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The effectiveness of the tissue engineering in the obtaining of the biological materials from the extracellular matrix

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Abstract

Background: The present work describes the possibility of manufacturing biomaterials from the extracellular matrix for the treatment of the skin wounds. Biomedical collagen-based materials are clinically effective. Collagen is the most abundant and major component of the skin. Porcine collagen is almost similar to the human collagen, it is not immunogenic when used for the therapeutic purposes. Biomaterials can be obtained from the decellularized dermis, being a matrix rich in the collagen and glycoproteins.
Material and methods: 3 parallel groups of biomaterials were established and the average value was calculated. To ensure the effectiveness of the decellularization process, the decellularized porcine dermis was compared with the intact sample using qualitative and quantitative criteria.
Results: Histologically, the decellularized tissues revealed the presence of fewer cells. As a result, were removed approximately 80.5% of the genetic material from porcine dermal structures, demonstrated by the spectrophotometric quantification of deoxyribonucleic acid. *In vitro* graft degradation study in 0.01 M phosphate buffer pH 7.4 combined with collagenase, demonstrated a significant ($p < 0.05$) loss of collagen sponge mass by 100% over one hour in the group II compared to the decellularized dermis in group I which decreased in the weight by 91.3% during 35 hours.
Conclusions: Acellular biomaterials are immunologically inert, have hydrophilic and biodegradable properties, thus they can play a key role in the wound care, exerting the transfer of the bioactive molecules and drugs directly into the wound.
Key words: porcine acellular dermis, collagen sponge, biomaterials, tissue engineering.

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