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FRESH MUSCLE FIBER FRAGMENTS ON A SCAFFOLD: A POTENTIALLY NEW CONCEPT FOR PELVIC FLOOR RECONSTRUCTION?

Hypothesis / aims of study

Synthetic, permanent meshes have gained popularity in order to improve outcome of pelvic floor reconstructive surgery, but multiple complications have emerged. Recently, *in vitro* cultured muscle-derived cells seeded on biodegradable scaffolds have been proposed in the treatment of pelvic organ prolapse. However, a biodegradable scaffold with fresh muscle fiber fragments, collected at the time of surgery, may be a simpler and faster approach circumventing the disadvantages of *in vitro* culture of cells.
The aim of this study was to investigate in a rat model if methoxypolyethyleneglycol-poly(lactic-co-glycolic acid) (MPEG-PLGA) scaffolds seeded with either autologous *in vitro* cultured muscle-derived cells (MDC) or autologous fresh muscle fiber fragments (MFF) could be used for tissue repair.
Study design, materials and methods

Twenty scaffolds with autologous *in* vitro cultured muscle-derived cells (MDC) and twenty scaffolds with autologous fresh striated muscle fiber fragments (MFF) were implanted subcutaneously on the abdomen of rats, two in each rat, and examined after 3 (ten of each preparation) and 8 weeks (ten of each preparation). Growth pattern of MDC and MFF was assessed by immonohistochemistry, and biocompatibility was assessed by histopathology.
Results

At 3 weeks, both MDC and MFF were identified. However, the growth patterns of the two were different: MDC were finely distributed as single cells within the scaffold, whereas the MFF were localized as fragmented striated muscle fibers beneath the scaffold.
At 8 weeks, fragmented striated muscle tissue was generated from the MFF in six of ten explants, while the MDC had vanished. The scaffolds showed a high degree of biocompatibility, and were present at 3 weeks, but not at 8 weeks.
Interpretation of results

Autologous fresh muscle fiber fragments on a MPEG-PLGA scaffold seem to be useful for tissue repair. This technique bypasses the technically demanding, costly and time-consuming *in vitro* processing of muscle-derived cells.
Concluding message

This study introduces a promising new concept, namely fresh muscle fiber fragments on a biodegradable scaffold, with possible implications for the surgical reconstruction of pelvic organ prolapse.

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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	**The Danish Animal Experiments Inspectorate**