Only HIV Vax to Show Any Efficacy Prompted Strong Immune Response in New Study

Researchers gave the vaccine, previously studied in Thailand, to participants in South Africa.

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The only HIV vaccine regimen ever to demonstrate any efficacy has prompted strong antibody and cellular immune responses in a new trial that enrolled South African participants. This finding has led researchers to believe that it may not be necessary to tailor HIV vaccines to different regions of the world based on the different predominant circulating strains of the virus.

Publishing their findings in Science Translational Medicine on September 18, investigators in the HVTN 097 trial gave the HIV vaccine regimen used in the previous RV144 Thai vaccine efficacy trial to South African participants.

The new study was led by Glenda Gray, MD, co–principal investigator of the HIV Vaccine Trials Network (HVTN), which is headquartered at the Fred Hutchinson Cancer Research Center in Seattle. The study was funded by the National Institute of Allergy and Infectious Diseases, a division of the National Institutes of Health, and the President of the South African Medical Research Council.

The RV144 regimen uses a “prime-boost” strategy that includes a combination of two vaccines: ALVAC-HIV and AIDSVAX B/E, which is based on clades B and E of the virus. In Thailand, HIV clades B and E are endemic, while the dominant circulating strain of the virus in South Africa is clade C. In 2016, investigators launched the Phase IIb/III HVTN 702 trial in South Africa, which is testing a version of the vaccine regimen that was retooled to apply to clade C rather than clades B and E.

In the RV144 trial, the vaccine regimen lowered the risk of HIV among the Thai study members by 31.2%, which was not a sufficient efficacy to warrant a rollout. Experts generally agree that a vaccine with at least a 50% efficacy would justify global use and make a significant impact on the epidemic.

In the new HVTN 097 study, 51.9% of participants developed a CD4 T-cell response—a rate that held irrespective of the South African participants’ age and sex. This compares with a 36.4% response rate in the Thai study. Both South African and Thai participants’ immune systems also

generated antibody responses that crossed viral clades, specifically clades AE, B and C. The antibody responses to clade C antigens (viral proteins) were higher and more prevalent in the South African participants. Overall, the cross-clade immune responses were stronger in the South Africans than researchers had anticipated.

“This breaks open the thought pattern that each region of the world needs a separate type of HIV vaccine based on their circulating strains,” said HVTN principal investigator Larry Corey, MD, in a press release.

A previous clinical trial, HVTN 504, or Phambili, also conducted in South Africa, found that having a higher body mass index (BMI) was associated with a lower immune response to HIV vaccines. However, in HVTN 097, the study authors stratified their findings by BMI and found that this factor was not associated with lower T-cell or antibody response rates or the strength of the response. All those with a BMI greater than 30, indicating obesity, had a T-cell response to the vaccine.

The authors of HVTN 097 acknowledge that other variables, including race, the microbiome or genetic factors, may have influenced the immune responses to the vaccine in the South African participants.
