Vitamin E appears to cut heart disease risk

Daily consumption of vitamin E supplements appears to dramatically cut heart disease risk in middle-aged men and women, according to two large, ongoing studies of U.S. health professionals reported this week.

Biologically damaging oxidative reactions can foster degenerative changes that lead to many diseases associated with aging – from cataracts and cancer initiation to arthritis and heart disease. Not surprisingly, researchers have spent much of the last decade investigating the potential of vitamin E, the body's premier antioxidant, to halt or slow aging-related changes in animals and cultured cells. Several medical teams have even used vitamin E to reduce signs of oxidation in people (SN: 8/1/92, p.76).

Few investigators, however, have attempted to gauge whether a surfeit of vitamin E protects against degenerative disease, as measured, for instance, by fewer heart attacks or less need for coronary bypass surgery. In the May 20 NEW ENGLAND JOURNAL OF MEDICINE, researchers at Brigham and Women's Hospital and the Harvard School of Public Health, both in Boston, report on a pair of large studies that do just that.

Questionnaires administered to participants in the Nurses' Health Study provide eight years of life-style and dietary information on 87,245 registered female nurses. A related Health Professionals Follow-up Study correlated diagnosed heart disease with four years' worth of similar data on 39,910 male veterinarians, dentists, pharmacists, optometrists, osteopathic physicians, and podiatrists.

In both studies, participants who consumed vitamin E supplements for at least two years faced about 40 percent lower risk of heart disease than individuals who derived vitamin E through diet only. Moreover, "it doesn't really seem to matter what the dose of that supplement is," notes epidemiologist Meir J. Stampfer, who coauthored both studies. Vitamin E capsules usually contain from 100 to 800 international units (IU) of tocopherol. By comparison, the recommended daily allowance of vitamin E is 10 IU for men and 8 IU for women, a level typical of the U.S. diet. Rich sources of vitamin E include vegetable oils, margarine, nuts, and whole grains.

"I expected vitamin E use would be a marker for a very healthy life-style," Stampfer says, and that accounting for such life-style factors "would explain away most of the vitamin's effect."

But that didn't happen. Adjusting for nonsmoking life-style, consumption of vitamin C – another antioxidant – and other factors thought to lower the risk of heart disease, diminished vitamin E's protective effect very little. The researchers did find that in men, carotenoids – another class of antioxidants – might also offer some protection against heart disease in smokers. Though the same might also prove true for women, Stampfer says his team has yet to analyze such data on the nurses.

In an editorial accompanying the two reports, Daniel Steinberg of the University of California, San Diego, notes these two huge studies strongly support animal data by his and other groups showing that oxidation of low-density lipoproteins (LDLs), the so-called "bad" lipoproteins, can play an important role in atherosclerosis. Indeed, "that's the most plausible kind of hypothesis to explain the new data," adds Ishwarlal Jialal of the University of Texas Southwestern Medical Center in Dallas.

But Jialal and Steinberg both caution against consumers stocking up on the vitamin. Why? Regardless of their size, epidemiologic studies cannot establish causality. Results from the randomized, placebo-controlled studies that can do that may be up to five years away.

Until then, Steinberg says, "let's hold the vitamin E."

Jialal acknowledges that's hard to do. "I don't take it," he notes. "But even I'm getting convinced [of its efficacy]."

– J. Raloff

Nitric oxide flaw found in hypertension

Some cases of high blood pressure may be caused by a shortage of nitric oxide, a gas once thought to be toxic but now known to play a fundamental role in a variety of normal bodily functions. This is the first time that a defect in the way cells handle nitric oxide has been linked to hypertension in humans, the researchers contend.

High blood pressure is known as the "silent killer" because it can lead to heart attack and stroke. About 90 to 95 percent of people with high blood pressure suffer from essential hypertension, in which the underlying cause of the vessel-pounding pressure is unknown.

In 1990, cardiologist Julio A. Panza of the National Heart, Lung, and Blood Institute in Bethesda, Md., and his colleagues suggested that blood vessels in people with essential hypertension showed an impaired ability to dilate. The researchers knew that endothelial cells – skin-like cells that line the blood vessels – secrete nitric oxide and other chemicals that cause blood vessel walls to expand. Panza's team wanted to find out whether this gas, which is dissolved in the blood, plays a role in essential hypertension.

In an initial study of healthy volunteers and people with essential hypertension, Panza's team pinpointed the defect: Hypertensives have a shortage of nitric oxide in the walls of their blood vessels, a condition that may lead to chronically narrowed arteries, Panza says.

The researchers knew that endothelial cells use the amino acid L-arginine to make nitric oxide, and they wondered if people with hypertension had lower than normal levels of this precursor compound. If they supplied the L-arginine, the researchers reasoned, then the endothelial cells should crank out nitric oxide and the arteries' ability to dilate should improve.

To test that theory, the team embarked on a second study. They gave 14 people with hypertension and 12 controls with normal blood pressure an infusion of the vessel-dilating substance acetylcholine. Next, they administered L-arginine in combination with acetylcholine. In controls, the addition of L-arginine significantly boosted the vessel-dilating response to acetylcholine. In contrast, the hypertensives showed no increase in dilation when given the double infusion.

That finding suggests that for hypertensive patients, the shortage of nitric oxide is not caused by reduced availability of L-arginine, Panza says. The two studies appear in the May CIRCULATION.

More research is needed to elucidate the specific abnormality in the nitric oxide system responsible for hypertension, Panza admits. It may be that the endothelial cells fail to release nitric oxide. Alternatively, he speculates, people with hypertension may destroy nitric oxide more rapidly.

People with high concentrations of cholesterol in their blood may also have an abnormal nitric oxide system. However, Panza says these people may prove to have a defect different from that linked to hypertension. For example, a 1991 German study showed that treatment with L-arginine restored the dilating ability of blood vessels in patients with high cholesterol.

The results of such work raised the hope that L-arginine might prove beneficial in the treatment of hypertension. However, the results of Panza's study seem to dim L-arginine's promise as an antihypertensive drug, comments Thomas F. Lüscher of University Hospital in Bern, Switzerland, in an accompanying editorial.

Panza's study, and others like it, may lead to therapies that fix the biochemical defect underlying essential hypertension, Lüscher adds.

– K.A. Fackelmann