

1-B-06 Effect of food intake on cutaneous vasodilatory response during exercise in the heat

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Purpose: After food ingestion, metabolism is augmented for several hours, and body temperature increased (diet induced thermogenesis; DIT). The present study examined to clear the effect of DIT on cutaneous vasodilatory response during exercise in the heat.

Methods: Ten male subjects participated in this study. They exercised 50% of peak oxygen uptake for ~60 min with/without ingesting food. The food was adjusted to meet 25~30% of estimated energy requirement.

Results and Discussion: During experiment, esophageal temperature, mean skin temperature, and mean body temperature (T_b) in food intake session were significantly higher than that in without food intake session. There was no significant difference in skin blood flow between sessions during exercise. To clear the effect of DIT on the characteristics of cutaneous vasodilatory response, we plotted skin blood flow against T_b and calculated T_b threshold for cutaneous vasodilation, sensitivity, and peak value. There were no significant differences in sensitivity and peak value, however there was a tendency to be different in T_b threshold. There was positive linear relationship between difference in T_b at baseline level and difference in T_b threshold. This suggests that the difference in T_b threshold for cutaneous vasodilation is influenced by the difference in T_b at baseline level, which is caused by DIT.

Key Words: diet induced thermogenesis, skin blood flow, body temperature

1-B-07 Effect of high fat diet on CPT activity in rat skeletal muscle

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Purpose: It is reported that long-term ingestion of high fat diet containing long chain triacylglycerol (L-TAG) improves in both fatty acids oxidation and endurance performance, despite of an induction of obese. This potential explanation is based on fatty acid inducible mitochondrial biogenesis. It remains, however, unclear whether medium chain TAG (M-TAG) can increase mitochondrial content and carnitine palmitoyl transferase (CPT) activity (one of fatty acid oxidation enzymes) in muscle. The purpose of the present study was to investigate the effect of long-term M-TAG ingestion on CPT activity in rat skeletal muscles. **Methods:** Male Wistar rats (5-week old), were assigned to three groups; normal diet (CONT; n=6, 12% calories as fat), high L-TAG diet (L-TAG; n=6, 60% calories as fat) and high M-TAG diet (M-TAG; n=7, 60% calories as fat) group. After 5-week feeding ad libitum of assigned diet, activities for citrate synthase (CS), 3-Hydroxyacyl CoA Dehydrogenase (3-HAD) and CPT in soleus muscle were measured by spectrophotometric assay. **Results:** Body weight and epididymal fat pad weight in M-TAG group were significantly lower than those in CONT and L-TAG groups ($p < 0.05$). L-TAG and M-TAG groups showed significant higher CS activity in soleus muscle than CONT group ($p < 0.05$, respectively). While there were no significant differences in 3-HAD activity among the groups, CPT activity was higher in both L-TAG ($p < 0.05$) and M-TAG groups ($p < 0.05$) than in CONT group. When both 3-HAD and CPT activities were expressed as a ratio against CS activity, there was no difference among the groups in both enzymes' activity. **Conclusion:** 5-week feeding of M-TAG high fat diet increased both CS and CPT activities in oxidative muscle, suggesting that M-TAG also be a one of potential nutrients to induce mitochondrial biogenesis in skeletal muscle. The question if the M-TAG (and/or L-TAG) can upregulate any specific proteins which relate to fatty acid oxidation, can still debate.

Key Word: high fat diet, medium chain fatty acid, CPT