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## Aspects of structure and function of skeletal muscles

F.G.I. Jennekens, neurologist (Utrecht)

Diameter and histochemical type of muscle fibres are influenced by activity and innervation, and by ageing.

Inactivity ("disuse") causes atrophy of muscle fibres, usually of type II fibres predominantly. When conduction along the axon of an α motor neuron is blocked, the muscle fibres belonging to the motor unit of that neuron decrease in volume and spread of acetylcholine receptors in extra-junctional areas of the fibre membranes occurs. The change in the muscle fibre membranes stimulates sprouting of terminal axons connected to the endplate of these fibres. The effects of disuse and denervation of the muscle fibres resemble each other in many aspects.

Muscle labour as required for weight-lifting induces increase in size of muscle fibres. Endurance-training provokes a drop in the percentage of type IIB fibres and an increase in type IIA fibres. There may be a slight shift from type II to type I as well. Re-innervated muscle fibres assume the histochemical type of the other muscle fibres in the motor unit.

In the neonate approximately 50-60% of the muscle fibres belong to type II. During life, a very slow and gradual shift from type II to type I occurs, but not to the same degree in different muscles. Muscle power in old age is attennuated partly due to a decrease in activity and partly as a consequence of denervation and reinnervation. This latter process is the inevitable result of the loss of motor neurons, occurring in old age.

## Stereological study of heart and skeletal muscle in polymyopathic syrian hamsters

G.J.M. Egberink, biologist (Nijmegen)

Syrian hamsters (strain BIO 8262) suffer from a genetically determined polymyopathy, involving heart and skeletal muscle. In heart muscle the course of the disease shows a phasic pattern: (I) 0 - 6 weeks: no necrosis, (II) 6 -12 weeks: multifocal necrosis followed by infiltration of mononuclear round cells and calcification, (III) beyond 12 weeks: no new necrotic foci, scar formation and calcification. In skeletal muscle, however, the first histopathological changes (necrosis of muscle fibres) can already be seen in 1 week old hamsters. The dystrophic process in skeletal muscle is progressive during life time.

Stereological analysis showed lower volume densities of muscle fibres in both heart and skeletal muscle in the diseased hamsters. Higher volume densities of capillaries, connective tissue and infiltrating cells in the interstitial space were found with respect to healthy animals in both muscles. In skeletal muscle of older polymyopathic hamsters (36 weeks) the muscle fibre density was increased and the mean muscle fibre area was decreased. In heart