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Competing antibodies may have limited the protection achieved in HIV vaccine trial in Thailand

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Continuing analysis of an HIV vaccine trial undertaken in Thailand is yielding additional information about how immune responses were triggered and why the vaccine did not protect more people.

In a study appearing May 6, 2013, in the journal *Proceedings of the National Academy of Sciences*, an international team of researchers led by the Duke Human Vaccine Institute describe a previously unknown interaction between antibodies that worked to block the vaccine's protective powers.

The vaccine trial, known as RV144, used two investigational vaccines in combination, resulting in an unprecedented 31 percent protection rate among participants. While encouraging, that rate fell short of the minimum needed for public health use. However, additional analyses of the trial's data are yielding a trove of information about the virus and its potential vulnerabilities.

Last year, Duke researchers published a study in the *New England Journal of Medicine* that detailed clues to why the vaccine tested in the RV144 trial protected some volunteers.

In the current analysis, study authors, led by Georgia D. Tomaras, PhD, director of the Laboratory of Immune Responses and Virology at DHVI, explored the inverse relationship that helps explain why the vaccine may

have failed to protect more of the participants.

"We learned that a specific vaccine-induced immunoglobulin A can weaken the protective effect of immunoglobulin G. IgA competes with IgG to bind to the same site on the virus's outer envelope that is exposed on infected cells," Tomaras said. "In work with my colleague here at Duke, Dr. Guido Ferrari, we found that the IgA antibodies can block the activity of natural killer cells activated by IgG, further interfering with the vaccine-induced immune response."

Tomaras added that decreased vaccine effect was higher among participants who had more specific immunoglobulin A evident in blood samples compared to immunoglobulin G, suggesting that the ratio of virus-specific IgA to IgG in blood may be an important marker for vaccine effectiveness.

"Understanding that certain vaccine-induced immunoglobulin A antibodies in the blood may interfere with an antiviral function of another antibody is a new finding that can lead to further vaccine development on how to induce effective antibody responses," Tomaras said.

More information: HIV-1 vaccine-induced envelope gp120 C1 region IgA blocks binding and effector function of gp120 IgG, www.pnas.org/cgi/doi/10.1073/pnas.1301456110

Provided by Duke University Medical Center

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