

Better tests for sleeping sickness

May 22 2012



Health workers use the classical ITG rapid diagnostic test to screen blood on antibodies against sleeping sickness. A better and safer to produce test now is possible, say researchers at the Antwerp Institute of Tropical Medicine. Credit: © ITG

Lies Van Nieuwenhove, researcher at the Antwerp Institute of Tropical Medicine, has produced proteins imitating typical parts of the sleeping sickness parasite. They can be used in more efficient diagnostic tests, without the need for culturing dangerous parasites.

Each year many thousands of Africans contract sleeping sickness. The cause is a unicellular parasite, a trypanosome, which is transmitted by the bite of [tsetse](#) flies. First the parasite multiplies in blood and lymph, while evading the [human immune system](#). It then lodges in organs like heart and kidneys and finally in the brain. Patients become disoriented, their sleeping pattern disintegrates and they get motor and mental

problems. This inevitably leads to coma and death. The [World Health Organisation](#) estimates that sleeping sickness each year claims 10 000 to 20 000 lives.

In an early stage the disease is easy to treat, but once the brain is invaded, the treatment becomes more complex and one must use medicines with dangerous, even deadly, side effects. So it is important to detect the infection early.

In the regions where *Trypanosoma brucei gambiense* is found, [medical workers](#) for decades already use a rapid diagnostic test, developed at the Institute of [Tropical Medicine](#), to screen millions of people each year on the presence of antibodies in their blood.

But diagnostic test are not perfect: they always will miss cases, or on the contrary they see an infection where there isn't. A bit as the [metal detectors](#) at airports: too sensitive and they annoyingly go off on each buckle, earring or coin; a bit less sensitive and pocketknives start slipping trough.

In recent years the number of cases has come down substantially, thanks to campaigns against the disease, so error margins that were acceptable in the old days, because the tests still saved so many lives, now become inadmissible. Research scientist Lies Van Nieuwenhove set out to develop a new and better test.

In such tests one demonstrates the antibodies by presenting them targets they will also recognise and attack on real trypanosomes: typical proteins that cover the parasite as a mantle. When antibody and target react – when the test is 'positive' – this is made visible by for instance a colour change or a clotting. Today those targets are obtained from living parasites that are raised in laboratory animals, and are a constant danger for the laboratory technicians.

Therefore Van Nieuwenhove tried to synthesise artificial targets, 'mimotopes' that mimic only a part of the original target protein, but still are sufficient to react with the patient's antibodies. She indeed could produce mimotopes that are reliable and give alarm with the right patients. These mimotopes now can be the base for a new generation of rapid [diagnostic tests](#) for [sleeping sickness](#).

Provided by Institute of Tropical Medicine Antwerp

Citation: Better tests for sleeping sickness (2012, May 22) retrieved 3 June 2024 from <https://medicalxpress.com/news/2012-05-sickness.html>

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