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Cyclical development of *Trypanosoma brucei gambiense* from cattle and goats in *Glossina*

Short communication

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Sleeping sickness caused by *Trypanosoma b. gambiense* is endemic over a vast territory of West and Central Africa and constitutes a serious threat to human health. Besides man it has been known for a long time that domestic and wild animals can serve as reservoir hosts for this parasite (reviewed by Molyneux, 1980). This has also been clearly shown in recent years, using isoenzyme analysis, DNA hybridization and the human serum resistance test to identify *T. b. gambiense* parasites isolated from domestic pigs, sheep, dogs and cattle (Gibson et al., 1978; Joshua et al., 1983; Mehlitz et al., 1982; Paindavoine et al., 1986; Scott et al., 1983; Zillmann et al., 1984). In parts of Western and Central Africa, people keep their livestock in very close proximity to their villages. Tsetse flies, particularly the peridomestic *Glossina* species, are in close contact with man in many such villages. The present investigation was conducted to establish if tsetse flies could become infected with *T. b. gambiense* when fed on goats and cattle with partially subpatent parasitaemia, and whether metacyclic forms from these infected tsetse retain resistance to normal human serum.

Four *G. palpalis gambiensis* infected with *T. b. gambiense* TREU 1442 were fed on a Boran calf. The above tsetse flies had acquired the infection from Wistar rats at the peak of parasitaemia. The trypanosome stock was a derivative of TREU 1306 (Jones et al., 1981) and had been isolated from a man aged 38 years in Ayu district of Nigeria in 1970 (Gray, 1975). No parasites were detected in the peripheral blood of the Boran calf by the haematocrit centrifugation technique (Woo, 1969) at day 21 post-infection. Nevertheless, 200 teneral *G. m. centralis* were allowed to feed on its flank for 29 days and thereafter they were maintained on an uninfected rabbit. On day 42 post-emergence, 163 surviving tsetse were allowed to probe singly on warm slides at 37 °C to identify those with the mature infection. Three tsetse flies had metacyclics in their saliva probes. The metacyclics extruded by these 3 tsetse were then subjected to the in vitro test for human serum resistance (Jenni and Brun, 1982). They were found to be resistant to human serum and further, transformed to bloodstream forms in vitro in the presence of human serum.

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In another experiment, 3 *G. p. gambiensis* infected with the same stock of *T. b. gambiense* (TREU 1442) were used to infect an adult East African×Galla goat. The parasites were detected by haematocrit centrifugation on day 10 post-infection. Teneral *G. m. centralis* (200), *G. m. palpalis* (100) and *G. p. gambiensis* (60) were allowed to feed on this goat from day 17 after infection for 22 days and thereafter on an uninfected rabbit. On day 42 post-emergence, the surviving 127 *G. m. centralis*, 44 *G. p. palpalis* and 37 *G. p. gambiensis* were allowed to probe singly as above. The mature infection rate in *G. m. centralis* was 8.7%, in *G. p. palpalis* 6.8%, and in *G. p. gambiensis* 5.4%. Metacyclics from 11 *G. m. centralis* and 3 *G. p. palpalis* were used to determine their resistance to normal human serum in vitro. In both cases, the metacyclics and successive bloodstream forms showed resistance to human serum. These results demonstrated that cattle with subpatent parasitaemia and goats can function as reservoirs of Gambian sleeping sickness parasites.

It is suggested that in ecological zones where the various components of the zoonosis of *gambiense*-infection interact intermittently, the disease transmission to man is sporadic. But, in situations where the villagers live in close proximity to their livestock, close man-fly contact could probably be responsible for a high endemicity of the Gambian disease in many foci of infection in West and Central Africa.

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