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Major advance in sleeping sickness drug made by Glasgow scientists

September 6 2011

A new study published in the open-access journal *PLoS Neglected Tropical Diseases* on September 6th presents a key advance in developing a safer cure for sleeping sickness. Led by Professor Peter Kennedy, researchers at the University of Glasgow's Institute for Infection, Immunology and Inflammation have created a version of the drug most commonly used to treat sleeping sickness which can be administered orally in pill form.

Sleeping sickness – or human African trypanosomiasis (HAT) – is a neglected tropical disease of major importance. Transmitted by the tsetse fly and caused by the trypanosome parasite, sleeping sickness is invariably fatal if left untreated. Once the disease has crossed the blood-brain barrier and entered the central nervous system the most commonly used treatment is an intravenous course of the arsenic-based drug melarsoprol. Because melarsoprol has a low solubility in water, it is dissolved in propylene glycol and administered intravenously. The result is a highly-toxic drug that kills five per cent of patients receiving it and leaves many others permanently brain-damaged.

Researchers at the University of Glasgow combined melarsoprol with cyclodextrins – molecules that surrounded the drug allowing it to be administered orally, increasing its solubility and releasing the drug more slowly in the gut. In laboratory tests the altered drug was shown to retain its ability to kill the infection, and was able to cure mice infected with the parasite after a seven-day daily oral dosing schedule. The drug cleared parasites from the brain and restored normal blood-brain barrier

integrity.

According to Prof. Kennedy, "This new research is the most clinically important in the 20 years of our trypanosome research group. It has the potential of a major therapeutic advance and if it is equally effective in humans then it would also have a significant socio-economic impact because the duration of inpatient treatment would be shorter and some patients might even be eventually treated at home."

Prof Kennedy added: "You always have to be very cautious when extrapolating results from mouse models to the human disease but there are several reasons why we are quietly optimistic that this may very well work in humans too.

More information: Rodgers J, Jones A, Gibaud S, Bradley B, McCabe C, et al. (2011) Melarsoprol Cyclodextrin Inclusion Complexes as Promising Oral Candidates for the Treatment of Human African Trypanosomiasis. PLoS Negl Trop Dis 5(9): e1308. doi:10.1371/journal.pntd.0001308

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