

Sperm, spinach, smell: At ACS the subject was zinc

Researchers are just now gaining the analytical tools and expertise needed to discover the best food sources of various nutrient elements and to probe the consequences of their deficiencies in the diet. Last year, the American Chemical Society spring meeting featured a special symposium on iron (SN: 4/11/81, p. 231). This year at the meeting, recently held in Las Vegas, Nev., the ACS agricultural and food chemistry division focused on zinc.

The main dietary source of zinc—which is an essential part of certain enzymes, the protein molecules that aid biochemical processes in the body—is meat (animal protein). Another source is food plants, especially cereal, but these contain certain substances that can inhibit the body from absorbing all of the element. For example, the percentage of bioavailable zinc in— that is, the percentage of zinc the body can absorb from— whole flour bread is less than the percentage of bioavailable zinc in the more refined white bread, reported Wenche Frølich at the ACS symposium. The higher content of the metal-grabbing phytic acid in whole flour bread is a possible culprit in this phenomenon, said Frølich of the Norwegian Cereal Institute in Oslo. However, she emphasized, her findings do not support a switch from whole flour to white bread. “Even [with] a lower percent absorption of zinc from whole flour bread, the absolute amount absorbed is higher from the unrefined products because of the considerably higher content of zinc in these products,” she explained. Instead, the research suggests methods of enhancing the zinc supply: Frølich and colleagues already have shown that the decreased zinc bioavailability of whole flour bread can be overcome by extending the fermentation period when making the bread. “In this way, the phytic acid will be broken down [to] liberate the zinc for absorption,” Frølich said.

The oxalic acid in spinach may be another villain in the zinc bioavailability story, reported June L. Kelsay of the U.S. Department of Agriculture. The acid may rob the body's supply of zinc by forming insoluble salts with it, she said. Kelsay observed that after four weeks of eating four ounces (110 grams) of spinach every other day, male volunteers, between 34 and 58 years old, excreted 5 percent more zinc than was contained in the food they were eating. However, this effect was only observed in the group of subjects also eating a high-fiber diet, so the mechanism of body zinc depletion appears to have involved an oxalic-acid-plus-fiber complex.

What are the consequences of such mild zinc depletions? It is known that a severe zinc deficiency causes ailments such as the potentially fatal acrodermatitis enteropathica—which is marked by stomach and intestinal problems—and

that moderate deficiencies can cause retarded growth and rough skin. But little has been known of the effects of a mild zinc depletion, reported Ananda S. Prasad at the ACS symposium. Prasad, of Wayne State University in Detroit, used a 6-month-long, low-zinc diet to induce such a mild deficiency in nine male volunteers. Normal average body supply of zinc in the adult male is 1.5 grams; Prasad's subjects averaged 0.5 grams. The results were lowered sperm counts and loss of weight—effects that reversed with high-zinc diets.

Then there are those persons who have a lower body concentration of zinc due to abnormal metabolism of the element. Re-

sults of research reported by R.I. Henkin and colleagues of Georgetown University in Washington, D.C., suggest that this metabolic abnormality may cause the taste and smell dysfunction in 4 million of the 16 million persons in the United States who exhibit those two sensory disorders. Henkin discovered that in a group of 63 patients with taste and smell disorders, 25 percent could be classified as “malabsorbers” of zinc. After a three- to four-month treatment involving a 100-milligram daily dose of zinc (the normal recommended daily dose for adults is 15 milligrams), these “malabsorbers” exhibited significantly improved taste and smell functions, Henkin reported. —*L. Garmon*

Program to prevent premature deliveries

Despite significant advances in perinatal medicine during the past decade, premature deliveries remain the leading cause of newborn deaths and of newborn health complications. But a way to reduce the number of such deliveries now appears to have been found, according to a report in the April *OBSTETRICS AND GYNECOLOGY* by M.A. Herron, M. Katz and R.K. Creasy of the University of California at San Francisco. It consists of a novel program for preventing premature deliveries.

Several years ago Creasy and co-workers developed a means of rating pregnant women's chances of giving birth prematurely. The scoring system was based on a woman's socioeconomic and reproductive status as well as on data about her current pregnancy. Then Herron, Katz and Creasy launched a study to see whether this premature delivery risk-scoring system, combined with other tactics to prevent premature delivery, might significantly reduce the incidence of premature delivery.

Between July 1978 and June 1979, 1,422 pregnant women registered to have their babies at the University of California at San Francisco were rated for the risk of premature delivery. The initial scoring, performed at 12 weeks' gestation, assigned 144 patients to a high-risk group, and 1,278 patients to a low-risk group. However, because of miscarriages and abortions performed prior to 20 weeks' gestation, as well as a few patients moving to other areas, 272 patients were dropped from the study before a second screening was performed, leaving 1,150 patients. These 1,150 patients included 113 high-risk patients and 1,037 low-risk patients.

In addition to their regular obstetric management, patients in the high-risk group were followed weekly in a special High Risk Preterm Delivery Prevention Clinic. There they were educated concerning the dangers of preterm labor and symptoms of it that they should watch for

in themselves. They were also checked weekly at the clinic for such symptoms. If they entered premature labor, they were put in the hospital and given drug therapy to halt it. (Such drugs had been tried before to reduce premature deliveries, but hadn't made any significant inroads against the problem, perhaps because premature labor hadn't been recognized early enough.) Once drugs stopped premature labor, patients were discharged from the hospital, but kept on the drugs to keep premature labor from recurring. Still another aspect of the study involved better training of obstetric staff in the early detection and treatment of premature labor.

Out of the 1,150 patients, 28 delivered their babies prematurely, for an overall premature delivery rate of 2.43 percent. This rate compared to 6.75 percent for the University of California at San Francisco in the year before the study was initiated (1978) and to 6.5 percent from 1977 to 1979 at an affiliated institution that didn't have a special program for preventing premature delivery. Thus the program for preventing premature delivery appears to have brought about a significant decrease in the incidence of premature deliveries, Herron and her colleagues conclude.

Arthur J. Salisbury, vice-president of medical services at the National Foundation-March of Dimes (which concerns itself with the health of unborn and newborn children), terms the results “very exciting.” “A crucial next step,” he maintains, “is to learn whether the San Francisco group's success can be duplicated at other medical centers.” The March of Dimes plans to launch a cooperative trial to test the premature delivery prevention concept at the University of Alabama at Birmingham, Ohio State University, Vanderbilt University, Pennsylvania State University, Northwestern University and the University of California at San Diego.

—*J.A. Treichel*