

Passive smoking tied to vitamin C loss

"If you must smoke, please give me a vitamin C."

Nonsmokers may be justified in making this strange-sounding request the next time someone nearby lights up. A new study suggests that regular exposure to tobacco smoke decreases the body's stores of vitamin C (ascorbic acid), an important antioxidant. Previous research had shown only that smoking depletes vitamin C in smokers.

In fact, cigarette smoke resulted in vitamin C deficiencies in some of the study's nonsmoking volunteers, reports Diane L. Tribble of the Lawrence Berkeley (Calif.) Laboratory and her colleagues.

The study divided 141 women age 24 to 45 into three groups. The 50 nonsmokers who had little exposure to cigarette smoke had normal vitamin C concentrations in their blood. But five of the 44 nonsmokers regularly exposed to cigarette smoke — passive smokers — had vitamin C deficiencies. Even passive smokers not found deficient had lower concentrations of the vitamin than their smoke-free peers. Both groups of nonsmokers consumed similar amounts of vitamin C.

Of the 47 smokers, 11 had vitamin C deficiencies, but they ingested only about one-fourth as much of the vitamin as the nonsmokers.

Most of the passive smokers were exposed to cigarette smoke about 20 hours a week, though some reported as many as 95 hours of weekly exposure, the researchers report in the December *AMERICAN JOURNAL OF CLINICAL NUTRITION*.

The effects of cigarette smoke on vitamin C metabolism concern researchers, in part because the vitamin may help protect the body against the diseases linked to smoking (SN: 6/8/91, p.358). Oxidants in cigarette smoke speed up the metabolic turnover of ascorbic acid, thereby lowering the body's supplies, Tribble and her colleagues explain.

Passive smokers need more than the recommended dietary allowance (RDA) of vitamin C to make up for their losses, the researchers contend. Only those who consumed more than 250 milligrams of the vitamin per day had vitamin C concentrations similar to those of people only rarely exposed to smoke.

A double whammy

For 497 Seattle-area patrons of the fast-food restaurant Jack in the Box, the cheer vanished from their holiday season last year when they or their children developed gastroenteritis from eating hamburgers contaminated with a strain of the bacterium *Escherichia coli*.

Doctors now report that three of the infected children died from hemolytic uremic syndrome (HUS) soon after the poisoning. Thirty-five other children also developed HUS, which produces kidney failure, anemia, and low platelet counts. Ellis Avner and his colleagues at the University of Washington's Children's Hospital and Medical Center in Seattle described the cases in November at a meeting of the American Society of Nephrology in Boston. The disease strikes primarily children.

"This was the largest reported outbreak of *E. coli*-associated HUS," says Avner. Typically, as in this outbreak, about 10 percent of patients with *E. coli*-related gastroenteritis develop HUS, he says.

The future for some HUS survivors looks grim. A French study presented at the conference found that researchers have underestimated HUS' long-term effects, Avner says. Marie-F. Gagnadoux and her colleagues at the Enfants-Malades Hospital in Paris followed 25 HUS patients for 15 to 28 years. While still children, they all appeared cured, but 15 went on to develop serious renal problems, the researchers reported.

Avner predicts that 5 to 10 percent of the Seattle-area patients will suffer chronic kidney failure, 30 to 40 percent will have milder symptoms, and the others should fare well.

Richard Monastersky reports from San Francisco at a meeting of the American Geophysical Union

Digging up the dirt on Mauna Loa

How much time did it take to build Hawaii's massive Mauna Loa, the world's largest volcano? Much longer than scientists had thought, says a team currently drilling into the side of this fire-spouting mountain, most of which lies underwater.

Working near the city of Hilo on the big island of Hawaii, the research team has bored 1,100 meters into the ground to chart the history of lava flows that have poured out of Mauna Loa and its extinct sibling, Mauna Kea. Before starting the project, volcanologists had believed Mauna Loa's age might range up to 500,000 years. But the rocks pulled up during the drilling experiment show that the volcano spewed out lava far less often than previously thought, indicating that Mauna Loa and its neighbors on Hawaii may be more than twice as old as previously believed.

The drill hole first pierced lavas from Mauna Loa and then passed into the Mauna Kea flows. The big island also contains three other volcanoes: the extinct Kohala; the historically active Hualalai; and the currently active Kilauea. Because the drilling results indicate that these volcanoes grew slowly, they suggest that four might have erupted during the same span of time, says Donald M. Thomas of the University of Hawaii in Honolulu. He collaborated on this project with Donald J. DePaolo of the University of California, Berkeley, and Edward M. Stolper of the California Institute of Technology in Pasadena.

The big island's volcanoes and those on the other Hawaiian Islands formed as the Pacific plate passed over a vertical stream of hot rock rising from deep inside the planet. The ascending plume creates a volcano each time it burns a hole through the surface plate. But because the plate is moving, each volcano eventually dies out as it passes beyond the reach of this so-called hot spot. Then a new volcano develops over the spot. The youngest Hawaiian volcano, called Loihi, is slowly growing on the submerged flank of the island and will take many thousands of years to break the ocean surface.

The research team drilled into the Hawaiian lava flows to learn more about the plume of hot rock that feeds the volcanoes. While some geophysicists believe these streams of rock rise from the edge of the Earth's core, others believe they start much shallower in the planet, within the upper section of the mantle. By studying details in the successive lava flows that erupted from Mauna Loa and Mauna Kea, scientists hope to learn more about where plumes originate and how they rise through the mantle, DePaolo says.

A new spin on global warming

Although the makers of quartz watches would have you believe otherwise, even the most accurate timepiece won't precisely track the passing days. Because of tiny changes in Earth's rotational rate, day length can vary as much as one-thousandth of a second over a span of a few months. A group of researchers now reports calculations suggesting that such fluctuations may provide a means of monitoring long-term climate change, such as global greenhouse warming.

Richard S. Gross and his colleagues at the Jet Propulsion Laboratory in Pasadena, Calif., analyzed the seasonal changes in day length over the last 30 years. Whereas scientists think that rearrangements of matter inside the Earth cause longer-term shifts in rotational speed, the seasonal changes are thought to occur because of variations in the strength of winds.

Gross and his colleagues found that the seasonal fluctuations in day length over the last three decades correlate with the Southern Oscillation Index — an atmospheric pressure pattern in the Pacific associated with El Niño warming. This suggests that scientists can use the alterations in day length to monitor long-term changes in the atmosphere, particularly the strength of winds that blow around the globe, Gross says.