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## Hepatitis falls to vaccine, malaria doesn't

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Two thousand years after Hippocrates first described the sickly yellow skin now recognized as a sign of hepatitis, doctors armed with a vaccine against hepatitis B—a common form of the serious liver infection—have succeeded in interrupting its transmission in a heavily infected population.

A malaria vaccine, however, failed to protect against new infections in a major Thai study, leaving researchers without any reliable means of preventing a tropical scourge that each year kills as many as 2.5 million people worldwide, most of them children.

The hepatitis vaccine study was carried out among 1,515 healthy children in Taipei, Taiwan, where one of every five adults is infected with the hepatitis B virus. Most of the children had been inoculated as part of a massive government vaccination program begun in July 1984, soon after the first hepatitis B vaccine became available.

The program began with compulsory shots given to children at 1 month, 2 months, and 12 months of age. In the late 1980s, officials also began vaccinating unprotected school-age children. About 85 percent of children have now received the vaccine.

Huey-Ling Chen and his colleagues at the National Taiwan University Hospital in Taipei started to collect blood serum samples in 1994 from children attending a well-baby clinic at the hospital. They also stockpiled serum from students in six kindergartens and an elementary school.

The researchers tested the serum for hepatitis B surface antigen, a protein churned out by the virus. Doctors view that protein as a badge of infection.

They found that the vaccine had erected an almost impenetrable barrier to the virus, which is ordinarily transmitted at birth or through infected blood, contaminated needles, or sexual contact.

Before the Thai vaccination program began, nearly 10 percent of children were infected with the hepatitis B virus, the researchers say. Since then, the prevalence of infection has plummeted to 1.3 percent. In children born after the program began, the prevalence has dropped even further, to a fraction of a percent.

"What this tells us is that it is possible to control hepatitis B if you vaccinate appropriately," says Robert H. Purcell, head of the hepatitis viruses section at the National Institute of Allergy and Infectious Diseases in Bethesda, Md.

"Mass hepatitis B vaccination has proved to be a successful method of controlling hepatitis B infection in this hyperendemic area," Chen and his colleagues report in the Sept. 18 *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION*.

In a hyperendemic area, a disease is

both common and deeply rooted in the population. Hepatitis B is particularly prevalent in underdeveloped nations, where sterile hypodermic needles are hard to come by and mother-to-infant transmission is common.

Worldwide, the hepatitis B virus infects an estimated 175 million people, or one-third of those infected with hepatitis-causing viruses. One million hepatitis B carriers live in the United States.

Once the virus takes up residence in the liver, it incubates for about 6 weeks. The subsequent disease ranges from a mild flulike illness, marked by fever, nausea, vomiting, and fatigue, to sometimes fatal liver failure. In most cases, the symptoms recede after a few days. The skin typically regains its normal hue within a few weeks.

Nevertheless, doctors regard hepatitis B as a serious illness because it is a leading cause of chronic liver diseases, including cirrhosis and cancer. As a result, the development of a vaccine is

regarded as a breakthrough in the fight against these ailments, which are leading causes of death in countries like Taiwan, where hepatitis B is endemic.

In contrast, the malaria vaccine trial, carried out among 1,221 children age 2 to 15 in a refugee camp in Thailand, proved a disappointment.

In this study, half of the children received three shots of the malaria vaccine and the other half received three shots of hepatitis B vaccine. The malaria vaccine, code-named SPf66, is made up of four proteins from the deadliest malaria parasite, *Plasmodium falciparum*. Within 2 years, 195 children in the malaria vaccine group came down with the disease, compared to 184 children in the hepatitis vaccine group.

"The study provides no evidence that SPf66 is effective against falciparum malaria," say D. Gray Heppner of the Armed Forces Research Institute of Medical Sciences in Bangkok and his colleagues.

"There appears to be little justification for further trials with this vaccine."

—S. Sternberg

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## Nations consent to ban all nuclear tests

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Members of the United Nations' General Assembly voted last week to adopt a treaty barring nuclear detonations of any kind. A goal of negotiators for nearly 40 years, the Comprehensive Test Ban Treaty (CTBT) extends existing, less stringent agreements limiting the size and location of nuclear weapons tests.

To ensure that nations comply with the prohibition, the treaty provides for the establishment of a globe-girdling network of sensors called the international monitoring system (SN: 5/11/96, p. 298).

In the General Assembly, 158 nations voted to adopt the treaty, with only India, Libya, and Bhutan opposing it. It remains uncertain, however, whether the treaty will become international law. To enter into force, the treaty must be ratified by 44 specific nations—including India—known to have atomic weapons, power plants, or research reactors.

Arundhati Ghose, India's representative to the United Nations in Geneva, said, "India will never sign this unequal treaty. Not now, nor later." India objects to the treaty because it does not include a pledge to eliminate all nuclear weapons.

Diplomats remain hopeful that India will soften its stance. If the treaty has not entered into force within 3 years, states may accelerate the ratification process, possibly by circumventing objecting nations.

During the next few years, the CTBT organization is scheduled to begin setting up the International Data Center in Vienna to serve as the collecting station for data from the international monitoring system. As the Vienna center takes

shape, the U.S. Defense Department plans to begin shutting down a prototype center it had established in Arlington, Va., to develop the necessary software and systems, says Ralph W. Alewine III, deputy assistant to the secretary of defense for nuclear treaty programs.

The backbone of the monitoring system—a network of 50 seismic stations—is already near completion. Many of the stations have functioned in earlier networks operated by the United States and other countries. The monitoring system also is to include 11 underwater hydroacoustic sensors, 60 infrasound listening posts, and 80 radionuclide stations. Most of these are not yet available.

Under the provisions of the treaty, if the international monitoring system or any other network records a suspicious event, a committee of 51 nations will evaluate the available evidence. The CTBT organization can conduct an on-site inspection of the questionable event if at least 30 states on the committee deem it necessary.

Although such inspections cannot begin until the treaty enters into force, the monitoring system is already policing the globe in concert with many other secret and open networks. The combined observing power will probably hinder nations from violating the spirit of the treaty even before it enters into force, says Katherine Magraw of the U.S. Arms Control and Disarmament Agency in Washington, D.C. "If a suspect event is picked up, it would be known, and I suspect there would be quite a political outcry."

—R. Monastersky