

Evaluation of Novel Designed Antimicrobial Peptides Against Resistant *Gram-negative* Bacteria

Fensterseifer, I.C.M.^{1,2}, Porto, W.F.¹, Silva, O.N.¹, Santos, D.X.¹, Fernandes, G.S.¹,
Lima, L.G.N.¹, Franco, O.L.^{1,2}

¹ Centro de Análises Proteômicas e Bioquímicas, Curso de Pós-graduação em Ciências Genômicas e Biotecnologia, Universidade Católica de Brasília, Brasília, DF, Brazil; ² Molecular Pathology Post-Graduate Program, University of Brasília, Brasília, Distrito Federal, Brazil

INTRODUCTION: Due to rapid increase in the incidence of multi-drug resistant infections, new and more effective antimicrobial therapies are needed. AMPs (antimicrobial peptides) have emerged as a promising new therapy to be evaluated in the treatment of multiresistant infectious diseases. An alternative to the AMPs obtention is the rational design, aiming to improve bactericidal efficiency and reduce the possible adverse effects. **OBJECTIVE:** The present work focuses on checking the bactericidal activity of six rational designed AMPs created using the Joker algorithm. **MATERIAL AND METHODS:** Initially, a set of 36 peptides created by using the Joker algorithm was screened against a bioluminescent *Pseudomonas aeruginosa* strain. The six best AMPs (named PaAMP1B3, PaAMP1R3, EcAMP1R2, EcAMP1B3, PyAMP1B5 and PcAMP1R1) were synthesized by F-moc, evaluated by MALDI-ToF and then tested against *Escherichia coli* ATCC 8739 and clinical isolates of carbapenem resistant *E.coli* and *Klebsiella pneumoniae* (KPC). Hemolytic assays were also performed. **RESULTS AND DISCUSSION:** Initially all peptides tested showed no hemolytic activity and were able to kill the non-resistant strain of *E.coli* ATCC 8739 with MIC values ranging from 8-64 $\mu\text{g}.\text{ml}^{-1}$. MICs of all peptides were obtained against all bacteria challenged. The most active peptides against KPC were PaAMP1B3, PaAMP1R3 and EcAMP1R2 with MICs of 32 $\mu\text{g}.\text{ml}^{-1}$; and against carbapenem resistant *E.coli*, it was PaAMP1B3 with MIC of 16 $\mu\text{g}.\text{ml}^{-1}$. **CONCLUSIONS:** These results suggest that in near future, such AMPs can be used as a therapeutic possibility to control multiresistant bacteria.

Key-words: Antimicrobial peptides, Rational design, Resistant bacteria