A randomized, controlled trial on the effects of almonds on lipoprotein response to a higher carbohydrate, lower fat diet in men and women with abdominal adiposity.

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Abstract:
Background: Almonds have been shown to lower LDL cholesterol but there is limited information regarding their effects on the dyslipidemia characterized by increased levels of very low density lipoproteins (VLDL) and small, dense low-density lipoprotein (LDL) particles that is associated with abdominal adiposity and high carbohydrate intake. The objective of the present study was to test whether substitution of almonds for other foods attenuates carbohydrate-induced increases in small, dense LDL in individuals with increased abdominal adiposity. Methods: This was a randomized cross-over study of three 3wk diets, separated by 2wk washouts: a higher carbohydrate (CHO) reference diet (CHOhigh), a higher-CHO diet with isocaloric substitution of 20% kcal (E) from almonds (CHOhigh + almonds), and a lower-CHO reference diet (CHOlow) in 9 men and 15 women who were overweight or obese. The two CHOhigh diets contained 50% carbohydrate, 15% protein, 35% fat (6% saturated, 21% monounsaturated, 8% polyunsaturated), while the CHOlow diet contained 25% carbohydrate, 28% protein, 47% fat (8% saturated, 28% monounsaturated, 8% polyunsaturated). Lipoprotein subfraction concentrations were measured by ion mobility. Results: Relative to the CHOlow diet: 1) the CHOhigh + almonds diet significantly increased small, dense LDLIIIa (mean difference ± SE: 28.6 ± 10.4 nmol/L, P = 0.008), and reduced LDL-peak diameter (− 1.7 ± 0.6 Å, P = 0.008); 2) the CHOlow diet significantly increased medium-sized LDLIIb (24.8 ± 11.4 nmol/L, P = 0.04) and large VLDL (3.7 ± 1.8 nmol/L, P = 0.05). Relative to CHOlow, the effects of CHOhigh on LDLIIIa (17.7 ± 10.6 nmol/L) and LDL-peak diameter (− 1.1 ± 0.6 Å) were consistent with those of CHOhigh + almonds, and the effects of CHOhigh + almonds on LDLIIb (21.0 ± 11.2 nmol/L) and large VLDL (2.8 ± 1.8 nmol/L) were consistent with those of CHOhigh, but did not achieve statistical significance (P > 0.05). None of the variables examined showed a significant difference between the CHOhigh + almonds and CHOhigh diets (P > 0.05).