

BIOMEDICINE

Immunity and slow viruses

Some of the most mysterious of all modern ailments are the fatal slow virus diseases, which seem to be caused by viruses that take months or years to infect the central nervous system (SN: 4/14/73, p. 245; 10/7/78, p. 245). Scientists have never seen immune reactions against these diseases — until now. The first evidence of immune involvement with slow virus diseases is reported in the Oct. 10 *SCIENCE* by J. Sotelo, C. J. Gibbs Jr. and D. C. Gajdusek of the National Institutes of Health.

The scientists examined the blood of 38 patients with Creutzfeldt-Jakob disease (a slow virus disease), 63 patients with kuru (another slow virus disease), 71 patients with other neurological disorders and 50 healthy subjects for the presence of antibodies against central nerves suspected of being involved in slow virus diseases. The blood of 45 percent of CJD patients and the blood of 22 percent of kuru patients contained high levels of these antibodies, while only 13 percent of other neurological patients and only 10 percent of healthy subjects had high antibody levels in their blood. Thus, the antibodies probably represent immune involvement in the slow virus diseases, the researchers conclude, although they don't yet know how the antibodies fit into the course of the disease.

Kawasaki disease found in an adult

Kawasaki disease, a rare syndrome usually associated with children, has been found in an adult, according to the Oct. 3 *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION*. Three cases in adults were reported in *JAMA* last year.

Kawasaki disease is difficult to diagnose because it shares many symptoms with other diseases. It is marked by high fever lasting more than five days, congestion around the eyes, red, dry lips, red feet and hands, swollen arms and legs and peeling fingertips. Diagnosis of the disease is made on the basis of physical appearance and the exclusion by laboratory studies of other diseases. In each of the cases described in *JAMA*, doctors first thought they were dealing with a bacterial infection and used antibiotics. Only after the antibiotics failed to affect the illness and no bacteria were found in the blood did they turn to a diagnosis of Kawasaki disease.

The researchers believe the syndrome "is clearly not restricted to a pediatric age group," but, says JoLynn Glanzer, family practitioner and one of the authors of the report, "in adults it is probably very rare."

Coffee enemas prove fatal

Two deaths in the Seattle area in the past two years are attributable to frequent coffee enemas, according to a report in the Oct. 3 *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION*. One woman diagnosed with gallstones refused treatment and instead used coffee enemas, a procedure she evidently learned from a book. She reported receiving 10 or 12 enemas the first night, then as many as one per hour for a few days until she suffered seizures and had to be admitted to the hospital. She died after falling into a coma.

The second woman, who had a breast cancer removed by radical mastectomy, received four coffee enemas per day for 14 days at a clinic in Mexico where she had gone after refusing chemotherapy. Her death was attributed to an imbalance of fluid and dissolved salts in the blood.

In both cases, not enough caffeine was found in the bodies to cause death, says John Eisele of the medical examiner's office in King County, Wash. "The lethal effect to a large extent was due to the vast volumes of enemas given rather than coffee per se," he says.

EARTH SCIENCES

Polar solar mirages

In January 1597, an expedition led by Dutch navigator Willem Barents became ice-bound while trying to find a northeast passage from Europe to Asia through the Arctic. The explorers were forced to spend the winter on Novaya Zemlya, a group of islands that lie in the Arctic Ocean between the Barents and Kara seas. There, they witnessed a strange sight: the unexpected appearance of the sun, two weeks early, in the midst of the perpetual arctic night.

This so-called Novaya Zemlya effect, greeted with skepticism by scientists four centuries ago, is now providing researchers with unique data about the behavior of the atmosphere in the polar regions. The effect, as with other mirages, is caused by anomalous atmospheric conditions, W. H. Lehn and B. German of the University of Manitoba in Winnipeg, Canada, told the recent annual meeting in Chicago of the Optical Society of America. The distance at which an object can be seen is usually limited by the curvature of the earth. This limitation can be overcome if the atmosphere bends light rays downward to show an observer what lies below the horizon. Such bending, or refraction, can occur if the air temperature increases with elevation (called a temperature inversion). The Novaya Zemlya effect requires that the temperature inversion have a fairly sharp temperature change, as opposed to a gradual transition, between the cool air mass near the ground and the warmer air above. In this case, Lehn and German explain, a light ray can be thought of as traveling along an atmospheric "duct" whose upper boundary is the sharp temperature boundary; the rays are carried long distance around the curve of the earth to give polar observers a distorted and unseasonal preview of the sun.

Computer models developed by Lehn and German calculate the way different temperature gradients cause the atmosphere to transmit images and predict the kinds of images that can occur during a Novaya Zemlya appearance. Then, by comparing the observed Novaya Zemlya image and that predicted by the computer simulations, the researchers can estimate the atmospheric temperature distribution responsible for the event. One such sequence, the researchers told the meeting, was photographed May 16, 1979, over the Beaufort Sea from Tuktoyaktuk in Canada's Northwest Territories. The photographs show the entire spectrum of images predicted by the computer simulations, the researchers say, and will be used to derive estimates of the temperature distribution.

Unprepared California

A recently completed review by the Federal Emergency Management Agency (FEMA) has determined that "the Nation is not sufficiently prepared for a catastrophic earthquake in California, should such a disaster occur."

The study concludes that the probability of a major earthquake in southern California — one having a Richter magnitude of 7.0 or greater — is 2 to 5 percent per year and more than 50 percent in the next 30 years. If such a quake occurred about 50 miles north of Los Angeles, damage could total \$15 billion and fatalities could range from 3,000 to 13,000, the study says. In the immediate Los Angeles area, damages could reach \$70 billion and deaths could range from 4,000 to 23,000, depending on the time of day. In order to improve the state's preparedness, FEMA will set up a small staff in California to identify and correct deficiencies and to coordinate state, federal and local programs.

The FEMA review, which also involved the Departments of Defense, Transportation and Interior, among others, was prompted by the increase in seismic activity in California in the past year and by President Jimmy Carter's heightened concern over geological hazards after a visit to Mt. St. Helens.