THE NEW YORK TIMES, SUNDAY, MARCH 28, 1971

Serum Hepatitis:

# Hope for Immunity Through A New Vaccine

It was a landmark in medical history—the decision of an 18th-century English country doctor, despite obvious risks, to test a local "oldwives' tale": that milkmaids never get smallpox.

The physician, Edward Jenner, knew that milkmaids who developed mild symptoms of a cattle disease known as cowpox appeared to be free of smallpox. He also knew that anyone who had been stricken with smallpox was immune from contracting it again. Was it possible that cowpox made one immune to smallpox?

The only way he could test his theory was on human beings, for animals are not subject to smallpox. In 1796 he took material from the sore of a milkmaid with cowpox and rubbed it on scratches on the arm of an eight-year-old boy, James Phipps. Six weeks later he inoculated the boy with smallpox germs.

Had Jenner's hypothesis been wrong, the boy could have died, but instead he developed no symptoms and Jenner repeated the experiment on a number of others with uniform success. Despite this discovery, however, severe and fatal outbreaks of allpox continued even into this century.

Last week the story of Jenner's experiment was retold by Dr. Saul Krugman of New York University. The occasion was a conference called by Dr. Krugman to announce apparent success in protecting children against serum hepatitis—a report that was soon followed by news from Dr. Baruch S. Blumberg at the Institute for Cancer Research in Philadelphia that his group, too, was making progress toward a hepatitis vaccine.

In his reference to the Jenner story, Dr. Krugman was clearly trying to make two points: One was that cuts in Federal support for medical research could lead to a delay in implementation of the discovery almost as inexcusable as in the case of smallpox. The other was that development of a vaccine against hepatitis was only possible through human experimentation. As with smallpox, animals are not subject to the disease.

The work of Dr. Krugman and his colleagues had been criticized in some medical and political quarters because it made use of retarded children as experimental subjects. The justification was that the children benefited by the program, that their parents agreed to the program after being informed of the circumstances, and that the tests were essential if progress was to be made against a disease that takes a number of lives.

Benefit to the children, it was argued, arose from the grim circumstances peculiar to institutions housing large numbers of retarded children—in this case Willowbrook State School on Staten Island with a population of 5,500. Because the children cannot be trained to maintain adequate personal hygiene, it is claimed that they are almost sure to come down with both hepatitis and dysentery soon after arrival.

### Two Forms of Illness

Those taking part in the study, although inoculated with hepatitis, profit by intensive medical supervision and are protected from simultaneous exposure to dysentery. Other inmates are often hit by both diseases simultaneously.

The word "hepatitis" means liver inflammation, which may be caused by a variety of circumstances. Viral liver inflammation occurs in two distinct forms: One is infectious hepatitis, whose incubation period is short (measured in weeks) and which typically arises from contamination of food or water by human waste. The other is serum hepatitis, whose onset takes months and which is typically transmitted directly into the bloodstream by a contaminated needle or blood transfusion. According to Dr. Krugman, it is against the latter form that some children at Willowbrook have apparently been immunized.

A vaccine against serum hepatitis could be used to immunize those about to receive blood transfusions as well as medical personnel exposed to the disease that kills an estimated 3,000 Americans each year. Many of these die because contaminated blood has gone into blood banks, in some cases where the donor unwittingly carried the virus.

The way toward development of such a vaccine was opened in 1963 when Dr. Blumberg discovered a peculiar agent that he called Australia antigen. An antigen is an invader that stimulates the immunity system of the body to produce defensive substances known as antibodies. These are custom-made to attach themselves to the invader and render it innocuous.

### Transfusions Studied

Dr. Blumberg's group was exploring the effects of blood transfusions that transfer to the recipient active substances from the blood of another individual. They were also interested in the wide variation in human response to diseases such as hepatitis and the extent to which such susceptibility is inherited.

In this work, as explained by Dr. Blumberg last week, they have sought blood specimens from as wide a range of genetic groups as possible—Baffin Island Eskimoes, natives of Surinam, aborigines from Australia, and so forth. All told they have 100,000 specimens on file.

It was in this study that they found a peculiar antigen, first identified in blood serum from an Australian aborigine, that occurs in 10 to 20 per cent of those living in certain regions of the tropics. It was also found in "bleeders"—sufferers from hemophilia—and those mentally retarded because of mongolism.

In 1966 the nature of the Australia antigen became apparent. The agent suddenly appeared in the blood of a mongoloid who had previously been free of it, and the subject then came down with hepatitis. It now appears that the Australia antigen is indistinguishable from at least one form of hepatitis virus.

The antigen was found in bleeders presumably because they have been given many blood transfusions and were thus likely to have received contaminated blood. It was found in about a third of the mongoloids studied because the disease is rampant in homes for the retarded and, Dr. Blumberg believes, because mongoloids are particularly susceptible.

### Mass Production Foreseen

Several ways have been developed to extract concentrated samples of the agent from blood serum. Thus the way seems open for mass production and testing of the vaccine, leading to its ultimate use to protect all those endangered by the disease. Dr. Blumberg believes this may come within a few years.

What Dr. Krugman has done is boil the Australia antigen (that is, presumably, the virus) for one minute. This, he believes, "kills" it, but leaves it sufficiently intact to serve as an antigen. That is, when injected, it stimulates the body to become immune to the disease yet produces no symptoms. This is the way, for example, that the Salk vaccine induces immunity against polio.

While a vaccine is used to protect the individual before exposure, another tactic, after assumed contagion, is to take antibodies, or chemical defenders, from someone else and inject them. This, too, has been done in the Willowbrook project with apparent success.

One of the most important uses of tests for the Australia antigen is the identification of potential donors whose blood carries the antigen. At present the analysis spots only about a quarter of such carriers. However, Dr. Blumberg believes that new analytical techniques will greatly increase the effectiveness of such screening.

—WALTER SULLIVAN.