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HUMAN TRIALS SHOW MEGADOSES OF VITAMIN E
MAY SLOW ATHEROSCLEROSIS

DALLAS--In the first large clinical study of its kind, researchers here have shown that megadoses of vitamin E may slow the development of atherosclerosis.

When nutrition researchers at The University of Texas Southwestern Medical Center at Dallas gave volunteers daily doses of 800 international units (IUs) of alpha-tocopherol, commonly known as vitamin E, they discovered that the oxidation rate of low-density lipoprotein (LDL) was reduced by half. Scientists believe it is the oxidation of LDL--the "bad" form of cholesterol--that triggers the buildup of cholesterol in the artery wall, leading to atherosclerosis, or hardening of the arteries. Oxidation is the same process that causes oils to become rancid when exposed to air.

Dr. Ishwarlal Jialal, associate professor of internal medicine and clinical nutrition, and Dr. Scott Grundy, director of UT Southwestern's Center for Human Nutrition, published their findings in the June 1992 issue of the Journal of Lipid Research.

Two groups of 12 normal men were given either a placebo or vitamin E for 12 weeks. Levels of vitamin E in their blood and in their lipids (fats) were measured at the beginning of the study, at six weeks and at 12 weeks. None of the volunteers experienced side effects, nor did their cholesterol levels change.

"While the mean blood levels of vitamin E were similar in both

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levels at both six and 12 weeks," said Jialal, the study's principal investigator. "Levels were 3.3-fold higher at six weeks and 4.4-fold higher at 12 weeks compared to the placebo group."

Because vitamin E is a fat-soluble vitamin, the researchers also measured it in the LDL. They found vitamin E levels similar to those in the blood.

"We can conclude from this finding that if you put someone on vitamin E, then measure it in the plasma (blood) and it's high, that means it's high in the LDL also," Jialal said.

Next the researchers tried to oxidize the LDL in the laboratory. "At baseline there was no difference in the oxidation of LDL," Jialal said. "But at six and 12 weeks, we showed that the vitamin E-treated group was less prone to oxidation." At six weeks, the oxidation rate of LDL in the vitamin group was 55.7 percent less than in the placebo group. At 12 weeks the rate was 42 percent less.

"We've documented that vitamin E enrichment of LDL decreases its susceptibility to oxidation and may well interrupt a key step in atherogenesis (the formation of lipid deposits in the arteries)," Jialal said. "Hence dietary micronutrients with antioxidant properties, such as vitamins E and C, could have a major role in future strategies for atherosclerosis prevention."

LDL transports 60 to 70 percent of the cholesterol in the blood. The higher the level of LDL, the greater the risk of coronary heart disease. Once LDL is inside the artery, it can be oxidized by cells that produce reactive oxygen.

"Oxidative modification of LDL is the most plausible explanation of how cholesterol promotes atherosclerosis," he said. "The earliest sign of atherosclerosis is the accumulation of cholesterol-filled white blood cells (monocytes or macrophages) in the lining of the artery wall."

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Macrophages cannot take up normal LDL, but oxidized LDL--resulting from exposure to free radicals--binds itself to special receptors on the cells. These receptors take up oxidized LDL and its cholesterol in an unregulated manner and become engorged. Oxidized LDL is also toxic to cells, impairing their function and allowing more cholesterol-filled cells to enter the lining of the artery wall.

Jialal and Grundy have shown in previous test-tube studies that vitamins C and E inhibited the oxidation of LDL. "Thus, our studies suggest that by inhibiting LDL oxidation, the dietary antioxidants could help prevent atherosclerosis," Jialal said.

He stops short, however, of recommending megadoses of either vitamin.

"You've got to do a clinical trial to show the benefit to people before recommending vitamin supplementation," he said. "One more part of the puzzle is whether vitamin E reduces heart attacks. If someone has heart disease, then you might make a case for supplementing with vitamin E. The other side of the coin is it does no harm.

"I would still recommend that people increase their intake of vitamin E in their diet by eating more leafy vegetables, sunflower seeds, nuts and oils, like wheat-germ oil and sunflower oil."

The Recommended Dietary Allowance for vitamin E is 5 to 10 milligrams (5 to 10 IUs) per day.

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NOTE: The University of Texas Southwestern Medical Center at Dallas comprises Southwestern Medical School, Southwestern Graduate School of Biomedical Sciences, Southwestern Allied Health Sciences School, affiliated teaching hospitals and outpatient clinics.