One step closer to developing an HIV vaccine

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HIV is a virus that infects the cells of the body's immune system and this can lead to the progression of a disease called AIDS (Acquired immunodeficiency syndrome). Specifically HIV attacks to CD4 cells which help the immune system to fight off infections. Over time HIV reduces the number of these cells and if the person with HIV has no treatment then the person is more likely to get infections or cancers. AIDS is the last stage of an HIV infection where the body is too weak to fight off ordinary infections.

HIV has taken the lives of over 39 million people worldwide and despite all the effort to control the disease still a large number of people become HIV infected every year. So far there is no cure for HIV but with the correct treatment the life of the infected person can be prolonged. The development of a true HIV vaccine is generally considered as the only way to end the thread of AIDS. Most effective vaccines work by eliciting antibodies capable of blocking the infection. However, an HIV vaccine that can produce antibodies that effectively kill the virus has not yet been discovered.

Little is known about antibodies that are capable to kill the HIV virus. Therefore it is very interesting to isolate antibodies that are generated by vaccination. B lymphocytes are the cells of the immune system that secrete antibodies. When the body encounters an infection for the first time it creates a population of cells called memory B cells. These cells express antibodies on their surface and they are very important in the case of reinfection by the same pathogen as they rapidly secrete a large number of antibodies. By isolating those cells that are specifically against the vaccine candidate it is possible to study their structure as well as how they bind the pathogen.

In this work, a new vaccine HIV candidate was tested in Rhesus macaque. The animals were immunized with the vaccine candidate and blood was collected regularly. It was then possible to evaluate the antibody response, that is, the amount produced as well as the number of the cells that produce antibodies specifically against the vaccine candidate. Blood was obtained from the animal with the highest number of antibodies two weeks after the third immunization, where the antibody responses reach peak levels. Using the flow cytometry method the population of the memory B cells against the vaccine candidate was defined successfully and isolated from the other cells.

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