

Preparation of porous ternary alloy Ti-34-Nb-6Sn / Mg for the implant

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Titanium alloys are designed in order to provide attractive mechanical properties, including Young's modulus, high mechanical strength and biocompatibility [1]. These properties are achieved when titanium structured under β phase, and the selection of non-toxic beta-stabilizing metals is important for the improvement of the alloys. In order to create a good interaction at the bone-implant interface, it is interesting that these biomaterials also have adequate porosities for the bone cells to adhere on its surface, and the bone tissue to grow around the prosthesis. Thus, the purpose of this work was to produce the Ti-34-Nb-6Sn alloy by the powder metallurgy technique allied to the magnesium space holder. After the synthesis, the structure of the material was characterized by X-ray diffractometry (XRD) and its morphological and compositional analysis, carried out by Scanning Electron Microscopy (SEM) and X-ray dispersive energy (EDX). The apparent porosity analysis was made by the Archimedes method. In the biological assay, stem cells derived from equine bone marrow were seeded on the surface of the materials in order to obtain information about cytotoxicity and cell adhesion. The results of XRD and MEV confirmed the formation of the alloy (PDF: 25-977), being that the proportion of phase β was greater than the phase α (PDF: 44-1288,41-1352), and the evaporation of Mg, as well as a significant increase of porosity, which was also confirmed by the Archimedes method. Additionally, according to SEM, the cells showed good adhesion on the surface of the material, as well as inside the formed pores. According to the techniques used, it was then possible to obtain β phase rich titanium alloy with significant porosity on which the cells adhered satisfactorily.