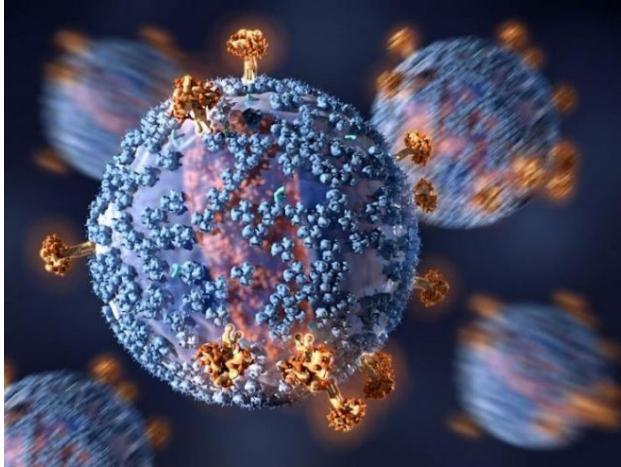


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Upcoming HIV vaccine trial gets boost from cell targeting design

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Researchers have identified an immunogen that can activate a certain subset of B cells to release broadly neutralizing antigens against HIV. This material relates to a paper that appeared in the March 25, 2016 issue of Science, published by AAAS. The paper, by J.G. Jardine at Scripps Research Institute in La Jolla, CA, and colleagues was titled, "HIV-1 broadly neutralizing antibody precursor B cells revealed by germline-targeting immunogen." C. Bickel / Science (2016)

Researchers are close to developing a vaccine against HIV. They have identified the precursor cells that produce the antibodies which effectively neutralize the rapidly mutating virus. These cells are found in most people, discovered the team.

The finding helps immunize people with a series of HIV proteins (immunogens) that trigger the immune system to produce a broad range of antibodies against the virus. This becomes possible after the first immunogen binds and activates specific precursor B cells from a sea of millions.

The broadly neutralizing antibody precursor B (germline) cells have the potential to develop into broadly neutralizing antibody-producing B cells.

The team from The Scripps Research Institute (TSRI), the International AIDS Vaccine Initiative (IAVI) and the La Jolla Institute for Allergy and Immunology has designed an HIV vaccine germline-targeting immunogen capable of binding

those specific B cells present in most people. The findings are published in Science on March 25.

"We found that almost everybody has these broadly neutralizing antibody precursors, and that a precisely engineered protein can bind to these cells that have potential to develop into HIV broadly neutralizing antibody-producing cells, even in the presence of competition from other immune cells," said the study's lead author, William Schief, TSRI professor and director, Vaccine Design of the IAVI Neutralizing Antibody Center at TSRI, in whose lab the [engineered HIV vaccine](#) protein was developed.

The body's immune system contains a large pool of different precursor B cells that respond to a wide variety of pathogens. This large pool makes it difficult to find the right precursor B cells that can recognize a specific feature on a virus surface.

"Using a new technique, we were able to show—well in advance of clinical trials—that most humans actually have the right B cells that will bind to this vaccine candidate. It is remarkable that protein design can be so specific as to 'find' one in a million cells, demonstrating the feasibility of this new vaccine strategy," said study co-author Shane Crotty, professor at the La Jolla Institute.

Last year in June, the engineered HIV vaccine protein, the "eOD-GT8 60mer" produced antibody responses in mice that showed some of the traits necessary to recognize and inhibit HIV. With the present work, the researchers plan a clinical trial test with a nanoparticle version to check for efficacy in humans.

"The goal of the clinical study will be to test safety and the ability of this engineered protein to elicit the desired immune response in humans that would look like the start of broadly neutralizing antibody development," Schief said.

If the eOD-GT8 60mer performs well in humans, additional boost immunogens will be needed to ultimately induce broadly neutralizing antibodies that can block HIV.

The present work provides a tested method to check if any new vaccine protein can bind to its intended precursor cell, before testing in clinical trials.

The B cells capable of creating "VRC01-class" antibodies that recognise a critical surface patch, or epitope, of HIV was found in the blood of healthy volunteers. The starting VRC01-class B cells were very similar in the different people