

1-A-15 Increased muscular dehydroepiandrosterone levels

are associated with improved hyperglycemia in obese rats

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This study is undertaken to assess the effect of DHEA administration and exercise training on muscular DHEA and DHT levels and hyperglycemia in diet-induced obese and hyperglycemia rats. After 14 weeks of a high-sucrose diet, obese male Wistar rats were assigned randomly to one of three 6-week regimens: control, obese DHEA treatment or obese exercise training (running at 25m/min for 1hour, 5days/week)(n=10 each group). The results indicate that either 6 weeks of DHEA treatment or exercise training significantly attenuated serum insulin and fasting glucose levels compared with the control group. Plasma and muscle concentrations of DHEA and DHT, and expression levels of 5 α -reductase were significantly higher in the obese DHEA-treated and exercise-training groups. Moreover, both DHEA administration and exercise training upregulated GLUT4 translocation with concomitant increases in protein kinase B and protein kinase C- ζ/λ phosphorylations. Muscle DHEA and DHT concentrations closely correlated with fasting blood glucose levels (DHEA treatment: $r = -0.68$, $P < 0.001$; exercise training: $r = -0.65$, $P < 0.001$), serum insulin levels, and activation of the GLUT4-regulated signaling pathway. Thus, it is speculated that increased levels of muscle sex steroids may contribute to improved fasting glucose levels via upregulation of GLUT4-regulated signaling in diet-induced obesity and hyperglycemia.

1-A-16**Elucidation of biological motion adjustment mechanism in metabolism-related signal molecules**

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Purpose & Methods: We have established an original line from rats of Wistar strain that had unique characteristic of high voluntarily wheel-running, named SPORTS (Spontaneously Running Tokushima-Shikoku) rats. Ghrelin and Adiponectin with a feeding promotion action have a variegated body adjustment function of the energy metabolism regulation, the anti-inflammatory mechanism, the sympathetic nerve control and the cardiovascular system protection. Therefore, we administered Ghrelin or Adiponectin in the intracerebroventricular lesion of the SPORTS rats to examine the effects on the voluntary exercise.

Results: Ghrelin significantly decreased a voluntary activity with a wheel running cage, but did not affect the oxygen consumption, while Adiponectin decreased oxygen consumption with the decrease in spontaneously physical activity in open field.

Discussion: Ghrelin negatively controls the voluntary exercise with a wheel running cage through the center nerve system. On the other hand, Adiponectin acting on the central nervous system participates in the spontaneously physical activity in open field with energy consumption reduction. Thus, Ghrelin and Adiponectin might be new key molecules for the biological regulation of voluntary exercise.

● **Key Words:** Ghrelin, Adiponectin, voluntary exercise, energy consumption