LABORATORY OF TISSUE ENGINEERING AND CELL CULTURES

106. TISSUE ENGINEERED VASCULAR GRAFTS: DECELLULARIZATION OF PORCINE AORTA THROUGH THREE DIFFERENT METHODS

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Introduction. Cardiovascular diseases are the number one cause of death globally. Vascular surgery, and namely coronary artery bypass grafting (CABG) and peripheral artery bypass grafting (PABG), are the preferred treatment for long-term revascularization. Considering the limitations and unsatisfactory clinical results of synthetic grafts , and limited availability of autologous vessels, tissue engineering has become a promising approach in development of new vascular prostheses. The use of decellularized matrices is one of the various perspectives exploared in this field.
Aim of the study. To evaluate the efficacy of three methods in vascular tissue decellularization and to identify the technique that can provide preservation of both mechanical properties and immuno-privileged characteristics of autologous vessels.
Materials and methods. Fresh porcine aorta was obtained from the local slaughterhouse. After dissection of the surrounding connective tissues the samples were subjected to chemical treaments, comprising: A – 1% Triton-X 100, 1% SDS and 0,02% EDTA; B – 1% SDS, 5% DMSO and 0,02 %EDTA; C – 0,1Mm HCl. All the experiments were performed under the steady temperature (37 C) and agitation (200 rpm) for 48 hours. The decellularization effectiveness was evaluated by means of histology and DNA content testing.
Results. The histology study showed incomplete cell removal in the B group, in addition, alteration of the extracellular matrix was identified in all cases. DNA quantification demonstrated the high level of the cell remnants in SDS group.
Conclusions. Our results demonstrated feasibility of chemical treatment in development of acellular scaffolds. However, when used alone SDS was not confirmed to be suitable for complete cell removal. In addition, before a large clinical application of these grafts a more complex evaluation (mechanical testing, cytocompatibility, in vivo testing) is necessary.
Key words: Regenerative medicine, tissue engineering, vascular grafts, decellularization, biological scaffolds

TRAUMATOLOGY AND ORTHOPEDICS SECTION

107. TREATMENT PECULARITIES IN TROCHANTERIC FRACTURES

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