

# SURFACE PREPARATION AND EVALUATION FOR BIOINTERFACES

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**INTRODUCTION:** Bio-functional surfaces are central for medical implants, tissue engineering scaffolds, biosensors and biochips. The bio-functionality is achieved by a combination of surface topography, surface (bio)chemistry, and visco-elastic properties.

**METHODS:** In the present work we use lithographic techniques for surface patterning, supported phospholipid bilayers – with or without functional biomolecules in the bilayers – for surface (bio)chemical modification, and various metal or ceramic substrates as platforms. Experimental techniques for characterization include QCM-D, XPS, FTIR, SPR, TEM/SEM. The prepared surfaces are evaluated through adsorption studies with biomolecules and in cell culture studies.

**RESULTS:** By proper choice of material surface, unilamellar vesicles can be deposited to create supported phospholipid bilayers (SPB) or monolayers of intact vesicles. By suitable “doping” e.g. by biotin, additional overlayers can be deposited by using biotin-streptavidin coupling. Patterned surfaces for cell studies are made with photo- or electron beam lithography, and by using colloidal particles to define surface patterns. Specific cell culture results include an increased differentiation of rat calvaria osteoblasts on microstructured silicone surfaces with pyramids and an altered cytokine release pattern of uroepithelial cells on surfaces with defined nanoscale versus microscale topographies.

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