SURFACE CHEMICAL MODIFICATION OF POLY(DIMETHYLSILOXANE) FOR ENHANCING STABLE ADHESION
OF HEPATOCYTES

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Nowadays, application of poly(dimethylsiloxane) (PDMS) in biomedical microfluidic devices for cell culture has become very popular. In particular, PDMS-based platforms have been increasingly used for in-vitro cellular system analysis directly on-chip. However, studies\textsuperscript{[1,2]} have shown that the hydrophobicity of the PDMS surface is unfavorable to achieve an adequate cell adhesion and proliferation since the physical adsorption of extracellular matrix proteins on these surfaces is unstable, decreases with time and causes cells dislodging from the surface. For this reason, a durable hydrophilic and protein-resistant surface of PDMS is desirable for the construction of a hepatocyte culture platform, which has potential applications in drug testing and drug discovery.

In this work, we have used micro-contact printing (uCP)\textsuperscript{[3]} to deposit protein patterns on PDMS substrates. The polymeric stamps were fabricated with replica molding from conventional photolithographic molds and from direct laser ablated microstructures to test the impact of stamp roughness. Furthermore, the PDMS surface was chemically modified functionalizing it with (3-aminopropyl)triethoxysilane (APTES) and glutaraldehyde (GA) and thus, immobilize Collagen Type I by covalent binding. Cell adhesion was evaluated by immunofluorescence staining of focal adhesion kinase (FAK) and proliferation with the MTT assay.

The aim is to study if these surface modifications promote the adhesion and viability of hepatocytes for a longer time in comparison with polystyrene plates.

Keywords: PDMS, micro-contact printing, hepatocytes

References:


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