

Antimicrobial, thermally and visible light stable silver (I) cyanoximates that inhibit biofilm formation

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Technology description

Background

Hospital-acquired infections are becoming more prevalent worldwide. According to the CDC, 1.7 million patients in the US acquire infections during their hospital stay, which costs \$6.7 billion dollars annually. Fifty-four percent of hospital-acquired infections occur at surgical sites or in urinary tracts, and are increasingly caused by antibiotic resistant bacteria. Incorporating long lasting broad-spectrum antibacterial agents into the polymeric matrix for fixing indwelling medical devices has the potential to greatly reduce the number of hospital-acquired infections.

Summary

Known for their antibacterial properties, silver compounds are often incorporated in implant materials, such as bioglass and bone cement in order to reduce infection occurrence rates. However, the greatest challenge with those applications is that common silver (I) inorganic compounds are either leaching out, or become reduced to elemental silver upon exposure to light and heat.

Researchers from Oklahoma State University and Missouri State University have developed novel silver compounds that significantly improve the ability of silver-incorporating biomaterials to remain stable with exposure to light and heat. This group of silver (I) cyanoximates display remarkable resistance to high intensity visible light, heat, and have a broad range of solubility (from completely insoluble to relatively soluble). Importantly, researchers have demonstrated these complexes, when incorporated into polymeric composites, possess strong antimicrobial activity by inhibiting both planktonic and biofilm growth of several diverse human pathogens.

Application area

Bio-implants

Catheters

Water sterilization

Advantages

Entirely new class of compounds with a string and broad spectrum antimicrobial activity against Gram-positive and Gram-negative antibiotic resistant bacteria

Water insoluble, light and thermally stable

Can be readily incorporated into polymeric matrixes

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