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ASIA EDITION

IAVI vaccine design can eliminate HIV

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Singapore: A team led by scientists from the Scripps Research Institute (TSRI) and the International AIDS Vaccine Initiative (IAVI) has unveiled a new technique for vaccine design that could be particularly useful against HIV and other fast-changing viruses.

It offers a step toward solving what has been one of the central problems of modern vaccine design of how to stimulate the immune system to produce the right kind of antibody response to protect against a wide range of viral strains. The researchers demonstrated their new technique by engineering an immunogen (substance that induces immunity) that has promise to reliably initiate an otherwise rare response effective against many types of HIV.

"We're hoping to test this immunogen soon in mice engineered to produce human antibodies, and eventually in humans," said team leader Dr William R Schief, who is an associate professor of immunology and member of the IAVI Neutralizing Antibody Center at TSRI.

For highly variable viruses such as HIV and influenza, vaccine researchers want to elicit antibodies that protect against most or all viral strains, not just a few strains, as seasonal flu vaccines currently on the market. Vaccine researchers have identified several of these broadly neutralizing antibodies from long-term HIV-positive survivors, harvesting antibody-producing B cells from blood samples and then sifting through them to identify those that produce antibodies capable of neutralizing multiple strains of HIV. Such broadly neutralizing antibodies typically work by blocking crucial functional sites on a virus that are conserved among different strains despite high mutation elsewhere.

However, even with these powerful broadly neutralizing antibodies in hand, scientists need to find a way to elicit their production in the body through a vaccine. "For example, to elicit broadly neutralizing antibodies called VRC01-class antibodies that neutralize 90 percent of known HIV strains, you could try using the HIV envelope protein as your immunogen," said Dr Schief, "But you run into the problem that the envelope protein doesn't bind with any detectable affinity to the B cells needed to launch a broadly neutralizing antibody response."

Mr Joseph Jardine, a TSRI graduate student in the Schief laboratory, evaluated the genes of VRC01-producing B cells in order to deduce the identities of the less mature B cells-known as germline B cells-from which they originate. Germline B

cells are major targets of modern viral vaccines, because it is the initial stimulation of these B cells and their antibodies that leads to a long-term antibody response.