

Eating away at cancer risk

Cabbage, broccoli and brussels sprouts received yet another vote of confidence as anti-cancer agents in dietary guidelines the American Cancer Society (ACS) released last week. Aimed at convincing people to reduce their cancer risk by changing their eating habits, the society's report echoed previous warnings from the National Research Council and National Cancer Institute: The road to some cancers of the digestive tract seems paved with fat, alcohol and smoked or pickled meats (SN: 6/26/82, p. 422).

In addition to suggesting that obese people lose weight, and everyone eat more fibrous foods, the ACS says that fruits and vegetables high in A and C, such as citrus and members of the cabbage family, seem to cut the risk of gastrointestinal and respiratory cancers. These are not the first guidelines to tout vitamins as protectors against malignancy (SN: 10/1/83, p. 217), but a study described in the Feb. 15 *NEW ENGLAND JOURNAL OF MEDICINE* questions the value of vitamin A.

Walter C. Willett of the Harvard School of Public Health in Boston led the study of 111 men and women at 14 U.S. medical centers who were cancer-free at the start of the study, but developed malignancies within the following five years. (The group was part of a 10,000-person study of high blood pressure.) After comparing blood samples before and after the cancer developed, with samples from 210 cancer-free volunteers, the researchers found no relation between cancer and levels of vitamins A or E in the blood. (Vitamin E has also been cited frequently as a cancer deterrent, though the ACS says its benefits to humans have not been solidly established.)

Willett says that while their findings raise doubts about A and E, their study was too small to spot any small, protective effects against particular types of malignancies. Future research should check for non-vitamin components of fruits and vegetables that might account for the protective effect found in other studies, he says.

Medicine capsules

- With the winter comes the flu. The Centers for Disease Control (CDC) in Atlanta reports that the south Atlantic and south central states have thus far been the hardest hit. This year's variety is type A (H1N1), responsible for epidemics in the winter of 1977-1978 and 1978-1979. The virus has been reported in 26 states and the District of Columbia as of Feb. 8. Two factors may be at work in the widespread outbreaks this year: victims of the previous epidemics may have lost their immunity, and variant strains may have evolved.

- The CDC reports four cases of toxic shock syndrome (TSS) among users of an over-the-counter vaginal contraceptive sponge introduced in June, 1983 (SN: 4/23/83, p. 261). Two of the women had left the sponge in place for more than the recommended 24 hours; all recovered. Because of initial concern about TSS, the sponge, marketed under the name "Today," comes with instructions to seek medical care if symptoms such as fever ensue.

"Given the small number of known cases and the potential reporting biases," CDC researchers report in the Feb. 3 *MORBIDITY AND MORTALITY WEEKLY REPORT*, "the risk of TSS associated with contraceptive-sponge use remains uncertain."

VLI Corp. of Costa Mesa, Calif., which now highlights a TSS warning on the Today box, estimates that five million sponges have been used by over a quarter of a million women. According to a company spokeswoman the toxic shock cases were coincidental to sponge use; more cases of the syndrome have been identified in diaphragm users than in sponge users, she says. The CDC and Food and Drug Administration recommend that women consult their physicians before using the sponge and that they follow the directions carefully.

PETRA at 45

The colliding beam apparatus called PETRA at the Deutsches Elektronen-Synchrotron (DESY) laboratory in Hamburg was originally designed to accelerate beams of electrons and positrons to a maximum energy of 19 billion electron-volts (19 GeV) each and collide them with each other. This gives experimenters a total of 38 GeV ("38 GeV in the center of mass," as they say) to produce new phenomena.

Experimental physicists want few things more than higher energy. In recent years PETRA has been undergoing a gradual upgrade with a goal of 45 GeV in the center of mass. On Dec. 9, that goal was reached, the December *DESY JOURNAL* announces. The Large Electron Positron collider (LEP) under construction at the CERN laboratory in Geneva and the Stanford Linear Collider (SLC) under construction at the Stanford Linear Accelerator Center in Menlo Park, Calif., will both come in at about 100 GeV in the center of mass. Until one of them is completed, PETRA is the world's most energetic electron-positron collider.

Kaluza-Klein and variable constants

The idea that the fundamental constants of physics may not be constant but may vary over time has a long history. Most recently it has come up in the context of P.A.M. Dirac's big numbers theory, but experiments designed to test that theory seemed virtually to have killed the idea (SN: 11/26/83, p. 346). Now, however, William J. Marciano of Brookhaven National Laboratory in Upton, N.Y., proposes that the Kaluza-Klein (KK) theories, now becoming popular among those who want to unify all of physics in a single theory, could prescribe such variations and in more complicated ways than Dirac's theory.

In 1921 Theodor Kaluza, a Polish mathematician working at the University of Königsberg in East Prussia, showed that the theory of electromagnetism could be united with Einstein's general relativity theory of gravity if one assumed that the universe had a fifth dimension. Electromagnetism becomes a ripple in that fifth dimension just as gravity is a curvature in the three ordinary spatial ones.

A few years later, the Swedish physicist Oskar Klein solved the difficulty that we do not perceive the fifth dimension by "compacting" it, rolling it up into a tiny ball around every point in space. That means that a being who decided to take a walk in the direction of the fifth dimension would very quickly return to its starting point, after traveling about 10^{-33} centimeters. Modern KK theories use up to 11 or 12 dimensions, and all but four are similarly compacted. We don't perceive the others, because, like the Kingdom of God, they are within us; we perceive only the four whose radii of curvature are wider than we are. In these many dimensions physicists find that they can make progress toward uniting electromagnetism and the two classes of force that animate the subatomic world (the weak interaction and the strong interaction) with the mathematically quite different theory of gravity (SN: 7/23/83, p. 60).

In the Feb. 13 *PHYSICAL REVIEW LETTERS* Marciano points out that if for some reason the KK radius, the radius of curvature of the extra dimensions, should vary with time, a corresponding variation in such numbers as the universal gravitational constant and the fine structure constant would result. Previous experiments testing for such variations were based on the Diracian idea of a monotonic variation, Marciano says. Variation of the KK radius might not be monotonic; it might even be periodic. If that were so, it would upset the assumptions on which earlier experiments were analyzed. Marciano calls for new and "clever" experiments.

If such a variation were found, it would be evidence that the extra dimensions of KK theories are physically real, as one faction of KK enthusiasts asserts, rather than mere mathematical artifacts to build a theory by, as the other faction insists.