FoodBioSystems DTP - PhD Project Advertisement Text

Project Title: FOODBIOSYSTEMS - Can many biomarkers make light work of liver fluke parasite diagnostics?

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Research Group: FOODBIOSYSTEMS BBSRC DTP
Project ID: FBS2020-25

Application Deadline: 6 March 2020

Project Description: Liver fluke parasites are a pervasive economic threat on UK sheep and cattle farms. Control of fluke infections is achieved primarily by treating animals with flukicide drugs, although this approach is becoming limited by developing drug resistance and consumer pressure for organic, drug residue-free produce. There is therefore a need to reduce flukicide use. One way to do this is by employing diagnostically led, selectively targeted treatment regimes (instead of blanket treatments of entire herds), but existing diagnostic tools have drawbacks meaning they are of limited value in supporting such an approach. The aim of this project is to identify new molecular biomarkers to support the development of improved diagnostic tools. Our approach will be to use state-of-the-art omics methods, combining proteomic, peptidomic and transcriptomic analysis of blood sera from fluke infected sheep. We will then analyse these 'big data' datasets using a computational method called network analysis to identify patterns indicative of fluke infection. This will be the first study to perform these omics methods in such depth in any host-parasite system, the first to analyse them as a single combined polyomic dataset, and the first to use network analysis to identify biomarker patterns in a parasite infection dataset. Our ultimate goal is to identify biomarker patterns that provide earlier and more sensitive diagnosis of fluke infection than is possible with existing tools. This will enable reduced flukicide use, and efficiency savings for farmers, through targeted, early intervention treatment of infected animals.

Funding Notes: This project is part of the FoodBioSystems BBSRC Doctoral Training Partnership (DTP), it will be funded subject to a competition to identify the strongest applicants. Due to restrictions on the funding, this studentship is only open to UK students and EU students who have lived in the UK for the past three years.

This is a CASE project with in-kind support from Ridgeway Research Ltd, a UK-based veterinary serviced firm who will provide samples, as well as placement and diagnostics training for the successful student.

The FoodBioSystems DTP is a collaboration between the University of Reading, Cranfield University, Queen's University Belfast, Aberystwyth University, Surrey University and Brunel University London. Our vision is to develop the next generation of highly skilled UK Agri-Food bioscientists with expertise spanning the entire food value chain. We have over 60 Associate and Affiliate partners. To find out more about us and the training programme we offer all our postgraduate researchers please visit https://research.reading.ac.uk/foodbiosystems/.

Training opportunities:
Experimental methods: Basic molecular biology and protein biochemistry, RNA-Seq, proteomics/peptidomics, and bioinformatics/computational analysis of large-scale datasets.
Diagnostic parasitology: Via a placement with Ridgeway Diagnostic Services, one of the country's leading commercial diagnostic service providers.
Science communication: student will play a central role in communicating project goals and progress with stakeholders (local farmers and farmers unions etc). We will involve these groups in informing development of our biomarker research towards a useable diagnostic test.

Student profile:
Qualifications
Undergraduate degree (2:1 or higher) in Biological Sciences or similar, or 2:2 at undergraduate level with a distinction at MSc in a biological or computational discipline.
Skills and experience
Demonstrable knowledge of helminth parasitology, with some research experience in at least one of (i) molecular biology, (ii) biochemistry or (iii) computational biology.