Biocompatibility of Ti-6Al-7Nb alloys with particle size and modified surfaces as implant for bone regeneration

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Titanium-based materials are widely studied for biomedical applications since they offer biocompatibility, mechanical resistance and durability. The production of metal alloys with different combinations is common to obtain the desired properties. Herein, the influence of grain size and surface modification in the biocompatibility and biomineralization was evaluated and discussed in titanium-based alloys. The chemical composition of Ti-6Al-7Nb (ASTM F1295) alloy was, in weight: Ti-base, Al – 6.17 %, Nb – 7.05 %, Fe – 0.14 %, O – 0.17 %, C – 0.01 %, N – 0.03 %. Ultrafine-grains (UFG) and coarse grains (CG) samples were submitted to acid treatment (concentrated phosphoric acid ate 80ºC during 30 minutes) and alkaline (NaOH solution at 60ºC during 24 hours) treatment to surface modification. Discs with thickens of 2 mm and diameter of 12 mm were used in the experiments. The following tests were performed: protein assay and bioactivity tests. We evaluated the *in vitro* cytotoxicity of samples using a human osteoblasts cell line (MG63), using the protein assay after incubation for 14 days. Both groups showed no toxic effect in human osteoblasts, providing a great biologic compatibility. The statistical analysis between control and alloy groups resulted in $P > 0.05$ indicating there was no statistically significant. Although Ti-6Al-7Nb alloy was indifferent in ALP activity after 14 days, being that ALP activity occurs during osteoblasts differentiation and calcification of bone matrix. !The non-interference in ALP activity, demonstrates an important property of this alloy, showing that probably this material does not interfere negatively with osteoblasts differentiation. Further *in vitro* studies are needed to investigate the influence of this material on other proteins involved in the bone repair process. Bioactivity tests are been performing and will presented.