

## A vitamin a day will keep cancer away?

There is widespread skepticism that massive doses of vitamin C can prevent colds, or that large doses of vitamin E can improve sexual drive or fertility. Still, there is ample evidence that both vitamins can do some nifty things, if only in tissue, animal and clinical studies.

When mice ate vitamin E daily, they lived 25 to 30 percent beyond their normal life span. Vitamin E helped reduce gum disease in patients participating in one study. Vitamins E and C reduced chromosome damage in tissue culture. Vitamins E and C now show promise in preventing sun-induced skin cancer, two Texas dermatology researchers have found.

It is well known that sunlight, or ultraviolet light, can cause certain types of skin cancer. How sun causes skin cancer is not understood very well, though. So Wan-Bang Lo and Homer S. Black of the Baylor College of Medicine decided to study the mechanism. They found that after human or animal skin was exposed to ultraviolet light, cholesterol in the skin was oxi-

dized. One of the products of cholesterol oxidation is cholesterol alpha-oxide, a known cancer-causing chemical. So Lo and Black concluded that oxidation of cholesterol in skin might result in cancer-causing compounds, and these compounds in turn would trigger skin cancer.

Antioxidant chemicals such as vitamins E and C are known to reduce oxidation of fats. So Lo and Black decided to see whether these vitamins and two other antioxidants might keep ultraviolet light from oxidizing cholesterol in skin into cholesterol alpha-oxide. For intervals of two weeks they fed one group of mice a regular balanced diet. They fed another group of mice the same diet supplemented with vitamins E and C and two other antioxidants. After each interval of feeding they took skin samples from both groups of mice and examined the samples for antioxidant and cholesterol alpha-oxide content.

As they report in the Dec. 21/28 NATURE, the mice receiving antioxidant supplements had 54 percent more antioxidants in their skin than did the control mice after two weeks of feeding, and 18 percent more antioxidants in their skin than did the control mice

after eight more weeks of feeding. The mice receiving the supplements did not form any cholesterol alpha-oxide in their skin after two weeks of feeding, and compared with the control mice, they had 50 percent protection against the chemical during the subsequent eight weeks of feeding. While the mice ate the antioxidants, they showed no side effects, nor did their skin change in structure as a result of high antioxidant content.

Some questions have to be answered, of course, before vitamins E or C or other antioxidants might be used to prevent skin cancer in people. Is cholesterol alpha-oxide the only, or at least the principal, cause of skin cancer in humans? How much antioxidants would one have to eat daily to prevent skin cancer? If antioxidants should turn out to have clinical value in preventing skin cancer, the value would be considerable. Sun screening agents have been shown to reduce sunburn and skin cancer, but many of them are far from ideal, and few of them are fully effective. In the past, numerous compounds have been suggested as possible agents against sunlight. Most, however, have toxic effects so that their value in preventing skin cancer is limited. □

## Soyuz 13 returns

After eight days in orbit, Soyuz 13 returned to earth on Dec. 26, safely bringing back cosmonauts Pyotr Klimuk and Valentin Lebedev to a landing amid a wind-whipped snowstorm in the barrens of the Kazakhstan Republic. Soviet space officials stressed the role of scientific experiments such as astronomical and earth observations

on the flight (SN: 12/22/73, p. 388), which reportedly also included studies of brain circulation during adaptation to weightlessness as well as work with an on-board "greenhouse" aimed at growing food supplies on future interplanetary voyages. There was no attempt to dock with another spacecraft, although docking practice flights are expected before the 1975 U.S.-Soviet joint rendezvous mission. □



Cosmonauts Klimuk and Lebedev gave redesigned Soyuz its second test flight. ESN

## Torque on the poles

The constant stream of energetic particles that pours out from the sun as the solar wind pushes measurably on the earth's magnetosphere, causing a torque, or rotational force, because of the magnetosphere's tilted axis. Michael D. Papagiannis of Boston University's astronomy department calculates that although this torque is probably too weak to have any effect on the 26,000-year precession of the planet's physical axis of rotation, it could be a factor in the movements of earth's magnetic poles.

The average torque, he reports in the Dec. 1 JOURNAL OF GEOPHYSICAL RESEARCH, is about  $2.6 \times 10^{21}$  gram centimeter squared per second per second. This is only about one hundred-millionth as strong as the torques caused by the sun's and moon's gravity, which cause the 26,000-year rotational precession, and thus should have no measurable effect, "since the period of the minute precession that it would cause would be much longer than the age of the solar system." On the other hand, says Papagiannis, it is conceivable that the longer periods of the torque from the solar wind can influence the ring of current in the core of the earth, which produces the planet's magnetic field. This might cause changes in the current that help to produce various already-known motions in the magnetic poles. □