disease phenotypes for which there is compelling evidence for pivotal roles for gut microbiomes. Zebrafish provide a genetically manipulatable host for which it is possible to strictly control the microbial environment. The ability to regulate the zebrafish microbiome in a range of genetic backgrounds

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promises the opportunity to systematically dissect the host-microbiome interaction, and investigate cause-and-effect interactions that have proved very difficult in other complex microbiome models such as mice.

Applications

Applicants must have obtained, or be about to obtain, a First or Upper Second Class UK Honours degree, or the equivalent qualifications gained outside the UK, in an appropriate area of science or technology.

Informal enquiries are welcomed and should be addressed to the lead supervisor.

Enquiries about the application process should be addressed to doctoraladmissions@bath.ac.uk.

Formal applications should be submitted on the University of Bath's online application form for a PhD in Biosciences. Please ensure that you quote the supervisor's name and project title in the 'Your research interests' section. You may apply for more than one project if you wish but you should submit a separate personal statement relevant to each one.

If you are an EU/EEA/Swiss national with settled or pre-settled status in the UK under the EU Settlement Scheme, please upload documentary evidence with your application.

More information about applying for a PhD at Bath may be found on our website.

The deadline for the receipt of applications is **Monday 7 December 2020 (23:59 GMT).**