Antibiotic Activities of Synthetic Peptide against the Clinically Isolated Multi-Drug Resistant and Biofilm-Forming Strains

Hae-Kyun Park[1], Sun Young Lee[1], Mi Hyun Kim[1], Jin Young Kim[1], Sun Oh Shin[1], Seong-Cheol Park[1], Yoonkyung Park[1,3], Song Yub Shin[1,2], Yong Lim[2] and Kyung-Soo Hahm[1,2 *]

[1]Research Center for Proteineous Materials (RCPM), [2]Department of Cellular & Molecular Medicine and [3]Department of Biotechnology, Chosun University, Gwangju, 501-759, Republic of Korea

The antibacterial activity of synthetic peptides against clinically isolated drug-resistant (MRSA and VRSA) and biofilm-forming strains were investigated. The 18-mer D-P5 peptide is an all D-amino acid isomer peptide of P5 which is an analogue of CA (1-8)-MA (1-12) hybrid peptide designed to increase not only net positive charge by Lys-substitutions but also hydrophobic helical region by Leu-substitutions in addition to the flexible region (GIG→P) substitution. Previously, we have shown the P5 peptide has a broad-spectrum antimicrobial activity with no cytotoxicity. Both P5 and D-P5 showed potent antibacterial activities in minimal inhibition concentration (MIC) by National Committee for Clinical Laboratory Standards (NCCLS) against various Gram-positive and Gram-negative bacteria including 10 clinically isolated multi-drug resistant strains. The peptide also showed a strong antimicrobial activity against several biofilm-forming strains. Our results suggest that peptide D-P5 can be an excellent candidate as a lead compound for the development of novel antiinfective agents.