Julia Pajorova et al., J Tissue Sci Eng 2015, 6:2
http://dx.doi.org/10.4172/2157-7552.S1.022

OMICS International
conferenceseries.com

4th International Conference on
Tissue Science and Regenerative Medicine
July 27-29, 2015 Rome, Italy

Nanofibrous polymer membranes modified with fibrin and collagen structure as carrier for skin cells

Julia Pajorova[1,2], **Marketa Bacakova**[1], **Denisa Stranska**[4], **Eduard Brynda**[1], **Tomas Riedel**[1], **Margit Zaloudkova**[3] and **Lucie Bacakova**[1]
[1]Czech Academy of Sciences, Czech Republic
[2]Charles University in Prague, Czech Republic
[3]Academy of Sciences of theCzech Republic, Czech Republic
[4]InStar Technologies a.s., Czech Republic

Our study contributes to the tissue engineering, mainly to the construction of appropriate scaffolds for regeneration of damaged skin. This research aims to treat skin burns, bedsores and other skin defects. Simultaneously, it brings valuable insights for basic research in the field of molecular mechanisms of adhesion, proliferation and phenotypic maturation of cells and the control of the cell behaviour through the cell extracellular matrix, represented by synthetic nanofibrous material. Nanofibrous polylactic-co-glycolic acid (PLGA) membranes were prepared by needle-less electrospinning technology. These membranes were further modified with cell adhesion-mediating biomolecules, e.g. collagen, fibronectin and fibrinin order to increase their affinity to colonizing cells. Adhesion, growth and differentiation of keratinocytes (HaCaT) and fibroblasts, i.e. major cell types of epidermis and dermis, were evaluated on these nanofibrous membranes. The results show that the membrane modification using fibrin structures improved adhesion and proliferation of human dermal fibroblasts. The collagen structure on the surface of membranes improved the adhesion and proliferation of human HaCaT keratinocytes. Furthermore, fibrin structure stimulated fibroblasts to produce collagen, which is a major component of extracellular matrix (ECM) in the natural skin dermis. Fibronectin enhanced cell attachment to the membranes. Therefore, we can conclude that nanofibrous PLGA membrane covered with protein layer, fibrin or collagen appear to be a promising solution for the construction of temporary skin tissue carriers.

Biography

Julia Pajorova, BSc is a Master student at the Faculty of Science of Charles University in Prague, Czech Republic. She is working on her master thesis in the Department of Biomaterials and Tissue Engineering, Institute of Physiology, Academy of Sciences of the Czech Republic. The topic of her thesis is “Adhesion, growth and differentiation of skin cells on nanofibrous polymer membranes”.

julia.pajorova@gmail.com

Notes: