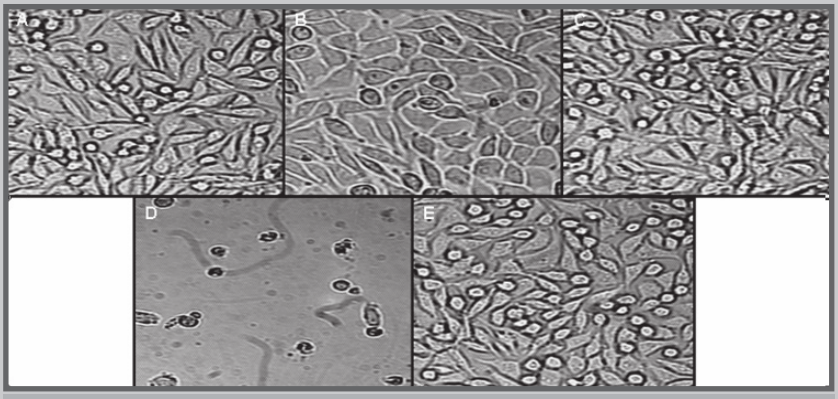

FIG.3. Morphology of L 929 fibroblastoid cell line culture after contact with copolymers (A)PLAGA, (B)BLENDA PLAGA+PHB,(C) PLAGACapr, (D)Phenol(E) Control cells

Discussion & conclusions

Cytotoxicity of new fibers from biodegradable polylactides was tested on mouse fibroblast cultures L929 . No fibroblast cultures after contact with extracts from PLA fibers material showed any damage, the cells had proper morphologies and showed good proliferation in contrast to the control cells. The test results have shown that the polylactide PLA fibers are noncytotoxic and may be promising materials for regenerative medicine.

Acknowledgement

Financial support by the project „Biodegradable fibrous products", POIG.01.03.01-00-007-/08 and EU in the frame of IE OP financed from the ERDF, is gratefully acknowledged.

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ADHESION AND GROWTH OF VASCULAR CELLS ON POROUS POLYETHYLENE TEREPHTHALATE SCAFFOLDS

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Abstract

Polymers such as polyethylene terephthalate (PET) have been used for large-caliber vascular prostheses with a relative success but their application is limited in small-caliber grafts. Blood vessel grafts with an internal diameter smaller than 6 mm are prone to fail mainly due to their thrombogenicity and poor haemodynamics. One of the possible solutions of these problems may be reconstruction of the tunica intima and media on the synthetic grafts. For this purpose, special PET foils were prepared. Six-μm thick foils were irradiated by copper ions or fission fragments from a radionuclide etalon source ^{252}Cf and etched by 1M sodium hydroxide to obtain holes of a defined diameter (from 80 to100 nm in foils irradiated by copper ions and from 1.0 to 1.5 μm in foils irradiated by fission fragments) and density ($1x10^6$ cm^{-2} - fission fragments to $5x10^8$ cm^{-2} – copper ions) (FIG.1). Afterward these materials were seeded with vascular smooth muscle cells (VSMC) derived from the rat aorta, or endothelial cells of the line CPAE. Adhesion, proliferation and viability of the cells were monitored after one, three and seven days. The cell proliferation was evaluated by changes in the cell number in several time intervals and construction of growth curves. Determination of cell viability was based on staining of live cells with calcein emitting green fluorescence, and the dead cells with ethidium bromide emitting red fluorescence.

Experiments with the growth of vascular smooth muscle cells and endothelial cells on the PET scaffolds with different pore size showed that endothelial cells prefer pores around 1 μm while VSMC have no preferences concerning the pore size of the polymer scaffolds tested. Although the highest cell population densities were found on the glass coverslips used as control material, the number of cells growing on pristine PET did not differ from the densities on PET foils irradiated by Cu-ions or fission fragments of Cf.

The obtained data showed applicability of our improved polymer foils as supporting scaffolds for vascular cells. In the further step, these porous PET

