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Antibacterial properties of three newly identified recombinant *Staphylococcus aureus* phage endolysins

*S*taphylococcus aureus causes serious infections in humans and animals. Controlling of staphylococcal infections is becoming very difficult due to the emergence of multidrug-resistant strains. Therefore, search for novel antimicrobial alternatives has become of great importance. One of these new approaches is bacteriophage-encoded endolysin enzymes, which have exogenous lytic activity against multiple antibiotic resistant bacteria, especially in Gram positive bacteria. In this study, we described cloning, expression and functional analysis of three endolysins from temperate bacteriophages from three clinical isolates of *S. aureus* strains. Temperate phages were isolated from the host strains using the mitomycin C induction. The endolysin genes of the phages were amplified using PCR, cloned and over-expressed in *E.coli*. The lytic activity of endolysins were tested against a wide range of bacterial species using spot-on-lawn assay method. The combination of the three endolysins (LysSA10, LysSA14 and LysSA15) displayed activity against 222 of 239 (93%) of *S. aureus* strains including 67 MRSA and 6 ATCC type strains. In addition, endolysins showed lytic activity against other Gram positive bacteria including a number of clinical and type strains of *S. epidermidis*, *S. haemolyticus*, *Enterococcus faecalis*, *E. faecium*, *Streptococcus pyogenes*, *S. pneumoniae*, *S. intermedius*, *Bacillus subtilis*, and *B. atrophaeus*. No lytic activity was observed against 7 *Lactobacillus* and one *Listeria monocytogenes* ATCC type strains tested. Overall, our results showed that the combination of the newly identified three recombinant endolysins exhibited a broad host range against several Gram positive bacteria. Thus, these endolysins are promising antimicrobial agents for combating bacterial pathogens.

Biography

Ali O Kilic has completed his PhD at Oklahoma State University in Microbiology and Molecular Genetics in 1994, and Postdoctoral studies from University of Missouri-Kansas City. He worked as Res. Assist. Prof. at the Collage of Dentistry, University of Illinois at Chicago, as a project manager of Healthcare Domain at Air Liquide, and as a senior group leader at Vaccines and Biologics department of Pharmaceutical Product Development for over ten years. He has published more than 30 papers in reputed journals and has been working as full-time faculty member at School of Medicine, Karadeniz Technical University since 2013.

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