

## **Influence of the contact angle/interfacial tension in the adhesion of fibroblast and pre-osteoblast cells into diamond film.**

W. Silva-1<sup>1,\*,#</sup>, D. Oliveira-2<sup>2</sup>, C. Marques-3<sup>3</sup>, A. Tabata-4<sup>4</sup>, M. Saequi-5<sup>5</sup>, L. Medeiros-6<sup>6</sup>, D. Macedo-7<sup>7</sup>, W. Bailo -8<sup>1</sup>

<sup>1</sup>Instituto de Biotecnologia-Unesp e Faculdade de Ciências Agrônomicas de Botucatu Departamento de Bioprocessos e Biotecnologia, Rua José Barbosa de Barros, nº 1780, Botucatu, SP, Brasil, CEP: 18610307.

<sup>2</sup>Instituto de Biotecnologia (IBTEC), UNESP e Faculdade de Medicina de Botucatu, UNESP, Brasil, CEP: 18618687.

<sup>3</sup>Universidade Estadual Paulista Júlio de Mesquita Filho, Faculdade de Ciências de Bauru, Departamento de Física, Brasil, CEP: 17033360.

<sup>4</sup>Universidade Estadual Paulista Júlio de Mesquita Filho, Instituto de Biociências, Departamento de Química e Bioquímica, Brasil, CEP: 18618689.

<sup>5</sup>Universidade Estadual de Santa Cruz – UESC Departamento de Ciências Exatas e Tecnológicas – DCET, Brasil, CEP: 45662900

<sup>6</sup>Universidade Estadual Paulista Júlio de Mesquita Filho Departamento de Bioprocessos e Biotecnologia, Brasil, CEP: 18610307

#Corresponding author: williammelosilva@gmail.com

Titanium alloys have interesting mechanical strengths and high corrosion resistance and are commonly used as medical prostheses or dental implants<sup>(1)</sup>. However, a minimum quantity of metal debris can cause inflammatory response from the tissues. Considering, that wear reduction can be achieved mainly associated with improvements in the surface of materials, the use of coatings with high chemical inertness capacity is a reasonable strategy to modify titanium alloy surfaces. In this regard, some studies have shown promising results with carbon-based coatings, such as diamond-like carbon<sup>(2, 3)</sup> and diamond films<sup>(4)</sup>. This work aims to coat Ti-6Al-4V alloy with diamond and study the influence on the adhesion of fibroblast cells and osteoblast on the surfaces. For this, three different conditions of the titanium alloy were investigated - smooth, rough and diamond coated. The coating was characterized by conventional techniques, such as morphological surveys by scanning electron microscopy (SEM), confocal profilometer, Raman backscattering spectroscopy and video-based optical contact angle measurement, to verify the diamond film quality, thickness, roughness and Id/Ig ratio. Cytotoxicity and cell viability essays were performed using human fibroblasts and the pre-osteoblast cell line MC3T3-E1, respectively, for the biocompatibility evaluations. In the end, the results of the surface wettability are correlated with the cell adhesion behavior."

[1] Olivares-navarrete, R. *et al.* The Spine Journal, **12**, (2012) 265.

[2] Rubstein, A. *et al.* Diamond & Related Materials, **22**, (2012) 128.

[3] Rodrigues, A. M. *et al.* Materials Research, **16(1)**, (2013) 252.

[4] Swiatek, L. *et al.* Diamond & Related Materials, **67**, (2016) 54.