Ca^{2+} handling properties of mechanically skinned fibres from fast and slow muscles of adult and old rats following chronic fenoterol treatment

D.R. Plant, J.G. Ryall, P. Gregorevic and G.S. Lynch, Muscle Mechanics Laboratory, Department of Physiology, The University of Melbourne, Victoria 3010, Australia.

Aging is associated with a progressive loss of motor function, a slowing of muscle movements, and a decline in muscle strength. These age-related changes in skeletal muscle contribute to the increased incidence of fall-related injuries in the elderly, resulting in a loss of functional independence. β_2-agonists (such as fenoterol) have potent muscle anabolic effects and we have recently demonstrated that four weeks treatment with fenoterol is sufficient to ameliorate the age-related muscle weakness and slowing of contraction in rats (Ryall *et al.*, 2002). In another study we demonstrated that aging deleteriously affects aspects of excitation-contraction coupling and sarcoplasmic reticulum (SR) function in mechanically skinned fast muscle fibres from aged compared with adult mice (Plant & Lynch 2002). It is not known whether fenoterol treatment would affect these properties in mechanically skinned fast and slow muscle fibres from aged rats.

We tested the hypothesis that four weeks fenoterol treatment would alter SR Ca^{2+} handling properties of mechanically skinned skeletal muscle fibres differently in adult and old F344 rats. Adult (16 months/age) and old (28 months/age) rats were treated daily with either fenoterol (1.4 $mg.kg^{-1}day^{-1}$, i.p.) or saline vehicle, for four weeks. Following treatment, rats were anaesthetised with sodium pentobarbitone (60 $mg.kg^{-1}$, i.p.) and the fast-twitch extensor digitorum longus (EDL) and predominantly slow-twitch soleus muscles excised carefully to prepare mechanically skinned fibres. Fibres were tested according to the methods we have described in detail previously (Plant & Lynch, 2002).

Preliminary findings indicate no age-related changes in normalised SR Ca^{2+} reloading or leak of Ca^{2+} from the SR. Fenoterol increased leak of Ca^{2+} from the SR in EDL but not soleus muscle fibres from adult and old rats. Rate of Ca^{2+} reloading was decreased with fenoterol treatment in EDL muscle fibres from both adult and old rats, but soleus muscle fibres from adult and old rats were not affected. These findings suggest that fenoterol's effects are similar in mechanically skinned fibres from adult and old rats. The effects of fenoterol on depolarisation-induced force responses in mechanically skinned fibres has yet to be examined.

Plant, D.R. & Lynch, G.S. (2002) *Journal of Physiology,* 543, 169-176.
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