Study debunks common myth that urine is sterile

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Researchers have determined that bacteria are present in the bladders of some healthy women, which discredits the common belief that normal urine is sterile. These findings were published in the April issue of the *Journal of Clinical Microbiology* by researchers at Loyola University Chicago Stritch School of Medicine (SSOM).

"Doctors have been trained to believe that urine is germ-free," said Linda Brubaker, MD, MS, dean, SSOM. "However, these findings challenge this notion, so this research may have positive implications for how we treat patients with urinary tract conditions in the future."

This study evaluated urine specimens of women who had symptoms consistent with a urinary tract infection (UTI), but were free of known UTIs. Urine samples were collected from standard urination, through a catheter, or from a thin needle inserted into the abdomen while the women were under anesthesia for gynecologic surgery. The urine was analyzed using advanced DNA-based detection methods. These tests determined that the adult female bladder can contain certain forms of bacteria that are not identified by urine culture techniques that are typically used to diagnose UTIs.

"While urine cultures have been the gold standard to identify UTIs in the past, they have limited utility," said Alan Wolfe, PhD, co-author and professor of Microbiology and Immunology, SSOM. "They are not as effective as the DNA-based detection measures used in this study."

This study also looked at collection methods to test urine for bacteria. The results revealed that the standard method to catch urine in a cup poses problems, because bacteria from the vagina often contaminate these specimens. In contrast, urine collection using a catheter or a needle was effective and comparable between tests.

Loyola researchers now plan to determine which bacteria in the bladder are helpful and which are harmful. They also will look at how these bacteria interact with each other and with their host, and how we can use this information to help patients. This research is in line with a larger international effort that is underway to identify the core bacterial composition of a healthy human body. Researchers strive to correlate changes in the composition of bacterial communities in and on the body with certain diseases.

"Further studies are needed to determine if the bacteria found in the bladders of women in this study are relevant to urinary tract conditions," Dr. Brubaker said. "If that is the case, these studies could make it possible to identify women who are at-risk for these conditions, which may change how we manage patients."

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