BIOMEDICINE

Surviving in cold water

In 1974, a five-year-old boy walked onto a partially frozen river in Norway and plunged into the water. He was submerged for 40 minutes before police finally rescued him. The boy was given mouth-to-mouth resuscitation, rushed to the hospital, then given lifesaving treatment. He survived without brain damage (SN: 7/5/77, p. 9).

Now a number of other survivals from what might have been cold-water drownings are reported in the Aug. 22 NEWSWEEK by Martin J. Nemiroff, a University of Michigan physiologist. He reports that the survivals are primarily due to a mechanism that he calls the "diving reflex."

When cold water hits the face, Nemiroff explains, it triggers the diving reflex, which is really a neural response that delays suffocation by shunting oxygen-rich blood to the brain, heart and lungs. When combined with the body's reduced metabolism and decreased oxygen needs in cold water, this shunting helps the victim survive without brain damage.

The diving reflex, Nemiroff continues, is especially strong in younger persons. He believes that it is a physiological vestige of the birth process from earlier times, when the transition from placental oxygen to the earth's atmosphere was a more hazardous affair than it is today.

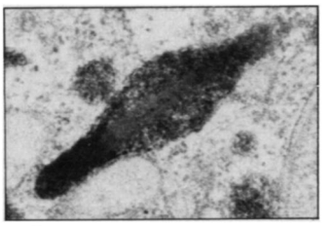
Infertility and egg cell allergy

One reason for infertility in some women may be that they are allergic to their own eggs. Such women may create antibodies that attack the ova's outer covering and thereby prevent sperm entry, according to a report in the Sept. 9 SCIENCE.

University of Tennessee zoologists C. Alex Shivers and Bonnie S. Dunbar hypothesized that eggs' noncellular, gelatinous-like covering, the zona pellucida, might contain antigens that produce antibodies in some infertile women. The researchers exposed zona pellucida-covered ova to the sera of 22 infertile women. Indeed, 15 of the 22 serum samples produced immune reactions to the ova, suggesting that the women from which the samples were taken were allergic to the eggs they themselves produced as well.

How might certain women come to be allergic to their eggs? Shivers and Dunbar hypothesize that, though some one million eggs are present in each woman at birth, 99 percent of the eggs are broken down and reabsorbed. Such a breakdown exposes the antigens on the eggs to the woman's immune system, and in some women this ongoing priming of the immune system might lead to autosensitization to the eggs.

A leukemia marker



A cell particle has been discovered in the white blood cells of persons with acute granulocytic leukemia, but not in the white cells of healthy persons, say J.S. Hanker and G.D.K. Romanovicz of the University of North Carolina in the Aug. 26 SCIENCE.

The particle has a unique spindle shape, resembling the Greek letter phi (see illustration), so Hanker and Romanovicz call it the "Phi body." They discovered it using special staining techniques. They believe that the body may help in the early diagnosis of acute granulocytic leukemia, particularly since it can be seen under the light microscope, to which physicians have easy access. In fact, they have already used the particle to diagnose several cases of this kind of leukemia.

The researchers believe that Phi bodies may act to manufacture and package enzymes for cell use, storage or elimination. They also speculate that the presence of the particles in cells may be an early indicator that something is wrong.

SPACE SCIENCES

Space shuttle payloads scheduled

The busy schedule for the space shuttle's first 17 orbital missions, extending late into 1981, has been worked out by the National Aeronautics and Space Administration. The craft is not scheduled to make its first space jaunt until at least March 1979 (it may be months later), but planning ahead is vital for the ambitious multiple-payload, multiple-customer transportation system.

Each of the first six missions, known as Orbital Flight Tests (OFTs), will carry a package of instruments called an "induced-environment contamination monitor," designed to measure the shuttle's effects (exhaust, magnetic, radio, etc.) on the space around it. The first "real" payload, a group of instruments for earth-resources studies, will go on the second flight, OFT-2.

The third flight will include a test of the huge, remote-control manipulator arm that will later be used to remove payloads from the shuttle's hold and to retrieve others from space. On OFT-4 will be a test of SSUS, one of several upper-stage rockets being developed to ride up in the shuttle and carry payloads on to still higher orbits or interplanetary trajectories. The now-empty Skylab orbiting space station will be the target of OFT-5, when shuttle astronauts attach a rocket motor to raise its altitude so that it will not burn up in earth's atmosphere. The last of the test flights has yet to be assigned; two candidates—one a classified Air Force project called Teal Ruby and the other a NASA satellite built on a proposed standarized multi-purpose frame—have recently grown "iffy."

Then, perhaps as early as May 1980, the operational missions will begin, of which the first 10 are already largely assigned, although subject to shuffling. The first one—flight 7—will carry the Long Duration Exposure Facility, a simple rack full of trays carrying a variety of low-cost, minimum-attention experiments. Flight 8 will deliver the first Tracking and Data Relay Satellite (TDRS-A), part of a network that will replace several ground-based tracking stations; also in the shuttle's huge hold will go a commercial communications satellite named SBS-A for a company called Satellite Business Systems. The remaining operational missions include: flight 9—the weather-watching satellite GOES-D for the U.S. and Telesat E for Canada; flight 10—TDRS-B and SBS-B; flight 11—the first of the European-built Spacelab research modules; flight 12—GOES-E and Intelsat 5; flight 13—TDRS-C and Telesat F; flight 14—Spacelab 2; flight 15—Telesat G and GOES-F, while the Long Duration Exposure Facility will be retrieved and brought back to earth, having given its trays a year in space; Flight 16—TDRS-D and SBS-C; flight 17—Spacelab 3, to be launched possibly as early as August 1981.

Non-astronauts for Spacelab

One of the long-standing promises of the space shuttle has been that it will permit people other than full-time, card-carrying astronauts to ride it into orbit. Candidates are now being evaluated for the first two such jobs, as "payload specialists" aboard the first flight of the Spacelab workshop. The choice of candidates, and the final selection, are made not by NASA (nor by the European Space Agency, which is responsible for the workshop module itself in the cooperative project), but by the scientists participating in the Spacelab mission.

Besides the flight crew, the mission will carry one U.S. and one European payload specialist, in charge of running the experiments. The U.S. candidate list includes three women, and ranges in age from 25-year-old NASA electronics engineer Frederick G. Huegel to University of Pennsylvania plant physiologist Allan H. Brown, whose 60th birthday was last week. Several of the 18 U.S. candidates are the actual Spacelab experimenters themselves. The European list will follow shortly.