Abstract

Staphylococcus epidermidis is a common pathogen in medical device-associated infections. Its major pathogenic factor is the ability to form adherent biofilms. In this work, three S. epidermidis strains isolated from infected catheters were chosen with the objective of investigating the effect of D-glucosamine (D-Glu) on reactive oxygen species (ROS) production, adhesion and biofilm formation. The chemiluminescence and nitroblue tetrazolium reduction assays were used to determine ROS production by planktonic S. epidermidis and the microtiter plate assay to quantify in vitro biofilm formation. D-Glu generated a dose-dependent increase in ROS in planktonic cells with maximum stimuli at a concentration of 0.05 mM, and reduced adhesion and biofilm formation. On the other hand, glucose showed an antioxidative stress action and promoted biofilm adhesion and growth. This study suggests a potential application of D-Glu against infections associated with indwelling medical devices, since the oxidative stress caused by this hexosamine in planktonic S. epidermidis contributed to reducing biofilm formation.

Keywords

Staphylococcus epidermidis, D-glucosamine, Glucose, Reactive oxygen species, Biofilm