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Deciphering the Limitations and Antibacterial Mechanism of Cruzioseptins

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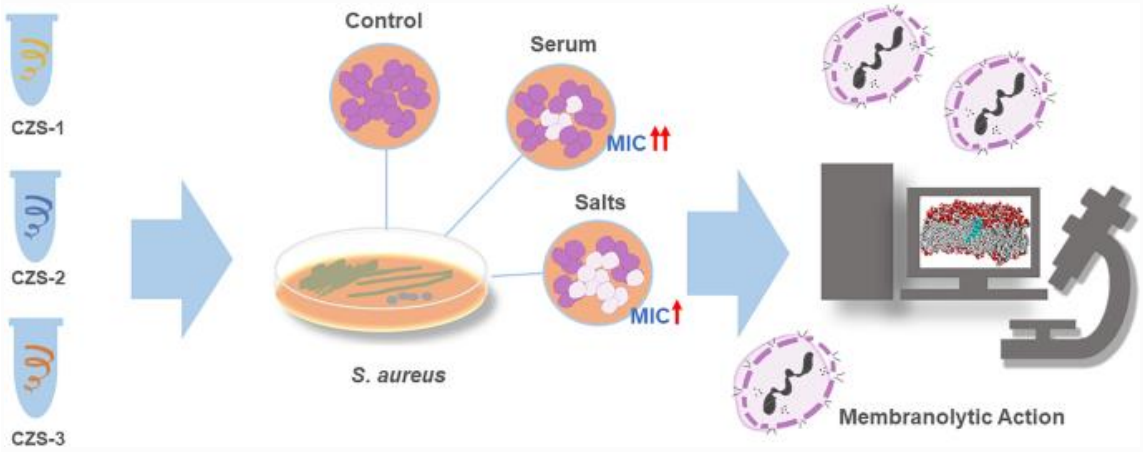
Abstract

Antimicrobial peptides consist mainly of membrane-active sequences, which are potentially relevant to antibiotic resistance era. In this context, a novel family of peptides isolated from the skin secretion of *Cruziohyla calcarifer* have been recently identified with wide and efficient antimicrobial effects. However, the mechanism underlying their antibacterial action remains unknown, as well as their activity under salt concentrations. For the primary purpose, spectrofluorometric and microscopic assays were performed using fluorescent intercalating agents. In silico study also were performed aiming to confirm the nature and energetics of the membranolytic interactions. The influence of proteolytic enzymes and salt concentrations was accessed by broth microdilution approach, mimicking physiological conditions. Cruzioseptins showed detergent-like properties, acting by a similar lytic mechanism characterized for others cationic peptides. An increase of up to three times the minimum inhibitory concentration was observed in presence of salts or serum. This represents an important challenge for the clinical use of peptide-based drugs. Overall, we ratify the antimicrobial potential of cruzioseptins and suggest paradigms that should be considered for translational medicine.

Graphical Abstract



Data Availability

All data generated or analysed during this investigation are included in this published article. Additional data will be made available on reasonable request.