

Scientists take a step towards better sleeping sickness treatment

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(Medical Xpress) -- Scientists at the University of Glasgow have taken a major step forward in the quest to develop new, safer drugs for the treatment of sleeping sickness.

The team at the Wellcome Trust Centre for Molecular Parasitology has gained new insight into a specific [protein](#) within the parasite responsible for the disease, which could help in the design of new parasite-specific drugs.

Transmitted by the tsetse fly, [sleeping sickness](#) is a neglected [tropical disease](#) spread by the [Trypanosoma brucei](#) parasite. There are no effective vaccines for this disease and many of the drugs used to treat it are highly toxic. Left untreated it is invariably fatal.

Scientists believe that a better way of fighting the disease would be to target specific proteins in the parasite called metacaspases, which have been shown to be important for its [survival](#).

A first step in creating such a [drug](#) is to understand the structure of the proteins and scientists at Glasgow have successfully determined the first three-dimensional structure of a metacaspase – one of five found within *T. brucei* – using X-ray crystallography.

Dr Karen McLuskey, a senior research associate in the Wellcome Trust Centre for [Molecular Parasitology](#), said: “This structure allows us to visualise important details of how the metacaspase interacts with the

proteins that it is destined to destroy”.

Professor Jeremy Mottram, leader of the research team, said “Overall, this structure provides a means towards designing specific inhibitors of metacaspases that can potentially be used for the development of novel drugs against parasitic diseases.”

The research, ‘*Crystal structure of a Trypanosoma brucei metacaspase*’, was funded by The Wellcome Trust and Medical Research Council and is published in the journal *Proceedings of the National Academy of Sciences*.

There are two forms of sleeping sickness (Human African Trypanosomiasis): *Trypanosoma brucei gambiense*, which accounts for 95 per cent of reported cases of sleeping sickness, and can infect a person for years without any major symptoms, often already having progressed to an advanced stage when signs do appear.

Trypanosoma brucei rhodesiense accounts for five percent of cases and progresses rapidly with symptoms apparent a few weeks or months after infection and quickly crossing the blood-brain barrier.

The disease progresses in two stages, the first characterised by fever, headaches, joint pain and itching, before progressing to the second phase when the [parasites](#) invade the central nervous system. This stage results in reduced coordination, confusion, weakness, tremors and disruption of the sleep cycle resulting in insomnia and bouts of daytime sleeping from which the disease takes its name.

The World Health Organisation (WHO) [reports](#) that, after continued control efforts, the number of cases of HAT reported in 2009 has dropped below 10,000 for the first time in 50 years. The trend has been maintained in 2012 with 7,139 new cases reported. The estimated

number of actual cases is 30,000.

Provided by University of Glasgow

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