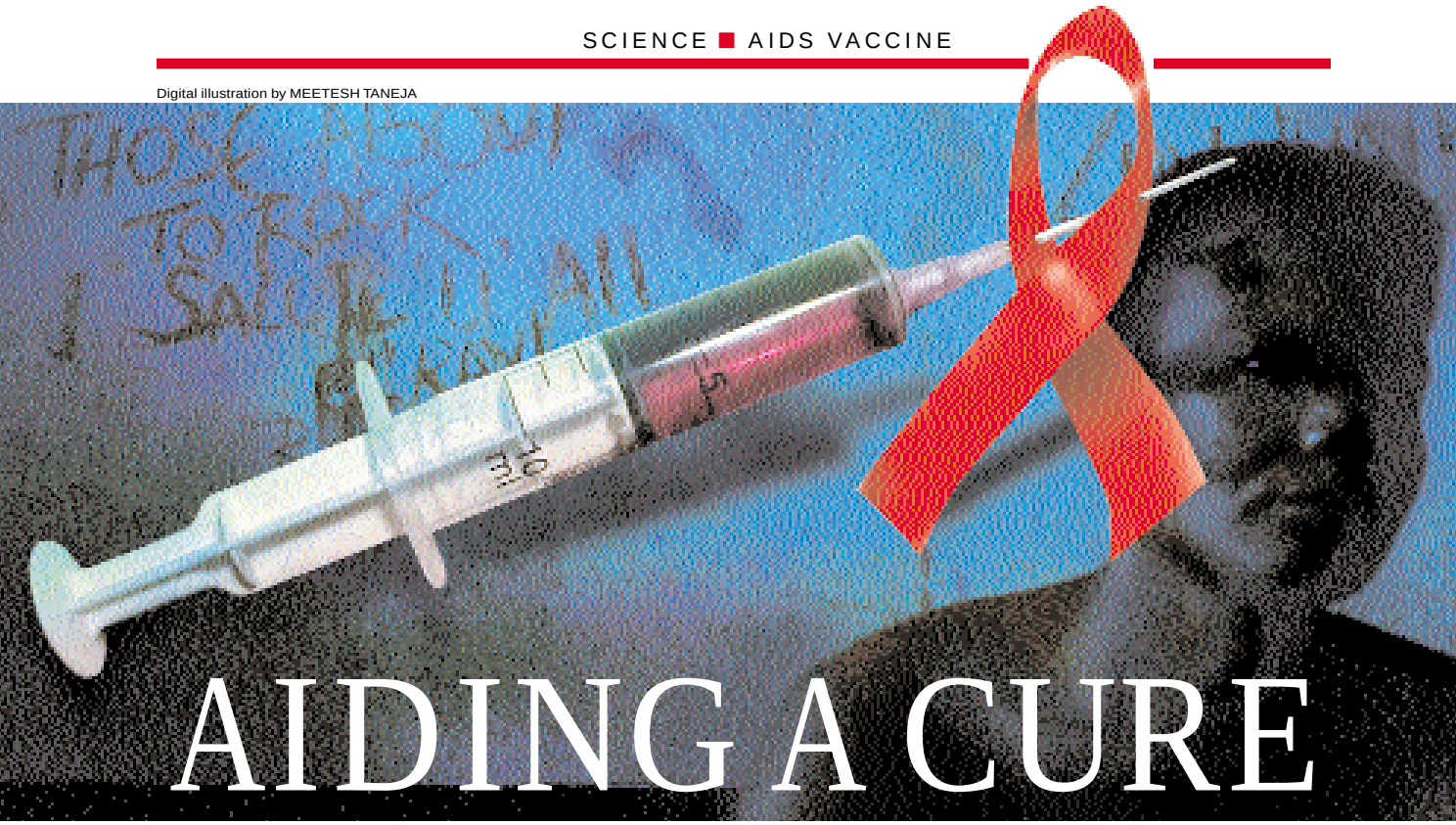
Digital illustration by MEETESH TANEJA



AIDING A CURE

Acceleration in the efforts to develop an AIDS vaccine appropriate for use in India promises hope in the battle against the killer disease

■ by Shefalee VASUDEV

IT IS THE MOST URGENT AND the most publicised quest in medicine today: a cure for Acquired Immuno Deficiency Syndrome (AIDS). Unfortunately, the marvels of modern medicine have not managed to slow down the virus' lethal march, even though a slew of multi-drug therapies has been developed to combat it. But an omnipotent vaccine to immunise man from the fatal effects of AIDS is yet to be identified.

For India, which already has 3.9 million people afflicted with the disease, there is now a glimmer of hope: the first steps have been taken to develop an effective AIDS vaccine suitable for the country. Last week, the Union Health Ministry announced a well-defined programme to develop an AIDS vaccine for India. This means that the first phase of trials of an AIDS vaccine for India could begin within 18 months. Dr Lalit Kant, senior deputy director-general, Indian Council of Medical Research (ICMR), says, "This had to be done—no one else in the world will make an AIDS vaccine suitable for the type of the human immuno-deficiency virus (HIV) found in India."

