

ABSTRACT

Pancreatic transplantation is the only possible treatment to induce independence from exogenous insulin administration in type 1 diabetes mellitus. However, the shortage of donor organs remains the main limitation of pancreas transplantations. The goal of the research is the preparation of a bioartificial organ based on cell therapy. Parts of the extracellular matrix obtained by decellularization of the pancreas are used for its preparation. The protein scaffolds prepared in this way are then repopulated by different cell types again. The extracellular matrix provides structural support to cells, mediates signaling for differentiation, proliferation or migration.

Mesenchymal stromal cells are used in clinical therapy, have a positive effect on tissue regeneration processes, modulating the function of the extracellular matrix, suppress inflammation and promote angiogenesis.

After pancreas decellularization, we repopulated the extracellular matrix with islets, mesenchymal cells and endothelial cells. Then, the pancreas was transplanted subcutaneously into syngeneic diabetic rats to observe islet revascularization. Based on sections of explanted scaffolds, we found out that revascularization of the islets was higher without the endothelial cells in the transplanted extracellular matrix.

Key words: diabetes type 1, islets, revascularization, mesenchymal stromal cells, extracellular matrix, endothelial cells