SCIENCE NEWS of the week

Beta Carotene May Slow Artery Disease

Beta carotene, the nutrient that gives carrots, mangoes, papayas and apricots their deep orange color, may help ward off heart attacks and strokes in people with artery-clogging atherosclerosis, according to new research findings.

"We have some provocative information to suggest [beta carotene] may delay the progression of atherosclerosis," says J. Michael Gaziano of the Harvard Medical School in Boston. Gaziano presented preliminary evidence of beta carotene's vessel-protecting prowess in Dallas this week at the American Heart Association's 63rd Scientific Sessions.

William A. Pryor, who studies vitamins and other nutrients at Louisiana State University in Baton Rouge, goes farther, calling the new findings the first direct evidence that compounds called antioxidants can counteract atherosclerosis in humans. The Harvard study, Pryor says, offers "the kind of gold-standard proof that physicians have been waiting for."

Previous experiments with tissue cultures and animals had already convinced some researchers of antioxidants' potential to slow the damaging buildup of fatty plaque in atherosclerotic arteries. In 1988, for instance, endocrinologist Daniel Steinberg tested a potent antioxidant drug in rabbits born with a genetic defect causing extremely high cholesterol levels and accelerating the development of atherosclerosis. Steinberg, of the University of California, San Diego, reported that the drug cut the rabbits' atherosclerosis risk by half.

But proof that antioxidants protect human blood vessels from plaque formation remained elusive. The Harvard study, though relatively small and involving men only, now appears to strengthen the proposed link in humans.

Gaziano and his colleagues focused on the antioxidant beta carotene, which the body converts to vitamin A from dietary sources such as carrots, leafy green vegetables and some fruits. They found that men taking a 50-milligram beta carotene pill every other day for six years suffered half as many major cardiovascular events, such as heart attack and stroke, as men taking placebo pills. At the outset of the study, all 333 participants showed signs of coronary artery disease, such as chest pain.

The men are part of an ongoing project called the Physicians' Health Study, involving 22,000 male physicians. Data from that project revealed in 1988 that men taking an aspirin tablet every other day reduced by half their risk of a first heart attack (SN: 1/30/88, p.68). Because nearly all the men in the beta carotene study took aspirin after the 1988 report came out, the Harvard researchers statistically controlled for aspirin use in analyzing their results. They also controlled for cardiovascular risk factors such as high blood cholesterol.

The scientists speculate that beta carotene's antioxidant properties discourage the formation of a particularly damaging type of low-density lipoprotein (LDL) cholesterol. That fits with Steinberg's hypothesis that LDL cholesterol poses its greatest threat when it interacts with a chemically reactive form of oxygen in the bloodstream. The oxidized LDL, says Gaziano, may damage cells lining the vessel walls, accelerating the plaque buildup that can choke off blood flow.

Charles H. Hennekens, a coauthor of the new report, says further study must confirm the finding that beta carotene benefits men with already established coronary artery disease. "These are tiny numbers," he says, noting that a larger study might yield different results.

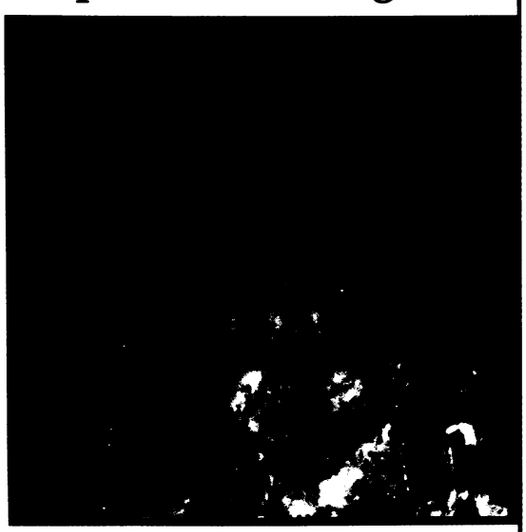
Whether beta carotene staves off coronary artery disease in healthy people remains to be seen, Gaziano adds. About half of the healthy men in the Physician's Health Study have been taking beta carotene supplements, and the final results—due in about four years — may provide some evidence of a protective effect in healthy arteries, Henneken says.

Until then, the Harvard researchers stop short of advising that anyone—with or without coronary artery disease—take beta carotene pills. While Pryor notes that 50-milligram doses of beta carotene are "completely safe," Hennekens says he worries that if people begin to view beta carotene as a "quick fix" for coronary artery disease, they may be less likely to eliminate important lifestyle risks such as cigarette smoking or high-fat diets.

Pryor suggests the beta carotene results may spur investigations into the cardiovascular effects of other carotenoids—yellow-to-red pigments found in many fruits and vegetables. "There are 500 carotenoids," he says. "Who knows if beta carotene is the best?"

— K. A. Fackelmann

Hubble telescope depicts Orion's edge



NASA

This image of the edge of the Orion nebula, taken in visible light by the Hubble Space Telescope's wide-field/planetary camera and released on Nov. 6, reveals new details about Orion's boundary with a cooler, denser gas cloud adjacent to it. Inside the nebula, ultraviolet radiation from hot, young stars heats oxygen and hydrogen, causing the atoms to emit visible light. The blue and green in the color-enhanced image depict light from oxygen and hydrogen atoms, respectively. Orion's intense stellar radiation also drives off gas from the neighboring cloud, including singly ionized sulfur, which emits the true-color red light dominating the picture.

This curtain of gaseous sulfur, representing the no-man's-land between the nebula and its neighbor, concentrates in clumps and filaments, some measuring only 0.1 arc-second in diameter — a scale beyond the resolving power of ground-based telescopes, says astronomer J. Jeff Hester of the California Institute of Technology in Pasadena, a member of the Hubble camera research team.

Despite Hubble's hobbled optics system (SN: 7/7/90, p.4), which can focus only a small percentage of light to within a circle of 0.1 arc-second, the camera successfully captured the structural detail because of the sulfur's extremely bright emission, Hester notes. He adds that computer processing helped to reduce the effects of the telescope's defective mirror, yielding the closest look yet at the interactions between Orion's stars and their surroundings, as well as the temperatures and other physical conditions within the nebula itself.