

Tissue engineering approach to repair abdominal wall defects using cell-seeded bovine tunica vaginalis in a rabbit model

ABSTRACT

The aim of this study was to engineer skeletal muscle tissue for repair abdominal wall defects. Myoblast were seeded onto the scaffolds and cultivated in vitro for 5 days. Full thickness abdominal wall defects (3 × 4 cm) were created in 18 male New Zealand white rabbits and randomly divided into two equal groups. The defects of the first group were repaired with myoblast-seeded-bovine tunica vaginalis whereas the second group repaired with non-seeded-bovine tunica vaginalis and function as a control. Three animals were sacrificed at 7th, 14th, and 30th days of post-implantation from each group and the explanted specimens were subjected to macroscopic and microscopic analysis. In every case, seeded scaffolds have better deposition of newly formed collagen with neo-vascularisation than control group. Interestingly, multinucleated myotubes and myofibers were only detected in cell-seeded group. This study demonstrated that myoblast-seeded-bovine tunica vaginalis can be used as an effective scaffold to repair severe and large abdominal wall defects with regeneration of skeletal muscle tissue.

Keyword: Skeletal muscle tissue; Abdominal wall defect; Myoblast-seeded-bovine tunica vaginalis