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Fact Sheet

The search for an HIV vaccine

Soon after the identification of the human immunodeficiency virus (HIV) in 1983, some health officials were predicting that a vaccine would be developed within a couple of years. The search has proven to be much more difficult than anticipated, but scientists are confident that an HIV vaccine will be discovered.

- The quest for an HIV vaccine dates back to 1987, when the first human trial of a candidate HIV vaccine was conducted in the United States. About 30 experimental vaccines have since been tested in some 60 trials.
- So far, most of the trials have been staged in industrialized countries, but now trials are increasingly being done in developing countries also. During the 1990s, several vaccine initiatives were launched in developing countries, including Africa.
- A vaccine will not be a panacea, nor will it be an alternative to prevention. Because an eventual vaccine is unlikely to be 100% effective, it will have to be used alongside wide-ranging and effective prevention programmes. In fact, once a vaccine is developed, awareness-raising and prevention efforts will need to be redoubled in order to counter the risk of complacency.
- An HIV vaccine must benefit all humanity. Once discovered, the vaccine will have to be made available to everyone with minimum delay, in sufficient quantities and at affordable prices. Early planning is needed to ensure that this is achieved.

A massive challenge

- The peculiarities of the virus make the development of an HIV vaccine an arduous and expensive process. Still lacking, for instance, is the clear scientific understanding required to guide the pharmaceutical development of specific candidate vaccines.
- HIV/AIDS differs profoundly from most other infectious diseases. In the case of the latter, the body develops an immune response to an infection in order to protect itself and help it recover from disease. A successful vaccine against such diseases therefore stimulates effective immune responses. But HIV immobilizes the body's immune responses, leaving them incapable of controlling infection or preventing disease.
- Most existing vaccines are based on an entire microorganism (virus or bacterium) that has been killed or rendered harmless. In the case of HIV, however, those 'classical' vaccine approaches are not considered sufficiently safe. Experimental HIV vaccines therefore are based on *parts* of the virus (to ensure that vaccination does not result in HIV infection). This makes the development of a vaccine even more challenging.

- Ten subtypes of the HIV virus have already been identified. Scientists do not yet know whether a vaccine will have to be prepared for each subtype or whether a more broadly protective vaccine will be possible. That, coupled with the fact that the subtypes in developing countries differ from those prevalent in the industrialized world, makes it essential that experimental vaccines be developed simultaneously in the North and South.
- Scientists know that the development of a vaccine is possible (because animals can be protected against HIV infection), but they remain uncertain as to whether that success can be extrapolated to humans. For that reason, the search for an HIV vaccine has to include human trials, which are costly and time-consuming.

A long process

- The quest for an HIV vaccine takes many years. Experimental vaccines are first tested on animals, and the best vaccine candidates can then be selected for possible testing on humans. Testing is then carried out on HIV-negative volunteers, in three phases. Only in the last phase does it become clear whether the vaccine works.
- Phase I tests are done on 20-40 volunteers. These tests are intended to confirm the vaccine's safety and determine whether it triggers strong enough levels of HIV-specific immune responses.
- Phase II tests involve hundreds of volunteers and are intended to further check vaccine safety and assess the potency of immune responses.
- Phase III tests involve large-scale field trials, involving thousands of volunteers. The aim is to gauge whether the candidate vaccine indeed protects against HIV infection or the onset of AIDS. The trials last for up to four years.
- About 30 experimental HIV vaccines have been tested since 1987—all of them in Phase I or II trials—and the bulk of them in the United States and Western Europe. Since 1993, however, 13 such trials have been conducted in the South—in Brazil, China, Cuba, Haiti, Kenya,

Thailand and Uganda. In some of these trials, scientists have determined that experimental vaccines are safe and that some stimulate anti-HIV responses in the body. But they do not yet know whether the vaccines would protect people against infection. That can only be determined in Phase III trials, which are ethically, logistically and scientifically complicated.

- By mid-2001, two efficacy (Phase III) trials were underway. One, in the United States, was based on subtype B of the virus, while the other, in Thailand, was based on subtype BE. Initial results are expected towards the end of 2001.
- Numerous other vaccine endeavours are underway. In the African AIDS Vaccine Programme, announced in Nairobi in June 2000, African scientists, governments and institutions are teaming up to develop a vaccine that can help turn the epidemic around on that continent. They aim to complete at least one efficacy trial by 2007. Also active in the quest is the International AIDS Vaccine Initiative, a research consortium started in 1996 and supported by government and private grants. It is committed to ensuring that rich and poor countries alike get simultaneous access to a vaccine.

Everybody's duty

- The duty of developing a vaccine rests with the entire international community. But the wealthy countries (and the pharmaceutical industry) have the human, financial and technical resources to speed up the research and development of vaccines that are appropriate for use in developing countries. At the same time, developing countries have a key role to play, not least in conducting relevant clinical trials to prove vaccine efficacy.