

# **METABOLIC CAPACITY OF HUMAN LONG-TERM DENERVATED MUSCLES**

W. Rossmannith, K. Moser-Thier, H. Gruber, R. E. Bittner

Center for Anatomy and Cell Biology, Medical University of Vienna, Vienna, Austria

Metabolic capacity of skeletal muscle displays a remarkable plasticity in response to physical activity. Changes in mitochondrial density and activity are a central phenomenon of these adaptations. Yet, little is known about the restorability of mitochondrial capacity in highly degenerated long-term denervated muscle by means of functional electrical stimulation. We are following mitochondrial parameters of a cohort of patients with long-term flaccid paraplegia undergoing functional electrical stimulation. Up to now we have analyzed mitochondrial function and total amount of mitochondria before the onset of stimulation of the bilateral muscle biopsies of 23 patients. Mitochondrial function was determined by respiratory physiology of permeabilized muscle fibers and mitochondrial density by measurement of a marker enzyme activity (citrate synthase) in homogenates. Our results indicate a generally low respiratory capacity of denervated muscles. This reduction appears to be the result of the low mitochondrial density of these highly degenerated muscles, whereas remaining mitochondria appear to be functional. Mitochondrial density and cellular respiratory activity are negatively correlated with the length of the preceding denervation period of the analyzed muscles and the extent of degeneration (as evaluated by routine histology). These results will be a reference for the comparison of the effects of 2-3 years of functional electrical stimulation on muscle mitochondrial capacity.

## **Author's Address**

Rossmannith Walter, Univ.Ass. Univ.-Doz. Mag. Dr.  
Institut für Anatomie  
Währinger Straße 13  
A- 1090 Wien

e-mail: [walter.rossmanith@meduniwien.ac.at](mailto:walter.rossmanith@meduniwien.ac.at)