

## Gene therapy for improving peripheral nerve regeneration and preventing muscle atrophy after nerve trauma

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Skeletal muscle atrophy following denervation may not allow a good functional recovery if the muscle is not quickly re-innervated by the regenerating nerve fibers. In this regard, both improvement of peripheral nerve regeneration and prevention of skeletal muscle atrophy are important to achieve a satisfactory functional recovery after nerve injury. Local gene transfer could represent a promising strategy to reach this goal. Various genes are candidates in fostering peripheral axon regeneration and in preventing muscle atrophy, among these, the vascular endothelial growth factor (VEGF).

The main goals of our study were twofold: (i) to accelerate axonal regeneration along muscle-vein-combined conduits used to bridge a 1-cm-long rat median nerve gap, and (ii) to prevent denervation-related atrophy of Fingers Flexor muscle after complete rat median nerve transection.

Results showed that the over-expression of VEGF led to a worse nerve regeneration in the muscle-vein-combined guide in comparison to LacZ controls, whereas in the muscle it led to a significantly lower progression of atrophy.

Altogether, our results suggest that VEGF direct local injection in denervated skeletal muscle significantly attenuates denervation-related atrophy thus representing a promising strategy for improving the outcome of posttraumatic neuromuscular recovery after nerve injury and repair.