ADHESION AND CHARACTERIZATION OF RGD ON AFM'S TIP

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The nanotopography of the biomaterials and adhesion nanoforces of the biomolecules to materials are the aims of that project. An atomics forces spectroscopy system (Digital Instruments PicoForce System) coupled to a Digital Instruments Multimode (SPM-AFM) is used in INASMET Foundation. The possibility of calculating the adhesion force of biological molecules linked to a material is one of the many applications that this system has. These studies allow us to know more intimately the organic-inorganic interface and the intermolecular forces.

As the adhesion force is calculated by means of molecular traction assays, the tip must be superficially functionalizated with specific groups according to the molecule that we want to study. Therefore, the tip must be functionalizated with functional groups that allow the adhesion with the molecule in study.

Nowadays, due to the novelty of the technique, the functionalizated tips have a high cost and the stability of the immobilized functional groups is very short. Therefore, in this project we pretend to deepen in the stability of the tips and their functionalization.

The functionalization with RGD (Arg-Gly-Asp) is the priority we have started to work in. RGD is a very important molecule in biomaterials study [1,2,3], this peptide is present in a lot of proteins of the extracellular matrix and cellular receptors recognize this adhesive sequence. In the first phase we have studied the method to obtain a high distribution of the immobilized RGD (figure 1), now we are going to assay this method in AFM tips functionalization. Later we will try to measure the force adhesion of the osteoblast to different materials. These assays are very important to certificate the biocompatibility of the material.

Techniques such as Raman Scattering, Atomic Force Microscopy (AFM), X-ray Photoelectron Spectroscopy (XPS), Infrared spectra with Fourier transformation (FTIR-ATR) have been used for characterization of the samples.

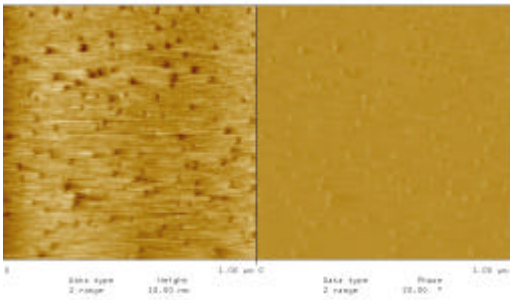
References:

[1] Kay C. Dee, Thomas T. Andersen, Rena Bizios. *Biomaterials* 20 (1999) 221-227.
[2] Ulrich Hersel, Claudia Dahmen, Horst Kessler. *Biomaterials* 24 (2003) 4385-4415.
[3] Stylianos Kouvroukoglou, Kay C. Dee, Rena Bizios, Larry V. McIntire, Kyriacos Zygourakis. *Biomaterials* 21 (2000) 1725-1733.

Figures:

Figure 1.

RGD immobilized



RGD deposited