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Improved Antibacterial Sandwich System for Urological Purposes

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Session: Biomolecules and Biophysics and Interfaces & Flash Session**Presenter:Sara Bröskamp,** *Munich University of Applied Sciences, Germany***Authors:**S.F. Bröskamp, *Munich University of Applied Sciences, Germany*
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In the anaerobic environment of kidneys and bladder which even lack the permanent presence of weak but always toxic oxidative reagents (like ClO_2^-) it is obvious that no Ag^+ ions can be generated by oxidation of a metallic silver film. However, it is well known that the antibacterial impact of Ag^+ ions which can act as a single ion is much higher than the effect of neutral silver nanoparticles [1]. In our efforts to define an effective membrane which is deposited on the interior and exterior surfaces of tubes which exhibit an aspect ratio of more than 100 (balloon catheters) we introduce a significantly improved coating which makes use of the soft oxidation of already deposited silver layers by a microwave or RF plasma [2]. This procedure not only improves the antibacterial effect but also extends the active time of the catheters. The silver oxide on top of the base silver layer which is deposited on an originally hydrophobic surface of an organic polymer by a well-known process is eventually topped by an organic layer of comparable thickness [3,4]. This coating with even thickness on the interior of the tubes has been extensively improved by a device which counteracts the decreasing vapor density of the film-building species by a well-definded temperature gradient [5]. In the case of ureteral stents, we make use of the series of drainage holes along the catheter which act as adjacent sources for the film-building monomer. This layer controls the antibacterial activity which can be effectively tuned by its porosity [6]. The oxidation of the silver also effectively prevents sulfidation by S-containing amino acids (cysteine) which can be present in the kidneys of patients. The silver release rate has been measured by atomic absorption spectroscopy (AAS).

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