

Altered mRNA expression of hepatic lipogenic enzyme and PPAR α in rats fed dietary levan

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Abstract

The peroxisome proliferator-activated receptors (PPAR α) are a transcriptional factor that participate in aspects of lipid catabolism such as fatty acid uptake through membranes, fatty acid binding in cells, fatty acid oxidation and lipoprotein assembly and transport. Levan, or high molecular-mass α -2,6-linked fructose polymer is produced extracellularly from sucrose-based substrates by bacterial levansucrase. To investigate the effect of levan feeding on serum leptin, hepatic lipogenic enzyme and PPAR α , NPY and UCP expression in high fat diet induced obese rats. 4 wk Sprague Dawley male rats were fed high fat diet (beef tallow, 40% of calories as fat) and 6 wk later, rats were fed 0%, 1%, 5% or 10% levan supplemented diets for 4 wk. Serum triglyceride and total cholesterol level was dose dependently reduced in levan supplemented diet fed rats, while the HDL cholesterol level was increased by levan supplemented diet. The mRNA expression of hepatic fatty acid synthase and acetyl CoA carboxylase, which are the key enzymes in fatty acid synthesis, was down-regulated by dietary levan. However, dietary levan not affected the malic enzyme, phosphatidate phosphohydrolase, HMG CoA reductase gene expression in liver. In addition, hepatic PPAR α mRNA expression was up-regulated by dietary levan, dose dependently. This suggests that, in vivo, the hypolipidemic effect of dietary levan may result from the inhibition of lipogenesis and stimulation of lipolysis accompanied with

gene expression regulation of hepatic lipogenic enzyme and PPAR α . Anti-obesity and lipid-lowering effect of levan may involve the transcriptional regulation via activation of PPAR system.

Reference

1. S. A. KANG, K. H. HONG, K. H. JANG, S. H. KIM, K. H. LEE, B. I. CHANG, C. H. KIM, & R. W. CHOUE. Anti-Obesity and Hypolipidemic Effects of Dietary Levan in High Fat Diet- Induced Obese Rats. (2004) J Microbiol Biotechnol 14,796-804.