

## ANTIBACTERIAL NANO-COATINGS

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### **Abstract**

For biomedical applications it is highly desirable to design surfaces which are toxic for bacteria whilst being harmless to eukaryotic cells. Nano-coatings prepared with our method fulfill this requirements. The method is fast, effective and versatile. Our nano-composite containing gold nanoparticles (AuNPs) may be deposited on both hydrophilic and hydrophobic surfaces. It means that different materials can be modified (i.e. glass, cotton, wood, natural and synthetic polymers, hydrogels). Modified materials displays strong antibacterial activity towards both Gram-positive and Gram-negative bacteria strains. Toxicity tests showed that - in spite of its antiseptic properties - the nanocomposite is harmless for mammalian cells. The main advantage of our approach is the durability of the obtained nano-coating, which justifies the use of more expensive AuNPs rather than silver (AgNPs). The bacteria are killed upon direct contact with the modified surface and not due to ion release or nanoparticle uptake. This is a great advantage because nanocoatings with immobilised antibacterial agents exhibit reduced development of drug-resistance. Moreover are regarded as having less adverse impact for the environment.

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