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Cultivation of adipose stem cells on modified poly(L-lactide) acid

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In recent years, the importance of artificial materials has grown in medicine and biology. Advanced tissue damage therapies are concentrated on stem cells, which can be used for direct application to the damaged sites or for tissue engineering using appropriate scaffolds. In addition, biomaterial scaffolds are important for fundamental scientific research as relatively simple and physicochemically well-defined artificial templates of Extracellular Matrix (ECM), allowing studies of ECM signals controlling cell adhesion, spreading, growth, differentiation, functioning, viability, matrix degradation, etc. The advantage of the PLLA scaffold is its biodegradability; the ability to allow the cells to grow and form in the new tissue while gradually biodegrading. Stem cells derived from adipose tissue (ASC) are often studied. Adipose tissue is relatively abundant in many patients and is relatively easy accessible without considerable donor site morbidity due to its subcutaneous localization. In comparison with the other sources of stem cells in the human body, ASCs in the adipose tissue are present in much larger quantities, have a higher proliferation capacity and delayed senescence. ASCs can be differentiating *in vitro* into other cell types such as osteoblasts, chondroblasts or smooth muscle cells. In this work the influence of modified poly(L-lactic acid) surface on adhesion, proliferation of stem cells derived from adipose tissue was studied. The PLLA polymer film was activated with argon plasma and subsequently modified by hyaluronic acid or poly(ethyleneglycol). The surface was analyzed and characterized by various methods. The *in vitro* method determined the suitability of a substrate for ASC cultivation. The aim of this experiment was to determine a suitable type of PLLA modification allowing for an ideal interaction between the substrate and the cell. This work was supported by the Ministry of Health of CR under the project 15-33018A.

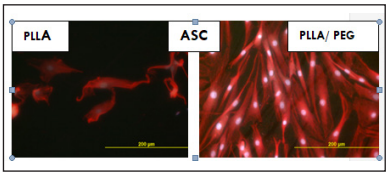

Figure-1: Photographs of proliferated ASC cultivated for 7 days on pristine PLLA a PLLA modified by Ar plasma and poly(ethylene glycol).

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Biography

Nikola Slepickova Kasalkova is an Assistant Professor of Materials Engineering at the University of Chemistry and Technology Prague, Czech Republic. She has completed her PhD from University of Chemistry and Technology Prague in 2011. Her main research activities include surface modification and characterization of materials; carbon layer, carbon and metal nanostructures preparation and characterization; surface analysis of materials (wettability, morphology); study of cells-material interaction, cyto-compatibility test and study of antibacterial properties of materials.

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