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The effects of high-fat, high-sucrose diet and starvation on serum lipid profiles, abdominal fat weight and hepatic acyl-CoA synthetase level in rats

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Acyl-CoA synthetase catalyzes the conversion of a fatty acid to an acyl-CoA. This enzyme is essential in mammalian fatty acid metabolism, including the β -oxidation of fatty acid and the synthesis of cellular lipids. The purpose of this study was to investigate the effects of dietary fat composition and starvation on serum lipid profiles, abdominal fat weight, and hepatic acyl-CoA synthetase (ACS) level in Sprague Dawley rats. The rats were fed an AIN-76 diet or modified AIN fat diet, supplemented with 20% beef tallow (high-fat diet, HF), and 0.7% corn oil (low-fat diet, LF), for 4 weeks. Starvation group was fed AIN-76 diet, and fasted for 48 hrs before sacrifice. Hepatic ACS mRNA levels have measuring by Northern blot analysis with ACS cDNA probe. All values are expressed as group means \pm SD. Significance of differences were determined by ANOVA at the $p < 0.05$ level. LF group showed significant increase in serum total cholesterol level compared with other groups. Serum LDL-cholesterol levels of starvation group and HF group increased significantly compared to normal diet(N) group. Serum HDL-cholesterol levels of N group and LF group were significantly higher than those of starvation group and HF group. Serum triglyceride levels of LF group were significantly higher than those of N group, the starvation group, and the HF group. The abdominal fat weight was significantly higher in HF group, and lower in starvation group than that of N and LF group. In addition, we have evaluating the mRNA levels of ACS in those groups. In conclusion, the change in composition of dietary fat and starvation could affect changes in concentration of serum lipids and abdominal fat weight. Also, we expect ACS mRNA levels will serve to enhance our understanding of the molecular mechanisms underlying fatty acid metabolism