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AUTOLOGOUS HUMAN MYOBLAST AND FIBROBLAST CELL CULTURES FOR RECONSTRUCTION OF THE LOWER URINARY TRACT

Hypothesis / aims of study

In the past few years technologies have been developed to generate skeletal muscle cell cultures as a potentially limitless source for tissue engineering and stem cell therapy. In the present study we wanted to demonstrate that autologous human fibroblasts as well as myoblasts can routinely be prepared from small skeletal muscle biopsies.

Study design, materials and methods

Muscle biopsies were obtained from 49 patients. Under local anesthesia, a small incision was made in the left upper arm. A small muscle biopsy was taken and immediately placed in a transport tube containing 10ml of transport medium. The tube was marked with the respective patient's data and a bar code. Culture of the autologous cells was performed in a cGMP ("current good manufacturing practice") laboratory. The cells of all patients were produced in a clean room environment, and all steps of the production process were documented and performed according to defined standard operating procedures. Quality of the cells, especially purity and function of the myoblasts, was evaluated by means of electrophysiological (function of calcium channels, cell fusion) and immunohistochemical (anti-desmin-antibodies) tests.

Results

Myoblasts and fibroblasts obtained from skeletal muscle biopsies were allowed to proliferate for several weeks. No infections or contaminations occurred. Quality control of the cells revealed that amount, function and purity of cells, especially the myoblasts, were excellent. Electrophysiological characterization of all autologous myoblasts demonstrated that transient T-type as well as slow activating L-type calcium channels were present. The cells showed typical characteristics of striated muscle cells and were able to form myotubes.

Interpretation of results

Autologous human myoblasts as well as fibroblasts cells can be used for electrophysiological and pharmacological studies. Furthermore, they serve as ideal source for reconstruction of the lower urinary tract.

Concluding message

Autologous fibroblasts and myoblasts meeting GMP requirements can routinely be grown from skeletal muscle biopsies.

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