

POL O-2

POLYURETHANE/GRAPHENE OXIDE GRAFTS FOR TISSUE ENGINEERING

Aleksandra Ivanoska-Dacikj¹, Gordana Bogoeva-Gaceva², Andres Krumme³,
Chiara Scalera⁴, Velimir Stojkoski⁵, Icko Gjorgoski⁶, Trpe Ristoski⁵, Ivica Gjurovski⁵,
Valentin Mirčeski⁶

e-mail: aivanoska@manu.edu.mk

¹Macedonian Academy of Sciences and Arts, R. Macedonia

²Faculty of Technology and Metallurgy, R. Macedonia

³Tallinn University of Technology, Estonia

⁴Ab medica, Italy

⁵Faculty of Veterinary Medicine, R. Macedonia

⁶Faculty of Natural Sciences and Mathematics, R. Macedonia

Modern tissue engineering aims to create materials which promote, possibly in a controlled way, cell adhesion. They cannot be considered as a standing substitute of a tissue, but as a temporary structure which promotes regeneration. In this work, a biodegradable polyester urethane (Degrapol) was used as a matrix which mechanical, electrical and cell adhesion properties ought to be modified by addition of graphene oxide (GO). Using solution electrospinning method, samples containing different quantities of GO (0.5-2.0 wt%) were obtained [1]. In order to produce fibrous scaffolds with increased porosity, solutions of DP and GO were co-spun with a water soluble polymer, polyethylene oxide (PEO), which was subsequently removed. Morphological and mechanical properties of the scaffolds were analyzed, and it was found that the addition of GO had not changed much the morphology of the obtained fibrous net. The co-electrospinning of the polymers was successfully performed resulting in a mesh formation consisted of both polymers. The tensile test showed that the presence of GO in the matrix increased the tensile strength up to 7.15 MPa. The obtained porous scaffolds were used to heal an artificial lesion of connective tissue. The experiment was performed on white laboratory rats Wistar strain according to the procedures for the use of experimental animals for scientific purposes. Histological tissue analysis was performed 3 months after the application of scaffolds. The results show degradation of the scaffolds, absence of an inflammatory process and penetration of tissue cells in the scaffolds. It can be concluded that the porous scaffolds are biocompatible, which may have practical application in the human and veterinary medicine.

References:

[1] COST STSM Reference Number: COST-STSM-CA15107-36045

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