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Abstract

Synergy between Antimicrobial Peptides Derived from Aurein 2.2 and IDR- 1018 and Commonly Used Antibiotics †

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Abstract: Antibiotic resistance has become a large public health problem due to the frequent and unrestricted use of antibiotics. Thus, there is an urgent need to find novel antibacterial therapeutics or a combination of antibacterial agents to treat antibiotic-resistant bacteria. This study investigated the synergy between two antimicrobial peptides (AMPs) and broad-spectrum antibiotics used against a number of ESKAPE pathogens, namely P. aeruginosa, S. aureus, A. baumannii and E. faecium. One of the AMPs, denoted peptide 73, was derived from the natural host defense peptide aurein 2.2 [1,2]. The other AMP (IDR-3002) was derived through in silico quantitative structure-activity relationship (QSAR) models [3]. The minimum inhibitory concentration (MIC) of each AMP was evaluated against each of the 4 strains listed above. Based on the MIC found for each AMP, a checkerboard assay was performed to investigate the synergy between the peptides and antibiotics, as expressed by the fractional inhibitory concentration (FIC). Neither peptide showed synergistic effects with antibiotics when tested against the Gram-positive bacteria (S. aureus and E. faecium). However, each AMP combined with polymyxin B showed synergistic activity against antibiotic sensitive strains of P. aeruginosa and A. baumannii. The results will be presented in light of using AMP/antibiotic combinations to combat antibiotic resistance.

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