

## A Mild Energy Reduction in the Lunch Diet may be Preventive for Metabolic Syndrome

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**<Objective>** Metabolic syndrome has become a major public health concern in Western countries and in Japan. This syndrome comprises the so-called lifestyle-related diseases, including diabetes, obesity, hypertension, and hyperlipidemia, which in turn reportedly contribute to a marked elevation in the risk of cardiovascular diseases. In the present study, we investigated whether a relatively mild reduction in dietary energy can be useful for preventing metabolic syndrome in humans.

**<Design>** The experimental protocols and procedures were approved by the Committee of the Nakamura Gakuen University's Ethical Review Board. After receiving an oral explanation of the study, 10 healthy men provided written informed consent prior to enrollment; they (age:  $46.8 \pm 6.9$  years; body weight:  $70.7 \pm 9.1$  kg; and BMI:  $23.9 \pm 2.6$  kg/m<sup>2</sup>) were then fed a lunch diet (without careful for breakfast and dinner) consisting of  $713 \pm 45$  kcal ( $29.8 \pm 1.4\%$  energy from fat) for the first stage over 4 wk; this was followed by a 1-wk washout period and a second stage over 4 wk, which involved feeding the subjects a diet consisting of  $594 \pm 36$  kcal ( $24.9 \pm 1.5\%$  energy from fat). The subjects were weighed and fasting blood samples were drawn before and after of each dietary stage. The dietary data were derived from the food records. Wilcoxon's signed-rank test was performed to examine the statistical significance of the outcome variables in response to dietary treatment.

**<Results>** In the second period wherein participants were fed lunch diets for 4 wk with reduced energy as compared to the beginning of this stage, the participants' waist circumference was decreased from  $85.9 \pm 4.6$  cm to  $84.9 \pm 5.0$  cm ( $p = 0.047$ ) and alanine transaminase (ALT) level was decreased from  $27.9 \pm 14.7$  U/L to  $19.6 \pm 6.2$  U/L ( $p = 0.004$ ). High-molecular weight adiponectin (HMW-adiponectin) was inversely and favorably increased from  $2.65 \pm 0.50$  µg/mL to  $2.97 \pm 0.63$  µg/mL ( $p = 0.020$ ). However, blood pressure, body weight, triglyceride, aspartate amino transferase, and γ-glutamyl transpeptidase values did not significantly differ. On the other hand, there were no changes in these parameters during the first stage.

**<Conclusion>** Our results suggest that a mild intervention in the lunch diet is effective for relieving certain variables that are characteristic of metabolic syndrome, such as waist circumference, ALT, and HMW-adiponectin.