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Nanostructured coating of endoscopes against MRSA contamination using atmospheric plasma sources

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Worldwide increasing nosocomial infections due to multidrug resistant pathogens are a challenge for modern medicine. Although basic hygienic measures proved substantial effectiveness by reducing the risk of nosocomial infections, additional efforts are necessary to limit the nevertheless emerging incidence of e.g. methicillin-resistant *Staphylococcus aureus* (MRSA) throughout the world. A novel approach in the containment of nosocomial infections would be the protecting of medical devices from contamination by nanostructured surface which inhibits the bacterial adherence. In this study the prevention of *MRSA*-colonization relevant for medical devices, especially of endoscopes was pursued: Plasma based nanostructured coating technique was demonstrated in biopsy channel (lumen) of endoscopes. The coating with nanoparticles reduces the colonisation of multiresistant *MRSA* and other pathogen bacteria. The developed coating procedure of inner lumina consists of three steps, namely pre-treatment of channel by means of plasma to get a hydrophilic surface; immersion the tube with nanoparticles containing suspension with subsequent drying and finally post-treatment of the channel with plasma to fix the nanoparticles. The nanoparticles and thus all still adhering microorganisms and other contaminants in the channel can be removed using standard cleaning procedures between 60-80 °C. The coated endoscopes are in the original state with sterile surface and completely free of possible contaminations at the end of the cleaning procedure and treatment. To increase the integration potential of the foreseen process the work is focussed on non-thermal atmospheric plasma source: “Plasmoscope”-a special plastic tubes, which include a helical electrode structure developed at INP. The work is supported by the BMBF under the contract acronyms: Endoplas 13N9324 and Nanogiene 13N11357.

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