

# **Nerve regeneration inside fresh skeletal muscle-enriched synthetic tubes: A laser confocal microscope study in the rat sciatic nerve model**

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## SUMMARY

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The search for good conduits for bridging nerve defects is a major challenge of today's tissue engineering research. In this paper we report on a laser confocal microscope study on early nerve regeneration inside a tissue engineered graft made by a poly(DLLA- $\epsilon$ -CL) conduit enriched with fresh skeletal muscle. The same biodegradable tubes filled with PBS solution were used as controls. The conduits were placed to bridge unilateral 1-cm-long rat sciatic nerve defects and analysed 10 days after surgery. Results showed that inside the muscle-enriched tubes axon regeneration, labelled by means of anti-neurofilament antibody, was already begun, whilst no axon regeneration was detectable along control tubes. In addition, a-GFAP (glial fibrillar acid protein) immuno-labelling of Schwann cells showed that progression inside muscle-enriched tubes, especially from the distal nerve stump, was much more evident than in control conduits. These results suggest that enrichment of synthetic tubes with fresh skeletal muscle promotes axon regeneration and Schwann cell migration in early nerve repair stages.