Development of a pen-side diagnostic test for liver fluke infection in cattle and sheep.

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**Fasciola hepatica (the liver fluke)**

- Is a common and ubiquitous parasite of cattle and sheep in temperate climates
- It has a complex life cycle that involves an intermediate host, the mud snail, *Galba truncatula*
- It is highly pathogenic and infections result in weight loss, anaemia and a significant loss of production
- In worst cases it can result in sudden death through extensive damage to the liver
- Prevalence of liver fluke is increasing significantly within the UK
- Causes an economic losses of more than £30 million annually
- Increasing evidence of resistance to the drug of choice, triclabendazole (Fasinex) throughout the UK.

**Current diagnostic tests**

- Current diagnostic tests are based on faecal egg counts (FEC) which are slow, time consuming and expensive
- Other diagnostic tests include copro-antigen tests or antibody. ELISAs which detect host-anti fluke antibodies in bulk milk tank samples or individual samples and serum samples
- Both tests are costly as samples have to be sent of to the laboratory for testing
- None of these tests are able to detect acute fasciolosis, which mainly affects sheep, where farmers can lose up to 10% of their flock in a matter of days with very little warning.

**Project Aims**

- To produce a pen-side diagnostic test which provides farmers with immediate results
- Show that Cathepsin L1 (CL1), the major fluke antigen is ideal for use in the test.
- Produce a recombinant CL1.

**Identification of test antigen**

- The lateral flow will hopefully detect the presence of fluke antigen within whole blood samples
- SDS page and western blotting were used to identify the dominant fluke antigen in fluke Excretory/Secretory (E/S) products

**Recombinant Cathepsin L1**

- Production of a recombinant CL1 (rCL1) was conducted using the yeast, *Pichia pastoris*
- RNA was extracted from a fluke isolate and converted to cDNA before amplification of the CL1 using a high fidelity polymerase enzyme
- The CL1 gene was first cloned into an *E.coli* vector and then into *E.coli* TOP10 cells
- CL1 was then cloned into the yeast vector, pPinka-HC and transformed into the yeast using electroporation.
- I am now using western blotting and SDS page to confirm presence of rCL1 expression from yeast cultures.

**Conclusions**

- A pen-side test will provide farmers with a rapid diagnosis of individual animals for liver fluke infection
- This will allow targeted treatment, decrease farm costs and improve animal health and welfare
- It will also help to prevent the spread of resistance.