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» Journal Abstract

The effect of unloading and reloading on the extracellular matrix in skeletal muscle: changes in muscle strength and motor activity

EM Riso, AM Ahtikoski, TES Takala, T Seene

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During three weeks of hindlimb suspension muscle mass decreased 36% ($p<0.05$) in Soleus (Sol) muscle, 17% ($p<0.05$) in Gastrocnemius (GM) and had tendences to decrease in plantaris (Pla) (15%) and in extensor digitorum longus (EDL) (8%) muscles. Hindlimb grip strength decreased gradually during three weeks of unloading. Specific mRNA level for type I collagen decreased during three weeks of unloading in Sol muscle by 28% ($p<0.05$) and in GM muscle by 34% ($p<0.05$). mRNA level for type III collagen decreased in Sol by 22% ($p<0.05$) and in GM by 51% ($p<0.001$). Non-fibrillar type IV collagen mRNA level decreased in both above-described muscles about 25% ($p<0.05$). Lysyl oxidase (LO) mRNA level decreased by 46% ($p<0.05$) during three weeks of unloading only in Sol muscle. Matrix metalloproteinase-2 (MMP-2) mRNA level increased during reloading period in Sol and GM muscles subsequently 28% ($p<0.05$) and 49% ($p<0.001$). During unloading the activity of tissue inhibitors of metalloproteinases (TIMP-1 and TIMP-2) in slow-twitch (ST) and fast-twitch (FT) muscles changed in different directions: during first week of suspension, their expression decreased in Sol muscle by 31% ($p<0.05$) and increased in Pla and GM muscle subsequently by 24% ($p<0.05$) and 31% ($p<0.001$). The pretranslational level of changes in fibrillar and non-fibrillar collagen, MMP-2, LO, TIMP-1 and TIMP-2 -are shown for first time together with changes in muscle strength and motor activity during unloading and reloading

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