

There is hope of an HIV vaccine

Today, Uganda marks the World HIV vaccine Awareness Day. For over 21 years now, scientists have been researching for an HIV vaccine, but with little success.

Hilary Bainemigisha asked Dr Francis Kiweewa, the head of research at Makerere University Walter Reed Project, whether there is hope of an HIV vaccine

Are we really going to see an HIV vaccine in our lifetime?

There is hope, a lot of it. You see, vaccine research has been going on for 21 years, and there have been ups and downs with several vaccine candidates showing promise in animal studies, only to fail in large human clinical trials.

By fail, I mean they do not prevent the infection as expected, but we still learn a lot from the studies that help us to improve on the next vaccine candidate. Lessons we have been accumulating over the years have resulted into vaccine strategies that are now more promising than never before.

Currently, there are two to three large clinical trials that are either on going or planning to enrol participants in Sub-Saharan Africa. These are a result of lessons that have been accumulated from several smaller clinical trials, including those that Ugandans have participated in. This is the first time we are having more than one large clinical trial being carried out at a go and these offer several opportunities.

Are you happy with Uganda's participation in the HIV vaccine research trials?

Oh yes! We are part of the global family and have battled the HIV epidemic for years and, like in many parts of the world, new HIV infections are still being registered. Despite our earlier successes in the fight against HIV/AIDS, 1.4 million Ugandans are currently living with HIV and approximately 227 get infected daily.

We have had a successful rollout of Anti-Retroviral Therapy (ART) and a fairly successful HIV prevention programme. However, only 60% of Ugandans who need ART are receiving it today. And, of these, only 54% are able to suppress the virus. Though there are reductions in HIV-related deaths, the condition is still a big challenge in Uganda.

Prevention strategies such as medical male circumcision, prevention of mother-to-child transmission, treatment as prevention, voluntary counselling and testing, and lately, pre-exposure prophylaxis, a strategy that relies on using drugs that treat HIV to prevent infections, have all collectively been successful

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in progressively bringing down the number of new HIV infections.

The enormous resources needed to sustain the current strategies and the fact that no major epidemic has ever been eliminated without a vaccine, makes us strongly believe that getting an HIV vaccine is the only way through which we can sustainably win the fight against HIV/AIDS. Thus the need for Uganda to participate actively in HIV vaccine research.

You are talking about research in vaccines; have you entirely given up on an HIV/AIDS cure?

Right now, we do not have medicines that cure, but we have medicines that can suppress the virus so much that the person continues to function as though there is no virus. However, part of the vaccine strategy is to see if we can also promote cure.

Therefore, vaccine and cure researches go hand-in-hand. We test vaccines that prevent, but also test vaccines that slow the progression of HIV in those who are already infected so that when we give that vaccine, the goal should be to slow the progression of HIV to the extent that at one point, you may be off the ARVs.

How is an ordinary Ugandan involved in the HIV vaccine research?

We conduct clinical trials in the community. Community members participate in various ways, for example, as volunteers who receive the vaccine candidates for us to be able to test how their immune system responds.

Secondly, as community



Dr Francis Kiweewa, the head of research at Makerere University Walter Reed Project

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The number of people that get infected with HIV daily in Uganda

IN NUMBERS

1.4 million

The number of Ugandans currently living with HIV/AIDS

64%

The percentage of Ugandans who are receiving Anti-Retroviral Therapy (ARVs)

advisory boards (CABs) who work hand-in-hand with and link the scientists to the community. CAB members also support the research process through community education, help us dispel misconception about research in the communities and participate in raising awareness in communities about the usefulness of medical research.

The research we do has to be approved by ethics committees and regulatory agencies. Ethics committees have community representatives that are drawn from various populations and all these are ordinary Ugandans.

Community members support research participants and advocate to our governments to invest in research endeavours in the country. All these are contributions that an ordinary Ugandan can and should engage in.

How is the vaccine research conducted?

An HIV vaccine is a drug or product that is artificially formed to train the body to be

prepared to fend off the virus it enters the body. The products that we use contain manmade proteins or antigens, designed to induce an immune response against the virus in form of antibodies specialised to kill the virus.

It is those antibodies that are produced as a result of introducing the vaccine that are measured to see if this vaccine has the potential to protect. The assumption is when the body is able to produce those anti-bodies and the actual virus enters the body, the body is already primed to attack and kill the invading virus.

To achieve this, we request volunteers to come, we explain to them what the research is all about, the product we are going to use, the study procedures, and if they are fully informed and they agree to participate, then we introduce the vaccine into their body.

For a vaccine that is tested to determine if it can prevent HIV infection (or call it preventative vaccine), we test the vaccine on HIV negative individuals so that when they encounter the actual virus, the immune

system that we established in their bodies should be able to counter the infection if the vaccine works.

And this is what naturally should happen. When you get measles, for example, the body responds by producing antibodies (or simply put soldiers) that are specialised in fighting the measles' virus. And when you cure from measles, the immune system will stay, so that next time when the virus comes, the body is already primed to fight it, so you will not get an infection. We are, therefore, using that very natural phenomenon to try to produce a vaccine that works against HIV.

Majority of the vaccine candidates that we have tested up to date give us that immune response, but not strong enough to prevent HIV infection and that is one of the reasons why we do not have a vaccine today.

What other challenges are you encountering in the search for the HIV vaccine?

HIV is one of those viruses that are so stubborn to fight because it mutates or changes

Which organisations have partnered with you in this HIV vaccine research?

We work with several partners both local and international, but our main partner internationally are the US military HIV research programme under the US Department of Defence, Henry Jackson Foundation, Jensen Pharmaceuticals, GSK pharmaceutical company and NIH/DAIDS.

Locally, the main partner is the Ministry of Health and its organs, Makerere University School of Public Health, Uganda Virus Research Institute, CPIL, Uganda National Council for Science and Technology. We also work with various institutional review boards where we take our regulatory review, the National Drug Authority, other research institutions engaged in HIV vaccine research work and the community in general.

The press has also been a strong partner, especially when it comes to communicating our messages.

itself so often and this makes it difficult for researchers to come up with exact HIV look-a-likes. The rate at which it mutates itself to create several sub-types makes it difficult for researchers to get one vaccine that targets all those other sub-types.

Secondly, the duration it takes to come up with a vaccine candidate. For a product to be tested, it goes through several stages, notably the pre-clinical when it is still in the lab and in animal studies to ensure safety, after which it is slowly introduced to humans. In humans, it still goes through different stages, all aimed at ensuring safety of the product being introduced.

Thirdly, the resources needed. Conducting HIV vaccine research is very expensive and as such, no single partner can be able to meet all the resource needs. We depend on multiple partners coming together including donors and governments. Fortunately, the global community has prioritised HIV vaccine research and resources have been put together, though still, they are not enough.

Fourthly, the misconceptions from the community. When we talk about HIV vaccine research, people think that we get a virus and give it to someone and we follow them up, which is not true. This can affect community participation. Awareness is still low and any way of increasing it will go a long way in improving on the work of the HIV vaccine research.