

Boning up on fluoride

Fluoride, noted for fighting cavities, also can fortify the porous inner layer of the skeleton. French researchers now report that daily doses of fluoride along with calcium supplements can strengthen bone in some people stricken with osteoporosis.

For millions of postmenopausal women who develop osteoporosis, bones become brittle and prone to fracture, especially in the hips and spine. Calcium deficiencies are known to intensify the disease, but calcium supplements by themselves have failed to reverse it.

Although physicians have toyed with fluoride treatments to restore bone mass since 1961, they have long questioned the strength of such bone. Researchers from several French institutions report in the Aug. 13 LANCET that they have completed the first formal randomized test of the safety and effectiveness of fluoride-calcium combination therapy.

Similar studies are at the brink of completion at Henry Ford Hospital in Detroit and the Mayo Clinic in Rochester, Minn.

In France, 257 osteoporosis patients took 50-milligram doses of sodium fluoride daily, plus a calcium and a vitamin D

supplement. At the same time, 209 other patients received standard calcium treatments not involving the use of fluoride. All were between ages 50 and 92; of the 466 participants, 421 were women.

The group treated with fluoride had a significantly lower rate of vertebral crush fractures, an indication of bone strength, the scientists say. Of the 316 followed for the full two years of the study, 39 percent of the fluoride group reported at least one new fracture per year, compared with 51 percent of the nonfluoride group.

But there were notable side effects in the French study, many of them gastrointestinal. The most prevalent was pain in the ankles and feet of 39 members of the fluoride group compared with 10 of the nonfluoride. Lawrence Riggs, head of the Mayo Clinic study, attributes the pain to the rapid turnover of bone.

Also, the mass of the outer layers of bone actually decreased after fluoride treatment, possibly heightening the risk of hip fractures, according to the French researchers. Still, they say the benefits of treatment outweighed the side effects.

On the basis of his preliminary data, Riggs predicts fluoride will probably be useful for some selected patients but will not prove a miracle drug for osteoporosis. Adds Evelyn Phillips of the Henry Ford Hospital, "There are seldom miracle drugs for chronic diseases, but there's always something you can do." — L. Beil

Strike the parasite and spare the host

Recent research by two scientific teams offers new hope for curing Chagas disease and leishmaniasis, parasitic diseases that kill millions each year and for which no effective drugs exist. The scientists appear to have overcome the first stumbling block in treating any parasitic disease: killing the parasite without harming the human host.

One team accomplished this by developing drugs that interfere with an enzyme found in the parasites causing Chagas disease and leishmaniasis but not in humans. Chagas disease ravages the heart; leishmaniasis ulcerates the skin and internal organs. Normally, the enzyme works with a compound called trypanothione to destroy oxygen free radicals, toxic by-products of cellular activity. Humans produce an analogous enzyme, but with a different structure. Graeme Henderson and Peter Ulrich at Rockefeller University in New York and their colleagues proposed that disrupting the reaction between the enzyme and trypanothione would block the parasites.

The scientists created a series of compounds designed to masquerade as trypanothione and lure the enzyme away from the true trypanothione. Surprisingly, says Ulrich, "the compounds went one step further." They worked with the enzyme to produce toxic free radicals, essentially turning the parasite's defensive enzyme into a suicide weapon, the researchers report in the August PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES (Vol.85, No.15). When the group administered three of the drugs to cultured human smooth-muscle cells infected with Chagas disease parasites, one drug killed significant numbers of parasites.

Rather than developing new drugs, a second research team is testing an old drug used for gout against leishmaniasis. Under the World Health Organization auspices, Joseph Marr and Randolph Berens of the University of Colorado Health Sciences Center in Denver and their colleagues are administering the gout drug, allopurinol, in combination with antimony, a standard treatment for leishmaniasis, to more than 400 leishmaniasis patients in South America. Their findings, soon to appear in the AMERICAN JOURNAL OF TROPICAL MEDICINE AND HYGIENE, reveal the two drugs together work far better than either drug alone. The researchers are also conducting studies that phase out the antimony, which is highly toxic and needs to be given intravenously. Allopurinol is nontoxic to humans, and the Colorado team has developed an oral form of the drug. Says Marr, "It is kind of ideal."

— M. Hendricks

Astronomers plan a month on the sun

Stereo images of the sun, taken jointly by a U.S. spacecraft orbiting Earth and a Soviet craft on its way to Mars, may be among the highlights of International Solar Month. Among the diverse activities planned for the elaborate program will be observations throughout September, involving researchers from at least 13 countries and facilities both in space and on the ground.

The solar month idea was born essentially out of an April 28 meeting in Bethesda, Md., between U.S. and Soviet solar scientists, who were discussing the possibility of simultaneous observations with the U.S. Solar Maximum Mission satellite and one of the Soviet Union's two spacecraft now heading toward the little Martian moon Phobos (SN: 6/18/87, p.392). Both "Solar Max" and Phobos 1 carry white-light coronagraphs for photographing the sun's coronal fringes, as well as soft X-ray imaging devices that make pictures of the solar disk in a very different part of the spectrum.

Another major participant will be the Very Large Array (VLA), a vast complex of 27 radiotelescopes in Socorro, N.M. In September, the VLA's antennas will be arranged in an ideal pattern for "imaging" the full solar disk, notes Joan

Schmelz of Applied Research Corp. in Landover, Md. Further restricting the time available for International Solar Month is the fact that Solar Max may be destroyed as early as 1990, as the result of reentering Earth's atmosphere. Thus, Schmelz wrote in the July 26 Eos, next month is likely to be "one of at most two opportunities" available for the VLA and Solar Max to study the sun at the same time.

In fact, she says, "I think every solar physicist in the world would admit that what we really need for solar studies are simultaneous multiwaveband observations." Aiding plans for each day's operations will be daily images from the five Earth-based observatories of the U.S. Air Force's Solar Optical Observing Network, which will form the basis for regularly updated observing guidelines to participants worldwide.

Other nations involved in International Solar Month include Canada, Australia, Japan, West Germany, Hungary, Poland and Italy. Some were partners in the Coronal Magnetic Structures Observing Campaign in late 1987, an intensive study of several active solar regions at different wavelengths during the rise phase of the present solar cycle.

— J. Eberhart