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Inhibition of atherosclerotic plaque formation in ApoE-deficient mice by dietary supplementation with *Lactobacillus casei*

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Submission date: November 24, 2013; Acceptance date: April 18, 2014; Publication date: April 27, 2014

ABSTRACT

Background: Elevated serum cholesterol in humans is generally a risk factor correlated with the development of atherosclerosis (AS). *Lactobacillus casei* has been demonstrated to have the potential to reduce human serum cholesterol levels. The purpose of this study was to evaluate the anti-atherosclerotic effect of *Lactobacillus casei* (Strain Shirota) in apoE-deficient mice.

Methods: A total of 60 male ApoE-deficient mice of 4 weeks age, were randomly divided into 4 groups of 15 each group and matched for body weight. Four groups of apoE-deficient mice consumed one of the following diet: AIN-93G purified diet (n=15); AIN-93G purified diet with *Lactobacillus casei* (Strain Shirota; 0.5 mL of 10^8 cfu/mL，n=15); AIN-93G purified diet with *Lactobacillus casei* (Strain Shirota; 0.5 mL of 10^{10} cfu/mL，n=15); AIN-93G purified diet with *Lactobacillus casei* (Strain Shirota; 0.5 mL of 10^{12} cfu/mL，n=15).

Results: After 16 weeks intervention, the areas of atherosclerotic plaques in the aortic sinus were determined. Plaques were much more severe in control group than in *lactobacillus casei*-treated groups ($P < 0.05$). The plaque area of aortic sinus in mice fed *lactobacillus casei* with 0.5 mL of 10^8, 10^{10}, or 10^{12} cfu/mL was 44.61%, 56.01%, 82.58% less compared with control group, respectively. Compared with control group, total cholesterol accumulation in aortas and livers showed a significant reduction in mice fed with *lactobacillus casei* ($P < 0.05$). Addition of *lactobacillus casei* also ameliorated serum lipid profile by decreasing total serum cholesterol and increasing HDL cholesterol concentration.

Conclusions: *lactobacillus casei* significantly improved lipid profile and reduced cholesterol

accumulation in liver and aorta, leading the inhibition of the formation of atherosclerotic lesion.

Keywords: *lactobacillus casei*, atherosclerosis, apoE-deficient mice,cholesterol