Nanostructured antibacterial coating of endoscopes by using atmospheric plasma sources

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Medical instruments are used frequently for the diagnosis and therapy of medical disorders. Contaminated surfaces of medical products have been shown to contribute to nosocomial outbreaks. The most frequently identified pathogens are staphylococci, including methicillinresistant Staphylococcus aureus (MRSA). Presently more than 20% of nosocomial *Staphylococcus aureus* isolates in Germany are MRSA [1]. In other countries, e.g. Japan, France or the United States, the proportion of MRSA exceeds 50% with increasing infections. In other reports the mortality rate of patients with device-associated infections varies from 35% to 45% [2].

For that reason the surface research for developing antibacterial materials using chemical or physical modification of the solid surface has been intensified in the last years. In this paper a novel concept was realized in order to prevent the colonization of MRSA and other pathogen bacteria on the surface of medical devices (endoscopes): Plasma based nanostructured coating technique was demonstrated in biopsy channel (lumen) of endoscopes. The coating with good biodegradable nanoparticles reduces the colonisation of multiresistant *Staphylococcus aureus* and other pathogen bacteria.

The nanoparticles can be removed using standard cleaning procedures between 60-80 ^{o}C. Thus, all adhering microorganisms and other contaminants in the endoscope channel can be removed. At the end of the cleaning procedure and treatment the coated endoscopes are in their original state with sterile surface and they are completely free of possible contaminations. To increase the integration potential of the foreseen process the work is focused on non-thermal atmospheric plasma source: “Plasmoscope”- a special plastic tube, which includes a helical electrode structure developed at INP. The work is supported by the BMBF under the contract acronyms and numbers: Endoplas 13N9324 and Nanogiene 13N11357.

References

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