PhD Project Advertisement

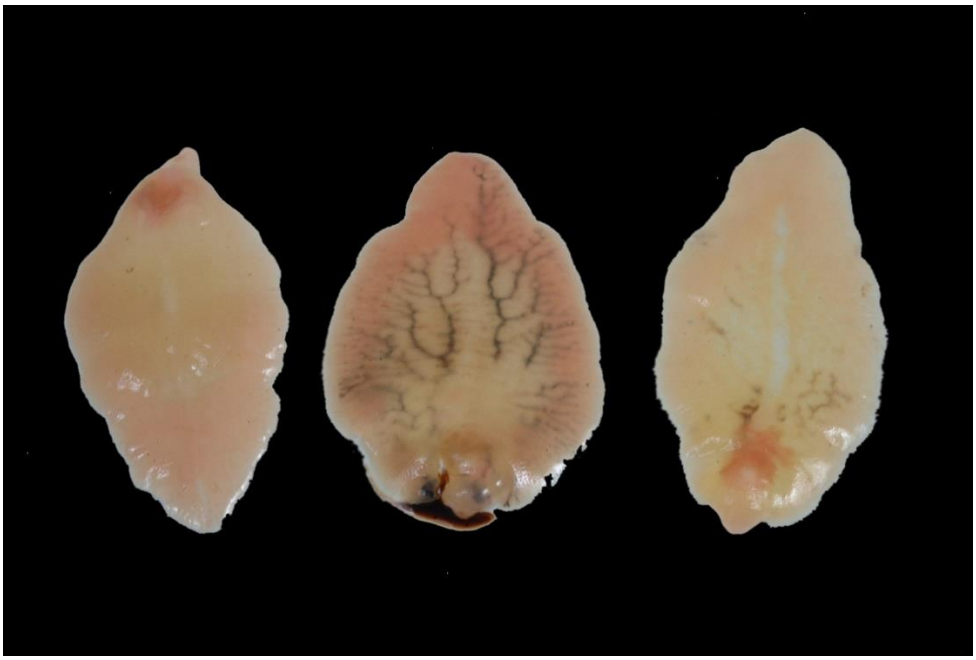
Project title: Is it a Fluke or is it Reproducible: Understanding Isolate Variation in *Fasciola hepatica* for Diagnostic Potential
Project No: FBS2022-50-Morphew-ar

Lead supervisor: Dr Russ Morphew, Aberystwyth University, Institute of Biological, Environmental and Rural Sciences
Email: rom@aber.ac.uk

Co-supervisors:
Prof. Rainer Cramer, University of Reading, Department of Chemistry.
Prof. Peter Brophy, Aberystwyth University, Institute of Biological, Environmental and Rural Sciences

Project description:

Helminth parasites are responsible for >55% of livestock diseases representing a major threat to global food security and food borne disease, with control being through anthelmintic drugs due to an absence of vaccines. In particular, zoonotic fascioliasis, caused by liver fluke, has a profound, negative impact on livestock production and welfare, causing death or chronic wasting disease and predisposition to bacterial diseases with losses of ~$US3 billion/annum worldwide. With a reliance on triclabendazole (TCBZ) as the frontline anthelmintic drug, control has been hampered by the emergence of TCBZ resistance. To facilitate improved control, there is now an urgent need for new diagnostics capable of differentiating between liver fluke that are TCBZ resistant and those that are TCBZ susceptible. New liver fluke isolates, that are both susceptible and resistant to TCBZ, are now available to explore using post genomic technologies to generate the next generation of liver fluke diagnostics.



Therefore, this project aims to employ a multiomic approach to reveal liver fluke isolate specific profiles that can be exploited for TCBZ differentiation diagnostics and to support the confirmation of isolate TCBZ status. This

project will aim to 1) Utilise proteomics to fingerprint liver fluke isolate somatic[1], excretory-secretory and extracellular vesicle[2] proteins 2) Transcriptome profile liver fluke isolates for sequence variations 3) Optimize Liquid AP (MA)LDI to Support Rapid Isolate Differentiation and 4) develop a pilot pen-side diagnostic test. This work will importantly lay the foundations to support future TCBZ resistance/susceptibility diagnostics for the liver fluke.

Training opportunities:

The student will gain experience and training in a wide range of molecular and parasitological methods including biochemistry, molecular biology and *in vitro* parasite maintenance. This will also include purification and analysis of extracellular vesicles. In addition, training will be provided in multiomics technologies and bioinformatics for the analysis of large-scale omic datasets. Furthermore, the student will gain experience in analytical mass spectrometry and biomolecule purification. The student will also spend time with Ridgeway Research Ltd, a UK-based veterinary service firm, where they will receive training in parasite life cycle management. The student will also play a central role in communicating project goals and progress with stakeholders (local farmers and farmers unions etc).

Student profile:

We are seeking a student who has obtained (or predicted to obtain) an honours degree in a course relevant to the proposal (biochemistry, zoology, microbiology, molecular sciences, animal sciences, veterinary sciences, etc.) with evidence of considerable laboratory or computational experience. Advanced technical/practical training in parasitology, analytical mass spectrometry or omic data analysis would also be desirable.

References:

[1]https://pubmed.ncbi.nlm.nih.gov/20726552/

[2]https://pubmed.ncbi.nlm.nih.gov/30811394/

Funding particulars:

This is a CASE project with in-kind support from Ridgeway Research Ltd, a UK-based veterinary service firm.

For up to date information on funding eligibility, studentship rates and part time registration, please visit the FoodBioSystems website.