

original species completely supplanted by another. Cultures of anaërobes require exceptional care to avoid contamination and subsequent loss of identity; no culture can be accepted upon its face value.

165 (1747)

**The variation in the size of *trypanosoma*
brucei according to the host.**

By T. D. BECKWITH and W. W. REICH.

[From the Department of Bacteriology and Experimental Pathology,
University of California.]

It has been stated by observers that a certain species of trypanosome may show differences in size according to the host infected. An examination of the literature however reveals much divergence of opinion concerning this matter. In addition such statements as appear are very fragmentary. The technique upon which some of them are based moreover leaves much to be desired.

Plimmer and Bradford¹ (1898) quoted by Castellani and Chalmers remark that the length of *Trypanosoma brucei* is constant for a given animal but varies in different hosts, being between 26 and 27 micra in rats, mice, guinea pigs, rabbits and dogs. Kanthack, Durham and Blandford² state that the Nagana parasites vary considerably both in size and in form. Bruce, Hamerton and Bateman³ come to the conclusion that *Trypanosoma brucei* varies from 10 to 16 micra in length in the rat with an average of 13.0 while in guinea pigs the limits are 8 to 16 micra with the average 12.5. Laveran and Mesnil⁴ claim that their own work which included parasites from a large range of mammals shows no manifest variation in size of the organism.

A culture of *Trypanosoma brucei* was obtained from Dr. F. G. Novy at the University of Michigan. Immediately upon re-

¹Plimmer and Bradford, quoted from Castellani and Chalmers, "Manual of Tropical Medicine," 3d edition, 1920.

²Kanthack, Durham and Blandford, *Proc. Roy. Soc. London*, 1908, lxiv, 100.

³Bruce, Hamerton and Bateman, *Proc. Roy. Soc. London*, 1909, lxxxi, 14.

⁴Laveran and Mesnil, "Trypanosomes et Trypanosomiasés," 1912.

cept, it was suspended in sterile physiological saline and injected subcutaneously into a white rat. In order that some carefully collected data might be acquired concerning possible variations in the size of the micro-organism in the rat and in the guinea pig, blood from this animal very shortly after death was injected into a guinea pig. Heart blood from this guinea pig at the time of its autopsy in turn was injected into another guinea pig and also into a white rat. By this method the host altered from time to time. The series of animals included four rats and four guinea pigs, all of which showed no parasites before the time of use. Numerous slide preparations were made from heart blood as soon after death as possible, within an hour or two at most. These were stained with Wright's stain made up according to the usual formula but diluted with one additional equal part of methyl alcohol. Measurements were then made by means of a properly calibrated series of lenses and with a filar micrometer. Slides made from each animal were included. By this means were examined 100 individuals from the guinea pigs and 90 from the rats. All trypanosomes measured were in the fully developed stage with typical morphology.

As a result it is found that the average size of *Trypanosoma brucei* in guinea pigs is 18.46×3.16 micra while in white rats it is 13.25×2.23 micra. The application of statistical methods shows that these two series are comparable since deviations for guinea pig trypanosomes are—length 13.68 and width 4.27 while for white rats they are—length 14.27 and width 3.59. Coefficients of dispersion are: guinea pigs—lengths 0.13 and breadth 0.23; for white rats they are determined to be—length 0.18 and breadth 0.27. This variation in the two hosts was apparent throughout the period of active infection.

We find therefore that *Trypanosoma brucei* does vary in size according to the host infected and that it is markedly larger in the guinea pig than in the white rat. These findings are comparable to those of Hegner⁵ with *Trypanosoma diemyctyli* in salamanders.

⁵Hegner, *Jour. Parasit.*, 1921, vii, 105.