Passive stretch suppresses muscle atrophy in rats: effects of duration and frequency of stretch

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We previously reported that denervation-induced muscle atrophy was suppressed by 15 min passive muscle stretch once daily though an upregulation of Akt/mTOR signal pathway. However, little is known how the duration and frequency of stretch affect the atrophy suppression. Thus the aim of the present study was to examine the difference in the effect between the stretch for 30 min once daily and 15 min twice daily on the atrophy suppression. Wistar rats were subjected to sciatic nerve removal and stretching for 15 min once daily (15STR), 30 min once daily (30STR), and 15 min twice daily (15*2STR) for 2 weeks. The soleus muscle was removed to measure the cross-sectional area of muscle fibers (CSA). The phosphorylation level of Akt was also examined by western-blotting. The averaged CSA of 15*2STR was significantly greater than that of 15STR and 30STR. Although no difference in the increased level of Akt phosphorylation was observed between 15STR and 30STR, the phosphorylation level in the second stretch in 15*2STR showed comparable value to that in the first stretch. These results suggest that improved suppression of atrophy in 15*2STR is related to the frequency of Akt activation.