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The effect of the trypanocidal drugs berenil and samorin on infections of *Glossina morsitans centralis* by *Trypanosoma congolense*

Short communication

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Recent reports have shown that trypanocidal drugs, when administered to tsetse flies in the bloodmeal, can influence trypanosome infection in the vector. Agu (1984) found that maintaining tsetse flies on samorin treated sheep eliminated both immature and mature *Trypanosoma vivax* infections from the flies, a result subsequently repeated using an in vitro feeding system (Agu, 1985). Jefferies and Jenni (1987) discovered that both samorin and berenil, while not eliminating *T. b. brucei* from the midgut of *Glossina* when administered with the bloodmeal using an in vitro feeding system, significantly reduced the number of flies which developed salivary gland infections.

In contrast Nyeko et al. (1985) found that maintenance of *Glossina* on samorin treated rabbits did not affect transmission of *T. congolense* by the flies, but that trypanosomes were subsequently more resistant to the drug.

Here we present the results of some experiments with *T. congolense* infected *G. m. centralis* which indicate that samorin, but not berenil, administered to the flies using an in vitro feeding system, can prevent the transmission of *T. congolense* to mice.

Trypanosoma congolense STIB 68 FAA, used in these experiments, is a derivative of STIB 228 which was isolated in 1971 in the Serengeti National Park from a lion (*Panthera leo*) (Geigy and Kaufmann, 1973).

Glossina morsitans centralis flies were obtained as pupae from ILRAD, Nairobi, Kenya. Prior to infection flies were cooled after emergence at 8° C for up to 4 days to ensure sufficient numbers were available. They were allowed to return to 26° C before being offered an infective bloodmeal on mice at room temperature at the peak of the first parasitaemia. Infected flies were then maintained at 26° C and 70% relative humidity. Fresh pig blood was offered to flies through silicone membranes 3 times a week. In treated groups, the drug was added to the blood immediately before feeding.

Metacyclic positive flies were identified by inducing flies to probe onto warmed glass slides and salivary probes examined for trypanosomes. Positive flies were then used to attempt to transmit the trypanosomes to mice. As salivation is not a completely reliable method for identifying *T. congolense* infections, all flies were subsequently dissected to determine midgut, labral and hypopharyngeal infection rates. Flies were first salivated 20 to 26 days post-infection (P.I.) and dissected between days 21 and 34 P.I.

White ICR male mice (25 g, Tierzuchtinstitut, Zürich) were used to infect flies and to check for infective flies. For infection mice were inoculated intraperitoneally with stabilated trypanosomes or with mouse blood obtained from previously infected mice. Fresh mice were used to check the

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Table 1. Effect of berenil or samorin administered with the bloodmeal on *T. congolense* in *G. m. centralis*

Drug	Dosage and no. of times administered	No. of flies dissected	No. of flies infected		
			Midgut	Labrum	Hypopharynx
Berenil	1.0 μg/ml: 10× days 3–25 P.I.*	52	36	35	27
Samorin	0.1 μg/ml: 7× days 2–19 P.I.	54	15	8**	7**
Controls		72	33	31	29

* post-infection ** significant at 5% level

infectivity of flies shown to be positive by the salivary probe method. Each mouse was checked at least 3 times a week by the wet blood film technique for at least 35 days.

Drugs were obtained as marketed products. Samorin (Trypamidium) from Specia, Paris, France and berenil from Hoechst AG, Frankfurt am Main, FRG. Drug solutions were made up in distilled water at concentrations 100× greater than the final concentration required in the bloodmeal.

The results presented in Table 1 show that while berenil appears to have no affect on *T. congolense* in the vector, samorin reduces the number of flies with infections of the labrum and/or hypopharynx. Furthermore, whereas 4 flies from both the control and berenil treated groups found by salivation to possess a hypopharyngeal infection were successfully used to infect one out of 2 mice (control) and one out of 3 mice (berenil), 4 positive flies from the samorin treated group failed to produce a detectable parasitaemia despite repeated attempts to infect mice.

The results are contrary to those of Nyeko et al. (1985), who found that feeding *T. congolense* infected *G. m. morsitans* on samorin treated rabbits did not prevent transmission. This difference may be due to the way in which the drug was administered to the flies in the two studies. Here samorin was mixed with fresh pig blood to a final concentration of 0.1 μg/ml before the flies were fed using an in vitro system, whereas Nyeko et al. (1985) used drug-treated rabbits. Concentrations of 0.2, 0.7 and 2.17 μg/ml of samorin have been detected in the blood of rats (Hill and McFadzean, 1963) camels (Ali and Hassan, 1984), and goats (Braide and Eghianruwa, 1980), respectively, 24 h after administration. However, in treated animals drug levels will decline continuously, therefore despite "regular treatment" of the host animals total exposure to samorin in the study of Nyeko et al. (1985) is likely to have been lower than in the experiments described here and probably accounts for the differing results.

In summary, although multiple administration of trypanocidal drugs appears necessary to reduce transmission of *T. vivax* (Agu, 1984, 1985), *T. b. brucei* (Jefferies and Jenni, 1987), and *T. congolense* (present study), these results and the possible occurrence of increased resistance of trypanosomes to drugs after exposure in the vector, as reported for *T. congolense* and samorin (Nyeko et al., 1985), indicate that this topic requires further study in order to determine its possible influence on the epidemiology of trypanosomiasis.

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Literature by the authors.