mu-Theraphotoxin-An1a: primary structure determination and assessment of the pharmacological activity of a promiscuous anti-insect toxin from the venom of the tarantula Acanthoscurria natalensis (Mygalomorphae, Theraphosidae)

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Résumé en anglais	Tarantulas are included in the mygalomorph spider family Theraphosidae. Although the pharmacological diversity of theraphosid toxins (theraphotoxins) is broad, studies dedicated to the characterization of biologically active molecules from the theraphosid genus Acanthoscurria have been restricted to the investigation of antimicrobial peptides and polyamines produced by the hemocytes of Acanthoscurria gomesiana. The present study reports the purification, primary structure determination and electrophysiological effects of an anti-insect toxin, named mu-theraphotoxin-An1a (mu-TRTX-An1a), from the venom of Acanthoscurria natalensis - a tarantula species occurring in the Brazilian biomes caatinga and cerrado. The analysis of the primary structure of mu-TRTX-An1a revealed the similarity of this toxin to theraphosid toxins bearing a huwentoxin-II-like fold. Electrophysiological experiments showed that mu-TRTX-An1a (100 nM) induces membrane depolarization, increases the spontaneous firing frequency and reduces spike amplitude of cockroach dorsal unpaired median (DUM) neurons. In addition, under voltage-clamp conditions, mu-TRTX-An1a (100 nM) only partially blocks voltage-dependent sodium current amplitudes in DUM neurons without any effect on their voltage dependence. This effect correlates well with the reduction of the spontaneous action potential amplitudes. Altogether, these last results suggest that mu-TRTX-An1a affects insect neuronal voltage-dependent sodium channels, which are among possible channels targeted by this promiscuous toxin.
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