

Micro to nano bio-interfaces for biomedical applications

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Synthetic state-of-the-art biocompatible surfaces that present defined chemical patterns (2D) of proteins or topographic structures (3D) have been widely developed in the last years as simplified models to study cell-cell or cell-extra cellular matrix interactions. We have used microcontact printing (MCP) and lithography techniques to easily fabricate 2D and 3D unique Glycosaminoglycans bio-interfaces for the study of stem cell differentiation.

On the other hand, in the field of nano-medicine, the fabrication of nano-bio-structured interfaces together with photonic label-free detection biosensors, such as surface plasmon resonance (SPR) has a deep impact for detecting various kinds of biomarkers with ultra high sensitivity. Therefore, we are investigating the use of extra-ordinary bio-functionalized gold interfaces structured in periodic arrays of nano-holes for medical diagnosis, based on a molecular detection at the femto molar level in real samples obtained from the patients.