

# Effective vaccine remains elusive as pursuit continues



Researchers from around the world agree that more resources should be made available for vaccine development by and for the South.

Reuter

The first clinical trial to test the efficacy of an HIV vaccine in HIV-negative but high-risk individuals in the US and Thailand began this past Tuesday. It's apparent that another HIV vaccine could move to clinical efficacy trials in two years.

These large-scale, phase III studies seem to indicate that scientists and pharmaceutical companies are moving in the right direction. In the United States, staff at the National Institutes of Health have added HIV vaccine development to their list of priorities. The Joint United Nations Programme on HIV/AIDS (UNAIDS) is helping governments and scientists create the infrastructure for vaccine research, concentrating in the last few years on three countries – Brazil, Thailand, and Uganda. The International AIDS Vaccine Initiative (IAVI), an independent, global not-for-profit organisation, is working with several donors to create international teams of researchers, pharmaceutical manufacturers, and epidemiologists who will place HIV vaccine development on a fast track. Many community groups that have been instrumental in pushing for the development of drug treatments for HIV infection are now turning their attention to vaccines.

Some in the AIDS community

feel, however, that much more could be done to promote vaccine development. About CHF300 million are spent every year worldwide for HIV vaccine research and development. To put that figure in perspective, José Esparza, Vaccine Development Adviser for UNAIDS, points out that one developing country – Brazil – will invest CHF900 million on drugs for treating AIDS this year. According to

Despite 17 years of experience with drug therapies and preventive measures, the rate of new HIV infections continues unabated in the South. These resource-poor countries simply do not have the economic power, and often the political leadership, to stanch the HIV epidemic.

An HIV vaccine would be a potent tool in the developing world not only because of its low cost but also because of its logistic simplicity. "Even if HIV therapeutic drugs were free, getting somebody a supply of 40 drugs a day and keeping that supply available in a mind-boggling problem in a village setting. A vaccine involves only one or two injections, and you don't

Seth Berkley, president of IAVI, at the peak of development of new drugs to treat individuals infected with HIV, pharmaceutical companies spent nearly CHF3 billion a year.

The push for HIV vaccines should be growing, supporters say, because vaccines are probably the only way the HIV epidemic can be contained in developing countries [see adjacent article].

Nevertheless, many investigators feel there's no reason to expect an effective HIV vaccine any time soon. "There have been some small advances, but we are at the same place now that we were three years ago," says Ronald Desrosiers, of the New England Regional Primary Research Center and Harvard Medical School in Boston.

According to Desrosiers, progress toward an HIV vaccine is sluggish mainly because of the virus' ability to continue replicating even if assaulted by a battery of drugs. "When individuals are infected with HIV, they have strong antibody and cell-mediated immune responses, but the virus hardly blinks. Once HIV gets its foot in the door, it's tough to stop. That is different from the vast majority of

viruses for which there are successful vaccines," Desrosiers says.

Another problem may be the variety of strains of HIV. "In the case of polio, there were only three strain types. In the case of HIV, we don't know how many different strain types we need to include in a vaccine to provide broad-based coverage," Desrosiers emphasises.

The vaccine that is being tested in the United States has been designed by the company VaxGen to protect individuals from strains of HIV that occur in North and South America, Western Europe, and Australia. A similar vaccine is being developed by VaxGen to target strains of HIV prevalent in Thailand, Korea, Japan, Taiwan, and Indonesia. But no vaccine is being developed against the HIV strain that infects 48% of people worldwide, says Esparza. On the other hand, Lars Kallings of the IAS says the protective efficacy of a vaccine may not be related to the various virus subtypes.

The VaxGen vaccines have been genetically engineered to induce antibodies against gp 120, a glycoprotein that is found on the protein envelope that coats HIV. After 14 years of research the first genera-

## Activism needed for vaccines to reach

the drugs that treat the infection, not to mention the costs of monitoring therapy.

It has been difficult to entice pharmaceutical companies to invest the time and money in vaccine development, however. According to Berkley, SmithKline Beecham, the biggest vaccine manufacturer in the world, does not have an HIV vaccine program. Until recently, Merck & Co. had only one part-time staff person working on vaccine strategies. Why? The perceived lack of a market to afford such a vaccine.

IAVI has been trying to create such a market. Typically, vaccines are developed in the United States or Europe and targeted to strains

have to monitor people afterward," asserts Seth Berkley, president of the International AIDS Vaccine Initiative (IAVI) in the US.

But while scientists may one day know enough about HIV to create an effective vaccine, current knowledge is inadequate. And some researchers assert the pace of vaccine development will remain slow until pharmaceutical companies see a financial advantage and governments feel pressure from activists.

The effect of the HIV epidemic in the developing world is well known: 90% of all new HIV infections occur in poor countries. Also obvious is the fact that nations in the South cannot afford to pay CHF30,000 a year per person for