life sciences

HORMONES

Role for thyrocalcitonin

Experimental evidence has indicated that a hormone produced by the thyroid gland, thyrocalcitonin, plays a role in regulating calcium levels in the body, preventing the accumulation of an overdose.

But there has been some doubt about this hypothesis because the evidence came from experimental situations not encountered in normal circumstances.

Now, two scientists at the University of North Carolina School of Medicine in Chapel Hill present evidence for thyrocalcitonin's physiological activity, suggesting that it does protect against hypercalcemia.

In the Oct. 24 SCIENCE, Drs. T. Kenney Gray and Paul L. Munson report on research with rats fed moderate amounts of calcium after long periods of fasting. The hormone, they believe, may contribute to the body's overall conservation of calcium in the skeleton by minimizing losses from the blood into the urine and gastrointestinal tract. This prevents too much calcium from getting into soft tissues, keeping blood levels normal.

"The thyroid gland, presumably through thyrocalcitonin, protects rats from hypercalcemia when moderate amounts of calcium are ingested rapidly, as likely occurs in natural life when a period of starvation or food restriction is followed by an episode of abundance," they report. "Whether or not the thyroid gland also protects during a normal meal that follows a fast of only a few hours has not yet been determined."

PATHOLOGY

Parasitic protozoa in culture

Experimental animals frequently carry a ubiquitous group of protozoa, generally classed as mammalian microsporidia, that live in their tissues as potential contaminants. The influence of these infectious contaminants on experimental results is unknown; there are no methods for detecting latent infection by these microsporidia in living animals, and they have not been grown in vitro for detailed analysis or for production of antigen. If large colonies of the organisms were available, scientists could use them as antigens in tests that would detect the presence of a latent infection in an animal.

Dr. John A. Shadduck, a veterinary pathologist at Ohio State University in Columbus, reports an in-vitro system for isolating and purifying these pathogens and has isolated one, tentatively named *Nosema cuniculi*. In the Oct. 24 SCIENCE he describes his experiments, using single layers of rabbit eye cells to isolate the parasite.

OXYGEN TOXICITY

Clue to nervous system effects

High pressure oxygen, such as is produced in hyperbaric chambers, can have toxic effects on the central nervous system (SN: 9/27, p. 280). Speaking at the annual meeting of the American Society of Anesthesiologists in San Francisco, Dr. S. H. Ngai of the Columbia University College of Physicians and Surgeons said he has found a possible explanation.

Certain chemicals, amines, in the brain play important roles in CNS activity, regulating such processes as motor activity, sleep and wakefulness, mood and body temperature. Hyperbaric oxygen, he finds in experiments with rats, produces changes in these vital amines, which include dopamine, norepinephrine and serotonin.

Rats inhaling 100 percent oxygen at room temperature synthesize serotonin and norepinephrine at increased rates, he says. When oxygen pressure is increased to three or four atmospheres, he also finds, the rate at which these amines are used up increases dramatically.

When normal patterns of synthesis and use of these brain chemicals are disrupted, convulsions may ensue. By deliberately introducing compounds that increase the synthesis of these compounds, and hence their levels in the brain, he showed that some animals appeared to be protected from the threat of oxygen toxicity in hyperbaric experiments; deliberately manipulated decreases seemed to override the protective mechanism and make them more susceptible to the ill effects of oxygen.

"These results suggest that the central nervous system toxicity of hyperbaric oxygen may be in some yet-unexplained manner related to the effects of oxygen on the synthesis and release of these amines," Dr. Ngai reports.

ANESTHESIOLOGY

New drug lasts longer

A new local anesthetic, under study for Food and Drug Administration approval, acts two to three times longer than present agents, Seattle scientists reported at the Anesthesiology meeting. In tests with 1,800 patients, bupivacaine hydrochloride (Maracaine) showed no untoward side effects, Dr. Daniel C. Moore and co-workers at the Mason Clinic found.

Its onset of effectiveness is as rapid as that of other agents, the researchers say, after comparative studies with Carbocaine, Pontocaine and Xylocaine, similar agents now in use. For the last four years, Maracaine has been in use in Europe.

RH INCOMPATIBILITY

Test predicts brain damage threat

A test has been developed by a research team at the Hebrew University-Hadassah Medical School in Jerusalem to detect infants in danger of brain damage from RH incompatibility or other blood diseases.

The diseases destroy blood cells, leading to anemia and jaundice. If the infant becomes jaundiced beyond the capacity of its blood serum albumin to bind the excess bile pigment, known as bilirubin, this toxic substance may enter into the brain of the infant and damage it.

The new test, developed by the Hadassah team including Drs. S. H. Blondheim, Nathan Kaufmann, Ariyeh Simcha and Jaime Kapitulnik, determines when the bilirubin-binding capacity of the infant's blood is exceeded or when this is imminent. The test is performed with less than a drop of serum, which is washed through a buffer. When the washings are clear, the column is stained for visible traces of bilirubin with a special reagent. If the column turns blue, it is a sign that there is free bilirubin beyond the capacity of the serum albumin to bind it.