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## How effective are dietary interventions in lowering lipids in adults with dyslipidemia?

### EVIDENCE-BASED ANSWER

Diets lower in fat, higher in soy protein, or higher in fiber reduce serum total cholesterol, low-density lipoprotein (LDL), and triglycerides. More restrictive low-fat diets also lower high-density lipoprotein (HDL), while soy protein increases HDL. Average decreases in LDL range from 6.96 to 25.14 mg/dL, depending on the particular intervention and participants' baseline characteristics (strength of recommendation [SOR]: **C**, based on meta-analyses of ran-

domized controlled trials [RCTs] measuring intermediate endpoints). A "portfolio diet" that includes cholesterol-lowering "functional foods" can reduce total cholesterol and LDL; a Mediterranean-type diet can lower LDL (SOR: **C**, based on fair-quality RCTs, measuring intermediate endpoints). We do not yet know whether these diets will also help patients live longer and more healthy lives or just improve their lipid profiles.

### CLINICAL COMMENTARY

#### Simple interventions, like reducing fast food and increasing fruit and vegetable intake, are a good starting place

Dietary modifications are necessary for the successful long-term treatment of lipid disorders, as well as many other chronic medical conditions. Patients are often encouraged when they learn they can reverse a disease process without taking a medication. We should take every opportunity to educate our patients and promote healthy lifestyles. Simple interventions, such as eating less fast food and more fresh fruits and vegetables, are often a good starting place.

Other simple interventions to reduce cholesterol levels are taking fiber supplements and substituting commercially available margarines with plant sterols for butter.

Dietary counseling or referral to a medical nutritionist should be part of our overall treatment plan for patients with lipid disorders. Regularly scheduled follow-up visits help promote adherence to therapeutic lifestyle changes and encourage a therapeutic alliance.

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#### ■ Evidence Summary

Dietary changes are recommended as first-line treatment for mild to moderate dyslipidemia. We examined evi-

dence on 5 common dietary interventions for adults with dyslipidemia. The average effects on lipid levels are reported in the **TABLE**.

TABLE

## Average effect of dietary interventions on serum lipid levels

DIETARY INTERVENTION		AVERAGE CHANGE IN MG/DL OF LIPID LEVELS (% CHANGE)			
		TOTAL CHOLESTEROL	LDL	HDL	TRIGLYCERIDES
Low fat	NCEP Step I	-24.36* (-10%)	-18.95* (-12%)	-1.55 (-1.5%)	-15.10* (-8%)
	NCEP Step II	-31.32* (-7%)	-25.14* (-13%)	-3.48* (-16%)	-16.83* (-8%)
Soy	All	-8.51* (-3.77%)	-8.12* (-5.25%)	-1.55* (+3.03%)	-8.86* (-7.27%)
	Hypercholesterolemia	-9.67*	-6.96*	+3.87*	-7.97*
Fiber (per g/d)		-1.74*	-2.20*	-0.12	+0.27
"Portfolio"		-58.39* (-22.34%)	-51.82* (-29.71%)	3.09 (-6.50%)	18.60 (9.33%)
Mediterranean		-15.47 (-6.06%)	-19.34* (-11.37%)	0 (-12.50%)	-17.71 (0%)

\* Statistically significant at  $P \leq .05$

### Low-fat

A meta-analysis of 37 mostly good-quality controlled trials evaluated the former National Cholesterol Education Program (NCEP) Step I and Step II diets in 11,586 participants.<sup>1</sup> The Step I diet restricted intake of total fat ( $\leq 30\%$  of total calories), saturated fat ( $\leq 10\%$  of total calories), and cholesterol ( $\leq 300$  mg/d). Step II goals were lower for saturated fat ( $< 7\%$ ) and cholesterol ( $< 200$  mg/d). Mean baseline lipid values (mg/dL) were total cholesterol, 233.57; LDL, 155.10; HDL, 47.95; and triglycerides, 147.91. Both of these low-fat diets significantly reduced total cholesterol, LDL, and triglycerides. The Step II diet also reduced HDL.

### Soy

A meta-analysis of 23 good-quality controlled trials with 1381 participants reported that soy protein with naturally occurring isoflavones significantly reduced total cholesterol, LDL, and triglycerides while significantly increasing HDL.<sup>2</sup> The amount of soy isoflavone consumed varied across studies. One subgroup analysis showed that consumption of  $> 80$  mg/d

was associated with a better effect on lipids. In subjects with baseline hypercholesterolemia (total cholesterol  $> 240$  mg/dL), greater reductions in total cholesterol, and greater increases in HDL were reported, with comparable changes in LDL and triglycerides.

### Soluble fiber

A meta-analysis of 67 good-quality RCTs evaluated the effects of soluble dietary fiber in 2990 subjects (mean baseline lipid values [mg/dL]: total cholesterol, 240.9; LDL, 164.4).<sup>3</sup> Diets high in soluble fiber (average dose of 9.5 g/d) were associated with a statistically significant decrease in total cholesterol and LDL and no significant change in HDL or triglycerides. Type of fiber (oat, psyllium, or pectin) was not influential after controlling for initial lipid level.

### "Portfolio" diet

A fair-quality randomized crossover study with 34 participants found that a "portfolio diet," which combines the fat intake of the NCEP Step II diet with cholesterol-lowering

### FAST TRACK

**A diet lower in fat and higher in soy and fiber reduces serum total cholesterol, LDL cholesterol, and triglycerides**

“functional foods” (including plant sterols, nuts, soluble fibers, and soy protein), markedly reduced total cholesterol and LDL.<sup>4</sup> Mean baseline lipid values (mg/dL) were: total cholesterol, 261.41; LDL, 174.40; HDL, 47.56; triglycerides, 199.28.

### **Mediterranean diet**

A fair-quality RCT with 88 participants reported reduced LDL among subjects assigned to a Mediterranean-type diet.<sup>5</sup> Mean baseline lipid values (mg/dL) were total cholesterol, 255.22; LDL, 170.15; HDL, 58.01; triglycerides, 141.71.

### **Recommendations from others**

The NCEP Adult Treatment Panel III and the American Heart Association recommend the Therapeutic Lifestyle Changes diet.<sup>6,7</sup> The first stage of this diet emphasizes reduction in dietary saturated fat and cholesterol at the levels of the former NCEP Step II diet ( $\leq 7\%$  of energy as saturated fat and  $\leq 200$  mg dietary cholesterol). If the LDL goal is not achieved, the second stage emphasizes the addition of functional foods and soluble fiber.

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