*Medical Journal of Zambia (1977), 11, 2, 41.*

# Variation in the Sensitivity to Normal Human Serum of Clone-drived Antigenic Variants of Trypanosoma (Trypanozoon) Brucei complex Trypanosomes

**Laurence R. Rickman,** M.Sc. (Hons.), MIBiol., FILMS, FRSH.
Scientist, WHO Tropical Disease Research Centre Ndola, Zambia.

(Received for Publication: 12th March 1977)

The present concept of T.rhodesiense sleeping sickness epidemiology rests, to some extent at least, upon the long-held belief that the infectivity for man of Trypanosoma (Trypanozoon – brucei rhodesiense and the non-infectivity for man of T.(T).b.brucei, are constant and stable properties.

Renewed interest has recently been taken in the effect of normal human serum in vitro, on trypanosome population of distinct antigenic type, derive from clones prepared from T.rhodesiense and T. brucei samples syringe-passaged in white mice.

Having shown that 2 clones, each of distinct antigenic type (one derived from T.rhodesiense, the other from T.brucei) were serologically identical, van Meirvenne et al (1975a,b) have recently examined the effects of normal human serum on a series of 12 antigenic variants of T.rhodesiense, i.e. ETat 1–12 (McNeillage et al, 1969; Lumsden & Herbert, 1975), using a modified version of the blood incubation infectivity test (BIIT) (Rickman & Robson, 1970).

These authors noted that, after incubation for 5 hours at 36°C., trypanosome motility varied widely among the different antigenic types, though all retained their infectivity for mice. From their results they suggested that different antigenic types may exist in forms resistant or sensitive, i.e. "rhodesiense" or

"brucei" forms respectively, to human serum, among non-human mammalian hosts naturally infected with T.brucei (van Meirvenne et al, 1976).

Using, of necessity, a shortened (15-day) animal examination period, I have examined the BIIT responses of both the ETat (T.rhodesiense) and the AnTat (T.brucei) series of clone-drived antigenic types (Rickman, in press) and find that the results are concordant with, and possibly augment, those of van Meirvenne and his colleagues.

The ETat series produced 7 positive, 2 equivocal and 3 negative BIIT responses, thus confirming, by the marked disparity in prepatency in the test animals, the wide variation in sensitivity of the diffe- antigenic types to normal human serum in vitro. (Note: it is assumed that all test animals would have been positive within the normal 30-day post-inoculation examination period).

Because of their reputedly low infectivity and virulence for mice, those used to provide the donor samples for the BIIT testing of the AnTat series, were partially irradiated, with 400 rads from a cobalt source, prior to inoculation with the stabilate mate- The 13 different antigenic types produced 7 negative 3 equivocal and 3 positive BIIT responses.

Whilst it is tempting to interpret the clear BIIT positivity of the 3 AnTat variants as being the first supportive evidence for the thorty of the evolution of T.rhodesiense from T.brucei, by the acquisition of its nosodemal character of infectivity for man, it is possible that these particular variants were potentiated in some way by the partial immuno-suppression of the donor mice. However, it is interesting to note that the 2 antigenic types, previously shown to be serologically identical, i.e. ETat 7 and AnTat 11, both produced early and clear BIIT positivity in the test animals.

Fairbairn (1933), Rickman (1971) and Robson & Rickman (in press) have shown that there is no clear correlation between the motility of T.(T). brucei complex trypanosomes, after incubation in vitro in human blood or serum at 37°C for 5 hours or longer, as evidenced by wet-film examination, and their subsequent infectivity for small laboratory rodents.

Because of this it is felt that, whilst these preliminary experimental findings seem to suggest the possibility of antigenic types, infective for man, arising spontaneously within enzootic T.(T).b.brucei populations in nature, they clearly underline the need for further studies of the infectivity, for man and of mouse, of homogenous, cloned antigenic variant populations that have been derived from single metacyclic forms of proven T.(T).b.brucei and T. (T).b. rhodesiense samples, freshly isolated from the field environment and maintained as relapsing infections in larger non-human mammalian hosts.

## ACKNOWLEDGEMENTS

The advice and guidance of Professor W.H.R. Lumsden, Director and Head, Department of Medical Protozoology, London School of Hygiene and Tropical Medicine, under whose direction this work was undertaken, is gratefully acknowledged.

The author is particularly indebted to Dr. N. van Meirvenne, Prince Leopold Institute of Tropical Medicine, Antwerp, for supplying the AnTat stabilates for testing.

## REFERENCES

*Fairbairn, H. (1933) Annals of Tropical Medicine and Parasitology, 27, 185.*

*Lumsden, W.H.R. & Herbert, W.J. (1975) Transactions of the Royal Society of Tropical Medicine and Hygiene, 69, 205.*

*McNeillage, G.J.C., Herbert, W.J. & Lumsden, W.H.R. (1969) Experimental Parasitology, 25, 1.*

*Rickman, L.R. (1971) In: International Scientific Council for Trypanosomiasis Research, 13th Meeting, Lagos, 1971. Organisation for African Unity, Scientific, Technical and Research Commission, Publications Bureau, 67.*

*Rickman, L.R. & Robson, J. (1970) Bulletin of the World Health Organisation, 42, 650 & 911.*

*Van Meirvenne, N., Janssens, P.G., Magnus, E., Lumsden, W.H.R. & Herbert, W.J. (1975). Annales des Societes Belges de Medicine, de Parasitologie et et de Mycologie, 55, 21.*

*Van Meirvenne, N., Magnus E. & Janssens, P.G. (1976) Annales des Societes Belges de Medicine Tropicale, de Parasitologie et de Mycologie, 56, 55.*