

Experimental vaccine protects monkeys from blinding trachoma

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An attenuated, or weakened, strain of *Chlamydia trachomatis* bacteria can be used as a vaccine to prevent or reduce the severity of trachoma, the world's leading cause of infectious blindness, suggest findings from a National Institutes of Health study in monkeys.

"This work is an important milestone in the development of a trachoma [vaccine](#)," noted Anthony S. Fauci, M.D., director of the National Institute of Allergy and Infectious Diseases (NIAID) at NIH. "If this approach demonstrates continued success, the implications could be enormous for the tens of millions of people affected by trachoma, a neglected disease of poverty primarily seen in Asia and sub-Saharan Africa."

In their study, published in the [Journal of Experimental Medicine](#) online, scientists from NIAID, led by Harlan Caldwell, Ph.D., describe how they tested their vaccine concept in a series of experiments. First they infected six cynomolgus [macaques](#) with the strain of *C. trachomatis* that they had weakened by removing a small piece of DNA. The scientists observed that the monkeys spontaneously cleared the infection within 14 days with no or minimal signs of ocular disease. The animals then were exposed twice more to the weakened strain at four- and eight-week intervals, but the animals still showed no signs of trachoma despite being infected.

According to Dr. Caldwell, this finding is particularly significant because repeated *C. trachomatis* infections typically lead to more severe eye disease in people. The infected animals did not develop eye disease, and they all mounted robust immune responses.

The same six macaques then were exposed to a highly [virulent strain](#) of *C. trachomatis* as were six other macaques in a control group that had not been vaccinated. Three of the macaques in the vaccine group showed no signs of infection or

disease, and the three others showed greatly reduced infection compared with monkeys in the control group. All six macaques in the [control group](#) became infected and displayed moderate to severe [eye disease](#) that persisted for between two and four months.

Macaques are used in trachoma studies because their immune responses closely predict those of humans. The animals in the study were treated with antibiotics after completion of the experiments, and all recovered completely.

The NIAID researchers are currently exploring how they can move their vaccine into human clinical trials.

If left untreated, prolonged trachoma infection can cause a person's eyelids to fold inward, so that the eyelashes rub the eyeball and scar the cornea. This can result in impaired vision and sometimes blindness. Trachoma is treatable with antibiotics, although in many parts of the world people have limited access to treatment. Currently, there is no vaccine for trachoma. Trachoma experts estimate that approximately 1.3 million people are blind from trachoma, 1.8 million people have low vision as a result of the disease, and an estimated 40 million people have active trachoma. Trachoma is most often spread through direct personal contact, shared towels and other cloths, and flies that have come in contact with the eyes or nose of an infected person.

Chlamydia diseases include sexually transmitted infections, which can result in pelvic inflammatory disease that can cause infertility in women, as well as trachoma. According to the NIAID researchers, findings from this study also could lead to the development of a vaccine against sexually transmitted Chlamydia infections. The Centers for Disease Control and Prevention received more than 1.2 million reports of Chlamydia infections in 2009.

More information: L Kari et al. A live-attenuated chlamydial vaccine protects against trachoma in nonhuman primates. *The Journal of Experimental Medicine*. DOI: [10.1084/jem.20111266](https://doi.org/10.1084/jem.20111266)

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