

Venom of two scorpion species can be used in developing drugs against the tropical disease Leishmaniasis

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Scorpions and their venom is a goldmine when it comes to finding molecules and toxins that can be used to develop medicines and other useful products for humans. One of the most known examples is Chlorotoxin, a peptid found in the venom of *Leiurus quinquestriatus* (Ehrenberg, 1828) (Buthidae), which has been used in the development of methods for the treatment and diagnosis of several types of cancer. There is a huge amount of research on scorpion venom going on these days.

D. B. Pereira and co-workers recently published a study where they showed that the venoms of *Brotheas amazonicus* Lourenço, 1988 (Chactidae) and *Tityus metuendus* Pocock, 1897 (Buthidae) can be used in the fight against the tropical disease Leishmaniasis (a zoonosis caused by parasites of the Trypanosomatida genus *Leishmania*). The authors hope that components in the venom can be used in the development of new drugs against this serious tropical disease.

Abstract:

Leishmaniasis is a vector-transmitted zoonosis caused by different species of the genus *Leishmania*, with a wide clinical spectrum. It is a public health problem aggravated by a series of limitations regarding treatment. In the search for new therapeutic alternatives, scorpion venoms are a source of multifunctional molecules that act against the natural resistance of pathogens. This work evaluated the antileishmanial potential of *Brotheas amazonicus* and *Tityus metuendus* venoms against the promastigote forms of *Leishmania amazonensis* e *Leishmania guyanensis*. The venoms of *B. amazonicus* and *T. metuendus* were evaluated for their constituents using Fourier Transform Infrared (FTIR). Growth inhibition and death of promastigotes were evaluated in the presence of different crude venom concentrations (100 µg/mL, 50 µg/mL, 10 µg/mL, 1 µg/mL) after one hour of incubation at 25 °C. The FTIR spectra of both venoms exhibited bands in approximate regions, revealing that both exhibit similar functional groups. Crude venom from both scorpion species showed similar or superior leishmanicidal effects to the standard drug N-methylglucamine antimoniate. At the highest concentration of 100 µg/mL, cultures of *L. guyanensis* treated with the venom of *B. amazonicus* showed the highest mortality percentages, above 28%, while *T. metuendus* venom showed the highest activity against *L. amazonensis*, with mortality above 7%. This preliminary study demonstrates that *B. amazonicus* and *T. metuendus* venoms can be important tools in the search for new drugs against leishmaniasis. Next step involves evaluating the activity against the amastigote forms and purifying the venom proteins in order to identify the best anti-leishmania candidates.

Reference:

Pereira D, Martins J, Oliveira M, Lima-Júnior R, Rocha L, Andrade S, Procópio R. Leishmanicidal activity of the venoms of the Scorpions *Brotheas amazonicus* and *Tityus metuendus*. Brazilian Journal of Biology. 2023;83:e276872. [Open Access]

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