

INFLUENCE OF ADAMANTANE DERIVATIVE KVM-97 ON *cidA* GENE EXPRESSION IN *STAPHYLOCOCCUS AUREUS*

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Introduction. Biofilm formation is the preferred lifestyle for many microorganisms, including human bacterial and fungal pathogens (Santos ALSD et al., 2018). Biofilm bacteria are enclosed in a self-produced extracellular matrix composed of extracellular DNA (eDNA), proteins, lipids and exopolysaccharides. Extracellular DNA (eDNA) is a key structural component of biofilms that protects resident bacteria from the host's immune system and antimicrobial agents. DNA is adsorbed on the cell surface and spreads away from it, promoting adhesion to abiotic surfaces due to acid-base interactions. Cell lysis and eDNA release are regulated by the *cidA* gene. Inhibition of *cidA* expression reduces the ability of *Staphylococcus aureus* to form biofilms *in vitro* and *in vivo* biofilm growth models (Kelly C. Rice et. Al., 2007).

The aim of the study was to determine the expression of gene that regulate the production of eDNA in *S. aureus* under the action of an adamantane derivative 1-[4-(1-adamantyl)phenoxy]-3-(N-benzyl,N-dimethylamino)-2-propanolchloride.

Materials and methods. In this study bacterial strain *S. aureus* 222, resistant to oxacillin, chloramphenicol, ciprofloxacin, erythromycin, tetracycline, tobramycin was used. A derivative of adamantane KVM-97, used in the experiments, was investigated in concentration $0.5 \times$ minimum inhibitory concentration (MIC). The effect of the compound on expression of *cidA* gene was determined using real-time PCR. The relative gene expression level was calculated with $2^{-\Delta\Delta C_t}$ method (Livak K. J., Schmittgen T. D., 2001). The expression of 16S rRNA gene was considered as an internal control. The data obtained were compared by Newman-Keuls test ($p < 0.05$) (program «StatSoft «Statistica 6.0»).

Results. In previous studies, it was found that the compound KVM-97 exhibits antimicrobial activity against planktonic cells of *S. aureus* 222 and biofilms (N.O. Vrynchanu, N.I. Hrynychuk et. al., 2021). The KVM-97 treatment at a concentration of 0.5 MIC led to the considerable inhibition of the expression of *cidA* gene. The quantitative real-time PCR experiments demonstrated that the transcriptional activity of *cidA* gene was 7-fold less in *S. aureus* exposed to KVM-97 relative to control ($p < 0.05$).

Conclusions. The obtained data suggest that adamantane derivative KVM-97 exhibited anti-biofilm activity and reduced transcriptional activity of *cidA* gene in *S. aureus* 222 at sub-inhibitory concentration.