INFLUENCE OF THE ANNEALING HEAT TREATMENT IN THE CYTOTOCITY *IN VITRO* OF Ti-15Nb ALLOY

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1. Introduction

Titanium and Ti-4Al-4V alloy have been largely used in the production of prostheses and special medical and dental devices due to their properties [1]. However, recent studies Ti-6Al-4V alloy have been shown that vanadium (V) and aluminum (Al) are associated to cytotoxic effects that are responsible, respectively, for causing adverse reactions in tissues and neurological disorders as Alzheimer [2]. Recently, the new alloys without these elements are being studied. The promising alloys containing different wt% niobium (Nb), tantalum (Ta), zirconium (Zr) and molybdenum (Mo) have been investigated [3].

2. Experimental

In vitro cytotoxicity analysis (MTT): MC3T3-E1 cells (density of 2 x 10^4 cell/well) were cultured on Ti-15Nb with base medium. For testing direct cytotoxicity, the cells were plated under the surface of the material. For indirect cytotoxicity, the extracts of the alloy (1g/mL for 7 day at 37°C) were obtained and then the culture medium was substituted by the obtained extracts. In both tests, the preparation was made for the absorbance reading. Glass was used as negative control, while a solution of α-MEM, 10% of FBS, and 1% of phenol was the positive control. Micromorphological analysis: The cells were plated under the surface of the alloy. After 48 hours, the samples were examined in a EVO LS-15 scanning electron microscopy (Carl Zeiss). Glass was used as negative control, while a solution of α-MEM, 10% of FBS, and 1% of phenol was the positive control.

3. Results and Discussions

The results demonstrated that the annealing heat treatment in Ti-15Nb alloy no presented cytotoxic effects on the osteogenic cells – Figure 1 A-B. The cells maintained their morphology showing the numerous and long citoplasmatic processes on the Ti-15Nb alloy indicating a excellent cell adhesion (Figure 2).

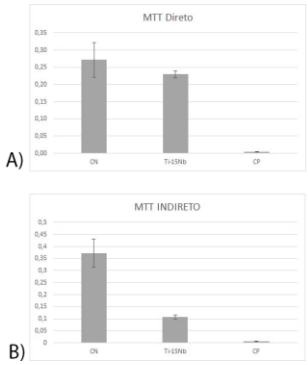

Fig. 1: *MTT in MC3T3-E1 cells cultured for 48 hours on Ti-15Nb alloy after annealing heat treatment. A) Direct cytotoxicity test B) Indirect cytotoxicity test. PC: Positive Contro – 1% phenol; NC: Negative Control – glass.*

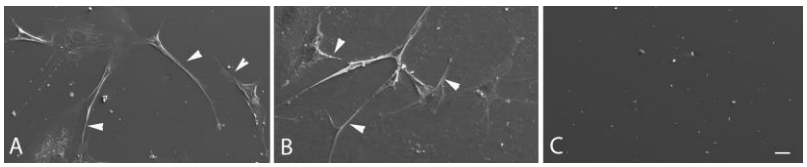

Fig. 2. *SEM in MC3T3-E1 cells cultured for 48 hours on Ti-15Nb alloy after annealing heat treatment. A) NC: Negative Control - glass; B PC: Positive Contro – 1% phenol. Arrowhead: citoplasmatic processes. Bar = 20 µm*

4. References

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