Add tea to that old 'apple a day' adage

A number of reports have suggested that, taken in moderation, alcohol — especially wine — may be good for the heart. What's a teetotaler to do? Drink tea and snack on apples, the results of a new Dutch study seem to indicate.

A growing body of research suggests that atherosclerosis probably traces to oxidation of low-density lipoprotein (LDL) cholesterol, the so-called bad cholesterol. This insight has prompted a search for dietary agents that might prevent LDLs from undergoing this chemical modification. The most celebrated candidates to turn up in that search: vitamin E, vitamin C, and beta-carotene (SN: 8/1/92, p.76).

The Dutch team focused on flavonoids. Trace quantities of these antioxidants — many of them pigments — occur naturally in plants and in drinks derived from them.

In 1985, as part of a continuing study of elderly men, the researchers conducted medical exams of 805 residents of Zutphen, the Netherlands. At the same time, they collected detailed dietary information for each participant and began chemically analyzing flavonoid concentrations in fruits, vegetables, and popular drinks. Five years later, the researchers brought the surviving participants — now 70 to 89 years old — back for follow-up exams and dietary surveys. Hospital or physician records confirmed the causes of death for the 185 participants who had died.

"Our study was quite small, so its [statistical] power is not large," acknowledges Michael G.L. Hertog of the National Institute of Public Health and Environmental Protection in Bilthoven. However, his team reports in the Oct. 23 LANCET, diets rich in flavonoids appear to cut a man's risk of dying from coronary heart disease.

For instance, 693 men entered the study with no history of heart attack. Within this group, those who consumed the most flavonoids exhibited less than one-third the risk of developing a fatal heart attack as men who consumed the least — and that was after accounting for each man's age, diet (including consumption of other antioxidants and fats), and such other risk-modifying factors as smoking and blood pressure. The data also indicate that high flavonoid consumption reduced the incidence of nonfatal heart attacks and the risk of dying from other causes.

"Vegetables and fruit were thought to be the major dietary sources of flavonoids," Hertog notes. "But in this population, the main source is tea." On average, the Zutphen men derived 61 percent of their flavonoids from the brewed beverage. Apples and onions, at 13 and 10 percent, respectively, proved the next biggest sources.

This study "reinforces the recommendation that we should eat more fruits and vegetables," says food chemist Edwin N. Frankel of the University of California, Davis. It also dovetails with test-tube findings by his group that flavonoids extracted from red wine can protect the LDLs in human blood from oxidation.

Although the Dutch study's risk analyses "are sound, I don't think anybody ought to change their habits based on them," says Arthur L. Klatsky, chief of cardiology at Kaiser-Permanente Medical Center in Oakland, Calif. "I suspect that it [the lower mortality attributed to tea] is not a statistical fluke." However, he notes that a similarly strong benefit from tea did not show up in a far larger study that he led recently.

The Zutphen data do suggest new areas for study, says Frankel. Chief among them should be analyses of flavonoid concentrations in U.S. foods, he suggests. Currently, "we lack good data on how much we consume," he notes. Equally essential, argues Ishwarlal Jialal of the University of Texas Southwestern Medical Center in Dallas, are studies on how the body handles flavonoids. They can't protect LDLs unless they reach them in the blood — and that hasn't been shown yet, he says.

— J. Raloff

Cosmic dust can ferry in organic molecules

During the solar system's first billion years, cosmic dust particles — speck-sized shards of rock — swarmed in the void, drifting steadily into Earth's primordial atmosphere and sprinkling the planet, some researchers have suggested, with the raw materials of life. Even today, slowly but steadily, the dust continues to rain onto Earth.

In March, space scientists reported collecting interplanetary dust particles from Earth's stratosphere and noted the presence of organic molecules on them (SN: 3/27/93, p.204). Now comes a detailed chemical analysis of those dust particles.

Simon J. Clemett, a chemist at Stanford University, and his colleagues report in the Oct. 29 SCIENCE the detection of polycyclic aromatic hydrocarbons (PAHs) on interplanetary dust. The PAHs bear unusual features that distinguish them from similar molecules found on terrestrial particles and meteorites. "This is the first time complex organic molecules have been clearly identified on interplanetary dust," says Claude R. Maechling, a chemist at Stanford and coauthor of the report. "There may be other species of organic molecules as well, but we've only just started to look for them."

"We're not claiming that interplanetary dust caused life to form — not by any means," he adds. "But we do know two things. One is that there are organic molecules on interplanetary dust. The other is that interplanetary dust particles have, since the Earth's formation, shed a fair amount of material onto the Earth. So it's reasonable to say that the interplanetary medium delivered large amounts of organic materials onto Earth. But that's as far as we want to go."

The particles were gathered by a high-flying NASA ER-2 aircraft, whose sticky, silicone-coated, wing-mounted "flags" went dust collecting 20 kilometers above sea level. Of the many particles captured, the scientists focused on 17, ranging in size from 2 to 50 micrometers in diameter. They classified eight as interplanetary dust particles, seven as terrestrial contaminants, and two as of uncertain origin.

"Interplanetary dust particles have three special features that differentiate them from terrestrial particles," says physicist Robert M. Walker of Washington University in St. Louis, another report coauthor. "First, their elemental makeup is similar to that of chondritic meteorites, which contain mostly silicon, magnesium, iron, and aluminum. Second, they show an enrichment of odd isotopes, such as deuterium and nitrogen-15. And third, they show the presence of nuclear particle tracks of heavy nuclei from solar flares. Those three factors give us proof positive for interplanetary dust particles."

The scientists crushed the rock specks between quartz plates and analyzed the resulting particles with a microprobe two-step laser mass spectrometer. They found "a rich mixture of nonvolatile, high-mass polycyclic aromatic hydrocarbons in two interplanetary dust particles," which they named Aurelian and Florianus.

"Both are certainly extraterrestrial, each has a chondritic elemental spectrum, and both have large deuterium enrichments," the team reports. "Furthermore, the N-15 enrichment recorded for Florianus is among the largest recorded for an extraterrestrial object." Interestingly, the organic molecules on the interplanetary dust were more complex than and quite different in makeup from those found in the terrestrial particles or those found previously in other meteorites, the researchers observe.

As for the implications of these findings, the researchers are cautious.

"These are abiotic compounds, not proteins or DNA," Maechling says. "We make no claims that these compounds have any biological activity. There are some theories that these polycyclic aromatic hydrocarbons could go on to form amino acids. But does that relate to life? We can't comment on that. That's a very hypothetical conclusion."

— R. Lipkin