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## HUMAN INFECTIONS WITH CHAGRES VIRUS IN PANAMA

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**Abstract.** Clinical and prevalence studies of Chagres virus (Phlebotomus-fever group of arboviruses) infections in Panamanian residents were performed. Clinical cases of Chagres virus infection in three persons are described. Antibody conversions and virus reisolations were demonstrated in all cases. The distribution of Chagres hemagglutination-inhibition antibodies in different regions of Panama were as follows: western region 0.4% of 1,329 samples; central region 4.3% of 2,829; eastern region 2.9% of 276; Perlas Islands 10.9% of 174 (including 17.8% of 107 from San Miguel Island), giving an overall rate of 3.3% in 4,608 samples. These results indicate a widespread distribution of Chagres virus in Panama, with a particularly high rate of antibody prevalence on one of the offshore islands.

Chagres virus (CHG), antigenically classified in the Phlebotomus fever group of arboviruses, was first isolated from the blood sample of a febrile patient during his participation in the jungle warfare training program in the Panama Canal Zone in July 1960.<sup>1,2</sup> Neutralizing antibodies to this virus were also detected in the sera of a few permanent residents in Las Barretas, Coclé Province, Panama during serological surveys. No other reports concerning the occurrence of this virus in man or in animal hosts have appeared. Another new Phlebotomus fever group virus, Punta Toro, was isolated from serum of a febrile patient who had returned from a jungle area of Panama at a Pittsburgh hospital in December 1966.<sup>3</sup> Although these two viruses have not been fully studied, they are related antigenically.

The present communication reports three additional human febrile cases of infection with CHG virus and also presents the results of studies of the prevalence of antibodies among indigenous populations of different geographic regions of the Republic of Panama.

### ISOLATION OF VIRUSES

*Case 1.* (E.F.) A 49-year-old Caucasian female from Las Cumbres, a residential area about 10 miles outside of Panama City, abruptly developed a fever on 5 July 1964. Other symptoms included mild headache with anorexia and nausea which

persisted for 3 days. Profuse perspiration was experienced intermittently. Physical examination on the day after onset showed no central nervous system or other signs except a temperature of 102° F. A blood specimen taken on that day showed a white count of 5,450 per mm<sup>3</sup>. The separated serum was inoculated intracerebrally into seven suckling Swiss mice for virus isolation attempts. Two mice were found dead and two other mice were sick on day 7. Three additional mice died on the 9th day after inoculation. On the second brain-to-brain passage from the two sick mice, all the infants became ill on day 5, and a stock virus was prepared from brain material. Reisolation of the virus was successful from the original serum after 3 weeks storage at -70° C.

*Case 2.* (E.R.) A Panamanian girl, age 16, with fever was seen by a survey team on 15 July 1964 at Cerro Cama, about 25 miles northwest of Panama city. No other signs and symptoms were recorded. Blood serum obtained the same day was inoculated on 16 July 1964 into suckling mice and hamster kidney tissue cultures (HKTC). Two mice were missing, and two were found dead on the 6th day after inoculation. Three other mice were sick on the same day, and a brain suspension for passage was made from these three mice. On the third passage, all suckling mice were sick 4 days after inoculation, and a virus stock was prepared from their brains. Reisolation of the virus from the original specimen was successful after 2 weeks storage at -70° C. Virus isolation attempts by HKTC failed.

*Case 3.* (C.J.) A white male physician, 63 years of age became ill with high fever while on an expedition in an area of Darien province close

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