

Microscopy of Material Surfaces for Tissue Engineering

Václav Švorčík¹, Petr Slepčka¹, Jakub Siegel¹, Oleksiy Lyutakov¹, Nikola Slepčková Kasálková¹, Kateřina Kolářová¹, Alena Řezníčková¹, Zdeňka Kolská²

¹Department of Solid State Engineering, University of Chemistry and Technology, Technická 3, 16628 Prague, Czech Republic. E-mail: vaclav.svorcik@vscht.cz; petr.slepcka@vscht.cz; lyutakoo@vscht.cz; nikola.kasalkova@vscht.cz; vaclav.svorcik@vscht.cz; katerina.kolarova@vscht.cz; alena.reznickova@vscht.cz

²Faculty and Science, J. E. Purkyne University in Usti nad Labem, 400 01 Usti nad Labem. Czech Republic. E-mail: zdenka.kolska@ujep.cz

The field of material surface modification with aim of biomaterials construction involves several approaches based on surface treatments that allow to prepare materials, which support the cell adhesion and proliferation and thus aid and improve the tissue formation. Modified materials have a surface composition and morphology intended to interact with biological systems and cellular functions. Not only surface chemistry has an effect on material biological response, surface structures of different morphology can be constructed to guide a desirable biological outcome. Nano-patterned material surfaces have been tested with aim to determine how surface geometry, physical and chemical properties on a micro- and nano-scale can affect cellular response and influence cell adhesion and proliferation. Surface physico-chemical properties (e.g. chemistry, morphology, wettability, electrical conductivity, optical and mechanical properties) of treated surfaces were determined. The enhancement in cell adhesion and proliferation on modified substrates was studied *in vitro*. Bactericidal action of noble metal nano-particles (e.g. Au, Ag) on polymers was characterized. The influence of metal nano-particles grafting by using metal nano-particle suspension prepared by "green" methods was determined.

Keywords: Polymer, Surface Treatment, Morphology, Cells, Bacteria, Surface Characterization

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