## 1-B-10 Physiological adjustment to exercise. Cellular response to the mechanical stimuli (3) Mild jogging accelerates the physical adaptation of the knee soft tissue cells to the extracellular matrix

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**Purpose:** Although there have been many studies on the effect of jogging/ walking to the metabolism and cardio-pulmonary/ skeletal muscle functions, few studies has been done to the tensile properties of the knee-joint. Fibroblast cells in the knee and tendon tissues secret extracellular matrix (ECM) by responding to the mechanical stimuli; tensile stimuli let cells to produce febrile collagen and compression stimuli produce water-bearing proteoglycan and HA. Since knee tissues are non-neuronal control and less vascularized, mechanical stimuli by physical exercise is the only signal for cell survival. **Methods:** Rats had been exposed to a 30-min single bout of mild treadmill exercise and examined the gene expression of ECM components, HSP27 and HSP47, water content, and quantity of HA in the surrounding knee tissues. **Results:** One-hour post-exercise data shows HSP27 and HA synthetase expression was remarkably enhanced. Quantity of water and HA were also high at one-hour post exercise compare to 3-day control group. These results indicate that weight-bearing jogging/walking exercise is important for maintaining and improvement of knee adaptation ability. We also obtained information regarding how often the training should be performed. **Key words:** knee joint, mechanical stimuli, ECM, HSP, HA

## 1-C-1 Effects of voluntary wheel running on mechanical vasodilation of the feed arteries of rat soleus muscle

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**Purpose:** This study sought to determine the effects of 10 weeks of voluntary wheel running on the threshold and amplitude of mechanical vasodilation in the feed arteries of rat skeletal muscle.

**Methods:** The threshold and amplitude of mechanical vasodilation were measured in cage control and voluntary wheel running (VR) Wistar Hannover rats. Soleus feed arteries were isolated and mounted on a micropipette in a sealed chamber. Arteries were pressurized to 80 mmHg. External pressure (0 – 250 mmHg) was applied for 1 s in a series of 1–10 repeated 1-s pulses with 1-s intervals between pulses. Luminal diameter was measured under an inverted microscope.

**Results and Discussion:** The peak running distance of VR rats was 3749.6 ± 478.3 m/day at 10 weeks of age. The threshold transmural pressure of the mechanical vasodilation was 0 mmHg in both cage control and VR rats. The amplitude of mechanical vasodilation of the feed arteries in VR rats (36.5 ± 3.1%) was significantly larger than that in cage control rats (26.2 ± 1.5%; $p<0.01$). The amplitude of mechanical vasodilation was decreased significantly ($p<0.001$) following removal of the endothelium by air. These results indicate that the threshold transmural pressure of mechanical vasodilation of the soleus feed arteries was not altered by VR, whereas the amplitude of mechanical vasodilation was increased by VR.

**Key words:** mechanical vasodilation, transmural pressure, voluntary wheel running, feed artery