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A push to accelerate next-gen immunogen design

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According to the International AIDS Vaccine Initiative (IAVI), in September 2009, scientists reported isolation of a pair of potent and broadly neutralizing antibodies against HIV. That discovery, the first-of-its-kind in a decade, was followed by the isolation of other broadly neutralizing antibodies (bNAbs) by researchers at the Vaccine Research Center of the US National Institutes of Health and IAVI-affiliated team.

The most promising of these antibodies are now being scrutinized by researchers to elucidate the specific mechanisms by which they bind to and neutralize HIV. The idea is to create artificially synthesized mimics of their targets on HIV to be used in vaccines to elicit similarly potent bNAbs and teach the immune system to thwart HIV infection. In order to create replicas of bNAb targets in the laboratory for use as immunogens, which are the active ingredients of vaccines, Translational Health Science and Technology Institute (THSTI), an autonomous institute of the Indian government's Department of Biotechnology and IAVI, designed and rolled out THSTI- IAVI HIV Vaccine Design Program in 2011.

In a coordinated and global effort, the IAVI-THSTI collaborative program participates in the complex task of developing, testing and then implementing strategies to rapidly screen large numbers of bNAb-based immunogens against HIV-1 and to prioritize them for further evaluation in preclinical studies. India's Department of Biotechnology, the THSTI and the IAVI expect that the program using high throughput screening will ultimately lead to strategies for next generation immunogen design and expand the number of AIDS vaccine candidates available for assessment in human trials.

"The program has accelerated research at different stages of vaccine development that includes neutralizing antibodies, determining structure of novel antigens, high throughput immunogen design and assays to rapidly screen immunogens. It is a first-of-its-kind global HIV vaccine discovery program in India, designed to fill scientific gaps in research, help in identifying candidate immunogens, screening and selection process. The program is designed to catalyze fresh thinking and harness innovation through new approaches to vaccine research," says Mr Kapil Maithal, director, Program Management, IAVI.

Under the collaboration, a new laboratory on the campus of the THSTI in New Delhi is to be established and a center of excellence will engage high throughput approaches to the global effort on neutralizing antibody. The program has allowed

extensive link with global institutions and implemented scientific plans to capitalize on recent renaissance in AIDS vaccine R&D and boost translational research. Mentored by Harvard-MIT Division of Health Science and Technology, the THSTI seeks to create a unique institutional environment for the conduct of multidisciplinary research that translates scientific and technological advancements into medical innovations.

The THSTI-IAVI program is linked closely to both IAVI Neutralizing Antibody Center at The Scripps Research Institute in La Jolla, California, US, and to IAVI's AIDS Vaccine Design and Development Laboratory in New York. The work conducted complements IAVI's partnership with Indian Medicinal Chemistry Program to design and generate conceptually novel HIV immunogens. International Centre for Genetic Engineering and Biotechnology in New Delhi and the Indian Institute of Science, Bangalore, are other institutions that are part of this partnership, displaying a vast connection of elite institutes to harness a common goal.