Beta carotene proves 'no magic bullet'

The U.S. government has sobering news for devotees of beta carotene. The dietary supplement doesn't prevent heart disease or cancer, and it may even increase a smoker's risk of lung cancer.

Richard D. Klausner, director of the National Cancer Institute, part of the National Institutes of Health in Bethesda, Md., announced last Thursday that researchers conducting an NCI-funded study of 18,314 men and women at high risk of lung cancer stopped the study 21 months early. Interim results showed that participants who had been taking beta carotene and vitamin A for at least 4 years had a 28 percent increase in lung cancer and a 17 percent increase in deaths, compared to those taking a placebo.

"Beta carotene is no magic bullet—far from it," says Klausner. "The only way to reduce your risk is to stop smoking."

Klausner also announced that an NIH-funded study of 22,071 male physicians shows that beta carotene prevents neither heart disease nor cancer.

Beta carotene, from which the body makes vitamin A, is one of hundreds of carotenoids. These compounds are found in dark green and orange fruits and vegetables, such as carrots, peaches, and spinach. As an antioxidant, beta carotene prevents potentially cancer-causing DNA damage. Some studies indicate that people with diets high in beta carotene suffer less heart disease and lower cancer rates, particularly lung cancer (SN: 11/04/89, p. 294).

The Beta Carotene and Retinol Efficacy Trial (CARET) included 14,254 current and former smokers and 4,060 men exposed to asbestos. Every day, half of the participants took 30 milligrams of beta carotene and 7.5 times the recommended daily allowance of vitamin A; the other half took a placebo. The trial was stopped when an analysis mirrored results of a similar Finnish study of 30,000 male smokers. In that study, lung cancers increased by 18 percent and deaths by 8 percent among men taking 20 mg of beta carotene.

"We don't know why beta carotene has these adverse effects," says study leader Gilbert S. Omenn of the Fred Hutchinson Cancer Research Center in Seattle. "Beta carotene could also have a direct toxic effect."

Omenn noted that blood samples taken in the CARET study ruled out a speculation that beta carotene depletes stores of another antioxidant, vitamin E (SN: 5/14/94, p. 310).

Initially, the Finnish results were greeted with skepticism because hope for beta carotene was so high, says Klausner. He notes that CARET shows such hopes "cannot be presumed to be true, no matter how fervently held."

The Physicians' Health Study, headed by Charles H. Hennekens at Harvard Medical School in Boston, found the supplement conferred no benefit or harm on physicians, including smokers, who took 50 mg of beta carotene every other day for 12 years.

Beta carotene alone cannot prevent cancer or heart disease, Klausner notes. Other compounds, however, may confer the benefits found from eating a low-fat diet high in fruits and vegetables.

"In the U.S. today, many people would rather pop a pill than change their lifestyle," says Hennekens. "Beta carotene neither substitutes for a good diet nor compensates for a bad one."

— L. Seachrist

More early findings from Galileo probe

While some astronomers ponder the latest findings about giant planets orbiting nearby stars (see p. 52), others are puzzling over the first data from the interior of our very own behemoth. On Dec. 7, a probe from the Galileo spacecraft plunged kamikaze-style into Jupiter. Science News reported some of the earliest analyses last month (SN: 12/23 & 30/95, p. 420).

This week, at NASA's Ames Research Center in Mountain View, Calif., investigators presented a slew of findings from the 57-minute mission.

Some of the results may force scientists to revise their thinking about how the planets matured, says Richard E. Young, Galileo project scientist at the center.

According to a widely held theory, comets bombarded the youthful planets, delivering a multitude of organic compounds, noble gases, and other atoms and molecules. As a result, the chemistry of the planets differs substantially from that of the primitive solar nebula from which they arose. But the quantitative nature of that difference and the relative importance of comets remain matters of debate, notes planetary scientist Tobias C. Owen of the University of Hawaii in Honolulu.

Data from the probe's mass spectrometer indicate that several elements, including carbon, oxygen, and sulfur, have abundances closer to solar values than previously thought. This suggests that scientists don't fully understand how the planets evolved, Owen says.

In contrast, another instrument on the probe measured only half the helium abundance of the sun's atmosphere. Researchers suspect helium formed droplets that rained down on Jupiter's core, a region the probe never reached.

A few of the other surprising findings may have more to do with the unusual nature of the probe's entry site—drier and more cloudfree than 98 percent of the planet's visible surface—than with the global character of Jupiter. For instance, the probe failed to detect the three distinct cloud layers thought to inhabit Jupiter's upper atmosphere. Scientists believe that below the visible cloud tops of ammonia reside layers of ammonium hydrosulfide and water vapor, but they found only wisps of gases and some evidence of water droplets.

"It's like the probe landed in Arizona or Death Valley rather than the Amazon rain forest," comments Gordon L. Bjoraker of NASA's Goddard Space Flight Center in Greenbelt, Md. "Unfortunately, if you want to look for clouds, this is not the place to land."

After correcting for a calibration error, probe scientists now say that the abundance of water on Jupiter is about the same as that indicated by the concentration of oxygen on the sun. That's about 10 times as much water as the researchers had previously estimated but only half the amount indicated by the Voyager spacecraft and one-tenth the amount anticipated by some scientists in the aftermath of Comet Shoemaker-Levy 9's 1994 crash into Jupiter.

Intriguingly, measurements of the Jovian winds indicate that they blow less strongly at the visible cloud tops—about 100 meters per second from west to east—than in deeper layers. The stronger winds, of 150 m per second, persisted as the probe descended, suggesting that heat escaping from deep within the planet, rather than sunlight striking Jupiter's topmost layers, drives the circulation, Young says.

The probe found that lightning occurs on Jupiter at only one-third to one-tenth the average terrestrial rate. Detectors recorded few optical flashes but about 50,000 radio signals consistent with lightning, indicating that the disturbances came from sources several thousand kilometers distant from the probe's equatorial entry site. *— R. Cowen*