



The Effect of Inactivity on the Function of Satellite Cells

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Abstract

Introduction: Muscle specific stem cells, termed satellite cells, play pivotal roles in postnatal growth, maintenance, repair, and regeneration of skeletal muscle. It is reported that exercise increases the number of satellite cell and improves its function. On the other hand, inactivity is reported to decrease the number of satellite cells, however it remains unclear the effects of the function of satellite cells like activation, proliferation or self-renewal. To investigate the effect of inactivity on the function of satellite cells, we adopted hindlimb suspension and reloading and single fiber immunostaining.

Methods: 5 weeks of age male C57/BL6 mice were divided into two groups: CON (normal keeping) and HS-RL (1week hindlimb suspension and 2weeks reloading). After 3 weeks keeping, mice were sacrificed and gastrocnemius, soleus and extensor digitorum longus (EDL) muscles were quickly dissected out from each mouse for subsequent analyses. Single fibers were obtained from EDL muscle. Single fibers were cultured in plate medium. After culture, each single fiber was fixed and immunostained to evaluate satellite cells function.

Results: There are no changes in body weight and muscle wet weight between two groups. Immunostaining indicated the reduction of satellite cells proliferation number and increase of differentiated satellite cells number in cultured fiber of HS-RL group at 48 hours.

Conclusion: Physical inactivity like hindlimb unloading depresses the function of satellite cells.

Keywords: Skeletal muscle, Satellite cell, Inactivity, Self-renewal