SILVER NANOPARTICLES DEPOSITION ON TITANIUM SURFACE TROUGH SILANIZATION

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ABSTRACT

Titanium implants are known by their biocompatibility and corrosion resistance properties that have allow it to be one of the most used materials for bone replacement, dental implants, fracture fixation among others. Despite its great advantages, titanium is not aside of implant-related infections, which can affect the implant integration and its performance. As it is known, such infections are related to bacteria adhesion and biofilm growth [1]. Antibiotic resistance bacteria have arisen today as one of the most complicated health problems and it is necessary to seek for alternatives that can avoid bacteria surface colonization. It has been shown that silver ions are effective against Gram positive or Gram negative bacteria and that silver nanoparticles (AgNPs) present higher antibacterial effect than metallic bulk silver [2]. For this reason, AgNPs deposition on titanium implants surface has been widely studied. In this work, a facile method to covalently bond AgNPs to titanium surface mediated by silanization of the surface is reported. Synthesis and characterization of the AgNPs by UV-Vis, TEM and XRD will be presented as well as the characterization of the titanium surface functionalized with the AgNPs by SEM (Fig. 1 a), EDS and XPS. In addition, the antibacterial character of the functionalized surface against *Pseudomonas aeruginosa* was evaluated by the adhesion to Agar test, were a decrease of 183-fold in the amount of CFU was determined by attaching the AgNPs to the titanium surface compared to non-treated titanium (Fig. 1 b).

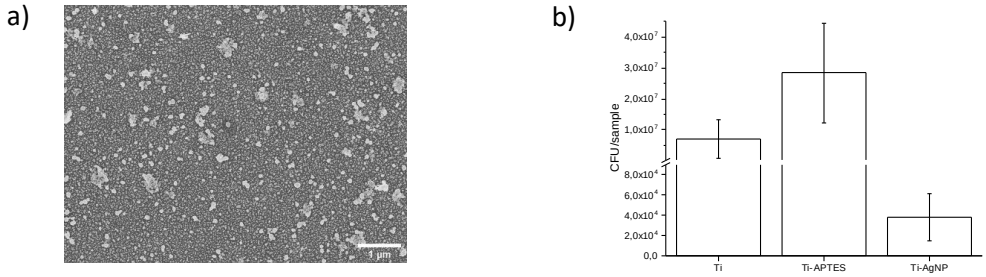

Figure 1. a) SEM image of AgNPs attached to titanium surface trough APTES silane, scale bar: 1 µm. b) Counts of CFU to non-treated titanium (Ti), silanized titanium (Ti-APTES) and titanium covered by AgNPs trough the APTES silane (Ti-AgNP).

[1] J.M. Sadowska, F.J. O'Brien, Mater. Today. 46 (2021) 136–154.
[2] A. Dey, A.K. Verma, Int. Nano Lett. 5 (2015) 223–230.