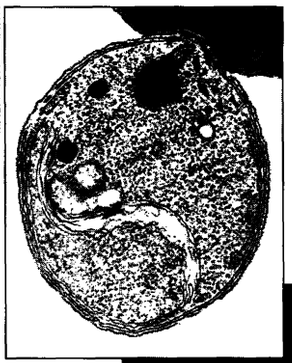
Although no other researcher has achieved anything like the results Patarroyo has reported, his peers regard him as an extremely competent biochemist. (*Nature* has published two of his accounts of successes in 1987 and 1988 with an early formulation of the vaccine—one in monkeys and the other in military volunteers.) As a result, the Walter Reed group is taking seriously Patarroyo's explanation for other groups' failures to replicate his results: namely, that others have not followed the same procedures he used for formulating the vaccine (*Science*, 27 April 1990, p. 422).

To avoid that problem, the vaccine to be tested at Walter Reed, according to Ripley Ballou, is designed to meet Patarroyo's specifications precisely, and—unlike all earlier batches—it has been produced in an FDA-certified lab that meets standards known as "good manufacturing practices." This makes it possible for scientists to conduct clinical trials in the United States, and also ensures that the vaccine is well characterized and easy to compare to the material used by Patarroyo. Patarroyo himself has collaborated closely with the Walter Reed group in planning the experiment, and one of the chemists involved in making vaccine for him has worked with the company retained to produce the vaccine for Walter Reed, Multiple Peptide Systems of San Diego, California.



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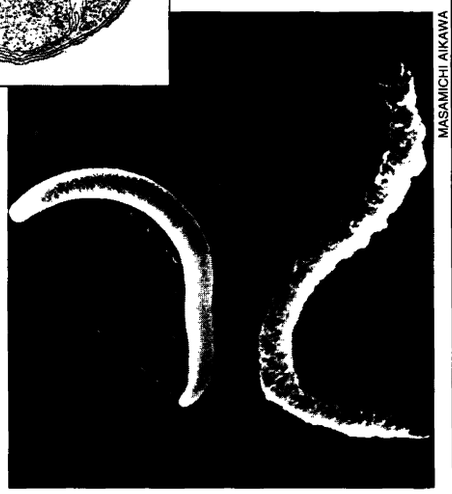

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Cocktail. *Patarroyo's vaccine is a combination of synthetic peptides mimicking surface proteins from both the merozoite* (inset) *and sporozoite stages of the malaria parasite.*

The test material consists of a polymer of four synthetic peptides, each replicating a protein from the most virulent strain of the malaria parasite, *Plasmodium falciparum*. Three of the peptides (only one of which has been fully identified) come from the surface of the asexual blood stage of the parasite called the merozoite, and the fourth comes from the well-studied invasive stage known as the sporozoite.

The Walter Reed group is in the process of finishing all the preclinical animal tests, and the vaccine has been "made and bottled." The scientific team is awaiting final animal potency data before it submits its papers to the FDA and asks the Army surgeon general for clearance to recruit volunteers. Then the clinical work will begin, possibly leading to field trials in which people living in malaria-infested areas are injected with the test material.

Despite the refusal of British authorities to endorse a field trial of this sort, says Stephen Hoffman, chief Navy malaria researcher, a research steering committee on which he sits feels it would be best to take the plunge and investigate the compound on human volunteers. "Given the enormity of the problem," Hoffman says, "it seemed inappropriate to ignore any proposed solution." ■ ELIOT MARSHALL

Tuberculosis Rebounds While Funding Lags

Within the past year, medical microbiologists have had to confront the rebirth of an ancient enemy. Tuberculosis, once thought to be under control in developed countries thanks to an arsenal of effective therapeutic drugs, has risen with a vengeance from the ashes of defeat. The reason: the emergence of new strains of the TB-causing pathogen, *Mycobacterium tuberculosis*, that are resistant to most of the drugs used to treat the disease (see *Science*, 10 January, p. 148). Indeed, the 1990s is shaping up to be the decade of TB, much as the 1980s was the decade of AIDS. Earlier this month, the emerging TB threat came center stage when a handful of leading researchers in the field got together in Bethesda, Maryland, for a workshop convened by Anthony Fauci, director of the National Institute of Allergy and Infectious Diseases (NIAID), to set priorities for federal funding of tuberculosis research.

But while the workshop participants had little trouble agreeing on those priorities, for the moment the available funds look pretty slim. Almost all funding for TB research comes from NIAID, and in 1992 the institute is expected to provide $5.2 million, with the amount slated to rise only to $5.4 million in 1993—barely enough to keep up with inflation—and a drop in the bucket by NIH standards. (By comparison, the institute budgeted $449 million for AIDS research in 1992.) "I don't want to bite the hand that feeds me, but you could say that TB [research] has been underfunded," says Michael D. Iseman, chief of the clinical mycobacteriology service at the National Jewish Center for Immunology and Respiratory Medicine in Denver. "The funding is terrible," agrees Joseph H. Bates, chief of medicine at the University of Arkansas Medical Center, "although everyone is hopeful that things will get better."

In defending NIAID's TB research budget, Fauci says that institute officials didn't become aware of the emerging TB threat until after they'd hashed out the 1993 budget more than a year ago. The level of funding, Fauci told *Science*, "does not reflect the seriousness of our concern." Fauci says he plans to share NIAID's newfound concern with Congress, which can either appropriate more money for TB research or ask NIAID to shift money from other projects—most of which, according to Fauci, are already quite lean.

Should the funds become available, however, the researchers won't have any problem spending them. "There's an awful lot of consensus on what science we need to know," says Barry R. Bloom, a Howard Hughes investigator at the Albert Einstein College of Medicine. Facets of TB research cited as "major objectives" at the workshop include an improved understanding of the bacillus and of TB epidemiology; faster diagnostic tests, especially for the drug-resistant strains; vaccine development and improved TB therapies; and, perhaps most critical, a sharp increase in the number of TB researchers.

"There are no good molecular biologists left in the area," microbiologist Patrick J. Brennan of Colorado State University lamented at the workshop, adding that "all the good biochemistry on the mycobacterium stopped 20 years ago." And basic researchers aren't the only endangered species in tuberculosis research. "The clinical investigator has just about disappeared," says Bates. What will it take to lure talented researchers back into the field? "If you provide dollars to do research," says Bates, "they'll come." And that, for the moment, is the problem—dollars. ■ RICHARD STONE