# Cerium and gentamicin antibacterial activity on loaded calcium-phosphates microspheres

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The average life expectancy is increasing, which leads to an increase of the pathologies associated with bone tissue that can be overcome with the bone substitutes. The use of antibacterial agents is an option often used to inhibit bacterial adhesion to biomaterials and to control biofilm formation and subsequent infections.

Calcium-phosphate porous microspheres, used as bone fillers, can be loaded with antibacterials aiming at preventing bone infections. Gentamicin is frequently used to treat and prevent bone infection and cerium is pointed as an alternative antibacterial substance. [1, 2]

The antibacterial activity and bacterial adhesion in the microspheres loaded with gentamicin and cerium chloride were evaluated.

The antibacterial effect was evaluated by a Kirby-Bauer method adaptation and the bacterial adhesion by the MTT test. Both studies were performed with *Escherichia coli* and *Staphylococcus aureus.*

The antibacterial activity studies showed that only microspheres with gentamicin have antibacterial activity for both species. Concerning bacterial adhesion studies, it was possible to conclude that both gentamicin and cerium chloride microspheres have the capacity to inhibit bacterial adhesion on their surface, moreover there was a higher adhesion inhibition effect on *Escherichia coli* than on *Staphylococcus aureus.*

Although cerium did not present antibacterial activity, it revealed the ability to inhibit bacterial adhesion, contributing to the possible control of the early stages of biofilm formation.

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