Activities of Antioxidant Enzymes and Lipid Metabolism in Rats Fed High Dose ofβ-Carotene, Canthaxanthin and Vitamin E in High Fat and Cholesterol Diets

英文摘要
The purpose of this study was to investigate the effect of high dose β-carotene, canthaxanthin vitamin E on the activities of antioxidant enzymes and lipid metabolism in rats fed high fat and cholesterol diet. Experiment I: Seventy-two male Wistar rats (weight about 252 g each) were randomly divided into six group : two control groups with or without adding 1 % cholesterol and 0.1 % cholic acid , the other groups fed 0.2 % β-carotene, beadlet β-carotene, canthaxanthin or vitamin E with 1 % cholesterol and 0.1 % cholic acid, all groups contained 15 % soybean oil. The rats of each group were sacrificed at the end of six-week feeding period, then the artery blood, liver and feces were collected. The levels of β-carotene, canthaxanthin, retinol andα-tocopherol were analyzed by HPLC. Analytical items included the activities of catalase, superoxide dismutase (SOD), glutathione peroxidase (GSH Px), glutathione reductase (GSH Rd), Glucose-6-phosphate dehydrogenase (G-6-PD), plasma and liver total cholesterol (TC), triglyceride (TG), thiobarbituric acid reactive substance (TBARS) test and liver conjugated diene. Experiment II: Eighty-four male Wistar rats (weight about 250 g each) were randomly divided into six groups. Experimental design was the same as experiment I. Analytical items included pathological histology of liver tissue, plasma and liver total cholesterol (TC) and triglyceride (TG), plasma cholesterol and triglyceride level of very low density lipoprotein (VLDL), low density lipoprotein (LDL), high density lipoprotein (HDL), feces neutral steroids and total bile acids.
In experiment I, the result showed that plasma β-carotene concentrations were higher in rats fed beadlet β-carotene, indicating that beadlet β-carotene had higher absorption than normal β-carotene. Rats fed cholesterol resulted in low plasma and liver retinol had lower concentrations, whereas β-carotene feeding resulted in higher plasma and liver retinol concentrations than the other groups fed cholesterol diets. The activities of SOD and GSH Px were decreased by feeding cholesterol diet,while β-carotene, canthaxanthin and vitamin E could increase those enzyme activities ($P<0.05$). The cholesterol diets would increase liver TBARS, conjugated diene, plasma TBARS, and these items were decreased by

feeding antioxidants. Experiment II : Rats fed cholesterol diets groups were induced series fatty liver, and rats fed β-carotene diets were better cross to normal. Rats had cholesterol-feeding group had higher plasma total cholesterol and LDL-C concentrations. Fed β-carotene diets result in plasma total cholesterol and LDL-C decreased significantly ($P<0.05$). Canthaxanthin and vitamin E fed groups had higher triglyceride in liver. The feces neutral steroids and bile acids were increased in rats fed β-carotene.

In conclusion, β-carotene, Canthaxanthin and vitamin E could decrease the oxidative stress from dietary cholesterol. The activities of SOD and GSH Px were decreased in rats fed cholesterol diet and β-carotene, canthaxanthin and vitamin E could increase those activities. β-carotene-fed decreased plasma total cholesterol and LDL-C. And β-carotene increased the feces neutral steroids and total bile acids.