

MORPHOLOGICAL AND HISTOLOGICAL ALTERATIONS INDUCED BY PLGA (POLYGLYCOLIC POLYLACTIC ACID) SCAFFOLD SEEDED WITH AUTOLOGOUS ADIPOSED DERIVED STEM CELLS OR MUSCLE DERIVED STEM CELLS IMPLANTED IN RABBIT BLADDER WALL

Morphological and histological alterations induced by PLGA (polyglycolic polylactic acid) scaffold seeded with autologous adiposed derived stem cells or muscle derived stem cells implanted in rabbit bladder wall

Purpose:

To evaluate the histological and morphological changes induced by PLGA scaffold seeded with autologous adipose derived stem cells (ADSC) or muscle derived stem cells (MDSC) after implantation in rabbit's bladder wall.

Material and Methods:

Under aseptic conditions 8 New Zealand male rabbits weighting 3.5+/-0,5 Kg were anesthetized with Xylazin (4mg/Kg) and Ketamine (20mg/Kg) to harvest inguinal fat pad (4 animals) or a muscle biopsy from anterior tibial muscle (4 animals). The fat was washed extensively with PBS and enzymatically digested using 0.075% collagenase. The digested tissue was strained to obtain a stromal vascular fraction. MDSC were obtained by the previously described preplated technique. Cells were cultured in 100 mm dishes with specific culture media. The cells were evaluated by flow cytometry to identify CD44+, CD90+, CD29+ and alfa-actin. Before transplantation, cells were labeled with Vybrant CM-Dil. Each animal received 2 scaffolds on submucosa to cover a 5 x 5 mm muscular defect created in the bladder wall (1 acellular collagen coated scaffold and 1 collagen coated scaffold seeded with 1 X 10⁷ labeled MDSC or ADSC cells). The muscle donor received MDSC and the fat donor receive the ADSC. Bladder was harvested at 4 weeks, paraffin embedded and evaluated after stained for H&E, Masson's Trichrome and IHC for alpha-actin, nuclei counterstained with DAPI.

Results:

After 4 weeks, unseeded scaffolds presented minimal cellular inflammatory reaction, showing the presence of neo-vascularization in between scaffold fibers. However, there was greater collagen deposition and inferior neo-vascularization when compare to cells seeded scaffolds. Furthermore, we observed expression of alpha-actin in seeded scaffolds, which suggest the presence of smooth muscle cells in the scaffold. After 4 weeks, autologous Dil labeled ADSCs and MDSCs could be visualized in between the scaffold fibers.

Conclusions

PLGA scaffolds presented minimal cellular inflammatory reaction. Seeding PLGA scaffolds with ADSC or MDSC decreased the collagen deposition, increase neo-vascularization and induce the presence of smooth muscle cells in the scaffold. At 4 weeks, ADSC and MDSC seeded on PLGA scaffold could be tracked and were viable after being transplanted to rabbit's bladder wall.

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Is this a clinical trial?	No
What were the subjects in the study?	ANIMAL
Were guidelines for care and use of laboratory animals followed or ethical committee approval obtained?	Yes
Name of ethics committee	Universidade Federal de São Paulo Ethical Comitée