biomedical sciences

Sedatives switch on appetite

Stimulants (amphetamines) turn appetite off and have been widely used as diet drugs. So one might logically ask whether sedatives turn appetite on.

There has been evidence that one kind of sedative, phenobarbital, stimulates appetite in animals. Now there is evidence that another sedative, diazepam (Valium), does it too, R. A. Wise of Sir George Williams University in Montreal reported last week at the third annual meeting of the Society for Neuroscience in San Diego.

When diazepam is given to rats, there "is an incredibly dramatic effect," Wise and his colleagues have found. The animals sit down and eat the equivalent of a full human meal. Wise and his co-workers have ruled out that the appetite stimulation comes from diazepam's sedative effect or antianxiety effect. Diazepam appears to act directly on the appetite center of the brain—nerve fibers in, or passing through, the hypothalamus.

Wise does not think that diazepam increases appetite to any great extent in humans. "The effect would be so strong," he says, "that nobody could ignore it." On the other hand, he conjectures, diazepam may cause "a mild increase in appetite, and it has not been noticed because it has a small effect."

A swift kick in the sciatic

The secondary hormonal messenger cyclic AMP is known to stimulate nerve ends in tissue studies. So Michael Pichichero of the University of Rochester School of Medicine and Bernard Beer and Donald E. Clody of the Squibb Institute for Medical Research decided to see whether cyclic AMP might help restore nerve function in animals. The nerve they worked with was the sciatic (hip) nerve in rats.

They severed the nerve in the rats. Some of the rats received a derivative of cyclic AMP as treatment. The control rats received no treatment. As they report in the Nov. 16 SCIENCE, cyclic AMP speeded the return of the nerve's function.

Other investigators have shown that cyclic AMP concentrates below the sciatic nerve within six hours after surgery. Such an increased concentration of cyclic AMP might be the mechanism for the normal regenerative process.

Villain behind high cholesterol

The tendency to accumulate cholesterol in the body can be inherited. If the tendency is inherited from both parents, it can lead to progressive heart disease during childhood and death from a heart attack, often before age 30. If the problem is inherited from only one parent, it often leads to heart disease and problems later in life, especially from ages 30 to 60.

Despite a fair number of people having inherited high cholesterol, little is known about its cause. Is the problem due to increased synthesis of cholesterol? Or might there be a defective degradation of cholesterol?

The cause, it now turns out, is abnormal cholesterol synthesis, Joseph L. Goldstein and Michael S. Brown of the University of Texas Southwestern Medical School report in the October PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES. The key is the enzyme that controls the rate of cholesterol synthesis. The genetic defect underlying inherited high cholesterol is not the structural gene that makes this enzyme. Rather, there is a defect in the gene that makes fat-proteins that usually exert feedback control over the enzyme.

earth sciences

A blow to quake-prediction theory

A study of the travel times of seismic waves monitored by the University of California network of seismographic stations from 1961 to the present has found no evidence for the much-talked-about dilatancy effect that has been giving hope for a means of earthquake prediction.

The dilatancy theory arose after seismologists noticed that in the months before several earthquakes, compressional waves (P waves) in the vicinity of the quake site slowed down, then speeded up again (SN: 9/29/73).

Data on file from the University of California seismographic network now has been examined to test the theory. The travel times of P waves from explosions at a stone quarry near Salinas, Calif., are accurately recorded at seven seismographic stations. The velocities were virtually constant.

"Variations seem to bear no correlation to earthquake occurrence," report T. V. McEvilly and L. R. Johnson in the Nov. 9 SCIENCE. Of four possible explanations they consider two most likely: 1) The dilatancy effect exists but was missed due to the distribution of the monitoring stations. 2) Dilatancy is not a significant effect in the source region of a major strike-slip fault such as the San Andreas Fault in central California. Similar monitoring in other local areas is needed to decide which explanation is correct.

Sulfur dioxide from volcanoes

Remote-sensing spectrometers set up near volcanoes in Central America to monitor the gases emitted by them indicate that about 1,000 metric tons of sulfur dioxide enter the atmosphere daily from Central American volcanoes. The figures, reported by Richard E. Stoiber of Dartmouth College and Anders Jepsen of Environmental Measurements Inc. in the Nov. 9 SCIENCE, are the first extensive measurements ever obtained by the technique.

They estimate that there are 50 volcanoes in the world with prominent vapor plumes and 50 with smaller ones. Extrapolating from their figures and adding estimates of the amount of sulfur dioxide emitted from underwater volcanism and from major eruptions of land volcanoes, Stoiber and Jepsen estimate that the annual amount of sulfur dioxide emitted from the world's volcanoes is at least 10 million metric tons. This figure is 10 times as high as one previous estimate. But it is about one-tenth the estimated amount of SO_2 released into the atmosphere each year as pollution.

Ocean ridges raised sea level

For nearly a century earth scientists have been aware of periods in the past when the oceans covered much larger portions of the land than they do now. A variety of causes have been proposed. Now two scientists have shown that the worldwide transgression and subsequent regression of the oceans during the Mid to Upper Cretaceous period (110 million to 85 million years ago) was due to a pulse of rapid spreading at most of the mid-oceanic ridges.

James D. Hays and Walter C. Pitman III of Columbia University's Lamont-Doherty Geological Observatory show in the Nov. 2 NATURE that the rapid spreading caused the ridges to expand. This enlargement of the ridges—huge. undersea mountain chains—displaced ocean water, sending it up over the continents. The subsequent regression of the oceans was caused by a reduction in spreading rates that began 85 million years ago.

Such changes would have had major effects on world climate, ocean circulation and the diversity of species.