Student Speech Contest 2024

Thin degradable coatings for optimization of osteointegration associated with simultaneous infection prophylaxis.

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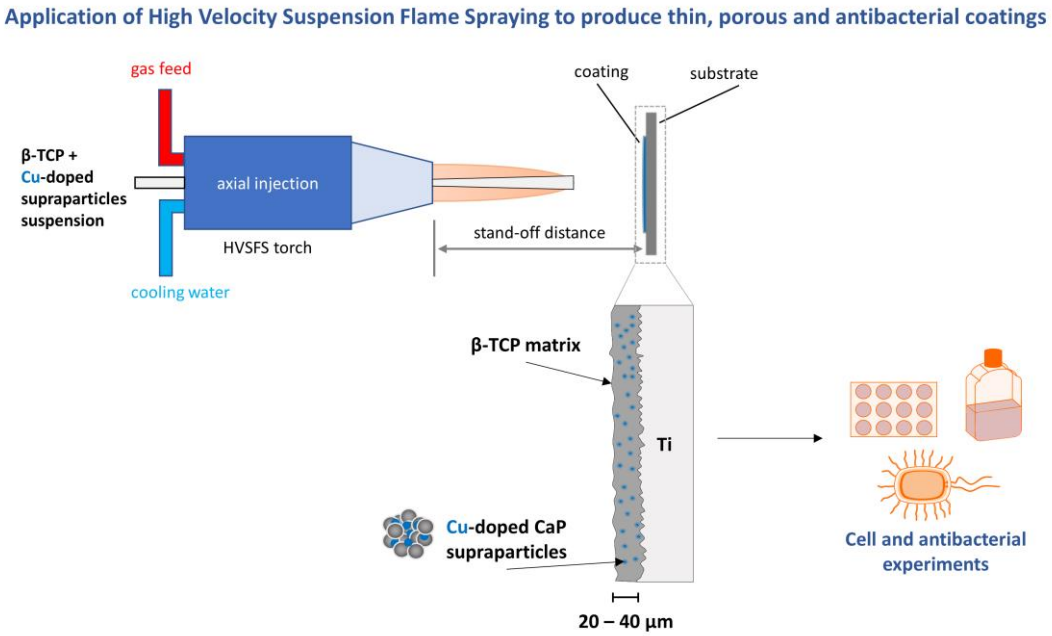

Abstract

Prosthesis loosening due to lack of osteointegration between implant and surrounding bone tissue is one of the most common causes of implant failure. Further, bacterial contamination and biofilm formation onto implants represent a serious complication after surgery. The enhancement of osteointegration can be achieved by using bioactive materials, which promote biological

response in the body stimulating bone growth and thus bonding to tissue. Through incorporation of antibacterial substances in bioactive, degradable calcium phosphate (CaP) coatings, faster osteointegration and bactericidal properties can be achieved. In this study, suspension sprayed calcium phosphate ceramic coatings with antibacterial properties have been prepared using high-velocity suspension flame spraying (HVSFS). Emphasize was set on the adjustment of the porosity, which allows cell infiltration throughout the coating and thus a better bone ingrowth. The porosity level was adjusted by using different suspension and spraying parameters. The antibacterial properties were achieved by implementing different spray dried Cu-doped CaP supraparticles into the coating layers. Biocompatibility was tested on human Osteosarcoma cells MG63 and antimicrobial activity against the bacterial strains Escherichia coli and Staphylococcus aureus was assessed.