Update on intake: Calcium consumption low

Shakespeare knew about it—"vigour of bone." Now, a panel of scientists reports from the National Institutes of Health in Bethesda, Md., that we need to consider our bones more carefully. Low calcium intake, it says, is leading to an increase in cases of osteoporosis, or brittle-bone disease.

Each year, 250,000 people suffer osteoporosis-related hip fractures; 12 to 20 percent of them do not survive. The lives of those who do are permanently changed; many lose the ability to walk and live independently.

To address the rising incidence of osteoporosis, which currently affects 25 million people in the United States, NIH sponsored a conference last week on optimal calcium intake. The panel warned that without a concerted effort to increase calcium intake, "the population over 45 years [old] will sustain 5.2 million fractures and incur $45.2 billion in costs to the health care system."

And people must change their ways now, because, as one study points out, the condition doesn't show up until later in life, often after it's too late to build up bone mass. Girls age 12 to 19 generally get only 900 milligrams of calcium per day (mg/day), one study found, an amount well below the suggested dose.

The panel recommends the following daily calcium intake: for infants up to 6 months of age, 400 mg; 6 to 12 months, 600 mg; for children age 1 to 10 years, 800 mg; 11 to 24 years, 1,200 to 1,500 mg; for women 25 to 50, 1,000 mg; postmenopausal women, 1,000 to 1,500 mg; for men 25 to 65, 1,000 mg; over 65, 1,000 to 1,500 mg. It cautions individuals not to exceed 2,000 mg/day, which could cause kidney stones.

The average daily adult diet, excluding dairy products, contains approximately 400 mg of calcium. Two cups of skim milk would boost that total to 1,000 mg, 2 cups of nonfat yogurt to 1,200 mg – a fairly simple regimen for people who can tolerate milk.

Earlier studies have shown that lactose intolerance afflicts 50 percent of adult Hispanics and about 75 percent of people of African, Asian, or Native American descent. Alternative sources of calcium include kale, broccoli, and sardines, as well as calcium supplements, though recent studies have shown that some supplements, particularly bonemeal, contain lead (SN: 9/4/93, p.150).

Despite their increased lactose intolerance, some other races fare better than Caucasians in regard to bone disease. One study presented at the conference showed that African Americans, Mexican Americans, and Japanese suffered less from osteoporosis. Another study, conducted by Velimir Matkovic of Ohio State University in Columbus, found that 80 percent of variance in bone mass is genetic; environment counts for 20 percent. Even so, proper calcium intake can probably contribute "to more than 50 percent of the difference in the hip-fracture rate later on in life," says Matkovic. – *G. Marino*

Subduing with tenacious, tacky tendrils

What looks like some serpentine alien born in a grade-B science-fiction flick is actually law enforcement's monster-size answer to Silly String.

Sandia National Laboratories in Albuquerque originally developed its patented "sticky foam" in the 1960s for classified, nuclear-safeguard functions. About 18 months ago, the Justice Department's research arm commissioned Sandia to develop a portable sprayer for the material – one that might enable police or prison guards to foam into submission violent or fleeing felons (represented here by a dummy).

Sandia

Explains Tom Goolsby, a mechanical engineer working on the project: One of Sandia's new sprayers shoots out the material – which can travel up to 30 feet and "stays sticky forever" – as a 0.2-inch stream of liquid. With the help of a chlorofluorocarbon gas, however, the relatively nontoxic foam quickly expands up to 50 times its original size, creating snakes of glue with a density near that of cotton balls.

In tests, the foam proved capable of immobilizing people or sticking them to sprayed walls or floors. And once it makes contact, this goo really adheres: Rubbing with mineral oil cleans it off skin, but at the rate of only about 1 square inch per minute. – J. Raloff

Conductive ceramics grow in a solution

Highly conductive ceramics, especially the superconducting copper oxide variety, are extremely hard to make.

Typically, scientists painstakingly deposit elements atom by atom on a thin film inside a multi-million-dollar vacuum chamber, then bake the film in a high-temperature kiln—an expensive, tedious, and labor-intensive process.

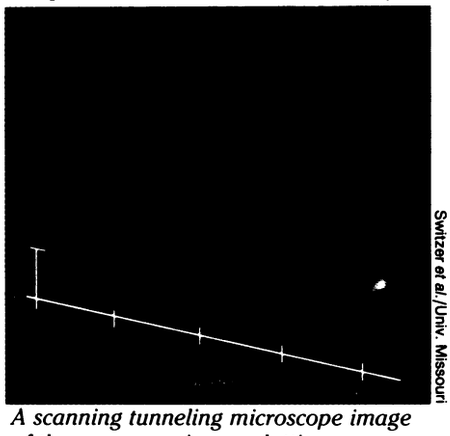
Now, a group of researchers reports an entirely different approach. In the June 10 SCIENCE, Jay A. Switzer, a chemist at the University of Missouri at Rolla, and his colleagues describe "growing" highly conductive ceramics in a solution in a beaker, with no costly vacuum chambers or clumsy kilns.

This new ceramic, which they call a "defect chemistry superlattice," is made from sandwichlike layers of thallium (III) oxide. Using electrochemical deposition, the scientists build the layers one at a time by pulsing electric current through the solution.

The ceramic's main advantage, says Robert Van Leeuwen, a chemist and coauthor, is its quick, cheap, and easy production. "Instead of using a $2 million molecular beam epitaxy machine, which most people use to make copper oxide superconductors, a high school student could make this material with a few thousand dollars' worth of equipment."

Of interest, too, are the new compound's optical properties. Like optical fibers, the new material transmits light efficiently in the near infrared, "where most optical communication occurs these days," Van Leeuwen explains. The ceramic may also find a use in optical switches in high-speed computers.

Owing to its structure and chemical properties, the new ceramic can conduct electricity almost as well as metal can, Switzer says. The compound may also prove to be a superconductor. Currently, the chemists are trying to determine if it can superconduct and, if so, at what temperature. – *R. Lipkin*



Switzer et al./Univ. Missouri

A scanning tunneling microscope image of the new ceramic superlattice.