and National Taiwan University are almost certain to join and that one or two other universities may also be invited.

The initial areas of cooperation have been winnowed down to two fields: molecular biology and biotechnology, and computer science. Last week, a task force was formed for each field and charged with identifying specific topics for cooperation, to be followed by a workshop or conference bringing together relevant faculty members and students. The goal is for researchers to pick their collaborators and for graduate students and postdoctoral researchers to pursue opportunities at any university in the association. Woo says this focus on research, as opposed to class work, avoids the thorny issue of transferring credits. Class work would also require fairly high-level language skills in what would be, for most students, a second foreign language.

The association also hopes to offer less serious opportunities for collaboration. Next year Taiwan's Tsing Hua University plans to host a "Go" tournament to capitalize on the popularity of the traditional board game. Pohang University of Science and Technology would like to host some sort of summer camp for students, although the details have not yet been worked out.

In fact, most of the association's plans are still vague. "There's no doubt we're interested in greater collaboration," says Woo. "But just where it will lead can only be imagined." What is more impressive, say Woo and others, is that the talks are being held at all. "It's the first time the presidents of major universities in East Asia have gotten together," says Seoul's Sonu. "That alone is really quite important."

–Dennis Normile

MALARIA

Serious Setback for Patarroyo Vaccine

Researchers have long dreamed of making a vaccine that would thwart the *Plasmodium* parasite. Each year, infection with this mosquito-borne organism causes more than 300 million cases of malaria and kills more than 1 million people, mostly children. But the parasite has evaded many of the weapons researchers have deployed against it. And now it may have done so once again. Recent field trials of a once-promising synthetic peptide vaccine called SPf66, created by Colombian biochemist Manuel Patarroyo, have not been encouraging, and the latest results, published on 14 September in *The Lancet*, are downright bleak.

The results, from a U.S. Army–sponsored trial of SPf66 among more than 1200 children in Thailand from 1993 to 1995, show no evidence of efficacy whatsoever. During the 2-year, $1.5 million trial, said to be the most expensive and best designed to date, roughly equal numbers of children receiving the SPf66 vaccine (195) or a hepatitis B "comparator" vaccine (184) experienced a first case of malaria. The authors, led by W. Ripley Ballou of the Walter Reed Army Institute of Research, conclude that, taken with other weak results, these data indicate that the SPf66 vaccine "does not protect against clinical falciparum malaria." Moreover, they write that the Thai data are so disappointing that "further efficacy trials are not warranted."

MAJOR FIELD TRIALS OF SPf66

Author	Location	Published	Efficacy
Valero	Colombia	*Lancet* 1993	39%
Alonso	Tanzania	*Lancet* 1994	31%
D'Allessandro	The Gambia	*Lancet* 1995	8%
Valero	Colombia	*Vaccine* 1996	35%
Nosten	Thailand	*Lancet* 1996	0

But SPf66 has been down in the dumps before and has bounced back (*Science*, 20 January 1995, p. 320). It has captured popular attention in South America and is supported by the World Health Organization (WHO). As epidemiologist Carlos Campbell of the University of Arizona, Tucson, says, the curtain has not yet rung down on this, "the biggest ongoing melodrama in malaria research."

The parasite's complex life cycle and multiple forms make it extremely difficult to beat. Patarroyo's strategy—which targets the blood stage of the lethal *falciparum* strain—aims to stimulate the immune system with a mix of synthetic peptides based on extracts from malaria-immune subjects. This upstart vaccine made a big impression when Patarroyo published articles in the late 1980s showing that it had protected monkeys against malaria and immunized more than 30% of soldiers who had been treated in Colombia. SPf66 appeared to be beating the skeptics. It gained momentum when Patarroyo donated a license for SPf66 to WHO in 1995. WHO responded by backing field trials.

Since the early 1990s, a variety of groups have carried out five large double-blind, placebo-controlled field trials of SPf66 (see table). The first two, yielding the highest efficacy rates (over 30%), were run with the help of Patarroyo's team in Colombia, where people face a relatively low "attack rate" by infected mosquitoes. The third big trial, backed by the Swiss Tropical Institute of Basel, took place in Tanzania, where the attack rate is said to be among the highest in the world. This study of 586 children, led by Pedro Alonso of Spain's Biomedical Research Foundation in Barcelona, reported an efficacy of 31%, but with wide error margins. The fourth trial, led by Brian Greenwood and Umberto D'Alessandro of the London School of Hygiene and Tropical Medicine and supported by Britain's Medical Research Council, took place in The Gambia, where the mosquito attack rate is moderate. Here, the vaccine had little effect and was associated with delaying or preventing malaria in only 8% of those treated. The study in northern Thailand, an area where the attack rate is also high, found no protection.

Observers read this mixed record in different ways. Ballou, for example, thinks it "closes the door" on SPf66, because the vaccine no longer looks useful for immunization in high-attack areas like Africa and Southeast Asia. But others remain optimistic. Alonso, for example, says "There is pretty strong evidence that [SPf66] is worthwhile in Tanzania," and he suggests that genetic differences in the population, the local parasite, or even in the chemical composition of the vaccine might have produced varying results. He thinks it is "bizarre" to suggest that no further field trials be undertaken. Patarroyo also thinks that small chemical differences may have affected efficacy rates. Ballou dismisses this view, noting that studies showed that the versions of SPf66 used in Colombia and Thailand produced similar results in tests of immunogenicity.

As for WHO, "We are somewhat disappointed" about the Thailand results, says Howard Engers, director of WHO's malaria research steering committee. But he adds, "It's not all doom and gloom around here." WHO plans to continue the Tanzanian trial of SPf66 in high-risk children and will evaluate those results before deciding on future trials.

Looking beyond SPf66, Engers notes that the attention devoted to Patarroyo's vaccine has helped spur interest in malaria vaccine development, and there are now at least three candidate vaccines in the wings waiting to be tested: a DNA vaccine designed by U.S. Navy researchers, a new U.S. Army vaccine being developed in conjunction with SmithKline Beecham, and an Australian vaccine already in field trials in Papua New Guinea. Engers says: "We see a bright future for second-generation malaria vaccines." This latest disappointment has only intensified researchers' dreams.

–Eliot Marshall