β_2-adrenoceptor agonist formoterol promotes slow-to-fast fibre transitions in rat skeletal muscle

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It is well established that β_2-adrenoceptor agonists (β_2-agonists), such as clenbuterol and fenoterol, promote a shift in fibre type expression from slow- (type I) to fast- (type II) twitch fibres[1]. This shift in phenotype can alter muscle contractile function by increasing rates of contraction and relaxation[2]. New generation β_2-agonists, such as formoterol, have more potent muscle anabolic effects than other β_2-agonists such as clenbuterol or fenoterol. However, the ability of formoterol to alter muscle phenotype has not been determined. In this study we treated young, adult Fischer 344 rats for four weeks with either formoterol (2 mg/kg/day, *i.p.*), or an equal volume of saline vehicle. After treatment, rats were anaesthetised with sodium pentobarbitone and the predominantly (85-90%) slow-twitch soleus muscle was excised and frozen immediately in thawing isopentane. Muscle sections (8 Î¼ m thick) were obtained for histological, biochemical and immunohistochemical analyses. Like clenbuterol and fenoterol[1], formoterol increased the proportion of the fast type IIa and IId/x fibres in the soleus muscle, with a concomitant decrease in the slow type I fibres, as determined from myosin ATPase histochemistry. Soleus muscles from formoterol treated rats also exhibited a reduced proportion of highly oxidative fibres compared with muscles from untreated control rats. The ability of β_2-agonists like formoterol to cause slow- to fast fibre transitions contributes to their ability to alter skeletal muscle contraction.

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(2) Ryall JG, Gregorevic P, Plant DR, Sillence MN, Lynch GS. American Journal of Physiology. 2002; 283:1386-1394.