STUDY OF NEW TITANIUM-BASED ALLOYS AS BIOMATERIALS AND THEIR CYTOTOXIC POTENTIALS

Dante Oliver Guim Corrêa [1]
Gerson Santos de Almeida [2]
Willian Fernando Zambuzzi [3]
Carlos Roberto Grandini, FBSE [4]

ABSTRACT

Biomaterials can be defined as synthetic or natural devices, which come into contact with the body. With the discovery of the concept of biocompatibility, these biomaterials began to have greater clinical use[1]. Both biocompatibility and cytotoxicity will be determined by several factors, including physicochemical properties and how they will be delivered to the body[2]. Certain popular titanium alloys on the market have been studied due to their cytotoxic action[3], and this, new research to find titanium alloys that do not show cytotoxicity began to emerge[4]. This work aimed to test new titanium alloys in osteogenic cells to observe their cytotoxic action, belonging to the Ti-Mo-Mn, Ti-Ta-Zr, and Ti-Mo-Nb systems. From the indirect cytotoxicity test (MTT), the cell viability of titanium alloys was determined. After preparation of the culture medium conditioned to titanium alloys, fed with fetal bovine serum, 1,0 mg/mL of Thiazolyl Blue Tetrazolium Bromide salt was added, and the sample was kept in an oven for three hours. The medium was removed, and 0.1 ml of DMSO added to solubilize the dye formed by viable cells. Absorbance was measured at 570 nm using a microplate reader. For cell adhesion, the culture medium that came into contact with the alloys was incorporated into the Violet Crystal, and the absorbance at 540nm was measured with a microplate reader. The results obtained were positive using the ISO-10993 standard, which state that a biomaterial is only considered cytotoxic if it is below 70% of cellular absorbance. All the tested new alloys had a result above 70% in cell viability. Even those below the control group had a positive result, as this factor is not considered to measure cytotoxicity. For cell adhesion, almost all results were above the control group, showing a stimulus for cell adhesion, one of the most interesting results of the work. Compared with alloys already studied in the literature, the new alloys presented in this work had less cytotoxic action. Thus, the tested alloys had the initial potential to be used as biomaterials, and further tests could be carried out to.

[1] Graduando do Curso de Ciências Biológicas da Universidade Estadual Paulista – UNESP/Bauru, diana.guim@unesp.br;
[2]Doutorando do Instituto de Biociências da UNESP/Botucatu, gs.almeida@unesp.br;
[3]Prof. Adjunto do Instituto de Biociências da UNESP/Botucatu;
[4] Professor orientador, Prof, Titular do Depto. Física e POSMat, UNESP/Bauru , carlos.r.grandini@unesp.br.

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