

## Muscle Fiber Type Composition and Morphometric Properties of Denervated Rat Extensor Digitorum Longus Muscle

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**Aim.** Analysis of fiber type composition and fiber size of extensor digitorum longus (EDL) muscle in rats during 30 days of denervation.

**Methods.** Fiber types were defined immunohistochemically using monoclonal antibodies specific for slow (type I) and fast fibers (type IIA, IIX, and IIB). Antibodies were applied on transverse sections of denervated extensor digitorum longus muscles 6, 12, and 30 days after denervation. Cross sectional area of muscle fibers was analyzed morphometrically by computerized image analysis.

**Results.** Control EDL muscle was composed of 41% of type IIB, 32% of IIA, 23% of IIX, and 4% of type I muscle fibers. The most profound effect of denervation was observed 30 days after the transection of the sciatic nerve. Denervation decreased the percentage of both type IIB and type IIX muscle fibers to 36% and 13% of the control muscle, respectively ( $p < 0.001$  for both), and increased the percentage of types IIA and type I muscle fibers to 42% and 9% of the control, respectively ( $p < 0.001$  for both). Morphometric analysis revealed progressive atrophy of all fast muscle fibers, which started 6 days after denervation ( $p < 0.001$ ). Thirty days after the sciatic nerve transection, a strong reduction in fiber size of type IIA, IIX, and IIB muscle fibers was observed ( $p < 0.001$  for each type). Type I muscle fibers initially showed the reduction in fiber size ( $p < 0.001$ ) but regained the size of control fibers until day 30.

**Conclusion.** Denervation decreased the percentage of type IIX and IIB muscle fibers, with concomitant increase in type IIA and type I muscle fibers. The reduction in fiber size was observed in type IIA, IIX, and IIB muscle fibers.

**Key words:** *immunohistochemistry; muscle denervation; muscle fibers; muscular atrophy; skeletal muscle*

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