

Estrogen a new weapon against urinary tract infection in menopause

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(Medical Xpress)—Estrogen stimulates the production of the body's own antibiotic and strengthens the cells in the urinary tract, according to a new study from Karolinska Institutet. The results, which are published in the scientific journal *Science Translational Medicine*, show that estrogen supplements may help menopausal women to ward off recurrent urinary tract infections.

[Urinary tract infections](#) are among the most [common diseases](#), affecting over half of all women at some point in life and repeatedly in 25 percent of these. [Menopausal women](#) have an increased risk of [recurrent urinary tract infections](#), which has been associated with [low estrogen levels](#).

Infecting bacteria first come in contact with the inside of the urinary bladder. The bladder lumen is covered with epithelial cells, acting as a fence protecting the vulnerable tissue as well as producing [antimicrobial peptides](#); the body's self-made antibiotic. These peptides act as rapid front line soldiers fighting infecting microorganisms. By the early action of the antimicrobial peptides, the number of bacteria can be reduced before they have a chance to multiply. In the post-menopausal woman, however, the epithelium is fragile and often damaged with occasional gaps between cells, which in turn affect the ability to resist infection.

In the current study, the researchers treated post-menopausal women with estrogen for 14 days, and then analyzed cells excreted in the urine. They found that estrogen acts on the epithelium in a way that the gaps between the cells lining the bladder lumen are healed, i.e. estrogen is

gluing them together. This makes it more difficult for bacteria to break this protecting shield and reach the underlying cells.

"During menopause, women have low levels of estrogen, and therefore also low levels of antimicrobial peptides as well as a damaged lining of the lumen in the urinary tract", says Dr. Annelie Brauner at the Department of Microbiology, Tumor and Cell Biology, who is responsible for the study. "This will give the bacteria opportunity to reach the underlying tissue, where they can hide and stay until they are triggered to cause a new infection. By treating post-menopausal women locally with estrogen the cells lining the bladder are strengthened and the body's own defense against infection is improved, making women better suited to fight infections."

More information: Luthje, P. et al. Estrogen Supports Urothelial Defense Mechanisms, *Science Translational Medicine*, online 19 June 2013. stm.sciencemag.org/content/5/190/190ra80

Provided by Karolinska Institutet

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