

Vaginal Vaccine Against Monkey UTIs

Researchers at the University of Wisconsin in Madison partially protected monkeys against urinary tract infections (UTIs) by inserting killed *Escherichia coli*, a common cause of the disease, into the animals' vaginas. Although the vaginal vaccine did not prevent UTIs from developing in the monkeys when their bladders were subsequently inoculated with *E. coli*, the vaccine reduced the recovery time for the treated animals to nearly half that needed by monkeys that were not immunized.

David T. Uehling and Walter J. Hopkins, both of the department of surgery, and their colleagues administered the experimental oil-based vaccine three times at weekly intervals. Infective *E. coli* were then introduced into the bladders of immunized and control animals, and the researchers found significantly fewer bacteria in the bladders of the immunized animals 2 days or more after infection. Moreover, the recovery time after the *E. coli* bladder infection was reduced from 3 to 6 weeks in the control animals to 2 to 4 weeks in the immunized animals. The immunized animals also had increased levels of anti-*E. coli* antibodies in their urine, although this difference was not firmly established until 21 days after infection. The researchers say that the only apparent side effect in the immunized animals was a mild and temporary inflammation of the vagina.

In contrast to other experimental vaccines for UTI, which are administered by standard intramuscular injections, the Wisconsin researchers' vaginally administered vaccine is "a new approach to the problem," says Hopkins. Its greater effectiveness may be because it stimulates production of high levels of a family of immunoglobulins, called immunoglobulin A (IgA) antibodies, that

are more resistant to enzymatic breakdown by bacteria than are IgG antibodies, Hopkins says. Intramuscular injection of vaccine produces mainly IgG antibodies, he adds, whereas vaginal administration of vaccine produces high amounts of both secretory IgA and IgG.

Unlike the intramuscular vaccines, which are aimed at preventing kidney infections, the vaginal vaccine may work at an earlier stage to prevent infections in the bladder before they move upward in the urinary tract to cause kidney infections. Direct immunizations of the bladder have been shown to induce rather than prevent UTIs and are therefore not being considered by the investigators.

It is not known how the vaginally administered vaccine works. Scientists speculate that *E. coli* bladder infections occur when bacteria from the anus travel to and colonize the vagina before reaching the urethra. Direct immunization at the vagina might block bacterial colonization there. However, the Wisconsin researchers did not detect anti-*E. coli* antibodies within the vaginas of the immunized monkeys.

The Wisconsin researchers say there is a more plausible mechanism for the effectiveness of vaginal immunization—the supposed integrated response of an individual's lymphoid tissues having mucosal membranes. "Studies on cattle show that if you stimulate one mucosal surface with antigen, antibody production to that antigen will also be stimulated on another mucosal surface, apparently due to the migration of lymphoid cells from one site to another," explains Hopkins. "By stimulating the monkeys' vaginal mucosa with antigen, we might prompt antibody production of the bladder mucosa."

Although Hopkins feels his research results are promising, much more improvement must be made in the vaccine before it can be clinically tested on women, he points out. He

Report Pleads for Improved Data Treatment

The scientific world is awash in data, but how much of it is retrievable or reliable? A panel of the National Research Council (NRC) of the National Academy of Sciences, concerned that the tide of data may be turning in the wrong direction, is urging educators, scientists, and engineers to give higher priority to "teaching good data practices." The panel's report recommends that short courses, workshops, lab instruction, and journal articles be used for instilling better data treatment habits in students and young scientists.

The panel report, "Improving the Treatment of Scientific and Engineering Data Through Education," acknowledges that its subject is often considered "unglamorous and a nuisance" by the research community. However, ignoring the issue is "costly to science and technology . . . in terms of time lost, inadvertent duplication of data, and inappropriate use of reported data."

Copies of the report can be obtained from the Numerical Data Advisory Board, NRC, 2101 Constitution Avenue, NW, Washington, DC 20418. □

and his colleagues are trying to improve the effectiveness of the vaccine by changing the regimen and delivery base as well as by adding more effective antigens from *E. coli*, mixed with adjuvants that stimulate a stronger immune response. □

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