Scientists uncover features of antibody-producing cells in people infected with HIV

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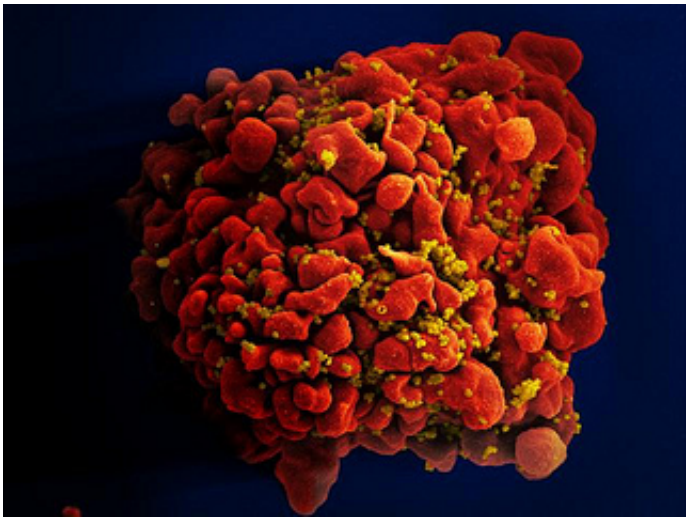

Scanning electron micrograph of an HIV-infected H9 T cell. Credit: NIAID

By analyzing the blood of almost 100 treated and untreated HIV-infected volunteers, a team of scientists has identified previously unknown characteristics of B cells in the context of HIV infection. B cells are the immune system cells that make antibodies to HIV and other pathogens. The findings augment the current understanding of how HIV disease develops and have implications for the timing of treatment. Researchers at the National Institute of Allergy and Infectious Diseases, part of the National Institutes of Health, led the study.

Using advanced tools to probe B-cell responses to HIV and other

pathogens in the laboratory, the researchers found that the B cells that make antibodies to HIV in infected, untreated people are abnormal in that they are more activated, unstable and unresponsive to further stimulation than normal B cells, and also are infrequently observed in healthy people. This finding may help explain why HIV-specific antibodies naturally produced by HIV-infected people do not clear the infection, according to the scientists.

The researchers also observed that when HIV-infected people start antiretroviral therapy, their B-cell response to HIV diminishes quantitatively but improves qualitatively, with normal B cells dominating. However, the earlier a person starts treatment for HIV, the greater their capacity to maintain their pre-treatment level of B-cell response to the virus. An HIV antibody response from primarily normal B cells correlated with both a low amount of virus in the blood (viral load) and a low level of immune activation. According to the scientists, more research is needed to determine whether normal B cells lead to a more effective antibody response than abnormal B cells, and whether HIV-infected people who maintain a low viral load and low immune activation generate a better B-cell response than people who have a higher viral load and a higher degree of immune activation.

Finally, the scientists observed that the B-cell response to HIV is unlike the B-cell responses to other pathogens in the same people. For instance, when researchers exposed the volunteers' blood cells to a tetanus probe, they observed a relatively normal B-cell response. This was likely, they say, because the volunteers had been vaccinated for tetanus before they became infected with HIV, had a normal B-cell response then, and maintained the normal response for years. However, the volunteers' B-cell response to influenza was less normal than their response to tetanus, probably because they had been exposed to certain strains of influenza after acquiring HIV, but more normal than their response to HIV.

Taken together, the study findings add to the growing body of evidence indicating that starting HIV treatment early benefits the health of infected individuals, according to the scientists.

More information: L Kardava et al. Abnormal B cell memory subsets dominate HIV-specific responses in infected individuals. The *Journal of Clinical Investigation* DOI: 10.1172/JCI74351 (2014).

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