

BIOLOGY

Detection of cancer-causing metals

Rapid, inexpensive screening tests are needed to determine just which of the thousands of chemicals in our environment elevate human cancer rates. Although various metals are suspected of causing cancer, the most widespread of these tests (SN: 3/29/75, p. 207) has not yet been able to identify them.

Now Lawrence Loeb and Michael Sirover of the Institute for Cancer Research in Philadelphia have a different technique that may be useful in examining metals. The researchers mix in a test tube a metal salt with the bare essentials for copying DNA—an enzyme, an initiator, nucleotide subunits, and synthetic DNA as the template. They found that metals known to cause mutations or cancer decreased the accuracy with which DNA is reproduced.

When the test-tube mixture included manganese, the number of errors was about 50 times that when only magnesium was included, Loeb told a recent symposium of the International Association of Bioinorganic Scientists in La Jolla, Calif. Silver, beryllium, cadmium, cobalt, chromium, nickel and lead also decreased accuracy of DNA synthesis. None of the tested metals not suspected of causing mutations or cancer gave this effect.

Inaccurate copies of DNA, in animals, could produce defective enzymes that might convert the mutated cell to a cancer cell, Loeb explains.

Food exchange soothes aggressive ants

The pause that refreshes may result in loss of prey. In laboratory studies, aggressive ants offered regurgitated fluids by the ants of a species they were attacking, let their frenzy diminish, accepted the food and groomed themselves. Researchers suggest that in the wild, the aggressor's pause would allow the food donor to escape.

Awinash P. Bhatkar and Werner J. Kloft, working at the University of Florida, mixed workers of the aggressive red fire ant with ants of other species, which had been fed radioactively-labeled sugar solution. Food exchange was measured by the transfer of radioactivity among the ants. The researchers also observed the aggressive encounters. As the alien species became more threatening, the food-offering response of the donor intensified, the scientists report in the Jan. 13 NATURE.

Exchange of food between ant colony members, including species living as slaves or guests, is an important force in development of symbiotic relationships. "Such a phenomenon among phylogenetically and ecologically separate species is possibly an adjustment against competition even when they come together by accident, such as the red imported fire ant from Brazil and the Florida Myrmicinae," they conclude.

Plants feel now, spiral later

Sensation and movement aren't limited to the animal kingdom. Plants can also respond to their environment with motion. Pea tendrils, the hairlike organs that anchor plants to supporting structures, coil when they are stroked. An Ohio University researcher has shown that sensory information can be stored for hours before the plant responds.

M. J. Jaffe demonstrates in an article in the Jan. 14 SCIENCE that pea tendrils require light to respond to stimulation. Tendrils stroked in the dark did not coil, but as soon as they were illuminated, even 2 hours later, they began to spiral. Similarly, when tendrils were cooled to 5°C immediately after stimulation they didn't coil until they were brought to 25°C. Jaffe suggests, "The technique of dark adaptation will now permit an operational isolation of the sensory function, allowing its mechanism to be studied free of confusion with the motor function."

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PUBLIC HEALTH

How family planning affects health

Health risks associated with childbearing could be substantially reduced if couples would follow five principles of family planning, according to a new study released by the Worldwatch Institute of Washington. The principles apply equally well in industrialized and in less developed countries, although poverty and the availability of medical care are still the most important determinants of risk.

The study, "Health: The Family Planning Factor," by Erik Eckholm and Kathleen Newland, sets forth optimum conditions for the safety of mothers and infants:

- Don't have children before age 20. Infant mortality for children born to teenage mothers is nearly twice that for children born to women in their late 20s. The babies of the younger mothers more often are premature or underweight, and complications of pregnancy are also more likely to kill the younger mothers. In Iran, where women bear children relatively early, this heightened danger of infant death is reflected in a particularly grisly proverb: "The first two are for the crows."

- Space births at least two years apart. A study in Punjab, India, showed that infants born less than two years after a previous child were 50 percent more likely to die by age one than were infants born two to four years after.

- Have no more than four children. The myth that women who have already borne many children have easier pregnancies and deliveries has been disproven. The opposite is true, as can clearly be seen in developing countries where many women suffer "maternal depletion syndrome"—looking aged while still in their 30s.

- Don't have children after age 35. The maternal death rate doubles between the early 30s and late 30s, and increases nearly eightfold by age 45. The rate of genetic defects such as mongolism rises exponentially with age.

- Choose your contraceptive carefully. Here statistics are particularly hard to interpret, since the risk of suffering cardiovascular disorders with the pill, for example, must be weighed against the risk of death during childbirth resulting from failure of a less-effective contraceptive. The risk of taking the pill for all women over age 40 is about equal to that of pregnancy for women in developed countries. Therefore, the authors recommend sterilization as the safest contraception for couples who have already completed their families.

'Epidemic' of teenage pregnancy

The consensus at the First Interhemispheric Conference on Adolescent Fertility can be summarized in one word: Teenage pregnancy worldwide, much of it out of wedlock and without planning, has become an "epidemic." Results of the conference, held in Virginia last year, appear in the December 1976 INTERNATIONAL FAMILY PLANNING DIGEST.

The problem is tragic not only because of the risks that face mother and infant (see article above), but also because the girls involved often are reduced to second class citizenship in already poor countries. In the Middle East, for example, where sexual taboos are particularly strict, unwed mothers sometimes commit suicide or are murdered by their families.

The scope of the problem is awesome. In some schools in Senegal, 12 percent of the high school girls have had abortions, although the procedure is illegal. In the United States each year, 10 percent of the teenage female population become pregnant—yet two-thirds of these pregnancies are unintended.

Most delegates called for more sex education and family planning services to slow the epidemic. Said Reimert T. Ravenholt of AID: "No one should be compelled to reproduce through circumstances and lack of foresight."

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