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A Natural Way to Protect Against Urinary Tract Infections

Analysis by Dr. Joseph Mercola | January 17, 2024

STORY AT-A-GLANCE

- An animal study from Baylor College of Medicine demonstrated how supplementation with the natural sugar D-mannose may improve cellular function in the urinary tract of older adults and lower the rate of urinary tract infections (UTIs)
- Researchers compared the cellular function of naturally aging mouse bladder cells against younger animals and found increased cellular senescence, oxidative stress and increased susceptibility to recurring UTIs, with an increased inefficiency in combating stress
- The prevalence of UTIs is rising, having grown by 60.4% from 1990 to 2019. Up to 60% of all women have at least one UTI during their lifetime according to some experts. The annual cost of treatment in the Medicare population for those with a UTI was approximately $12,000 per person in 2019
- In 2018, 79.8% of sampled pork, chicken and turkey in Flagstaff, Arizona, was contaminated with E. coli; blood and urine samples from a nearby medical center revealed 72.4% of those with a UTI had E. coli of the same strain, known as ST131
- You can take precautions at home to prevent and start early treatment. Women can take several specific hygienic steps that may help prevent the development of a UTI; you may consider using D-mannose, the active component in cranberries — proanthocyanidins (PAC) — and a saturated solution of potassium iodide (SSKI) as early treatment

In an animal study, researchers from Baylor College of Medicine[1] found that with age, cellular function in the urinary tract changes, favoring the development and recurrence

of urinary tract infections (UTIs).[2] The findings are particularly significant as the prevalence of UTIs is rising,[3] and UTIs in the elderly, the focus of the study, increase the risk of hospitalization, repeat ER visits, delirium and confusion.[4]

Bladder infections are the most common type of urinary tract infection, but other anatomical structures in the urinary tract can also become infected, including the kidneys, urethra and ureters, which are the tubes that lead from the kidneys to the bladder. According to Cleveland Clinic,[5] roughly 20% of all women will experience a UTI at some point in their life. Other experts estimate the lifetime incidence may be closer to 50% to 60%.[6]

The symptoms are the result of inflammation along the lining of the urinary tract. Symptoms of a urinary tract infection can include burning when you urinate, the urge to urinate frequently and urgently, flank pain, fever and cloudy and foul-smelling urine. As the infection progresses, the inflammatory response can damage the lining of the urethra or bladder and blood may appear in the urine.

The most common pathogens found in UTI cultures[7] include Escherichia coli, Klebsiella pneumoniae, Proteus mirabilis, Enterococcus faecalis and Staphylococcus saprophyticus. There is a high recurrence rate related to antimicrobial resistance, which has resulted in an increased economic burden from these infections. The featured study suggests a potential use of D-mannose supplementation to help lower this risk in elderly individuals.

D-Mannose Upregulates Autophagy, Improving Tissue Quality

According to a 2022 paper[8] in Frontiers in Public Health, the absolute number of urinary tract infections rose by 60.4% from 1990 to 2019. The researchers from Baylor College of Medicine[9] were looking for the connection between aging and the increasing prevalence of urinary tract infections. Data published in Developmental Cell compared the function of older and younger urinary tracts in an animal model.

"We began this study by comparing the functions of naturally aging cells in mouse bladders with those of younger animals, in the absence of a bacterial infection. Specifically, we studied urothelial cells, the cells that line the inside of the bladder where urine is stored," said corresponding author Dr. Indira Mysorekar, professor of medicine-infectious diseases, and Dr. E.L. Wagner, chair of internal medicine at Baylor, in a press release.[10]

The researchers noted[11] that with age, there was an increased frequency of recurring bladder infections alongside urethral dysfunction, cellular senescence and oxidative stress. These changes increase the susceptibility of the urinary tract to infection and increase inefficiency in combating stress.

The researchers discussed the changes that occur at the cellular level, identifying several pathways that demonstrated aged mice consistently lost urethral cells, which in turn further exacerbated cellular dysfunction. When the same mice were exposed to infection with E coli, there was an increased bacterial reservoir which made them more prone to spontaneous recurring infections.[12]

The investigation turned to the autophagy process, which showed recycling naturally slows with age and that older cells had larger lysosomes where defective cellular material is digested and recycled. This indicated the lysosomes were less effective. By treating the mice with a natural sugar, D-mannose, it restored autophagy and mitigated urethral cell shedding and reactive oxygen species.[13]

This suggested to the researchers that D-mannose supplementation could potentially help mediate the age-associated changes at the cellular level in the urinary tract. "Collectively, our results demonstrate that normal aging affects bladder physiology, with aging alone increasing baseline cellular stress and susceptibility to infection," said Mysorekar.[14]

"We suggest that mannose supplementation could counter age-associated urothelial dysfunction in addition to limiting recurring UTIs."