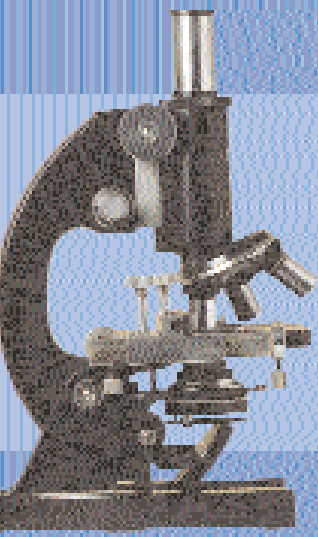
The development of any effective vaccine against the vicious and fast-mutating HIV, which causes AIDS, is a painstakingly slow process. AIDS has presented medicine with a curious set of conditions: it spreads faster in the developing world and unlike vaccines against other diseases like small pox, polio and meningitis, a vaccine for AIDS requires to be developed to suit region-specific subtypes of HIV. More than 90 per cent of HIV positive cases found in India are of the C subtype, which is a mutation of the HIV virus in reaction to a genetic strain found largely in people of the Indian subcontinent.

The process of developing an India-specific vaccine began in March 2001 when the ICMR and the National AIDS Control Organisation started work with the New York-based International AIDS Vaccine Initiative (IAVI). As advanced technological facilities were not available in India, the Government deputed scientist Shekhar Chakravarty of the Pune-based Serum Institute of India to work on developing a vaccine for India at Therion Biologics in Boston, US. The Government maintained that importing technology and machines to India in order to test a vaccine would have led to undue delay. Since AIDS is a frontal attack on the immunity system, the vaccine seeks to strengthen it among those infected and develop resistance among the uninfected. Chakravarty's research incorporates what is called the viral vector design that uses an immobilised HIV virus to generate antibodies. This design is more effective against the India-specific C subtype than the other two designs—the DNA-based and the bacterial vector.

The vaccine will specifically target the C subtype of HIV that is most prevalent among Indians.

Effectively India may be some years away from acquiring a vaccine that will immunise the entire population. But the current plans promise to ensure that it is suitable, accessible and cheap when developed. This will be in contrast to other path-breaking vaccines which reached developing countries like India 15-20 years after they had been tested in the developed world.

So far, the responses to AIDS have been on two levels:



AIDS VACCINE: THE JOURNEY SO FAR

The Research

It was noticed that some HIV-positive cases did not contract AIDS. Other people remained uninfected despite multiple exposures to the virus. These cases became the starting point for scientists in identifying mechanisms in the immune system that could resist HIV.

The Tools

Advances in AIDS research have equipped scientists to develop vaccines that stimulate a broad spectrum of immune responses—hormonal, cellular and mucosal. All these are needed in an AIDS vaccine.

The Breakthrough

New anti-AIDS vaccines are first tried on animals. Several experimental vaccines using the DNA of HIV as a vaccine have successfully protected monkeys against their version of HIV, called the SIV, the simian immunodeficiency virus.

The Trial

PHASE I

First human tests of a candidate vaccine conducted on small numbers (10-30) of healthy adult volunteers who are not at risk. Modified Vaccinia Ankara (the type also isolated for an India-specific vaccine) is currently in Phase I. This is where India now joins the race.

PHASE II

Involves a large number of volunteers (50-500), usually a mix of low-risk and high-risk people. These trials take 18-24 months and mostly yield preliminary indications of efficacy.

PHASE III

Definitive tests using thousands of high-risk group people. Phase III trials of AIDS vaccine require three years for enrolment, immunisations and efficacy assessments. VaxGen's Phase III is currently on in Thailand.

curative and preventive. Anti-retrovirals—like AZT, the first anti-HIV drug approved for use in the US—have a burgeoning demand in India: the sale of these drugs grew by as much as 107 per cent in 2001, according to ORG-MARG data.

Preventive efforts were carried out on a smaller scale. Though many vaccines are being tested for safety and effectiveness in the US and parts of Africa, in Asia it is only in Thailand that an AIDS vaccine—AIDSVAX developed by VaxGen Inc—has reached advanced stages of trials.

Apart from elaborate laboratory tests, the vaccine has to go through a series of trials on humans before being cleared *(see box)*. There are, however, bound to be doubts over whether the fixed guidelines for such a complicated series of procedures will be strictly followed. Anjali Nayyar, the India officer for IAVI, is hopeful: "An advisory board of 32 eminent people from different walks of life has been constituted to ensure the ethical and social transparency of the vaccine trials."

Advisory boards apart, the fear that lurks in the minds of doctors, NGOs and counsellors extends to challenges beyond the laboratory. There is always the very real danger of misinformed Indians being used as guinea pigs. So despite promises of proactive transparency, the sceptics underline multiple concerns. The trial of the Indian AIDS vaccine is a social minefield as much as a scientific one. The need to safeguard the reproductive health of women, the protection of human rights and the importance of informed consent of all participants in a trial are only a few issues to be considered. What if volunteers are denied care and treatment during the trial? What if a volunteer becomes HIV positive? Such queries are only partially answered, but the need to include a variety of parties in the process is key.

As Dr N.K. Ganguly, ICMR director-general, declares, "An AIDS vaccine will be affordable in India only if there is a good public-private partnership." This will require the pharmaceutical companies to work in tandem with the Health Ministry. The Government too will need to put in legal safeguards. Says Rajya Sabha member Kapil Sibal: "We will need to implement the existing laws and form new legislations to ensure the privacy of the patient and the right to better health care services."

In the entire process, what has been injected into social consciousness is the threat of AIDS across all sections. An effective vaccine is needed because AIDS affects not just sex workers, truck drivers or those who are labelled as "high-risk" groups. It is for everyone, especially those who do not perceive the aids risk for themselves. Even if the vaccine trials become a tool to inform, educate and empower, they will help immunise many against high-risk behaviour. ■

ASIAN CHALLENGE: VaxGen's AIDSVAX being tested at a clinic in Thailand

REUTERS