Effects of aerobic exercise training on F13A-mediated energy metabolism in mice

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Objective: Apelin, an adipokine and also a myokine, is involved in energy metabolism. F13A is an analog of apelin-13. In this study, we aim to investigate the effect of aerobic exercise on F13A-mediated energy metabolism in mice.

Methods: 20 C57BL/6J wild mice were randomly divided into 4 groups (n:5), namely saline control group (SC), saline exercise group (SE), F13A control group (FC), and F13A exercise group (FE). Mice were intraperitoneally injected with F13A (0.2 μmol/kg/day) or saline (15 μl/kg/day). Mice in the exercise group underwent 60 min/day treadmill running at a speed of 15 m/min with a slope of 5°. After 2 weeks, the maximal oxygen uptake was measured and the running speed was adjusted to 20 m/min. The treadmill running continued 4 weeks. The mice were individually housed in a Comprehensive Lab Animal Monitoring System (Columbus Instruments, Columbus, OH, USA) between the 3rd and 4th week of training with free access to food and water. O2 consumption (V\textsubscript{O2}), CO2 production (V\textsubscript{CO2}) and respiratory exchange ratio (RER) during a 24-h period were measured after 24h of acclimatization. Glucose oxidation (in g/min/kg\textsuperscript{0.75} = [(4.545×V\textsubscript{CO2})−(3.205×V\textsubscript{O2})]/1000), and lipid oxidation (in g/min/kg\textsuperscript{0.75} = [1.672×(V\textsubscript{O2}−V\textsubscript{CO2})]/1000) were calculated.

Results: F13A alone increased glucose oxidation (P<0.01, vs SC group). Exercise plus F13A caused a significant decline in RER (P<0.01 vs FC and P<0.05 vs SE group), glucose oxidation (P<0.001 vs FC and P<0.05 vs SE group), whereas it increased lipid oxidation (P<0.05 in comparison with FC group). Exercise alone has no influence on 4 groups.

Conclusions: These findings suggest that 4 weeks aerobic exercise can regulate F13A reduce RER in mice, with a decrease of glucose oxidation and an increase of lipid oxidation in vivo.