

# Rare resistance mutation reduces treatment choices for urinary tract infections

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Nearly 20 percent of women aged 15-29 are diagnosed with a urinary tract infection (UTI). Now, investigators have uncovered a rare mutation that renders a UTI-causing pathogen resistant to levofloxacin, a quinolone antibiotic used to treat UTIs. The research is published August 21st in *Antimicrobial Agents and Chemotherapy*, a journal of the American Society for Microbiology.

Researchers isolated the pathogen, *Ureaplasma parvum*, from the urine of college-aged women presenting with their first UTIs at a university health care center. This resistance is especially problematic because some antibiotics commonly used to treat UTIs, such as penicillin, are impotent against *Ureaplasma*, due to this pathogen's unusual biology.

"To our knowledge, this is the first report of this specific genetic mutation in *Ureaplasma* in the United States, and only the third report anywhere in the world," said corresponding author Mary B. Brown, PhD, Professor, Department of Infectious Diseases and Immunology, College of Veterinary Medicine, University of Florida, Gainesville. The mutation occurs in other bacteria—though rarely—and has not been found previously in the US.

The study was also the first to evaluate [antibiotic resistance](#) levels in college-aged women with their first UTIs. It was part of a larger study to determine risk factors for first time UTI and development of recurrent UTIs, said Dr. Brown. Antibiotic resistance prolongs and complicates UTI treatment, she said. Most laboratories do not routinely test for

Ureaplasmas, and no studies had previously evaluated their resistance levels in college-aged women with a first UTI, said Dr. Brown.

Furthermore, Ureaplasma, and its sibling genus, Mycoplasma, members of the Mollicutes family, have an unusual characteristic: they have cell membranes but lack cell walls. "Antibiotics like penicillin and the other  $\beta$ -lactamases that interfere with cell wall synthesis are totally useless against the Mollicutes," said Dr. Brown.

Thus, the resistance to levofloxacin, caused by a mutation in the gene parC, further reduces treatment options for women with UTIs caused by Ureaplasma. But the situation may be still worse. The relevant mutation in parC, "S83W," probably causes resistance to other quinolone [antibiotics](#), since it is located in the quinolone resistance region of the gene, said Dr. Brown. She explained that Ureaplasma bearing that mutation appeared to be resistant to ciprofloxacin, suggesting that it might be resistant to still other quinolones. However, the procedures for formally establishing resistance to other quinolones have not been conducted.

The study included 180 women with symptomatic first-time UTIs, along with 80 age-matched controls. Thirty-five of the women had recurrent UTIs.

This study also turned up tetracycline resistance in one isolate of Ureaplasma. Previous regional studies had identified tetracycline resistance in more than one third of Ureaplasma species isolates, but no studies had evaluated resistance to tetracycline in college-age [women](#) with a first time UTI.

Thanks to this research, the mutation conferring resistance to levofloxacin can now be added to surveillance programs to inform clinicians of antibiotic resistance in urinary tract pathogens, said Dr.

Brown.

Provided by American Society for Microbiology

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