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UCSB Researchers Advance Understanding of Urinary Tract Infections

Anyone who has ever had a urinary tract infection knows that they can be difficult to fight.

The bacterium E. coli is responsible for about 80 percent of human urinary tract infections. Scientists at the University of California, Santa Barbara have made important strides in understanding E. coli at the molecular level in an effort to discover the mechanisms by which E. coli cause urinary tract infections. The findings, the result of two years of study, are published in the November 19 issue of the journal Molecular Cell.

In this study, the scientists---all associated with the Department of Molecular, Cellular and Developmental Biology---focused on the mechanisms by which these bacteria, which normally live in the bowel, adhere to and colonize the urinary tract.

The scientists, Aaron D. Hernday, Bruce A. Braaten, Gina Broitman-Maduro, Patrick Engelberts, and David A. Low, studied how the expression of "pili" on the surface of the E. coli cells is controlled by environmental conditions. "Pili" are hair-like cell surface structures that play an important role in the adherence of the cells. If the cells cannot adhere and colonize, then they wash out of the urinary tract.

Certain stressful conditions can influence the genetic "switch" that causes the bacteria to be covered in pili. According to the findings this switch is either on or off.

The study shows a mechanism by which a sensor called Cpx detects stressful environmental conditions and sends a signal to turn the switch off. This response may be important in allowing bacterial survival under stressful conditions.

About UC Santa Barbara

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