

Children without immunity: Causes probed

Immune deficiency diseases are a serious problem for those children afflicted with them. Because the children lack crucial components of the immune system, they are wide open to infections.

Immunologists have heroically attempted to repair the immune systems of such children. Some of their efforts have proved spectacularly successful; others have failed (SN: 1/18/75, p.42). The basic problem is that immunologists have not yet pinpointed the causes of immunodeficiencies.

Since 1972, however, evidence has been growing that severe combined immunodeficiency disease—the worst of all immune deficiency diseases—may be due to the absence of a particular enzyme in cells that make up the immune system. This discovery provoked much interest among immunologists. A group of researchers at the Memorial Sloan-Kettering Cancer Center reports that it now looks as if the disease may not be due to a lack of the enzyme but rather to something that inhibits it.

In 1972 Hilaire Meuwissen of the Albany (N.Y.) Medical Center and his colleagues identified three infants who had serious combined immunodeficiency disease and who also lacked a particular enzyme in their red blood cells. This enzyme, adenosine deaminase, helps metabolize DNA, the genetic material of cells. This finding generated considerable interest among immunologists since it was the first documented enzyme deletion associated with an immune system disease. The subsequent identification of a number of severe combined immunodeficient patients with a total lack of adenosine deaminase in their red blood cells and with only traces of the enzyme in their immune cells and other cells further substantiated a possible correlation between the enzyme defect and the disease.

Now Paul P. Trotta, Elizabeth M. Smithwick and M. Earl Balis of Memorial Sloan-Kettering have found that red blood cells from two children with serious combined immunodeficiency disease do not possess normal adenosine deaminase activity. This finding once again suggests that the children's immune disease is the result of a lack of enzyme. The enzyme is apparently not properly functioning in their immune cells, just as it doesn't function properly in their red blood cells. But when the investigators let these red blood cells age for a month, they regained their adenosine deaminase activity. These results suggest that something was inhibiting the adenosine deaminase activity before aging. Because the inhibitor was less stable, aging killed it.

Similarly, researchers found that the parents of these children had less than normal adenosine deaminase activity and that when their red cells were aged for

a month, enzyme activity increased. This again suggests that serious combined immunodeficiency disease is inherited and involves the expression of an inhibitor of adenosine deaminase.

Trotta and his co-workers report in the January PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES that the enzyme inhibitor seems to be inherited and that the inhibitor might somehow prevent the normal function of adenosine deaminase. They point out that a lack of adenosine deaminase, in turn, might interfere with the normal development of the immune system; alternatively, the inhibitor might interfere directly with the development of the immune system.

In any event, "these results imply new possibilities for the molecular basis of the immunodeficiency diseases," they say. □

Rockefeller urges R&D commitment

Vice President Nelson A. Rockefeller, in a speech this week before the American Association for the Advancement of Science, called for free and vigorous scientific and technological development in the coming decade to maintain America's military strength and energy independence. An audience of 1,200 scientists and laymen heard Rockefeller's address Monday night in the Sheraton-Boston Hotel.

Fossil and nuclear power sources must be expanded, he said, but he blamed a developmental "stalemate" since the Arab oil embargo, on politicians and environmental activists who block progress needlessly.

Free enquiry must be fostered if such energy development is to be achieved, but, he said, "a free science requires a free society. . . . The hope for freedom throughout the world depends upon America's strength. A crucial part of this strength is military power." The United States is in "serious danger now of losing our lead time in the development of military science and technology." He said that is why President Ford recommended an increase of \$2 billion for defense research and development (SN: 2/14/76, p. 102) in the proposed 1977 budget. "It is equally important that we expand our support of scientific and technological development outside defense as well. President Ford's increase of close to \$1 billion for this purpose in his proposed budget is certainly a positive step, particularly in this year of financial problems."

Because the public confidence can be shaken "if a small minority of scientists without adequate basis for their claims spread unfounded fear and retard or prevent progress," Rockefeller said, "some

method is needed for bringing into focus the facts and objective judgments of the scientific community. He suggested that an impartial "science court" might be formed. He said the establishment of the Office of Science and Technology Policy in the White House would be an important step in this direction. □

Lunar instruments return from dead

A mysterious death on the moon has been followed by an equally strange return to life. Scientists at the National Aeronautics and Space Administration's Johnson Space Center are baffled.

When the astronauts from all the Apollo lunar landings except the first one took off for earth, they left behind them a series of automatic, isotope-powered instrument arrays known as ALSEPS, or Apollo Lunar Surface Experiment Packages. Intended to last a year each, the packages have all exceeded their expectations, although on Jan. 18, the ALSEP from Apollo 14 unaccountably stopped working. But on Feb. 19, with NASA researchers still struggling to understand its demise, it even more weirdly came back on again. In fact, it is working better now than it ever did.

A year ago the device's receiver failed, leaving scientists on earth able to receive data but not send instructions. Now the receiver works, too. In addition, the array's charged-particle detector (it also carries seismic, magnetic-field and other instruments), which has been confined by the hot lunar day to nighttime operations since it was emplaced in 1971, has started working around the clock.

Lunar temperatures, which can vary as much as 400 degrees F in two hours, were blamed at first for the ALSEP's shutdown. The theory now is that a stuck relay turned it off, and temperature changes brought it back. No one knows. □

237-inch telescope

The world's largest optical telescope is now in operation in the Soviet Union, according to reports from Moscow. With a 237-inch diameter mirror it exceeds the Hale Observatories' Mt. Palomar telescope, previously the world's largest, by 37 inches.

The new telescope, which took 16 years to build, is located on the 6,800-foot summit of Mt. Pastukhov in the Caucasus. Officially commissioned in December, it took its first photographs at the end of that month. Regular observations of stars began Feb. 7. According to the telescope's chief designer, Bagrat Ionnisiani and the Soviet Academy of Sciences' astronomy chairman, E. Mustel, the first major undertaking of the new instrument will be a study of quasars. □