

Effects of different concentrations of dietary salt on beneficial effect of light, long-term exercise and food restriction in genetically diabetic rats with a disrupted cholecystokinin A receptor gene

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Summary

OETF rats were developed as a model of non-insulin-dependent diabetes mellitus (NIDDM) with mild obesity. The daily profiles of energy expenditure associated with two peaks (one between 05:00 and 08:00, the other between 20:00 and 22:00) were observed at 8 weeks of age (without NIDDM), while these two peaks disappeared at 24 weeks of age with NIDDM. Laboratory rats are normally confined to cages that markedly restrict their physical activity. In these rats, the resting energy expenditure accounts for 90 % of the total daily energy expenditure, while the daily physical activity in humans consumes 30% of the total daily energy expenditure. We loaded light exercise, which consumed energy equivalent to physical activity, and examined whether this light exercise improved age-related decline in energy metabolism and glucose intolerance in OETF rats. The effect of 60% food restriction was also determined. These treatments improved pathological findings in OETF rats. Then, we examined the different concentrations of dietary salt on blood pressure in these rats. When the body weights were similar, the higher salt intake resulted in the higher blood pressure. However, obesity itself, regardless salt concentrations in the diet, increased blood pressure. The possible mechanisms of high blood pressure induced by obesity might be due to increased plasma levels of adipocytokines, such as leptin, TNF-alpha, and IL-6. The size of fat cells and the plasma concentrations of cytokines will be measured in the future.