

Effect of dietary casein and soy protein on plasma lipids in a streptozotocin-induced diabetes model in hamsters

Sung-Ling Yeh, Chang-Yun Hsu, Ming-Jer Shieh
Yeh SL;Hsu CY and Shieh MJ

Abstract

While it is known that soy protein diet depresses serum cholesterol relative to a casein diet in hypercholesterolemic humans and a variety of animal species, the effect of soy protein on diabetes mellitus-induced hyperlipidemia has not been studied. We investigated the effect of soy protein and casein on the levels of plasma glucose and lipids in hamsters with streptozotocin-induced diabetes. Thirty-one hamsters were divided into control and diabetic groups. Diabetes was induced by intraperitoneal injection of streptozotocin. Control and diabetic hamsters were further assigned to two subgroups, respectively. One subgroup was fed with casein and the other with soy protein isolate. The basal composition of the diets was identical, except for the difference in protein source. After 4 weeks of the test diet, plasma concentrations of glucose, triglyceride (TG), and nonesterified fatty acids (NEFA) were significantly higher in diabetic groups than in the control groups. The plasma levels of glucose, TG, and total cholesterol were significantly lower in the diabetic soy protein group than in the diabetic casein group. The plasma total cholesterol level in the diabetic soy protein group was similar to those of the control subgroups. No significant differences in plasma glucose, TG, cholesterol or NEFA concentrations were observed between the two control subgroups. The malondialdehyde level in the livers, as well as the erythrocyte glutathione peroxidase and superoxide dismutase activities did not differ between control and diabetic groups, nor were there differences between the casein and soy protein groups. These findings suggest that soy protein also exerts hypocholesterolemic effects in this diabetic model system, and had favorable effects on lowering plasma glucose and TG. The soy protein diet did not affect lipid peroxide production or the erythrocyte antioxidant enzyme activities indicated that the antioxidant system was not changed under the present experimental condition.