# New blood test developed to tackle major livestock disease in Africa

September 12 2016, by Roddy Isles


Credit: University of Dundee

The University of Dundee and the Global Alliance for Livestock Veterinary Medicines (GALVmed) have partnered to develop a simple and effective device that tests for a cattle disease that is endemic in 40 African countries and accounts for up to a 50 percent loss in milk and meat production in the continent.

The device, less than 3 inches long and similar in format to a pregnancy

test, can identify within 30 minutes whether or not an animal is infected with the parasite Trypanosoma vivax from a single drop of blood. The simple device does not require electricity or any additional equipment, factors that are essential for deployment in resource-limited settings.

The cattle disease nagana, also called African animal trypanosomosis, is caused mainly by two parasite species, Trypanosoma vivax and Trypanosoma congolense, and affects huge swathes of sub-Saharan Africa. The T. vivax form of nagana has also spread to South America. With around 60 million cattle at risk from the disease, which causes muscle wasting and death, the socio-economic impacts of nagana are profound. It has an impact on the lives of millions of smallholder farmers and the economy.

"Nagana is difficult to diagnose because early symptoms can be easily confused with a myriad of other endemic diseases," said Professor Mike Ferguson, Regius Professor of Life Sciences at the University of Dundee, who led the research team.

"There is an urgent need for new, inexpensive and simple, diagnostics that can be used by vets and farmers to test animals prior to deploying expensive medicines."

With this in mind GALVmed asked the University of Dundee to help develop a new diagnostic for nagana.

GALVmed is an NGO which makes livestock vaccines, medicines and diagnostics accessible and affordable to the millions of smallholder farmers in developing world, headquartered in Edinburgh.

Taking a hi-tech approach, the research team identified the components of Trypanosoma vivax that cattle make antibodies to.

One of these components was developed into a prototype diagnostic device in collaboration with Dr Steven Wall (Product Support Manager) at BBI Solutions OEM Limited, who specialise in the development and manufacturing of lateral flow assays in the Dundee MediPark.

The prototype diagnostic device was evaluated with over a hundred serum samples from uninfected and T. vivax-infected cattle. The promising results, just published in the journal PLOS Neglected Tropical Diseases, have inspired GALVmed to further investigate this innovative diagnostic test for use in Africa.

Dr Jeremy Salt, Senior Director of Research and Development at GALVmed, said, "We are delighted with the progress on an effective and simple diagnostic test for T. vivax infection through our partnership with The University of Dundee and BBI Solutions OEM Limited.

"Such a test could allow millions of smallholder farmers an efficient way to test their cattle for this debilitating disease and give peace of mind that any subsequent treatment for T. vivax infection will be done with the certainty that the patient is infected, which saves the farmer money. This will give more control to the smallholder farmers whose quality of life has been affected by this disease that covers over 10 million square kilometres of Africa.

"To ensure that the final test is widely used throughout the regions where it's endemic, GALVmed will be working with scientists, manufacturers and distributors in the 40 countries where AAT is rife to create a sustainable supply chain for the final product."

Professor Ferguson added, "I am very proud of the talented scientists, Jennifer Fleming, Lalitha Sastry, Lauren Sullivan and Steven Wall, who did this work, and of the synergistic relationship between the University of Dundee and BBI Solutions OEM Limited. Hopefully, with further

development by GALVmed, the device will prove sufficiently useful to be adopted for the detection of nagana caused by T. vivax in the developing world."

**More information:** Jennifer R. Fleming et al. Proteomic Identification of Immunodiagnostic Antigens for Trypanosoma vivax Infections in Cattle and Generation of a Proof-of-Concept Lateral Flow Test Diagnostic Device, *PLOS Neglected Tropical Diseases* (2016). DOI: 10.1371/journal.pntd.0004977

Provided by University of Dundee