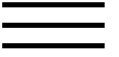


The multiple and complex and changeable scenarios of the *Trypanosoma cruzi* transmission cycle in the sylvatic environment.

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The multiple and complex and changeable scenarios of the *Trypanosoma cruzi* transmission cycle in the sylvatic environment

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Highlights

- â€¢ *T. cruzi* transmission is deeply woven in a food web, complex interaction framework.
- â€¢ Positive serologic tests are observed in 20% of free-living mammals.
- â€¢ *T. cruzi* isolation is achieved in 40% of the serologically positive mammals.
- â€¢ *T. cruzi* distribution among wild hosts is aggregated and habitat-

dependent.

â€¢ No clear association between *T. cruzi* DTU and mammal species was observed.

Abstract

In this study, we report and discuss the results generated from over 20 years of studies of the *Trypanosoma cruzi* sylvatic transmission cycle. Our results have uncovered new aspects and reviewed old concepts on issues including reservoirs, true generalist species, association of mammalian species with distinct discrete typing units â€“ DTUs, distribution of *T. cruzi* genotypes in the wild, mixed infections, and *T. cruzi* transmission ecology. Using parasitological and serological tests, we examined *T. cruzi* infection in 7,285 mammalian specimens from nine mammalian orders dispersed all over the Brazilian biomes. The obtained *T. cruzi* isolates were characterized by mini-exon gene sequence polymorphism and PCR RFLP to identify DTUs. Infection by *T. cruzi* was detected by serological methods in 20% of the examined animals and isolated from 41% of those infected, corresponding to 8% of all the examined mammals. Each mammal taxon responded uniquely to *T. cruzi* infection. *Didelphis* spp. are able to maintain high and long-lasting parasitemias (positive hemocultures) caused by TcI but maintain and rapidly control parasitemias caused by TcII to almost undetectable levels. In contrast, the tamarin species *Leontopithecus rosalia* and *L. chrysomelas* maintain long-lasting and high parasitemias caused by TcII similarly to *Philander* sp. The coati *Nasua nasua* maintains high parasitemias by both parental *T. cruzi* DTUs TcI or TcII and by TcII/TcIV (formerly Z3) at detectable levels. Wild and domestic canidae seem to display only a short period of reservoir competence. *T. cruzi* infection was demonstrated in the wild canid species *Cerdocyon thous* and *Chrysocyon brachyurus*, and positive hemoculture was obtained in one hyper carnivore species (*Leopardus pardalis*), demonstrating that *T. cruzi* transmission is deeply immersed in the trophic net. *T. cruzi* DTU distribution in nature did not exhibit any association with a particular biome or habitat. TcI predominates throughout (58% of the *T. cruzi* isolates); however, in spite of being significantly less frequent (17%), TcII is also widely distributed. Concomitant DTU infection occurred in 16% of infected mammals of all biomes and included arboreal and terrestrial species, as well as bats. TcI/TcII concomitant infection was the most

common and widely dispersed, with mixed TcI/TcII infections especially common in coatis and in Didelphimorphia. The second most common pattern of concomitant infection was TcI/TcIV, observed in Chiroptera, Didelphimorphia and Primates. Taken together, our results demonstrate the complexity of *T. cruzi* reservoir system and its transmission strategies, indicating that there is considerably more to be learned regarding ecology of *T. cruzi*.

Graphical abstract



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Keywords

Trypanosoma cruzi; DTU; Reservoirs; Transmission cycles; Ecology of parasites

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Mapping and modeling of neglected tropical diseases in Brazil and Bolivia, the mechanical system, of course, illustrates triplet hedonism.