

**POPULAR SCIENCE ABSTRACT**

The early phase of development of muscles stops following the disappearance of embryonic and neonatal myosin and the elimination of polyneuronal innervation of muscle fibres with the formation of motor units (MUs), but later the muscle mass still considerably increases. It is unknown whether the three types are visible among newly formed MUs soon after the early postnatal period and whether their proportion is similar to that in adult muscle. Moreover, the processes responsible for MU-force regulation by changes in motoneuronal firing rate as well as properties of motor unit action potentials (MUAPs) during maturation are unknown. Three groups of Wistar rats were investigated - 1 month old, 2 months old and the adult, 9 months old. The basic contractile properties and action potentials of MUs in the medial gastrocnemius (MG) muscle were analysed. The three types of MUs were distinguishable in all age groups, but higher proportion of slow MUs was noticed in young rats (29%, 18% and 11% in 1, 2 and 9 months rats, respectively). The fatigue index for fast fatigable MUs in 1 month old rats was about 2 times higher than in 9 months old rats. The twitch time parameters of fast MUs were shortened during the maturation; for these units, the force-frequency curves in young rats were shifted towards lower frequencies, which suggested that fast motoneurons of young animals generate lower firing rates. Higher twitch-to-tetanus ratios noted for the three MU types in young rats suggested the smaller role of rate coding in force regulation processes, and the higher role of MU recruitment in young rats. No significant differences in MUAP parameters between two groups of young and adult animals were observed. Concluding, the maturation process evokes deeper changes in fast MUs than in slow ones.