

Infection of wild and laboratory animals with Machupo and Latino viruses*

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Natural infection with Machupo and Latino viruses occurs only in the cricetine rodent Calomys callosus. Machupo virus induces fatal infection in suckling mice and hamsters, and in adult guinea-pigs, marmosets, and rhesus monkeys. Latino virus kills only suckling hamsters; it produces chronic but non-viraemic infection in Calomys rodents.

Machupo virus, in contrast, induces a viraemic immunotolerant infection in suckling Calomys, and a split response in animals more than 9 days of age. Tolerant infection is associated with haemolytic anaemia and splenomegaly, lesions not observed in animals able to clear viraemia and produce circulating neutralizing antibodies. Experimental increase in the fraction of tolerant response was obtained by decreasing the virus dose or by phenotypic inbreeding of rodents. Long-term effects of tolerant infection included mild runting, decreased survival time, and almost total sterility among females, largely caused by fatal virus infection of embryos.

INTRODUCTION

This report presents a selective summary of our continuing work on the biology of Machupo and Latino viruses. Studies were pursued in two principal directions: (a) a search for laboratory animals that might serve as models for human Bolivian haemorrhagic fever, and (b) elucidation of the mechanisms by which Machupo virus is transmitted among *Calomys callosus* rodents.

NATURAL INFECTION IN ENZOOTIC FOCI OF MACHUPO VIRUS

Naturally occurring antibody to Machupo virus has been found only in the small cricetine rodent *Calomys callosus* captured in localized areas of Bolivia. A survey of other rodents and marsupials in the areas of Bolivia where Machupo virus is endemic and in nonendemic surrounding areas included marsupials of the genera *Caluromys*, *Didelphis*, and *Marmosa*, other cricetines of the genera *Oryzomys*,

Zygodontomys, *Holochilus*, and *Nectomys*, the Muridae *Mus* and *Rattus*, and the echimyid *Proechimys*. Attempts to isolate virus from the kidney or spleen of a representative number of each genus were negative. The search for Latino antibody has been hampered by the lack of an adequate neutralization test; however, in non-anticomplementary rodent sera, no complement-fixing antibody was detected in any wild-caught rodent, including *Calomys callosus* (the only species from which Latino virus was recovered).

EXPERIMENTAL INFECTION IN WILD, DOMESTIC, AND LABORATORY ANIMALS

Antibody responses to experimental infection of various wild and domestic animals with Machupo virus (1) are summarized in Table 1. None of the animals became ill or died. The number of animals used per genus was limited, but only in *Proechimys* did all the rodents that were inoculated develop neutralizing (N) antibody.

Adult animals in general proved clinically resistant to Machupo virus infection. As indicated in Table 2, the list of susceptible adults thus far includes only guinea-pigs (strain C-13), the marmoset (*Saguinus Geoffroyi*), and the rhesus monkey. Guinea-pig disease was nondescript; there was little or no viraemia and no evidence of haemorrhage.

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