

Hormones without an endocrine system

The origin of the hormone insulin has been pushed further and further back in evolution. The hormone, which directs sugar and fat metabolism, traditionally was thought to arise in early vertebrates at the time of origin of the pancreas gland. But recently scientists found that many mammalian cells, outside the pancreas, make insulin, and cells in complex invertebrates produce it too. Now Derek Le Roith, Maxine A. Lesniak and Jesse Roth report insulin-like material in two other animals — the fruitfly and the earthworm. "These findings suggest that insulin is much more widespread in invertebrates than was previously thought, and not only in gut- or nervous system-derived cells," the National Institutes of Health scientists say in the January *DIABETES*.

Insulin appears to be a common theme even beyond the animal kingdom. Le Roith and co-workers have found insulin-like material in organisms phylogenetically as far-flung as the protozoan *Tetrahymena*, the fungi *Neurospora* and *Aspergillus* and the bacterium *Escherichia coli* K-12. The material from all these organisms has the same biochemical action on rat fat cells as does mammalian insulin, and it is inactivated when it is bound by antibodies against mammalian insulin.

The investigators also have preliminary results demonstrating endorphin-like material in *Tetrahymena*, and other researchers have found evidence in bacteria for the hormone chorionic gonadotropin. Le Roith and colleagues speculate that the chemistry of intercellular communication systems — the nervous system and the endocrine system — did not arise in complex animals, but rather in primitive, single-celled organisms. The anatomical details of the intricate systems thus would have developed later in evolution. They say that many puzzling findings can be explained best with the assumption that the endocrine system and nervous system arose from a common precursor rather than one from the other.

Nudist rat colony

Hairless mice, which lack a functional thymus gland, have long been used in cancer research. They do not reject foreign tissue so they can be used to host human tumors while scientists test different treatments. But the mice are so small that Texas researchers found they could not obtain the blood and bone marrow samples they needed. So they turned to a larger rodent that shares with the so-called nude mice both the hairless condition and the immune system deficiency.

The "nude" rat, unlike the nude mouse, has a hood of dark hair that thins out around shoulder level, but like the nude mouse it cannot reject foreign tissue. With nude rats obtained last year from the Oxford Laboratory Animal Center in Surrey, England, Benjamin Drewinko and James J. Stragand began a colony at the M.D. Anderson Hospital and Tumor Institute in Houston. They say the rats are superior to nude mice in size, in general health and in the ease with which they are bred. Currently, 24 pups per month are produced from 10 breeding females, and the total number of rats in the colony is about 100. Four of the rats are albino, another mutation that "just popped up," Stragand says. He is now breeding second generation albino nude rats to see if they breed true.

The researchers are using the nude rats to look at tumor growth and therapy responses in the blood and bone marrow. They say that the animals provide a good clinical model because the tumor cell kinetics and biology is similar to that of human cancer patients. With nude rats, the scientists have developed an animal model for human colon tumors and are working on one for melanoma and another for prostate tumors. "We now are able to expand our work that was once limited because of the nude mouse's size and vulnerability," Stragand says.

Marsbook takes a lofty view

In their years of circling Mars, the two orbiting Viking spacecraft took tens of thousands of photos of the ruddy planet, its canyons, volcanoes, dunes, channels, duststorms, satellites and other features. A wide-ranging selection of them has now been produced in hardcover book form by the National Aeronautics and Space Administration as a 182-page, 9-by-12-inch volume called *Viking Orbiter Views of Mars*. Far more comprehensive than the 31-photo, softcover pamphlet issued by NASA last year (*Images of Mars* — SN: 10/11/80, p. 232), the new work includes numerous black and white photos and some color, with a number of stereo pairs (a viewer is provided) showing three-dimensional views of such subjects as the summit caldera of the huge volcano Olympus Mons. Besides chapters on the striking Martian topography, the book includes sections on such topics as the atmosphere (with its cloud layers and hazes), variable features (wind streaks and other dust deposits), the two Viking landing sites as seen from orbit, and the moons Phobos and Deimos. Essentially it is a companion piece to *The Martian Landscape* (SN: 5/31/80, p. 348), a similar work devoted to images obtained by the landers. Both books are available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. (Do not order from SCIENCE NEWS.) *Viking Orbiter Views of Mars* costs \$9.50 (specify stock number 033-000-00795-7), while *The Martian Landscape* is \$12.00 (stock number 033-000-00716-7). Also available is the *Atlas of Mars: The 1:5,000,000 Map Series* (\$7.00, stock number 033-000-00780-9), in which Viking and Mariner 9 images have yielded photomosaic, topographic and shaded-relief maps of the entire planet.

Copernicus dies; Einstein revives

An ending and a rebirth: Copernicus, NASA's third Orbiting Astronomical Observatory satellite, is about to be shut down after more than eight and a half years of operation. Einstein, on the other hand, the second High Energy Astronomy Observatory, has only recently been restored to full health following a guidance system malfunction that had cost nearly two months of scientific data and threatened to limit its future effectiveness.

Copernicus, launched on Aug. 21, 1979, and designed for a one-year lifetime of ultraviolet and X-ray studies, has by now been used by more than 160 researchers in 14 countries. But the sensitivity of its UV telescope has declined, and its X-ray instrument has provided only limited coverage for several years. More could be done with the satellite, but it has succumbed to the pressure of tight operating funds. Formal scientific studies were ended on Dec. 11, but engineering tests and a few additional observations are being continued until Feb. 15. During its lifetime, Copernicus has provided information on stars, neutron stars, candidate black holes, and the atmospheres of earth, Mars, Jupiter, Saturn, Titan and Io.

Einstein, launched Nov. 13, 1978, has provided thousands of pictures of the X-ray sky. Last Aug. 27, the three gyroscopes in its attitude-control system shut down, and flight controllers were able to bring only two of them back into operation. Modified commands to the craft's onboard computer enabled the controllers to bypass the stuck gyro and make do with only the other two, but the two-gyro system limited the satellite's flexibility. In mid-October, Einstein's computer was programmed to automatically send repeated "on" signals to the stuck gyro, while the X-ray telescope was shut off to prevent the crippled guidance system from accidentally allowing the instrument to point at the sun, which could burn it out. For weeks there was no response, but finally, on Dec. 6, only two days before the controllers were planning to risk turning the telescope back on anyway, the gyro started up again. The reason is still a mystery.