

Antimicrobial Activity of Zinc-Doped Hydroxyapatite Coatings Formed on Titanium Ti6Al4V Surface for Orthopedic Implant

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Prothetic joint infection (PJI) is one of the most serious complications of prosthetic joint implantation leading to a longer hospitalization. *S. aureus* is the predominant cause of PJI followed by *Pseudomonas aeruginosa* and *Stafilococcuspp.* coagulase negative. Several studies focused on the development of effective antibacterial surfaces that prevent bacterial adhesion, colonisation and proliferation into the surrounding tissues and it has been widely demonstrated that zinc ions (Zn^{2+}) exhibit antimicrobial activity against various bacterial and fungal strains. In addition to its antimicrobial activities, zinc is important in healthy bone growth and development. The aim of this study was to evaluate the *in vitro* activity of Zn^{2+} generated from the partial dissolution of Zn particles on surface of titanium discs, against *S. aureus* ATCC 29213. Hydroxyapatite (HA), and HA/ Zn^{2+} doped discs were used. Each disc was incubated with bacterial suspension following standard ASTM (American Society for Testing and Materials) method. After, colony-forming unit (CFU) were counted. The results showed 1,7 \log_{10} (97,8 %) CFU decrease vs untreated samples ($p < 0.05$), after 6 hours of incubation. To confirm quantitative data, morphological analysis was performed by Scanning Electron Microscope (SEM). On HA disc, bacteria, recognized by the typical spherical shape, colonized micro and nano porosities surface assuming an homogeneous distribution, while on the surface doped with Zn^{2+} , being smoother and less porous, the bacteria adhered to the surface in small colonies of about 2-10 bacteria. This new formulation of zinc coating could represent a promising approach for prevention and treatment of peri-implant diseases.

Biography

Francesca Sisto has graduated at the age of 24 years from Catania University (Italy) and postgraduated as Biologist from the same University. In 1996 she is specialized in Clinical Patology from Catania School of Medicine. From 2002 she is Assistant Professor of Microbiology at the Milan School of Medicine (Italy). She has published 48 papers in reputed journals and has been serving as reviewer of different journals.

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