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Effect of antimicrobial peptides against methicillin resistant *Staphylococcus aureus* isolates

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Staphylococcus aureus is a major pathogen responsible for both nosocomial and community-acquired infections. The severity of *S. aureus* associated infections ranges from benign localized skin abscesses to life-threatening diseases, such as arthritis, osteomyelitis, and endocarditis. *S. aureus* can adapt rapidly to the selective pressure of antibiotics, and this has resulted in the emergence and spread of methicillin-resistant *S. aureus* (MRSA). The extensive use and misuse of antibiotics have created the antibiotic resistance problem. Multi-drug resistant MRSA may enzymatically degrade the antibiotic, alter the antibiotic target site, or pump out the incoming antibiotic from the cell. This leap in the antibiotic resistance impairs the successful treatment of pathogenic infections. This progression leads to the fatal outcome and affects the economic burden of the country. Formation of biofilms by MRSA is another significant issue to control. It is estimated that biofilms account for up to 80% of microbial infections in the body. Biofilms also underlie importunate infections of implanted medical devices. Within a biofilm, bacteria display differential gene expression and are upward of 1000-times more resistant to conventional antibiotic treatment. Bacteria embedded in biofilms are often difficult to eradicate with standard antibiotic regimens and inherently resistant to host immune responses. As a result, treatment of many chronic *S. aureus* biofilm related infections, including endocarditis, osteomyelitis and indwelling medical device infections is hindered. Therefore a novel solution must be approached to curb this growing trend of drug resistance and formation of biofilms in MRSA. Antimicrobial peptides (AMPs) a growing class of natural and synthetic peptides, also presents a broad-spectrum activity. AMPs are small molecules and play an important role in innate immune system and are effective against multi-drug resistant organism due to unique mode of action. Hence, AMPs would be attractive targets against potential biofilm forming MRSA.

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