MALARIA

Vaccine Shows Promise in Tanzania Test

The much-vaunted candidate malaria vaccine developed by Colombian physician and biochemist Manuel Patarròyo has passed its biggest test yet. In last week's issue of *The Lancet*, researchers from Spain, Tanzania, Switzerland, and the United Kingdom report that the vaccine, SPf66, reduced the incidence of malaria by almost one third in children from the village of Idete in southeast Tanzania.

That's an important result, because previous successful trials have been conducted in South America, where the rate of malaria transmission is some 100 times less than in the worst affected regions of Africa; many malariologists expected that the protection offered by the vaccine would be swamped by the huge numbers of parasites to which Tanzanian children are exposed. Nevertheless, experts in the field warn that it's still too early to tell for sure if the vaccine will be a viable weapon in the battle against malaria. "This is a very encouraging initial result that needs to be clarified and expanded upon," says Stephen Hoffman, who heads the malaria vaccine development program at the U.S. Naval Medical Research Institute in Bethesda, Maryland.

In 1987, when Patarroyo, of the Institute of Immunology in Bogotá, first claimed to have made an effective malaria vaccine, he was greeted with intense skepticism. Many researchers could not see how Patarroyo's unorthodox approach could work. Essentially, he synthesized malaria parasite peptides and combined them on a trial-and-error basis. That skepticism began to dissolve only last year, when Patarroyo published a paper in *The Lancet* demonstrating the vaccine's efficacy in Colombia (*Science*, 19 March 1993, p. 1689). But many experts reserved judgment until the results came in from Tanzania, where people, on average, are bitten 300 times a year by malaria-infected mosquitoes. Among those who expected SPf66 to fail was epidemiologist Pedro Alonso of the Hospital Clínic i Provincial in Barcelona, Spain, who led the new study. "All the odds were against the vaccine working," he says. "I fell off my chair when we broke open the codes" and revealed the results.

Alonso and his colleagues vaccinated 274 children aged between 1 and 5 years with SPf66 and gave a placebo to 312 children. The finding that the vaccine reduced disease incidence by 31% is broadly similar to the 39% efficacy rate reported by Patarroyo in 1993. While these figures fall far short of the 80%-plus efficacy of vaccines in routine use against infectious diseases such as polio and diphtheria, malaria's high death toll—estimates run as high as 3 million a year worldwide—means that even a partially effective vaccine could be a valuable weapon.

That will depend, however, on whether the reduction in the number of bouts of malaria reported in the Tanzanian trial—most of which are not life-threatening—correlates with a similar decrease in fatal attacks. The study, notes Alonso, was simply too small to determine whether SPf66 reduces the number of deaths caused by the disease. "We all agree that there is a need to study the effect of the vaccine on mortality," says Tore Godal, director of the Geneva-based Special Program on Research and Training in Tropical Diseases, which backed the Tanzanian trial.

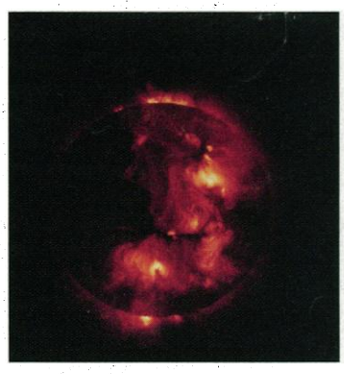
Some researchers, meanwhile, believe it may be necessary to improve SPf66's efficacy—perhaps by incorporating other antigens into the vaccine. It currently consists of three peptides from the blood form of the malaria parasite, synthesized chemically and linked together using a peptide from another stage of the parasite. Patarroyo argues, however, that—given the huge public health problem posed by malaria and the absence of any rival vaccine at a similarly advanced stage of development—it's important to push ahead with further clinical trials. "We have to use whatever we have in our hands."

–Peter Aldhous

SPACE SCIENCE

New Missions Focus on Sun, Galaxies

Solar physics and galactic evolution are the latest areas of science that stand to benefit from the National Aeronautics and Space Administration's (NASA's) push to launch smaller, cheaper probes more quickly. Last week, NASA selected the Transition Region and Coronal Explorer (TRACE) and the Wide-Field Infrared Explorer (WIRE) from 51 candidates for the second batch of launches in its Explorer program. TRACE will study the region between the sun's photosphere and corona, and WIRE will measure the luminosity and density of galaxies with large numbers of new stars.



NASA

Sunny day. New mission will study the sun, seen here in 1991 image.

Unlike the billion-dollar spacecraft of the past which took a decade or more to build, each Explorer is designed to cost about $35 million, weigh around 200 kilograms, and take 3 to 4 years to construct and launch. TRACE will also break new ground in the way some of its results are disseminated: It will beam back movies of solar activity that the public can access on the Internet and offer data on a bulletin board that researchers can use on a first-come, first-served basis.

TRACE will point a 30-centimeter telescope at the mysterious area called the transition region. The sophisticated device, designed to pick up ultraviolet, extreme ultraviolet, and visible wavelengths, will film the sudden, violent eruptions in the sun's magnetic field that characterize this area.

The instrument will provide a resolution five times finer than that of previous spacecraft that have studied the sun, according to Alan Title, the principal investigator and a senior consulting scientist at Lockheed Palo Alto Research Laboratories in California. His team includes researchers from Montana to Sweden.

Three years ago, a U.S.–Japanese mission called Yohkoh sent back the first hints of the transition region's unexpected turbulence, and a European spacecraft is now being readied to examine the solar interior. Together with TRACE, the resulting data will give scientists a detailed look at how the sun works.

WIRE is expected to shed light on the evolution of galaxies and star formation, said Helene Schember, the project director at the Jet Propulsion Laboratory in Pasadena, California. The spacecraft's infrared telescope, which is also 30 centimeters in diameter, will peer through the thick dust and gas of starburst galaxies, galaxies undergoing a burst of star formation. The data could help astronomers determine if such galaxies are the main source of stars in today's universe. The mission will also search for infant galaxies at great distances from Earth that would provide clues to galactic evolution.

The speed with which these missions can be put together and launched will be a big plus. But there's a downside, too: Smaller spacecraft force scientists to be satisfied with smaller, less capable instruments with shorter lives. WIRE's telescope, for example, will operate for only 4 months following launch in October 1998 before its fuel runs out and the satellite plunges back to Earth and disintegrates. Four months of data-gathering is, however, better than none at all.

–Andrew Lawler