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LOS ANGELES: Scientists are developing a new AIDS vaccine capable of inducing naturally produced antibodies in HIV patients to prevent the deadly infection.

Some people infected with HIV naturally produce antibodies that effectively neutralise many strains of the rapidly mutating virus, researchers said.

Scientists at The Scripps Research Institute (TSRI), La Jolla Institute for Allergy and Immunology and International AIDS Vaccine Initiative (IAVI) in US are working to develop a vaccine capable of inducing such "broadly neutralising" antibodies that can prevent HIV infection.

An emerging vaccine strategy involves immunising people with a series of different engineered HIV proteins as immunogens to teach the immune system to produce broadly neutralising antibodies against HIV, researchers said.

This strategy depends on the ability of the first immunogen to bind and activate special cells, known as broadly neutralising antibody precursor B cells, which have the potential to develop into broadly neutralising antibody-producing B cells, they said.

Researchers have now found that the right precursor ("germline") cells for one kind of HIV broadly neutralising antibody are present in most people, and has described the design of an HIV vaccine germline - targeting immunogen capable of binding those B cells.

"We found that almost everybody has these broadly neutralising antibody precursors, and that a precisely engineered protein can bind to these cells that have potential to develop into HIV broadly neutralising antibody - producing cells, even in the presence of competition from other immune cells," said William Schief from TSRI.

The body's immune system contains a large pool of different precursor B cells so it can respond to a wide variety of pathogens.

It also means that precursor B cells able to recognise a specific feature on a virus surface are exceedingly rare within the total pool of B cells, researchers said.

"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," said Shane Crotty from La Jolla Institute.

"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," he added.

Looking at blood donated by healthy volunteers, scientists found B cells that were capable of creating "VRC01-class" antibodies that recognised a critical surface patch, or epitope, of HIV.

VRC01-class broadly neutralising antibodies are a group of antibodies isolated from different individuals that appear to have developed in a very similar way, and it has been hypothesised that the starting VRC01-class B cells were very similar in the different people, researchers said.

The new vaccine eOD-GT8 60mer is designed to engage these precursor B cells to initiate HIV broadly neutralising antibody development, they said.

The findings were published in the journal Science.

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