Scientists find rabies-based vaccine could be effective against HIV

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Rabies, a relentless, ancient scourge, may hold a key to defeating another implacable foe: HIV. Scientists at Jefferson Medical College in Philadelphia have used a drastically weakened rabies virus to ferry HIV-related proteins into animals, in essence, vaccinating them against an AIDS-like disease. The early evidence shows that the vaccine – which doesn't protect against infection – prevents development of disease.

Reporting April 1, 2007 in the *Journal of Infectious Diseases*, the scientists showed that two years after the initial vaccination, four vaccinated non-human primates were protected from disease, even after being "challenged" with a dangerous animal-human virus. Two control animals developed an AIDS-like disease.

Matthias Schnell, Ph.D., professor of microbiology and immunology at Jefferson Medical College of Thomas Jefferson University, and his co-workers tested the effects of inserting two different viral proteins into the rabies virus genome, and using such viruses-based vaccines in preventing disease in rhesus macaques. One was a glycoprotein on the surface of HIV, while the other was an internal protein from simian immunodeficiency virus (SIV). They used the latter because HIV does not cause disease in monkeys.

The idea was that such rabies' vehicles, or "vectors," would help attract a strong response from the animal's immune system, though the rabies virus used cannot cause disease. Such vectors are based on a type of rabies vaccine strain that has been used for more than 20 years in oral vaccines against rabies in wildlife in Europe. The study was aimed at studying the safety and effectiveness of the rabies vaccine approach against HIV and related diseases.

Four macaques were immunized with both vaccines, while two animals received only a weakened rabies virus. After they gave the animals an initial vaccination, they then tried two different immune system boosts, but didn't see enhanced immune responses. They then developed a new vector, a viral surface protein from another virus, vesicular stomatitis virus (VSV). Two years after the initial immunization, they gave a booster vaccine with the rabies-VSV vector, and saw SIV/HIV-specific immune responses.

The group then challenged the animals with SIV and measured various parameters of infection, such as immune system CD4 cell count, amount of virus in the bloodstream and immune system antibody response. They found that those animals that were given the test vaccine could control the infection. The control animals without the experimental vaccine had high levels of virus and a loss of CD4 cells.

"We still need a vaccine that protects from HIV infection, but protecting against developing disease can be a very important step," Dr. Schnell says, noting that he and his colleagues aren't sure how long the viral immunity will last.

According to Dr. Schnell, the study demonstrated a "proof of principle" – that is, that the method used is technically possible. He says that the results indicate the need for future studies in larger groups of animals, and that these currently are underway. In addition, one key question remains unanswered: Is such a rabies-based vaccine feasible as an HIV vaccine in humans?

Source: Thomas Jefferson University