

HIV Prevention: Embracing Imbokodo

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Introduction

Human immunodeficiency virus (HIV) is a bloodborne pathogen that kills or impairs cells of the immune system, eventually and progressively destroying the body's ability to fight infections. If untreated, HIV will eventually lead to acquired immunodeficiency syndrome (AIDS), a condition in which ongoing failure of the immune system allows life-threatening, opportunistic infections and cancers to thrive. In 2016, more than 1.8 million people became newly infected with HIV, adding to the 36.7 million people globally who live with the disease. (World Health Organization, 2017). Although great progress has been made in the treatment of HIV to keep the virus from multiplying within the body, there is no cure for the disease. HIV/AIDS remains one of the world's most pressing global health challenges.

Developing a vaccine against HIV is a top priority, as it represents the best prospect for a world without AIDS (UNAids, 2018).

Attempts to create HIV vaccines have ongoing since the late 1980's, but the virus behaves a little differently than typical viruses for which vaccines have been effective. The search for an HIV vaccine has been challenging due to the unique properties of the virus, including its ability to mutate rapidly, and its global genetic diversity with multiple strains and subtypes prevalent in different parts of the world.

The challenge of finding an HIV vaccine requires global collaboration for development and testing. For more than ten years, Johnson & Johnson, through its Janssen Pharmaceutical Companies, has been working in close collaboration with academic partners and the National Institutes of Health to develop an HIV vaccine candidate. They have partnered with the Bill & Melinda Gates Foundation, HIV Vaccine Trial Networks and the National Institute of Allergy and Infectious Diseases (NIAID) for a current efficacy trial.

How it Works

The Janssen vaccine regimen contains two key components: a mosaic-based viral vector; and a soluble protein. The aim is to induce an immune response in humans similar to the responses observed in vaccinated, non-human primates and shown to correlate with protection against infection. The viral vector delivers so-called mosaic antigens that have been engineered using genes from a wide range of different HIV-1 subtypes with the aim of providing broad coverage. The vaccine regimen is therefore designed as a "global vaccine" that could potentially be deployed anywhere in the world to help prevent HIV infections (South African Medical Research Council, 2017).

Two early-stage, Phase 1/2a clinical trials ([APPROACH](#) and [TRAVERSE](#)) have evaluated mosaic-based HIV vaccines. The ongoing TRAVERSE study compares two regimens containing adenovirus 26 (Ad26) vectored vaccines delivering either three (trivalent) or four (quadrivalent) mosaic antigens. Preliminary data suggest that both types of mosaic-based vaccine appear to be well-tolerated and able to elicit anti-HIV immune responses. Based on these studies, a lead vaccine regimen comprising the 4-component Ad26 mosaic candidate and a Clade C gp140 soluble protein will be evaluated in HVTN 705/HPX2008 to see if it actually reduces HIV infections.

Imbokodo

Imbokodo is the name assigned to the proof-of-concept efficacy study that will evaluate the Janssen mosaic-based vaccine's safety and efficacy (compared to placebo) in preventing HIV-1 infection. The study aims to enroll 2,600 sexually-active women, aged 18-35, in five southern African countries. The first participants have begun receiving vaccinations at clinical research sites in South Africa. Regulatory approvals are being sought to conduct the study at additional sites in Malawi, Mozambique, Zambia and Zimbabwe.

South Africa is considered to have the largest HIV epidemic in the world, with 19% of all HIV-infected people living in that region (UNAIDS, 2018). "Imbokodo" is the Zulu word for "rock" which is part of a well-known proverb in South Africa that refers to the strength of women and their importance in the community. Younger, sexually-active women are among the populations at risk for HIV infection, and so are the target population for Imbokodo.

According to Johan Van Hoof, M.D., Janssen Vaccines & Prevention B.V. and Therapeutic Area Head, R&D, Infectious Diseases & Vaccines, the goal is to develop a vaccine that will help to protect any individual from HIV infection, regardless of where in the world they live. Any additional efficacy studies will also include men, as was the case with earlier-stage studies for this vaccine.

The study is being conducted at clinical sites coordinated by the NIAID-funded HIV Vaccine Trials Network (HVTN), an organization with robust practices for HIV clinical trial conduct and many years of experience in this field. This collaboration with the HVTN ensures that Imbokodo utilises all of today's best practices for conducting an HIV vaccine efficacy trial in Southern Africa. Local stakeholders have also been consulted on the launch of Imbokodo. Southern Africa is home to some of the world's leading HIV researchers and clinical investigators and the trial sites are incredibly well run.

Diagnosis

The diagnosis of HIV remains an important element in addressing the HIV pandemic. Similar to many other infections, the severity of HIV is directly in proportion to the number of virus particles in the body. Cost-effective, and rapid detection can confirm suspected infections to prevent further infection through sexual partners. Some systems can also be used for quantification during treatment, which can indicate if a treatment is effective in reducing the number of viruses in the body. Most recently, Hologic's Aptima® HIV-1 Quant Dx assay was awarded prequalification for *in vitro* diagnostics by the World Health Organization. This qualification indicates that the system meets quality, safety, performance and reliability standards, and allows global health organizations to consider their use for public sector procurement in resource-limited countries (WHO, 2017).

Next Steps

It is too early to predict how quickly the new vaccine could become available, as the clinical evaluation process is still in progress. Results from Imbokodo are expected by 2021, but additional efficacy studies will be needed to support potential licensure of the vaccine. The ultimate goal of an HIV vaccine is to eliminate HIV as a public health concern, so that people no longer have to worry about contracting this virus.

“Our Goal Is To Help Eliminate Hiv As A Public Health Concern – So That People No Longer Have To Worry About Contracting This Virus. With Our Partners, We Hope To Play A Part In Creating An Hiv-Free World.”

- Johan Van Hoof, M.d.

More information about the study is available at imbokodo.org.za or ClinicalTrials.gov using identifier [NCT03060629](https://clinicaltrials.gov/ct2/show/study/NCT03060629).

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