Food & Nutrition

Salads: A stroke of luck

Each year, some 480,000 people in the United States suffer an ischemic stroke. It's the most common type, caused by a blood clot in arteries of the brain. A new study suggests that one way to ward off the threat of this debilitating type of cardiovascular disease is to dine on a green salad.

Want to jazz up the meal? Toss in some orange slices or grapefruit, because citrus fruits also appear to be protective.

Kaumudi J. Joshipura and his colleagues at the Harvard School of Public Health in Boston collected data on 570 men and women who had developed ischemic stroke. The researchers compared the diets of these people and the eating habits described in surveys of almost 115,000 others. All were participants in either of two long-running Harvard programs: the female Nurses' Health Study or the male Health Professionals' Follow-up Study.

Consumption of fruits and vegetables appeared to be protective even after the scientists accounted for other standard cardiovascular risks, such as smoking, alcohol consumption, weight, activity level, and blood pressure. Each serving eaten on average per day reduced stroke risk by 3 percent in women and 5 percent in men, the team reports in the Oct. 6 JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION.

Sifting through the dietary data, Joshipura's group found that several families of foods accounted for most of that protection. These included crucifers, such as broccoli, cabbage, and cauliflower; green leafy vegetables; and vitamin C–rich foods, such as citrus fruits and juices. Though the scientists don't know the mechanism for these foods' benefit against strokes, they speculate that part of the protection may trace to folate, potassium, or antioxidants, such as vitamin C and flavonoid pigments.

"Our results provide further support for the recommendation to consume at least five servings of fruits and vegetables a day," Josphipura's team concludes. Currently, U.S. consumption of these foods averages 4.4 servings per day. —*J.R.*

Brewing up cleaner arteries

Several studies have indicated that alcoholic drinks, especially wine and beer, can reduce a person's risk of heart disease. Researchers suspect that some of these heart benefits trace to a retarding of atherosclerosis, the accumulation of artery-clogging plaque. A Dutch study now finds that tea offers a good alternative—at least for women.

Johanna M. Geleijnse of Wageningen University in the Netherlands and her colleagues recruited nearly 3,500 residents of Rotterdam to their study. Most were in their mid 60s or older, and all were free of cardiovascular disease. X rays of one of the heart's arteries in each man or woman allowed the researchers to quantify atherosclerotic plaque.

Diet can play a significant role in the buildup of plaque, a risk factor for heart attacks. Because tea—rich in plaque-retarding antioxidants—has been linked to a reduced risk of fatal heart attacks (SN: 10/30/93, p. 278), Geleijnse's team collected detailed data on the tea-drinking habits of each participant.

In the Oct. 11 ARCHIVES OF INTERNAL MEDICINE, Geleijnse and her colleagues report that after they accounted for other predisposing factors, the prevalence and extent of plaque was greatest in those who drank the least black tea.

Those who downed a cup or two per day had roughly half the incidence of severe atherosclerosis seen in people who drank no tea. Four or more cups per day reduced the incidence of severe atherosclerosis to less than one-third that seen in tea abstainers.

The researchers point out that this trend observed in the combined group did not prove statistically significant among just the men. However, the incidence of severe plaque among women drinking four or more cups of tea daily was only one-quarter as high as in women who eschewed the brew. —*J.R.*

Physics

Bubbling to extreme temperatures

Blasting intense, high-frequency sound through a liquid causes the formation of tiny gas bubbles, which then rapidly collapse. These little implosions can nevertheless be so violent that the compressed gas within a collapsing bubble emits a flash of light (SN: 10/5/96, p. 214). Using spectroscopic techniques, researchers have now established that temperatures inside these imploding bubbles can reach values comparable to those at the sun's surface. Chemist Kenneth S. Suslick and his coworkers at the University of Illinois at Urbana-Champaign report their findings in the Oct. 21 NATURE.

The researchers targeted silicone oil saturated with argon gas and spiked with traces of metals such as chromium and molybdenum. These metal elements emit characteristic colors of light when excited. The relative intensity of the light at different wavelengths is an excellent thermometer for determining the temperature of the metal atoms and, hence, the implosion temperature of the gas inside a collapsing bubble, Suslick notes.

Measuring light emissions from a dense cloud of collapsing bubbles, Suslick's team found that the gas temperature gets as high as 5,100 kelvins. The resulting short-lived hot spots are like microscopic furnaces and can drive high-energy chemical reactions in an otherwise cold liquid, Suslick says.

The researchers can now use their novel thermometer to study the factors that influence the implosion temperature. They have already discovered that a solution's chemical composition has a strong effect. Dissolving a small amount of a gaseous hydrocarbon such as propane in the oil can lower the implosion temperature to 2,500 K. —*I.P.*

Probing sandstone's pore network

Oil-bearing sandstone is a highly porous, intricately interconnected material that is often difficult to characterize precisely. Researchers have now demonstrated that a novel variant of nuclear magnetic resonance (NMR) imaging can capture crucial details of a porous rock's structure and elucidate its effect on fluid flow through the material. Ronald L. Walsworth of the Harvard-Smithsonian Center for Astrophysics in Cambridge, Mass., and his collaborators report their results in the Oct. 18 PHYSICAL REVIEW LETTERS.

In the new technique, researchers inject xenon gas into the porous material, held in a powerful magnetic field. As the gas atoms diffuse rapidly through the rock, they signal their positions by sending out radio waves. The scientists then use the radio data to calculate the ratio of surface area to volume of pores and determine how the material's convoluted structure restricts gas or liquid flow. The technique may also prove useful for characterizing foams and lung and sinus passageways. —*I.P.*

Glimpses of a superheavy element

Physicists have been synthesizing new elements in the laboratory for nearly 60 years. Most of the artificial nuclei created are highly unstable and last only a fraction of a second. Earlier this year, researchers obtained the first hint that an element with 114 protons in its nucleus would buck the trend of shorter lives for heavier nuclei (SN: 2/6/99, p. 85). Yuri Ts. Oganessian of the Joint Institute for Nuclear Research in Dubna, Russia, and his collaborators now provide details of that discovery in the Oct. 18 PHYSICAL REVIEW LETTERS.

In their initial experiment, the researchers bombarded a plutonium-244 target with calcium-48 projectiles to create a nucleus with 114 protons and 175 neutrons. A follow-up experiment last spring produced evidence that an isotope of element 114 having 173 neutrons had formed. The half-lives of the new isotopes range from seconds to tens of seconds, the researchers estimate. That's almost a million times longer than the life spans of isotopes of elements 110 and 112. —*I.P.*