# New research reveals possible method for boosting the immune system to protect infants against HIV

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- Researchers at Oregon Health &Science University may have uncovered a new weapon for combating HIV as it is passed from mother to newborn child. The research, which was led by researchers at OHSU's Oregon National Primate Research Center, will be published in the October 3rd online edition of the journal *Nature Medicine*.

"Mother-to-infant transmission of HIV is a tremendous worldwide problem, especially in several African nations," said Nancy Haigwood, Ph.D., researcher and director of the Oregon National Primate Research Center at OHSU.

According to the latest data from the World Health Organization, 33.4 million people were infected by the virus in 2008. About 67 percent of the world's infections are in African countries. In addition, 91 percent of the world's childhood infections are in Africa.

Haigwood, her colleagues at OHSU, along with researchers at the University of Washington are investigating strategies for preventing or countering HIV infections in babies born to women with HIV. Their strategy: to educate part of the baby's immune system within the first few hours of birth to better fight of the disease.

"HIV attacks and kills T-cells, the white blood cells that play an important role in the immune system because they have the ability to

identify and destroy disease invaders. By attacking the body's natural defenses, the disease progresses, causes AIDS and eventually death," explained Haigwood. "Therefore, many therapies focus on protecting T-cells."

However, Haigwood and her colleagues took a different approach. They focused on another component of the immune system, which was initially thought to play a lesser role in the body's defense against HIV. Babies born to HIV-infected mothers have HIV-specific neutralizing antibodies at the time of birth that are "passively" acquired across the placenta. They wanted to determine whether boosted neutralizing antibody levels would weaken the disease's ability to overtake the body's defenses.

To investigate this possible treatment, the researchers studied three small groups of infant monkeys. The first group was given additional antibodies derived from healthy mothers. The second group was given antibodies matched to simian/human immunodeficiency virus (SHIV). SHIV is a hybrid virus used in research to ensure that results translate between species. The third group of animals was provided with HIV antibodies similar to, but not exactly matching, the strain of infection they would receive. The three groups were then exposed to SHIV and their immune systems were subsequently monitored.

Unlike the other two groups, the "HIV-matched" animals were better protected from the virus. They developed higher levels of neutralizing antibodies and, had lower levels of SHIV in their blood plasma than the comparison groups six months post-infection. In addition they maintained their CD4+ T cells - another component of the immune system.

The study also provided insights into the level of antibodies needed to impact disease progression. For this study, the antibody levels were

relatively low dosed. Previously, antibodies were shown to block infection in animal models. This study demonstrated, for the first time, that very low levels of antibodies -- too low to block infection -- can influence disease progression in this setting and stimulate an immune response that contributes to viral control in the absence of drug treatment.

In future studies, the researchers hope to learn whether higher doses of antibodies translate into greater protection for the infants.

"This research demonstrates that boosting the body's HIV antibodies -- by a time-honored method of passive transfer that would use new HIV-specific human monoclonal antibodies -- may be a strategy for reducing infection levels and protecting CD4+ T cells in newborn children," said Haigwood. "While the treatment would not likely prevent infection, it could limit the levels of infection in children which would greatly reduce suffering and extend lives."

Provided by Oregon Health & Science University