

Indian scientists a step closer to new HIV vaccine

By Bhavya Khullar

New Delhi, April 21 (India Science Wire): Indian scientists have identified a new antibody against HIV subtype-C from Indian patients. This finding will help design vaccines against HIV in the future.

When given along with retroviral drugs, such a vaccine will be able to reduce viral load in patients. This will also help in passive immunotherapy - killing low amounts of virus in patients who may have been accidentally infected with the virus.

The antibody identified by Indian scientists has been named C11 since it is specific to subtype-C of HIV virus. As much as 90% patients in India and South Africa are affected by this subtype.

Blood samples were taken from a set of patients visiting All India Institute of Medical Sciences in New Delhi and YR Gaitonde Centre for AIDS Research and Education, Chennai, for treatment. These samples were used to make a library of all virus-specific DNA sequences in the patient body. Some of these DNA sequences were used to make proteins that could bind to HIV virus. These proteins were small antibody fragments that could bind to HIV virus with high efficiency.

It was found that smaller fragments of antibodies could bind to HIV proteins more effectively than full antibodies because they could reach to smaller and deeper areas in the cells for binding. These proteins can also be used for targeted drug delivery to HIV-infected cells in the future.

This is the first study that identifies an antibody against the virus subtype-C. "In the future, this can be used to design a vaccine that elicits a good antibody response," researchers said. "We have successfully generated human anti-HIV cross neutralizing antibody fragments with distinct specificities from Indian infected donors that can serve as potential reagents for blocking HIV infection and designing effective vaccines in the future." The research findings have been published in journal *Scientific Reports*.

For this study, AIIMS scientists collaborated with those at Indian Institute of Science in Bangalore, Translational Health Science and Technology Institute in Faridabad, Y R Gaitonde Centre for AIDS Research and Education in Chennai, National Brain Research Centre in Manesar, and International AIDS Vaccine initiative. The study was funded by the Indo-South Africa project of the Department of Science and Technology.

The research team included Lubina Khan, Rajesh Kumar, Ramachandran Thiruvengadam, Hilal Ahmad Parray, Muzamil Ashraf Makhdoomi, Sanjeev Kumar, Heena Aggarwal, Madhav Mohata, Abdul Wahid Hussain, Raksha Das, Raghavan Varadarajan, Jayanta Bhattacharya, Madhu Vajpayee, K. G. Murugavel, Suniti Solomon, Subrata Sinha and Kalpana Luthra.

An effective vaccine against HIV has remained a challenge because the virus changes its proteins very rapidly in the body, which means the immune system is unable to cope up the virus attack. The immune system is constantly fighting under an HIV infection. HIV infection in the body elicits a natural immune response, where cells in the blood make antibodies against HIV. These antibodies bind to HIV, which marks it as a target for killing. The problem is that the immune system takes 3 to 4 years to develop effective

antibodies against HIV. By this time, the numbers of immune cells reduce and the virus is already well spread in the body. (India Science Wire)