Abstract

One of the most challenging tasks in our days for the treatment of surfaces in general, is the modification of the polymers for applications which concerning biomaterials. At this level the materials must perform some specific properties and especially their surfaces. For example the implants must maintain for at least ten years their mechanical properties at the corrosive biological environment which they stand. At the same moment the biocompatibility must be secured. For that reason, it is necessary a reliable microscopically interaction between the artificial and the natural material to achieve the desirable attachment of cells of different species.

It is known today that the chemical composition and the morphology of the polymer surface is an important factor for their compatibility with biological systems. The physicochemical properties of the surface affect the attachment of proteins therefore and the biocompatibility of the material.

And answer to all these demands is the promotion of surface fictionalization techniques in order to introduce the desired type and quantity of reactive functional groups.

An example of a reactive functional group is the amino group (NH_2). The creation of amino groups on the surface of polymers is a very good promising method because of the ability of the amino groups to provide an excellent base for a multiple surface modification with an ulterior purpose the attachment of biomolecules with high selectivity.

The polymeric substrates were PET/SiOx surfaces. These materials are suitable for biomedicine and many other applications because of their bulk properties. However the surface of PET has a preadaptation for the attachment of proteins and in wetability. Material properties may include elasticity, origin, conductivity, strength, optical clarity and degradability. Several polymers have been selected as substrates for biomolecule immobilization intended for a variety of applications.

In this work we describe the chemical and physical properties of biotin (biotin-PEG) and methoxyl terminated PEG (M-PEG) films. These films are formed with a two-step chemistry based on the spontaneous adsorption of poly (ethyleneimine) (PEI) on to PET/SiOx surfaces. PEI introduces free amino groups on to the surface and therefore the two PEG derivatives (mPEG-NHS-Ester and Biotin-PEG-NHS Ester) which we used can react with the aminated surfaces. After that we add streptavidin who reacts with biotin and this is the tool to introduce on the surfaces successfully, molecules of GFP protein.

The chemical and physical properties of the films before and after treatment were studied with ellipsometry, atomic force microscopy and confocal microscopy.