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Growth Factor May Decrease Muscle Atrophy Secondary to Denervation

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Abstract

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ABSTRACT

Despite modern microsurgical techniques, functional outcomes following brachial-plexus reconstruction and peripheral-nerve repair are usually unsatisfactory, because irreversible muscle atrophy develops before reinnervation occurs. Insulin growth factor-1 (IGF-1) has been shown to improve muscle regeneration after injury, and may have a role in muscle preservation following denervation. This study evaluated the histologic, immunohistochemical, and electrophysiologic differences between normal and denervated muscle over an 8-week time period, and also evaluated the effects of injecting IGF-1 into denervated muscle. Denervated mice gastrocnemius muscles demonstrated a decrease in muscle diameter, a decrease in muscle weight, early nuclear proliferation, and a decrease in fast twitch and maximum tetanic strength, compared to normal gastrocnemius muscle up to 8 weeks following denervation. Four weeks after denervated muscle was injected with IGF-1 at time zero, however, relative preservation of muscle diameter and weight, and maintenance of electrophysiologic contractile properties were observed. These preliminary data suggest that IGF-1 may prevent muscle atrophy secondary to denervation.



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