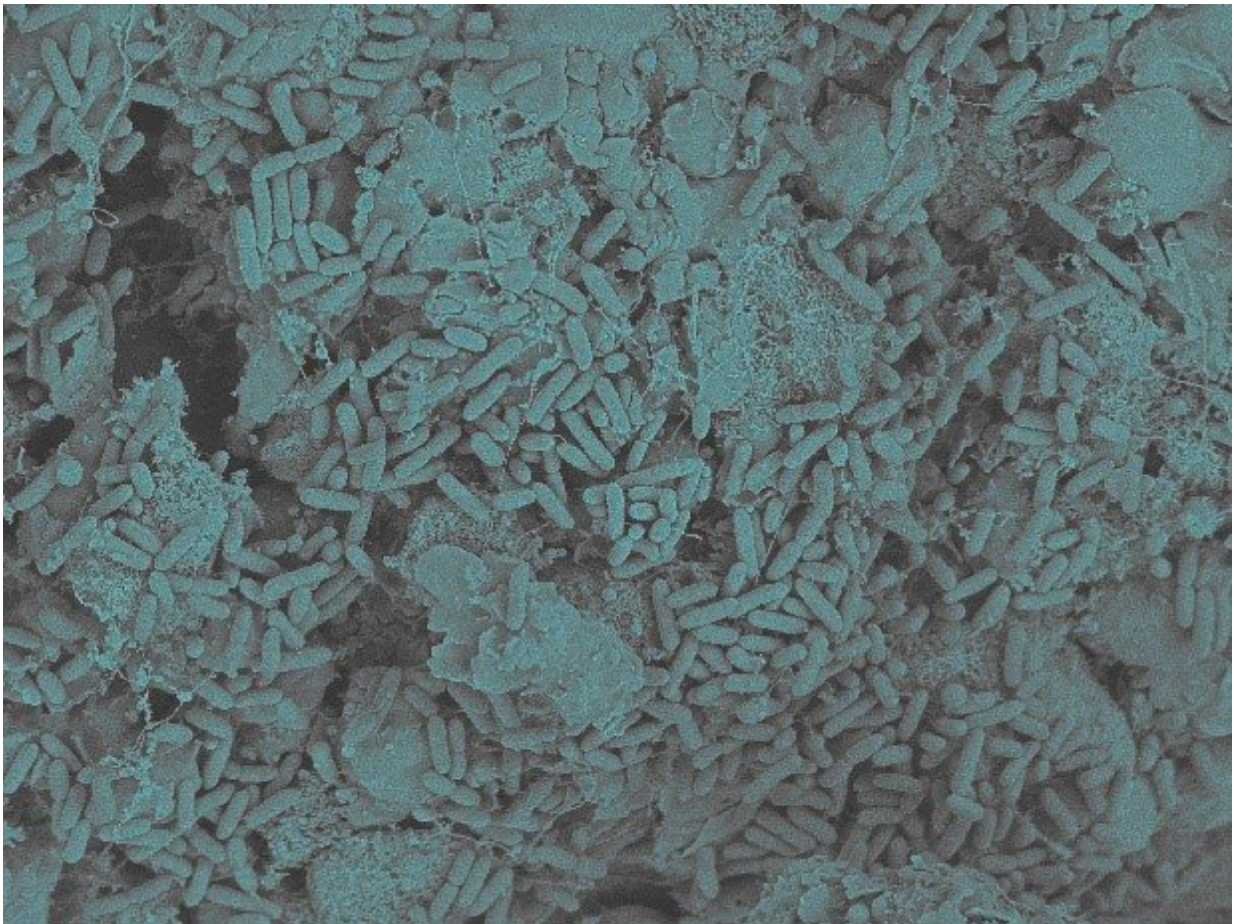


Whether a urinary tract infection recurs may depend on the bacterial strain

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E. coli bacteria infecting a mouse bladder. We found that urinary tract infections caused by this *E. coli* strain can provoke a protective immune response that prevents recurrent infections, whereas another *E. coli* strain could hide from the immune system and cause recurrent infections. Credit: Valerie P. O'Brien and Washington University Center for Cellular Imaging

Genetically diverse bacterial strains that cause urinary tract infections differ in their ability to trigger protective immune responses in mice, potentially explaining why these infections frequently recur in many patients, according to a study published December 13 in the open-access journal *PLOS Pathogens* by Thomas Hannan and Scott Hultgren of Washington University School of Medicine, and colleagues. As noted by the authors, the study suggests that the development of a broad-spectrum vaccine should take into account the genetically diverse pathogens that women encounter in the community.

Many patients suffer from highly recurrent [urinary tract infections](#) caused by *Escherichia coli*, which are genetically diverse bacteria. Recurrent episodes are often caused by the same *E. coli* strain that caused the first infection, suggesting that some patients may not develop a protective immune response. A better understanding of host-pathogen interactions is urgently needed for effective drug and vaccine development in the era of increasing [antibiotic resistance](#). To address this gap in knowledge, Hannan and Hultgren used a [mouse model](#) to compare the effects of two *E. coli* strains that cause urinary tract infections.

They found that one strain, UTI89, could infect the bladder indefinitely, whereas strain CFT073 was always cleared within eight weeks. After mice had a CFT073 infection and antibiotic treatment, they were protected from a CFT073 challenge infection, but were susceptible to a UTI89 challenge infection. By contrast, mice with a UTI89 infection and antibiotics were susceptible to [recurrent urinary tract infections](#) when challenged with either strain. Depleting T cells, immune cells important for developing protection against infection, prevented mice from clearing their CFT073 infections and made them susceptible to recurrent CFT073 urinary tract infections. The findings show that infection with one *E. coli* strain could trigger a protective immune response, while another strain sidestepped this response. According to the authors, the

results shed new light on immune responses to urinary tract infections and may be important for drug and vaccine development.

The authors conclude, "This study shows that some bacteria hide from the immune system to cause urinary tract infections again and again."

More information: O'Brien VP, Dorsey DA, Hannan TJ, Hultgren SJ (2018) Host restriction of *Escherichia coli* recurrent urinary tract infection occurs in a bacterial strain-specific manner. *PLoS Pathog* 14(12): e1007457. doi.org/10.1371/journal.ppat.1007457

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