The effects of allicin on weight in fructose-induced hyperinsulinemic, hyperlipidemic, hypertensive rats.


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BACKGROUND: Commercially available garlic preparations in the form of garlic oil, garlic powder and pills are widely used for certain therapeutic purposes, including lowering blood pressure and improving lipid profile. Despite the impressive effects of garlic most studies are limited by lack of controlled methods and suitable double-blinding, and by the use of preparations with unknown amounts and chemical identification of the active ingredient. Allicin, a synthetic preparation of an active constituent of garlic, was found to lower blood pressure, insulin, and triglycerides levels in fructose-fed rats. Thus, it was considered important to assess its effect on the weight of the animals.

METHODS: Male Sprague-Dawley rats weighing 240 to 250 g were fed a fructose-enriched diet consisting of 21% protein, 5% fat, 60% carbohydrate, 0.49% sodium and 0.49% potassium for 5 weeks, which produced hyperinsulinemia, hypertension, and hypertriglyceridemia. Group I (controls) rats were fed a diet enriched by fructose only; group II was given allicin the last 2 weeks, and group III was given allicin the first 3 weeks. The three groups consumed the same amount of food. Weight was measured at the beginning of the experiment and after 3 and 5 weeks on the diet.

RESULTS: Weight in the control group rose from 249.4 +/- 10.04 g to 274.5 +/- 15.5 g after 3 weeks and to 306.9 +/- 22.2 g after 5 weeks. Weight in group II rose from baseline 259.1 +/- 12.1 g to 306.9 +/- 22.2 g after 3 weeks on fructose alone, and declined slightly to 282.4 +/- 17.4 g after 2 weeks of allicin (P <.02). In group III, in which the protocol was reversed, the baseline weight of 260.4 +/- 13.25 g rose only to 269.8 +/-15.3 g (P <.431) after 3 weeks on fructose and allicin. CONCLUSIONS: The control group that was fed a diet enriched by fructose alone continued to gain weight, whereas the groups fed allicin did not. The difficulty of preventing weight gain after reaching the nadir of weight loss underscores the practical value of allicin for weight control.

Present-day uses of niacin: effects on lipid and non-lipid parameters.

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Existing guidelines for the prevention and treatment of coronary artery disease focus on lowering low-density lipoprotein cholesterol (LDL-C) as the primary lipid target. However, there has been increasing interest in raising high-density lipoprotein cholesterol (HDL-C) due to strong evidence linking low HDL-C levels with an increased risk of atherosclerosis. Raising HDL-C levels with lifestyle changes and pharmacologic interventions appear to reduce the risk of coronary artery disease beyond that of lowering LDL-C alone. Niacin has a substantial HDL-C raising effect, and also may beneficially alter total cholesterol, LDL-C and triglyceride levels. Niacin also exhibits antioxidant, anti-inflammatory and other beneficial effects on atherosclerosis. Niacin is safe and effective to use in women, in patients with diabetes mellitus and/or metabolic syndrome, and when used in combination with statins. Niacin has the promise of being a powerful pharmacologic agent in the fight against atherosclerotic disease, although additional clinical studies are required to examine this further.


**Allicin-induced decrease in formation of fatty streaks (atherosclerosis) in mice fed a cholesterol-rich diet.**


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BACKGROUND: Garlic (Allium sativum) has been considered to exhibit therapeutic features for many years. The effects of garlic on levels of serum lipids and on atherosclerosis have been investigated extensively. We have previously demonstrated that allicin, an active component of garlic, exerts a beneficial effect on lipid profile in hyperlipidemic rabbits. OBJECTIVE: To investigate the effects of allicin on formation of fatty streaks (atherosclerosis) and lipid profile in mice. METHODS: Allicin was extracted from garlic and kept in a buffer citrate solution at 4 degrees C. Sixty C57BL/6 mice were fed Paigen diet (17% fat, 1.25% cholesterol) for 15 weeks. Thirty randomly selected animals were administered allicin solution (9 mg/kg) and 30 were administered placebo. Blood lipid profile was evaluated five times during the study. At the end of the 15-week period, the animals were killed and the aortic sinus was evaluated for formation of fatty streaks (atherosclerosis). RESULTS: We observed no statistically significant differences between blood lipid profiles of groups. Microscopic evaluation of aortic sinus formation of fatty streaks (atherosclerosis), however, showed that values for mice in the allicin-treated group were significantly lower: areas of formation of fatty streaks (atherosclerosis) were 13,440 +/- 3310 and 23,410 +/- 3723 micron 2, respectively, for allicin-treated and control mice (means +/- SEM; P = 0.023). CONCLUSIONS: These results indicate that allicin reduces formation of fatty streaks (atherosclerosis) in hyperlipidemic mice. These changes do not seem to occur through an alteration in blood lipid profile.
The antiatherogenic effect of allicin: possible mode of action.


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OBJECTIVE: Garlic (Allium sativum) has been suggested to affect several cardiovascular risk factors. Its antiatherosclerotic properties are mainly attributed to allicin that is produced upon crushing of the garlic clove. Most previous studies used various garlic preparations in which allicin levels were not well defined. In the present study, we evaluated the effects of pure allicin on atherogenesis in experimental mouse models. METHODS AND RESULTS: Daily dietary supplement of allicin, 9 mg/kg body weight, reduced the atherosclerotic plaque area by 68.9 and 56.8% in apolipoprotein E-deficient and low-density lipoprotein (LDL) receptor knockout mice, respectively, as compared with control mice. LDL isolated from allicin-treated groups was more resistant to CuSO(4)-induced oxidation ex vivo than LDL isolated from control mice. Incubation of mouse plasma with (3)H-labeled allicin showed binding of allicin to lipoproteins. By using electron spin resonance, we demonstrated reduced Cu(2+) binding to LDL following allicin treatment. LDL treatment with allicin significantly inhibited both native LDL and oxidized LDL degradation by isolated mouse macrophages. CONCLUSIONS: By using a pure allicin preparation, we were able to show that allicin may affect atherosclerosis not only by acting as an antioxidant, but also by other mechanisms, such as lipoprotein modification and inhibition of LDL uptake and degradation by macrophages.

DFH has a stabilized extract of allicin.