

**DR-11****Development of biocompatible glass substrate with surface nanotopography**

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The wide application of nanomaterials allows us to reconsider common methods in various fields of science. Thus, in biology science, both submolecular and molecular interactions play a major role in cell processes and nanomaterials have great potential of application due to their selectivity in cellular mechanisms.<sup>1</sup> For example, it is possible to control both the cell-cell interaction and the cell-substrate interaction by iron oxide magnetic nanoparticles (MNPs), defining the cell fate.<sup>2</sup> Besides MNPs exhibit unique magnetic properties that increase controllability in the development and the usage of biocompatible glass substrate.<sup>3</sup>

In this study, we introduce the method of coating of the glass surface by magnetic nanoparticles. The nanoparticles were synthesized by the method of chemical co-precipitation of iron salts in aqueous solution. Cytotoxicity of MNPs at concentrations of 24-360 µg/well was measured by colorimetric assays (MTT-assay and resazurin redaction assay) on Human skin fibroblasts (HSF) in 96-well plate after 24 hours of exposure. Magnetic nanoparticles were characterized by atomic-force microscopy (AFM), DLS technique and hyperspectral imaging. Modification of the glass surface was based on the principle of self-assembly of nanoparticles. The surface nanotopography of substrate was examined by AFM and dark-field microscopy. Morphology changes of cells were observed with confocal and bright-field microscopy.

DLS results showed that size and zeta-potential of MNPs was 141,7±2,8 nm and -48±1,9 mV respectively. Spectral libraries of nanoparticles were collected by the method of hyperspectral imaging. Morphology of synthesized nanoparticles is spherical according to AFM images. The viability of cells increased up to 20% at the highest concentration of nanoparticles (360 µg/well) by results of colorimetric assays. Morphology of cells cultivated on the modified surface wasn't significantly changed regarding the control group. The received results characterize MNPs as a biocompatible nanomaterial which allows us to plan further research in the field of the interaction of mammalian cells with modified surfaces.

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**References**

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