CPPC 2021

sciforum

Abstract

Antibacterial Activity of Descys^{11}/Lys^{12}/Lys^{13}-(P-Bthtx-I)$_2$k Sequence Conjugated to Cell-Penetrating Peptides

Maria Carolina Oliveira de Arruda Brasil[1], Vanessa dos Santos Rodrigues[2], Warlley Campos de Oliveira[2], Paulo Ricardo da Silva Sanches[1], Norival Alves Santos Filho[3, 4], Cristiane Duque[5] and Eduardo Maffud Cilli[6]

[1] Institute of Chemistry of Araraquara- UNESP; caroloab@hotmail.com (M.C.O.d.A.B.); iqsanches@gmail.com (P.R.d.S.S.)
[2] Araçatuba Dental School - São Paulo State University (UNESP); vanessarodrigues_22@hotmail.com (V.d.S.R.); warlleygth@gmail.com (W.C.d.O.)
[3] Assistant professor at the São Paulo State University Júlio de Mesquita Filho-Unesp; norival.santos-filho@unesp.br
[4] Advisor professor in the postgraduate program in Biosciences and Biotechnology applied to Pharmacy (FCFAR-UNESP)
[5] Associate Professor (DDS, PhD), Department of Preventive and Restorative Dentistry, Araçatuba Dental School - São Paulo State University (UNESP); cristianeduque@yahoo.com.br
[6] Associate teacher at São Paulo State UniversityJúlio de Mesquita Filho (UNESP); eduardo.cilli@unesp.br
† Presented at the First Canadian Peptide and Protein Community Virtual Symposium, 27–28 May 2021; Available online: https://cppc2021.sciforum.net/

Published: 27 May 2021

Abstract: The resistance of microorganisms to antibiotics is occurring worldwide. An alternative against resistant bacteria has been antimicrobial peptides. Cell penetrating peptides are a family of peptides that are able to cross the biological membrane. In the present study, the peptide desCys^{11}/Lys^{12}/Lys^{13}(p-BthTX-I)$_2$K was coupled to the cell penetrating peptides PFVYLI, HIV-TAT (47-57) and AIP-6 to improve its antimicrobial action. The peptides were synthesized by SPPS. Circular dichroism spectroscopy was used to evaluated structure of conjugates. The biological activity was determined by broth microdilution tests and the minimum inhibitory concentration and the minimum bactericidal concentration were obtained. The hemolytic activity was performed to measure the toxicity against erythrocytes. The results obtained demonstrate that the peptides do not have a defined structure, which is consistent with the structure of desCys^{11}/Lys^{12}/Lys^{13}(p-BthTX-I)$_2$K. Conjugates showed activity against Gram-negative *E. coli* similar to the wild type peptide. However, the MIC decreased from 128 μM to values between 16 μM and 8 μM in Gram-positive *S. aureus*. Except to PFVYLI conjugate, hemolytic activity was not found. These results showed that the addition of the fusion peptides to the original peptide, improves the activity of the peptide against Gram-positive bacteria, without decrease its activity in Gram-negative bacteria.