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Osteoblastic differentiating potential of dental pulp stem cells on a chemically modified titanium surface

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Titanium implants characteristics are continuously modified to improve surfaces biocompatibility and to promote osteointegration. The aim of this study was to evaluate viability and differentiation of dental pulp stem cells (DPSCs) grown on two titanium surfaces. Experimental discs were divided into sandblasted/acid-etched group (control) and sandblasted/acid-etched coated with CaP ions group (test). DPSCs were cultured up to 28 days. Morphological analysis was performed by scansion microscopy (SEM), proliferation rate was evaluated by MTT assay, osteoblastic differentiating potential was analyzed checking the osteoblastic markers BMP2, RUNX2, ALP and Osterix, measuring the secretion of PGE2 osteoblastic differentiation mediator, and evaluating, through Alizarin Red staining, mineralized matrix deposition. The inflammatory effect was evaluated by interleukin 6 (IL-6) secretions. MTT assay and IL-6 secretion did not show any significant differences when DPSCs was cultured on test discs respect to control, even if SEM analysis evidences a higher secretome activity on test discs. An increase in PGE2 secretion level in test was recorded and all the osteoblastic markers, measured by means of real time RT-PCR, indicate a faster and stronger differentiation process on test discs, this result was also confirmed by Alizarin-red S assay which reveals significantly higher production of calcified extracellular matrix on the test discs. These results indicate that the surfaces could guarantee good cell viability along with a low inflammatory response and, at the same time they promote the osteoblastic differentiation, thus representing a good start point for future *in vivo* studies which aim to test the performances of the new surfaces in terms of in situ bone formation and osteointegration process.

Biography

Susi Zara has graduated in Pharmacy in 2006 and completed her PhD in 2009 from University of Chieti-Pescara, Italy. She is currently a Researcher at Pharmacy Department of Chieti's University. She has published more than 45 papers in international journals. Her fields of research are represented by intracellular signaling in the differentiation of mesenchymal stem cells on innovative biomaterials with a potential use in dental and orthopedic regenerative medicine.

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