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Sexual Transmission of American Trypanosomiasis in Humans: Insights into Evolution and Pathology in Chagas Disease

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ABSTRACT

Scope: The long-lasting asymptomatic American Trypanosomiasis may translate into Chagas disease (CD). The *Trypanosoma cruzi* (Tc) infections spread across five continents due to human population mobility, and CD is the most prevalent cause of heart failure in the Western Hemisphere. The hypothesis that Tc can be sexually transmitted was investigated.

Experiments: The blood and the semen samples were secured from 109 study subjects in four families. The Tc infections were assessed through the enzyme-linked immunosorbent assay (ELISA) and the indirect immunofluorescence (IF) of the Tc antibody. The protozoan nuclear (nDNA) and the mitochondrial DNA (kDNA) were assessed by the PCR with specific primer sets. All these experiments were conducted in three occasions one year apart.

Findings: The ELISA and the IF showed the Tc antibody in 31/109 (28.4%) families' members. However, the nDNA-PCR confirmed by Southern hybridization, cloning and sequence revealed positive results in 83/109 (76%) family members. The instills of nDNA-PCR+ semen aliquots in the vagina or in the peritoneal cavity of mice resulted into Tc nests in the somatic cells and in the organs of reproduction. The absence of the Tc antibody in 62.5% of the families' members explained by the vertical transmission of Tc infections, and immune tolerance shown in chicks hatched from Tc-infected eggs. The kDNA-PCR+ results in 91/109 (83%) explained by the vertical transfer of the mitochondrial kDNA sequences into the host's genome. Multiple kDNA mutations translated into Chagas-like heart disease.

Conclusion: The sexual transmission of Tc in humans is a pandemic route for the genetically driven Chagas disease and biodiversity.

Keywords: American Trypanosomiasis, *Trypanosoma cruzi,* Chagas Disease, Tc infections, Sexual transmission

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