

Beneficial Effect of Omega-7 Palmitoleic Acid on Metabolic Disorders in Type 2 Diabetic Mice

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Background

Studies have demonstrated the beneficial effect of omega-7 palmitoleic acid (C16:1 n-7) on reducing muscle insulin resistance and preventing beta-cell apoptosis. However, the effect of exogenously administered palmitoleic acid on metabolic disorders remains to be elucidated. The aim of this study was to examine the effect of palmitoleic acid on glucose/lipid metabolisms and insulin resistance in KK-A^y mice, a spontaneous model for studies of obese type 2 diabetes with low insulin sensitivity.

Methods and results

KK-A^y mice were orally administered vehicle, 300 mg/kg of palmitoleic acid, or palmitic acid (C16:0) on a daily basis. After 4 weeks of administration period, the levels of glucose, insulin and lipids in plasma had decreased significantly for the palmitoleic acid administration group, and insulin sensitivity had improved. Palmitoleic acid also reduced body weight and hepatic lipids concentrations. In contrast, there were no differences in risk factors for metabolic syndrome between the vehicle and palmitic acid administration groups. mRNA expressions of lipogenic genes in liver and proinflammatory adipocytokine genes in white adipose tissue were suppressed in palmitoleic acid administration group, and may have favourably affected hyperglycemia, hyperlipidemia and hepatic steatosis in diabetic mice.

Conclusions

Our results demonstrated that oral administration of palmitoleic acid effectively improved glucose/lipid homeostasis and hindered the development of metabolic syndrome in diabetic mice.