ABSTRACT

TITLE: Molecular Characterization of the Injected Venom of *Conus ermineus*

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Cone snails are predatory marine animals that rely on their venom components to immobilize and capture their prey. According to the type of prey preference, cone snails can be divided into three groups: vermivorous, molluscivorous and piscivorous. *Conus ermineus* had been identified as the only piscivorous snail of the Atlantic Ocean.

Cone snail venom is a complex and rich source of natural toxins. The majority of the components of the venom are peptidic in nature, and they act over different ionic channels and membrane receptors. Initial studies using mixture of venom collected from dissected venom ducts concluded that the venom from the same species do not exhibit unusual peptide polymorphism [Olivera, Hillyard, *et al.*, 1995] and that the only major difference between individuals of the same species are different concentrations of the venom components [Vianna, *et al.*, 2005].

For this study, peptides in the injected venom were collected from individual snails and characterized using analytical RP-HPLC for a maximum of three years. The different fractions collected were processed through capillary HPLC coupled with Q-TOF ESI-MS, and compared with analytical RP-HPLC fractions processed with MALDI-TOF MS.

This study demonstrates that there is an animal-to-animal variation in the peptide components of the injected venom. The injected venom remains relatively constant over time for specific specimens in captivity. Finally, there are some peptides that had been found in all specimens both by MALDI-TOF MS and by ESI-MS. In this study, these peptides are called “molecular fingerprint” peptides. Based on matches of their derived masses to those predicted by published cDNA sequences, nine novel peptides were putatively identified. This study establishes that variations due to enzymatic posttranslational modification are omitted when we consider only information extrapolated from cDNA.

The results of this study support the idea of the existence of a novel regulatory mechanism to expressed specific venom peptides for injection into the prey.