Muscle denervation is accompanied by atrophy and a decline in oxidative capacity. Here we investigated the time course of adaptations following denervation of the rat soleus muscle and whether the time course differs in young (5-month) and old (25-month) rats. Thereto, we denervated the soleus muscle of the left leg, while the right leg served as an internal control. Two weeks after denervation, muscle mass was decreased both in young and old animals to respectively 57 and 54% and (P < 0.001) and capillary to fiber ratio (C:F) to 51 and 50% (P < 0.01) of the control value. One week after denervation the optical density of sections stained for succinate dehydrogenase was 83 and 79% (P < 0.05) of control young and old muscles, respectively, and then remained stable. This indicates that after denervation the mitochondrial content per muscle mass was reduced, and that during the first week of denervation the loss of mitochondria occurred at a relatively higher rate than that of muscle mass. No major changes occurred between two and four weeks of denervation, except for a decrease in the proportion of pure type I fibers in four-week denervated muscles (young 90 vs. 77%; old 99 vs 87%; P < 0.05). The C:F and capillary density were higher than expected from the oxidative capacity and fiber sizes, suggesting a delayed regression of capillaries. The time course of atrophy, decrease in oxidative capacity and capillarization following denervation was similar in soleus muscles from young and old rats.

Keywords: Muscle, Ageing, Biomove session