MOLECULAR BIOLOGY

Pressure Unsickles Cells

Abnormal blood cells in the shape of a sickle, which cause a type of inborn anemia that will kill some 30,000 children, now living in the United States, can be temporarily made normal by high hydrostatic pressure.

At least one case of "unsickling" of the blood cells that cause sickle cell anemia has been reported in a patient by a professor of medicine at Wayne State University, Detroit, Mich., as a result of theories demonstrated under a child's microscope by a researcher at the National Institutes of Health, Bethesda, Md.

Dr. Makio Murayama of the National Institute of Arthritis and Metabolic Diseases told a symposium at the American Association for the Advancement of Science meeting about his discovery that abnormal molecules stack up to form fibers that cause blood cells to sickle. They can be made normal under hyperbaric pressure.

Lacking a hyperbaric chamber, the Detroit professor, Dr. Richard J. Bing, resorted to a submarine docked in the Detroit River when he received a frantic call from the mother of a baby with sickle cell anemia.

Although the child was not permanently cured by pressure aboard the sub, he was spared the immediate pain and the after-effects of a crisis, in which flesh is sloughed off.

Dr. Murayama gives credit to an old junior high school microscope that he brought up from the basement at home and used to make the discovery about the stacking-up or interlocking of the abnormal fibers. It paved the way for work with an electron microscope.

In his preliminary work, the researcher used the simple microscope because the instrument's stage had to be removed in order to mount a sample of blood from a sickle cell anemia patient in the magnetic field for observation. This couldn't be done with the more sophisticated instrument.

Dr. Murayama was a student of Dr. Linus Pauling for two years beginning in 1954, the year Dr. Pauling won the Nobel Prize in Chemistry. In 1949 Dr. Pauling had discovered a basic chemical difference between the normal adult hemoglobin present in the red cells of patients with sickle anemia.

It is now known that the slight difference of only one amino acid per beta chain exists between sickle cell and normal hemoglobin, but this slight difference considerably alters the physical architecture of the molecule.

The original observation that started Dr. Murayama on his 10-year search for the cause of sickling was that sickle cells in the sickled or gelled state at body temperature liquify or unsickle when cooled, and then sickle again if brought back up to body temperature. As he foresaw, sickled red cells do "unsickle" reversibly at pressure of about 200 to 300 atmospheres.

ENTYMOLOGY

Death in the Afternoon

If you want to rid your house of flies or roaches, chances for killing them are best at four o'clock in the afternoon.

It's true. In studies of the circadian or daily biological rhythms of insects, scientists have found that they are more susceptible to poisonous insecticides in the afternoon than they are in morning or night. This cyclic behavior may have important implications in agriculture and at least partly accounts for variations in reported differences in the action of pest killers.

Farmers might well control pests best by employing this biological principle. They could also save money, because the job can be done with smaller doses at the most vulnerable time.

William Sullivan of the U.S. Department of Agriculture told scientists at the meeting of the American Association for the Advancement of Science about tests conducted in a laboratory.

Insects were exposed for minutes to an aerosol insecticide containing pyrethrum. Then they were released from a closed environment and put in an air conditioned room. Mortality statistics were collected on flies after two days and on roaches after four days. Higher death rates were found among those who had been exposed to the poison during the afternoon, a time when the insects are active than at times when they are normally at rest.

AAAS ELECTION

Roberts Next

A year from now, in 1968, the reins of the American Association for the Advancement of Science will be tossed from one side of the scientific community to the other—from a social scientist to an astrophysicist. But the organization should be little affected by the change. The next president reflects the same concern for the social impact of science as do most prominent scientists today.

Dr. Walter Orr Roberts, new president-elect of the AAAS, comes with more than just distinguished scientific credentials to recommend his handling of the sprawling national body. A specialist on the sun and present director of the National Center for Atmospheric Research in Boulder, Colo., Dr. Roberts was also a member for three years of the U.S. national committee on the International Geophysical Year, one of the broadest-ranging and most administratively-complex scientific projects ever attempted.

Roberts

It is common among people in the upper echelons of science to proclaim that we are living in a vitally important Scientific Golden Age, but why is this so meaningful?

Dr. Roberts forthrightly points out that the difference is that now there is "the prospect, at last, of satisfying the material needs of all the people of earth, if we but have the wit and the will to share our resources."

With all its advantages, however, Dr. Roberts points out, science must nonetheless be watched closely and directly lest it do more harm than good. "The trait that to me seems the most socially important about science," he says, "is that it is a major source of man's dissatisfaction with the world as it is—it is a wellspring of man's discontent with the status quo."

Science is an invaluable tool, Dr. Roberts believes, which we are now committed to use, especially in bringing underdeveloped areas up to the level of the rest of the world. "If we ignore the approaching tides of progress," he says, "we may find ourselves a small island isolated in a vast hostile area."