Scientists Find Rare, Potent Antibody to HIV-1

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(PhysOrg.com) -- Scientists at Duke University Medical Center have for the first time isolated an important antibody in human serum that could potentially play a key role in the design of an AIDS vaccine. The research appears as a highlighted feature online in the *Journal of Virology*.

"The 2F5-like antibody is one of the gold standards for what an HIV vaccine needs to induce, but no one had ever found it before circulating in the blood of infected patients," says Georgia Tomaras, PhD, associate professor of surgery, immunology and molecular genetics and microbiology in the Duke Human Vaccine Institute and the senior author of the study.

The 2F5 antibody is especially valuable because previous research has shown it can successfully neutralize 80 percent of transmitted HIV viruses.

Now that researchers have found the antibody in circulating blood, Tomaras says they might be able to find ways to duplicate or enhance it, thereby boosting the body's defense system.

2F5-like antibodies belong to a class of immune cells called broadly neutralizing antibodies, one of the body's most powerful responses to infection. Only a small fraction of patients with HIV make these antibodies and they typically appear many months after initial transmission of the virus - at a point when scientists feel it is too late to do much good.

Tomaras, working closely with lead author Xiaoying Shen, led a team of researchers who examined the antibodies present in 300 patients infected with HIV-1. They found only one patient who had developed 2F5-like antibodies, supporting the notion that they are, indeed, very rare.

Researchers discovered that the 2F5-like antibody was potent enough to block multiple strains of HIV in the laboratory, but researchers say they are not entirely clear if it played any part in controlling the virus in the patient who carried it.

The scientists were also struck by another discovery: The 2F5-like antibodies arose concurrently with particular autoantibodies that may be a clue as to why these antibodies developed in this person and not in others.

"Tomaras and her team have created the opportunity for us to isolate and study the immune cells that enabled the production of this very rare antibody," says Barton Haynes, M.D., director of the Duke Human Vaccine Institute. "Our goal will be to understand how to trigger these cells to routinely make these kinds of antibodies before infection occurs."

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Provided by Duke University