

1-A-17 Protective effects of low-intensity exercise training on hyperglycemia and hyperlipidemia in Spontaneously type 2 Diabetic Torii rat

Kondo H¹, Fujino H², Murakami S³, Fujita N², Nagatomo F⁴, Ishihara A⁴

¹Nagoya Women's University, ²Kobe University, ³Himeji Dokkyo University, ⁴Kyoto University

Purpose: It is well known that male Spontaneously Diabetic Torii (SDT) rats, a new model of type 2 diabetes, develop hyperglycemia spontaneously without obesity at 16 weeks of age. We therefore examined that the chronic effect of low-intensity exercise training on the glucose tolerance and metabolism in the SDT rat. **Methods:** Male SDT (10-wks old) and age-matched wild-type Sprague Dawley (SD) rats were divided into four groups: sedentary diabetes (SDT), diabetes plus low-intensity exercise (SDT+Ex), control (SD) and control plus exercise (SD+Ex). Exercised rats performed a treadmill running at speeds up to 15 m/min for 60 min, 5 times per week. After 14 wks, oral glucose tolerance test with the estimation of total area under the curve (AUC), HbA1c, insulin, leptin and adiponectin were measured. **Results:** The level of blood glucose decreased in SDT+Ex rats compare to that in SDT diabetic rats at the age of 16 - 24 weeks old. The HbA1c in SDT+Ex was significantly low relative to SDT rats. The level of AUC was significantly higher in SDT rat than in SDT + Ex, SD + Ex and SD rats. There was no significant difference between the all groups in insulin and leptin levels. Although the expression level of adiponectin was significantly lower in SDT rat than in the SD rat, the expression level of adiponectin was significantly higher in SDT+Ex rat than in the SD rat. **Discussion:** Adiponectin is closely related to the insulin sensitivity, and its expression was decreased in type 2 diabetic SDT rats. Whereas exercise training was associated with changes in plasma adiponectin in SDT rats. These results indicated that exercise training attenuated the hyperglycemia and hyperlipidemia in type 2 diabetic rats.

Keywords: Exercise, diabetes, adiponectin, glucose tolerance

2-A-01 Preventive effects of interferential and low frequency currents on muscle atrophy in deep layer of the rat hindlimb muscle

Minoru TANAKA, Naoto FUJITA, Hidemi FUJINO
Kobe University Graduate School of Health Sciences

Purpose: Electrical stimulation using low frequency current has been used to prevent muscle atrophy.

However the depth efficiency with premodulated interferential current is greater than that with low frequency current. This study investigated the differential effects of electrical stimulation between using premodulated interferential and low frequency currents on muscle atrophy in the soleus muscle located on deep layer of the rat hindlimb.

Methods: The rats were divided into hindlimb unloading (HU), HU plus electrical stimulation, and weight-matched control (Cont) groups. In the HU plus electrical stimulation group, low frequency current was treated to the left hindlimb (LFC), whereas premodulated interferential current to the right (IFC).

Electrical stimulation provided 240s in a day, daily for 2 weeks of experimental period.

Results: In the mean muscle fiber cross sectional area, the HU group was significantly smaller than the Cont group in all muscle types. Although the LFC group was same level as the HU group, the IFC group was significantly larger than the HU and LFC groups.

Discussion: Previous study reported that skin impedance is lower at premodulated interferential current than at low frequency current. Therefore the dissipation of electrical energy is decreased at premodulated interferential current, which might have enhanced the effect of electrical stimulation on muscle atrophy in deep layer.

Key words: electrical stimulation, muscle atrophy, soleus, interferential current, low frequency current