

UDC: 57.08.57.085.57.085.2:611.611.1.611.11

Comparison of Bovine Pericardium Decellularization Protocols for Production of biomaterial for Cardiac Surgery

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Aim. Determination of the most effective protocol for decellularization of the bovine pericardium. **Methods.** Bovine pericardium was decellularized following five protocols: group 1 – Ammonium Hydroxide + Triton X-100, group 2 – 1 % SDS + Ammonium Hydroxide – Triton X-100, group 3 – 1 % SDS, group 4 – Trypsin enzyme + 1 % SDS, group 5 – 0,1 % SDS, respectively. Histological, biomechanical properties and detection of nucleic acids concentration in the samples were studied. **Results.** The decellularization time for groups 1 and 2 is much longer than described in previous scientific publication. Also, the biomechanical properties were lower than in the samples of control group. The lowest results were observed in the samples of group 3. Though in this group we observed the almost complete removal of cells from the tissues, unfortunately biomechanical properties of pericardium were lost. The samples of group 4 and 5 have high tissue tensile strength, the absence of nucleic acid after 21 days of decellularization. **Conclusion.** The data of histological, biomechanical and DNA testing showed that the protocols with 0,1 % SDS and Trypsin enzyme + 1 % SDS are optimal for the procedure of decellularization.

Keywords: pericardium, decellularization, tissue engineering

Introduction

Cardiovascular diseases are the most common cause of adult morbidity and mortality for many decades. It is astonishing that over 300,000 heart valve replacements and over 570,000 arterial bypasses are performed worldwide annually [1]. Therefore, to cover the gap between facilities' capacity and the number of patients in need of medical devices and pro-

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