STRESZCZENIE W JĘZYKU ANGIELSKIM

Multidrug-resistant strains of *A. baumannii* cause a serious threat to life and health, especially in hospital environment, where they cause infections that are difficult to treat. Their resistance to most available antibiotics leads to high mortality rates, prolonged hospitalization and increased treatment costs. The purpose of this study was to evaluate the activity of ceragenin as a substance with potential for clinical application in the treatment of infections caused by multidrug-resistant strains of *A. baumannii*. It is supposed that ceragenins, as mimetics of AMPs – natural antimicrobial peptides of the immune system – can be an effective therapy with a low risk of developing resistance to these compounds.

The study was carried out using ceragenins CSA-13, CSA-44 and CSA-131. To evaluate their effectiveness, the effects of the test substances were related to the antibiotics used in therapy: ciprofloxacin, meropenem and colistin. The effect of ceragenins was tested on 66 strains of *A. baumannii* – 1 laboratory strain and 65 clinical strains. A minimum inhibitory concentration (MIC) assay was performed to determine the lowest concentration of compounds that inhibits bacterial growth, a minimum bactericidal concentration (MBC) was also measured, which indicates the lowest concentration of compounds capable of killing bacteria. The study was extended to perform a colony counting assay (killing assay) after adding ceragenin to a suspension of bacterial cells. The ability of ceragenins to prevent biofilm formation and its eradication was also investigated. The morphology of *A. baumannii* cells treated with ceragenins and their effect on rheological properties were examined using atomic force microscopy. The cytotoxic effect of ceragenins against lung cancer cells of the A549 line and the anti-adhesive effect of CSA-13 were also evaluated. The performed studies showed strong antimicrobial activity of ceragenins against clinical strains of *A. baumannii*, including carbapenem-resistant strains. The conducted research revealed that the action of ceragenins causes damage to the cell membrane of microorganisms as indicated by changes in the morphology of *A. baumannii* cells interacted with ceragenins. The ability of ceragenins to inhibit biofilm formation was also observed, as well as its eradication from the abiotic surface. An interesting observation of the reduction in the adhesion forces of *A. baumannii* to host cells with CSA-13, leading to a decrease in cell infection was found. The results of this research indicate that ceragenins have the potential to be used in the treatment of infections caused by drug-resistant strains of *A. baumannii*.

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