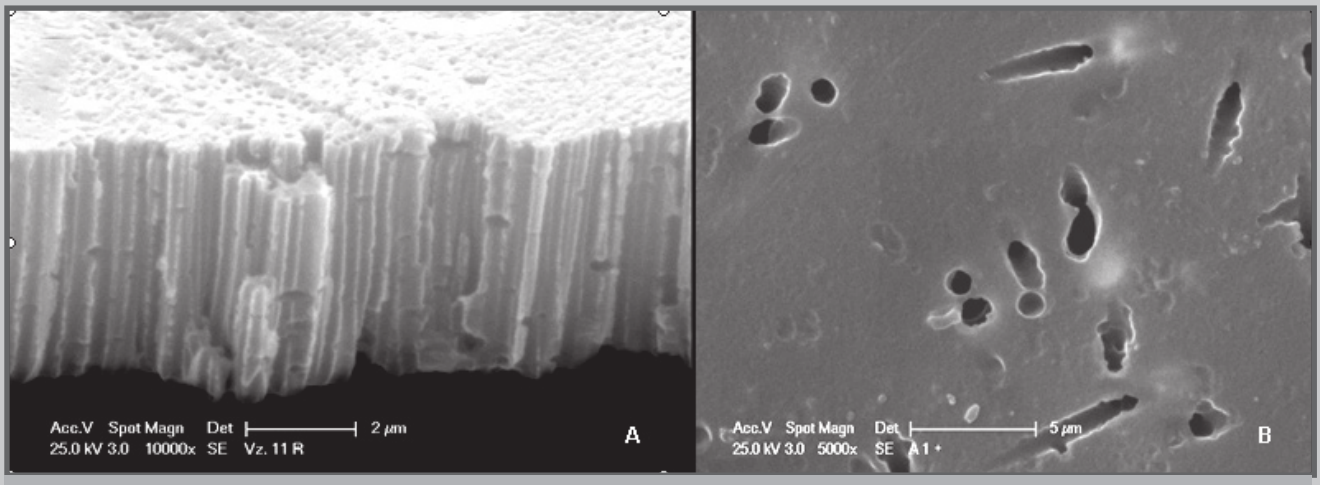

FIG.1. PET foils irradiated by Cu-ions (A) and fission fragments (B) viewed by scanning electron microscopy

membranes could serve as synthetic analogues of internal elastic lamina separating vascular smooth muscle cells and endothelial cells in a newly constructed bioartificial vascular wall.

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FULLERENE-TITANIUM (C_{60}/Ti) COMPOSITES CAUSE NO DNA DAMAGE RESPONSE IN HUMAN OSTEOBLAST-LIKE MG 63 CELLS

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Abstract

Fullerenes (C60) and fullerene-based composites are considered as promising substrates for biological cell colonization. It might be mainly due to their nanostructure, resembling the nanoarchitecture of the natural extracellular matrix. Thin films of binary C_{60}/Ti composites with various concentrations of Ti ranging from 25% (i.e., 25 Ti atoms and 75 C_{60} molecules) to 70% were deposited on microscopic glass coverslips in micro-patterned form through a metallic mask, and were tested for their potential use in bone tissue engineering. It is known that fullerenes and their derivatives can cause cytotoxic injury, cell death or inhibition of cell growth. These effects are based mainly on the reactivity of fullerenes, which may weaken with time due to the oxidization and polymerization of fullerenes in an air atmosphere. We therefore tested the dependence between the age of C_{60}/Ti composites (i.e., from one week to one year) and the level of DNA damage of human osteoblast-like MG 63 cells in cultures on these materials. The DNA damage was analyzed by immunofluorescence staining of markers of DNA damage response, such as phosphorylation of histone H2AX and focal recruitment of p53-binding protein. As positive control to markers of DNA damage response was used 7 days long treatment with 2,5 mM Thymidine. We also monitored the proliferation and

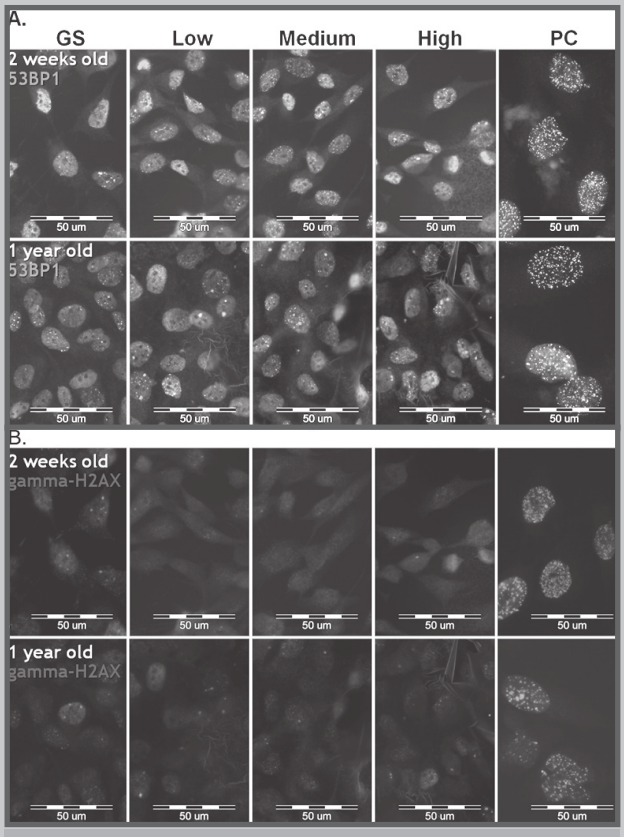

FIG.1. Immunofluorescence staining of markers of DNA damage response: 53BP1 (A) and gamma-H2AX (B) in human osteoblast-like MG 63 cells on 2 weeks old and 1 year old fullerenes with various concentrations of Ti (Low, Medium and High). GS–control microscopic glass coverslips, PC–positive control to markers of DNA damage response, 7 days long treatment with 2.5 mM Thymidine