A novel antimicrobial coating killing antibiotic resistant clinical and waterborne pathogens

Microbial growth on medical and technical devices is a big health issue, particularly when microorganisms aggregate to form biofilms. Moreover, the occurrence of antibiotic-resistant bacteria in the clinical environment is dramatically increasing, making treatment of bacterial infections very challenging. In search of an alternative, we studied a novel antimicrobial surface coating based on micro galvanic elements formed by silver and ruthenium with surface catalytic properties. The antimicrobial coating efficiently inhibited the growth of all tested nosocomial pathogens, as demonstrated by growth inhibition on agar surface and in biofilms of antibiotic resistant clinical *Enterococcus faecalis, Enterococcus faecium,* and *Staphylococcus aureus* isolates. It also strongly reduced growth of *Legionella* in a drinking water pipeline and of *Escherichia coli* in urine.

To test the application of the antimicrobial coating in a microgravity environment, samples of the antimicrobial material were implemented in the BIORISK experiment on the ISS for different time periods ranging from 6 months to two years. Data on the microbial growth inhibitory effect of the material after 6 and 12 months exposition on the ISS will be presented.

We postulate a novel mode of action for the antimicrobial material which is based on the generation of reactive oxygen species together with the release of small amounts of silver ions resulting in a synergistic antimicrobial effect.