DIFFERENTIATION TOWARD OSTEOGENESIS OF STEM CELLS FROM ADIPOSE TISSUE AND BONE MARROW: INTERACTIONS WITH NANOSTRUCTURED BIOMATERIALS

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Cell therapy realized by tissue engineering and expansion “ex vivo” of various cell types, has had applications in immunotherapy, organ transplant and renewal of tissues. To regenerate bone tissue are used techniques that provide the cell growth on biosynthetic materials suitable for stimulate and induct the osteogenesis. These materials are xenobiotic products, as alloys of Ti/Al/V or Ti/Nb/Zr, natural products as the hydroxyapatite (HA). In our study we evaluated the differentiation toward osteogenesis of the adipose tissue and bone marrow derived stem cell cultured on nanostructured biomaterials.
Our research are focused about the differentiation toward osteogenesis of adipose tissue and bone marrow derived stem cells cultured on four biomaterials: alloy of Ti/Al/V, nanostructured alloy of Ti/Nb/Zr and the same two alloys coated by hydroxyapatite. Therefore we carried out, using the above mentioned stem cells, the immunoenzymatic alkaline phosphatase determination and the quantitative analysis (RT-PCR) of the genetic expression of the most significant osteoblastic markers during all the differentiation period.
The cellular growth of the adipose tissue and bone marrow derived stem cell is better on two naked alloys than that on the same alloys coated by hydroxyapatite, however, are never revealed toxic phenomena. On the four biomaterials are maintained during all the differentiation period the osteoblastic phenotype with comparable results between primary coltures from adipose tissue and bone marrow. Therefore, these biomaterials seem to be effectiveness to the differentiation toward osteoblastic cell type of the adipose tissue and bone marrow derived stem cell.