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Inhibition Of Bacterial Biofilm Formation by Carbosilane Dendrimers and Their Complex with Endolysin - In Vitro and Ex Vivo Approaches with Cytotoxicity Analysis on Fibroblasts

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Bacterial biofilm is a highly organized community of microorganisms that adhere tightly to each other and/or to solid surfaces, such as catheters, via a matrix composed of an exopolysaccharide substance. Consequently, intensive research is being conducted on dendrimers modified with metal ions (e.g. silver) and on antimicrobial proteins (e.g. endolysin) as a antibacterial compounds

The aim of the present study was to analyze the inhibition of P. aeruginosa PAO1 bacterial biofilm formation in the presence of three dendrimers, endolysin and their complexes and to assess cytotoxicity against VH10 fibroblast cells. Inhibition of biofilm formation was assessed by spectrophotometric Crystal Violet assay and Confocal Microscopy. The effectiveness of inhibition of PAO1 biofilm formation was also evaluated on a pig skin. Our study confirms that the level of bacterial biofilm inhibition depends on the type of dendrimer used, the presence of a complex with endolysin, and the concentration used. The cytotoxicity of the tested substances against VH10 was evaluated by the MTS assay. The cytotoxic effect increased with increasing concentrations of the test compounds with the addition of endolysin not significantly affecting the toxicity of the dendrimers

The results indicate that the use of dendrimers and their complexes with endolysin shows promising potential to combat bacterial infections