World Academy of Science, Engineering and Technology
International Journal of Biomedical and Biological Engineering
Vol:10, No:12, 2016

Methane Plasma Modified Polyvinyl Alcohol Scaffolds for Melanocytes Cultivation

Authors : B. Kodedova, E. Filova, M. Kralovic, E. Amler

Abstract : Vitiligo is the most common depigmentation disorder of the skin characterized by loss of melanocyte in the epidermis that leads to white lesions. One of the possible treatments is autologous transplantation of melanocytes. Biodegradable electrospun polymeric nanofibers provide good mechanical properties and could serve as suitable scaffold for epithelial cells cultivation and follow up transplantation. Moreover the microarchitecture of nanofibers mimics the structure of extracellular matrix and its porosity allows nutrients and waste exchange. The aim of this work was to develop biocompatible and biodegradable polymeric scaffolds suitable for autologous melanocytes transplantation. Electrospun polyvinyl alcohol (PVA) nanofibers were modified by cold methane plasma to lower their hydrofility and to achieve better adhesion, proliferation and viability of the murine melanocyte (Melan-a). Cells were seeded on the modified scaffolds and their adhesion, metabolic activity, proliferation and melanin synthesis was evaluated and compared to non-modified scaffolds. Results clearly indicate that cold methane plasma modified PVA nanofibers are suitable for melanocyte cultivation and may be future candidate for vitiligo treatment. Furthermore, the nanofibers can be functionalized with various bioactive substances, for enhancement of the melanocyte proliferation, melanogenesis or healing and regenerative processes. The project was supported by the Ministry of Education, Youth and Sports NPU I: LO1309 and by Grant Agency of Charles University (grant No. 1228214).
Keywords : melanocyte, nanofibers, polyvinyl alcohol, plasma modification
Conference Title : ICSCRM 2016 : International Conference on Stem Cells and Regenerative Medicine
Conference Location : Bangkok, Thailand
Conference Dates : December 12-13, 2016