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Simple diagnostic test can help fight deadly sleeping sickness

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Scientists have developed a quick and simple diagnosis method, similar to a dipstick pregnancy test, to fight a deadly sleeping sickness.

The test to diagnose Human African Trypanosomiasis (HAT) just requires a pin-prick blood sample and will remove the need to take complex equipment into remote areas of sub-Saharan Africa.

Millions of people are at risk of HAT which is usually fatal if untreated, with patients falling into a coma before death. Around 5 000 cases are reported each year, with severe social and economic costs, and some areas at risk remain uncovered by surveillance and control efforts.

The disease is caused by the parasite *Trypanosoma brucei gambiense* (T.b. gambiense) and spread by the bite of infected tsetse flies.

Existing tests rely on extracts directly from the dangerous parasite, but now scientists at the University of Kent have designed a way of making material more easily and safer, and therefore more cheaply.

The next generation test was developed by Dr Barrie Rooney and Professor Mark Smales with colleagues from the University of Kent, funded by the Biotechnology and Biological Sciences Research Council (BBSRC) to work with international medical charity Medecins Sans Frontieres (MSF) as part of the BBSRC Flexible Interchange Programme (FLIP).

Dr Rooney said: "In 14 months we have gone from idea to validation of this new rapid diagnostic test.

"I have been involved with MSF mobile HAT screening teams in central African countries for over 10 years. Traditional testing involves a large team in remote areas doing time consuming microscopic work, and painful lumbar punctures. For this you need electricity and refrigeration.

"By combining the latest genome databases and old fashioned fermentation techniques we have come up with a fast, simple way of making robust and reliable tests. The new tests are designed to be heat stable and user-friendly like a dipstick pregnancy test.

"It will be a major improvement for screening and treatment of this deadly disease and speed us on the way to 'the elimination of sleeping sickness as a public health hazard' which is a World Health Organisation target."

The researchers were able to genetically engineer a parasite similar to T.b. gambiense, but which is safe and easy to grow, to produce antigens for HAT. These antigens bind to molecules in blood samples of patients infected with HAT, allowing the disease to be detected.

As well as being easy to carry out, fewer people will be needed to administer the tests and they take half as long to conduct as the traditional methods.

Professor Melanie Welham, BBSRC Executive Director, Science, said: "This is a brilliant example of exactly what the FLIP scheme is all about. FLIP funding allowed Dr Rooney to work with the University of Kent and MSF to design and develop this test in just 14 months.

"The promise and potential impact of this new diagnostic is obvious and I wish Dr Rooney success in the forthcoming work in the Democratic Republic of the Congo.

"FLIP brings scientists into different environments where they can learn new skills and exploit their existing expertise in new collaborations, enhancing the impact of bioscience research."

In July Dr Rooney will travel to the Democratic Republic of the Congo to identify areas where field trials of the new rapid diagnostic test could be carried out, alongside an MSF HAT mobile team conducting screening and treatment.

Although the test has been developed for HAT, the method has potential to develop diagnostics for other similar tropical diseases such as Chagas disease and visceral leishmaniasis.

Source:

Biotechnology and Biological Sciences Research Council
