

A NATURAL INFECTION OF *TRYPANOSOMA HIPPICUM* DARLING IN THE VAMPIRE BAT *DESMODUS* *ROTUNDUS MURINUS* WAGNER¹

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Information regarding the experimental infection of the Vampire bat *Desmodus rotundus murinus* Wagner with *Trypanosoma hippicum*, and details concerning the transmission of this infection under experimental conditions have been reported in previous papers (1, 2 and 3). Although 110 vampire bats have been caught for experimental purposes, examination of their blood before use showed only one to be infected with *T. hippicum*.

The bats caught for experimental use were collected in areas quite near Panama City, from caves and tree holes. Thirty were obtained from tidal caves on the Island of Taboga, situated in the Bay of Panama about 10 miles from Balboa, C. Z. The others were all taken on the mainland in a radius of about 20 miles from Panama City.

On February 13, 1935, five bats were caught in a hole of a tree situated near Rio Abajo, a small village about 4 miles east of the city. Mr. Benavides of this laboratory found one of these, an adult female, to be infected with a trypanosome which was identical in every respect with *Trypanosoma hippicum* Darling. The trypanosome measured, on the average, between 16-20 microns in length and 2-4 microns in width at the nucleus. The kinetoplast was situated at a distance of 2-4 microns from the posterior end of the organism and appeared prominently in Giemsa stained preparations. The nucleus was generally placed anteriorly and as a rule occupied the entire width of the organism.

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Basophilic granules were present and appeared more often in the anterior than in the posterior portion of the body. A prominent undulating membrane was always present. The flagellum was usually very short and in most specimens was not over 1-2 microns in length.

Its behavior in animals was characteristic of the other strains of *Trypanosoma hippicum* that are being carried in this laboratory. When inoculated into guinea pigs the trypanosomes appeared in the blood after an incubation period of four to seven days, and the infection terminated fatally in about two weeks.

On April 12, 1935, a horse, previously shown to be negative by microscopic examination of the blood, animal inoculations, and complement fixation tests, was inoculated intravenously with 5 cc. of whole blood, taken from the heart of a heavily infected guinea pig. The trypanosomes were found in the blood the day following and were present, except for a few days, at irregular intervals until the animal was killed three months later. The complement fixation tests became positive five days after the animal had received the inoculation and were positive as long as the horse was alive. The typical clinical symptoms of the disease were present and the usual gross and microscopical tissue changes were found at autopsy.

Attempts to transfer the infection by allowing the bat to feed on guinea pigs were unsuccessful. On February 21, 1935, seven days after the bat had been brought to the laboratory, it was placed on a clean pig and allowed to remain there for a period of one-half hour. Except for chewing and biting the leg of the pig, this being only an indication of its bad temper, it made no attempt to feed. The same performance was elicited on two other occasions when the bat was placed on pigs. In order to establish the strain of trypanosomes in laboratory animals it was necessary to inoculate them directly with blood from the bat.

On February 20, 1935, about one week after the bat was brought to the laboratory, it showed 32 trypanosomes to a thick drop blood preparation. On February 23, 1935, two days later, the infection reached its highest point, showing a one plus infection. From this time on the number of parasites in the blood

steadily decreased and finally disappeared. The animal is still alive and frequent check-ups by blood examination have failed to show a return of the trypanosomes to the circulation. This is the seventh vampire bat which, while under our observation, has recovered from an infection with *Trypanosoma hippicum*. Six other cases were reported by the author in a previous paper (4).

DISCUSSION

In 1932 Dunn published the results of his studies on vampire bats as vectors of *Trypanosoma hippicum*, and he showed that the bats could become parasitized by feeding on infected animals. Of 110 vampire bats examined by blood films and animal inoculations, only one was found to be positive for *T. hippicum*. In view of the fact that the infection is so easily acquired by these animals, it is surprising that a higher percentage of infection was not found. Several facts may explain this discrepancy. In the first place, as shown by Dunn (1932), the parasites are markedly pathogenic to the bats, killing them in nine to twenty-seven days. Secondly, if the bats recover from the disease, the trypanosomes disappear from the blood; this occurred in the case described above. Finally, Dunn (1932) and Clark (1935) have demonstrated that when bats feed upon animals with few trypanosomes in the blood, the chances that the bats acquire the infection are greatly reduced. Such slight infections are seen during periods between epidemics. The last epidemic of murrina on the Isthmus occurred in 1929, and since that time every effort has been made to keep the seed bed of this disease at as low a level as possible, affording little opportunity for bats to become parasitized.

CONCLUSIONS

1. The first case of a natural infection with *Trypanosoma hippicum* in the vampire bat *Desmous rotundus murinus* Wagner is reported. This strain of trypanosomes caused the usual type of disease which terminates fatally, when inoculated into laboratory animals and a horse.

2. Attempts to transfer the infection by feeding the bat on guinea pigs were unsuccessful.

3. This bat is the seventh one studied which recovered from the infection.

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