Probing the efficacy of a heterologous *Leishmania/L. Viannia braziliensis* recombinant enolase as a candidate vaccine to restrict the development of *L. infantum* in BALB/c mice

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In the present study, the *Leishmania braziliensis* enolase protein was evaluated as a vaccine candidate against visceral leishmaniasis (VL). The DNA sequence was cloned and the recombinant protein (rEnolase) was evaluated as a vaccine, associated with saponin, as an immune adjuvant. The protective efficacy of the rEnolase plus saponin combination was investigated in BALB/c mice against *Leishmania infantum* infection. The results revealed that the vaccine induced higher levels of IFN-γ, IL-12, and GM-CSF when a capture ELISA and flow cytometry were performed, as well as an antileishmanial nitrite production after using *in vitro* stimulation with rEnolase and an antigenic *Leishmania* preparation. The vaccinated animals, when compared to the control groups, showed a lower parasite burden in the liver, spleen, bone marrow, and paws' draining lymph nodes when both a limiting dilution technique and RT-PCR assay were performed. In addition, these mice showed low levels of antileishmanial IL-4, IL-10, and anti-*Leishmania* IgG1 isotype antibodies. Partial protection was associated with IFN-γ production, which was mainly mediated by $CD4^+$ T cells. In conclusion, the present study's data showed that the *L. braziliensis* enolase protein could be considered a vaccine candidate that offers heterologous protection against VL.

Keywords: Enolase; vaccine; *Leishmania infantum*; *Leishmania braziliensis*; immune response.

Financial Support: Programa de Pós-Graduação em Ciências da Saúde: Infectologia e Medicina Tropical, Faculdade de Medicina, UFMG. FAPEMIG. CAPES. CNPq.