In vitro evaluation of MG-63 cell adhesion in DLC films containing titanium dioxide nanoparticles for bone regeneration

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DLC coatings are useful for the designing of the biocompatible surfaces for biomedical implants [1]. In the last recent years, various authors have reported the production and characterization of TiO_2-DLC films for biological applications [2-3]. The interaction of cells with the surfaces of materials has an extreme importance for the effective use of these medical implants [4], and may define the degree of rejection. The material used in the implants cannot be rejected and cannot cause an inflammatory response, and should also be biocompatible [5]. On these studies, no adverse effects were reported in cells with contact, so the DLC films could be considered biocompatible [6]. The purpose of the current articles is to investigate the *in vitro* biocompatibility of DLC and TiO_2-DLC films using two different techniques: (i) contact angle/ surface energy (before cell interaction material) (ii) cell adhesion. Increases with increasing concentration of TiO_2 in the films. Multiple factors are likely to mediate this enhancement, such as the increasing of the surface roughness, decreasing of water contact angle (increasing of hydrophilic character) and increasing of the total surface free energy due to the higher polar component. Samples with stell, DLC, TiO_2 -DLC (0.1 g/L) and (0.5 g/L) films were used in all assay. The absorbance values in osteoblasts of humans (MG-63) in the samples of Steel, DLC, TiO_2-DLC (0.1g / L) and TiO2-DLC (0.5g / L) samples after 24 hours . Averages and standard deviation of three experiments (triplicate). The results were presented as a percentage of the cell in relation to the positive control (cells only). There were no significant changes in cell adhesion in relation to the DLC and the positive control. An adhesion index is higher in TiO_2-DLC films (0.5 g / L) compared to the other groups. These results show that the humans Osteoblasts to DLC films can be improved with the presence of TiO_2 nanoparticles. In order to be used for bone regeneration.

Keywords:, Diamond-like carbon, titanium dioxide nanoparticles cell adhesion, osteoblasts of humans, *in vitro*

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