

Myosin isozymes and force-velocity relation in fast rat muscle

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The force-velocity relations of 43 extensors digitorum longus (EDL) muscles of 90-day-old male ($n = 24$) and female ($n = 19$) rats were measured *in vivo* after anaesthetizing the animals with Thalamonal. Direct stimulation of 100/s for 0.3 s duration was used; the temperature was kept constant at 37° C by dripping warm Krebs around the perfused muscles. Shortening was effected at eight different velocities under the control of an ergometer and the tension was recorded on a fast UV recorder. The velocity constants (B) were computed using a form of Aubert's equation $P = P_0 \exp (-1/B)$, (Aubert, 1956). They varied between 0.9 and 2.55 muscle length/s.

The myosin isozymes of the muscles were separated by electrophoresis of native myosins in a nondissociating medium into three zones: HC-LC_{1f}-LC_{1f} (FM₃); HC-LC_{1f} LC_{3f} (FM₂); and HC—HC-LC_{3f}-LC_{3f} (FM₁); i.e. only the fast type isomyosins were found in EDL. muscles. The relative amount of FM₁, FM₂ and FM₃ was measured by computer planimetry and the concentration of LC_{1f} relative to the total concentration of the alkaline light chains (LC_{1f} + LC_{3f}) was computed as $(FM_1 + 0.5 FM_2) / (FM_1 + FM_2 + FM_3)$; it varied between 0.50 and 0.68.

Although the individual variations of the velocity constant and the proportions of LC_{1f} were large, we observed no correlation between them. Also there were no differences between muscles of male and female animals in respect to velocity constant (B) or the amount of myosin isozymes. These experiments provide no support for the hypothesis that the variations in power or maximum velocity of fast muscle is controlled by the relative proportion of the two alkaline light-chains, LC_{1f} and LC_{3f}.