Urinary Tract Infection Prevalence Rising

While the prevalence of urinary tract infections increases with age, in women over 65, the rate is roughly double that in younger women.[15] A significant trigger in younger women includes increased sexual activity with recurrence within the first six months being common. In an older population, the factors include catheterization, diabetes, functional disability, urinary retention and urinary incontinence.[16]

Hospital-acquired UTIs are among the most common forms of hospital-acquired infection.[17] The pathogens responsible for UTIs acquired in the hospital vary according to the geographical region. Regardless, UTIs have created a significant burden on communities and families.

Individuals who experience recurring UTIs have significantly impacted quality of life measures. European data show that recurring infections are linked to absenteeism and physician visits, while in the U.S., a substantial number of physician visits are related to UTIs. Researchers writing in 2019 concluded, "Data suggest that nonantimicrobial prophylactic strategies offer an opportunity to reduce both the rate of UTIs and the personal burden experienced by patients."[18]

A retrospective multicenter study[19] of Medicare fee-for-service data in patients enrolled from January 1, 2016, through December 31, 2019, evaluated the cost of uncomplicated UTI and complicated UTI alongside spending in the 12 months after diagnosis. The researchers evaluated data from slightly over 2.3 million people, 92% of whom lived at home and 8% who were not living in the community.

The annual cost for those living at home was $9,000 versus $21,444 for those who did not live in the community. The researchers concluded that spending on UTI-related expenses totaled roughly one-third of the annual Medicare spend for patients with a UTI and the average was approximately $12,000 per person in 2019.

There has been a rise in bacterial resistance alongside the rise in prevalence of urinary tract infections. A 2019 study[20] looked at 273 urine samples collected in outpatient departments. The results showed 92% of bacterial growth was resistant to one drug and

80% were resistant to at least two drugs. The most common antibiotic resistance was found in ampicillin, piperacillin, clindamycin and amoxicillin/clavulanic acid (Augmentin).

Antibiotic-Resistant Pathogens in UTIs Linked to a Food Source

You may have learned that UTIs are primarily caused by the transfer of Escherichia coli (E. coli) during sexual contact with an infected individual or by transferring fecal bacteria from your anus to your urethra. However, more recent studies have conclusively demonstrated that most of the rising number of UTIs is caused by exposure to contaminated chicken.

Contaminated chickens are found on factory farms where routine use of antibiotics for growth promotion and infection prevention has increased antibiotic resistance. Researchers initially demonstrated the link from poultry to human infection using data[21] gathered from 2005 to 2007 that matched drug-resistant E. coli from supermarket meat to human E. coli infections. Research[22] confirmed humans develop antibiotic resistance by eating poultry treated with antibiotics.

Bacteria cultured from conventionally raised chicken and from those who ate the chicken were found to be more prone to developing resistance against Synercid (quinupristin-dalfopristin), a strong antibiotic used to treat Vancomycin-resistant Enterococcus faecium. On further inspection,[23] researchers also found a close genetic match between drug-resistant E. coli in humans and bacteria found in poultry.

In 2018, 79.8% of 2,452 samples of chicken, pork and turkey from stores in Flagstaff, Arizona, were contaminated with E. coli. Blood and urine samples from patients at a major medical center in the Flagstaff area revealed E. coli in 72.4% of those with UTI. A strain of E. coli known as E. coli ST131 showed up in the meat samples and the human UTI samples.

"Our results suggest that one ST131 sub lineage — ST131-H22 — has become established in poultry populations around the world and that meat may serve as a

vehicle for human exposure and infection," the researchers noted,[24] adding that this E. coli lineage is just one of many that may be transmitted from poultry and other meat sources to people.

In essence, research showed that eating chicken treated with antibiotics can cause you to develop resistance to the last known line of defense against bacterial pathogens, which is a steep price to pay for inexpensive meat.

Prevent and Treat UTIs at Home

You may have read that cranberries are good for urinary tract infections. The most recent Cochrane systematic review of the literature[25] identified 50 studies with 8,857 randomized participants, which demonstrated cranberry products could reduce the risk of developing a UTI and the risk of symptomatic, culture-verified urinary tract infections in women with recurrent UTIs.

The active compounds in cranberries are proanthocyanidins (PAC) that help prevent p-fimbriated E. coli from adhering to urethral cells that line the bladder, and thus help reduce the number of urinary tract infections. Prevention is, of course, the best option, since once an antibiotic-resistant infection becomes established, it can be challenging to treat.

In addition to the effect that D-mannose has on aging bladder cells, it also helps reduce the bacterial load in your urine no matter your age.[26] Mannose is produced by your cells and covers the internal lining of your urinary organs. Bacteria adhere to the mannose on the walls of the urinary tract, so when you take D-mannose, the E. coli adheres to the mannose in your urine and is then flushed out when you urinate.

As the bacterial load is reduced, they're more easily overtaken by agents of your immune system. According to Dr. Jonathan Wright, medical director of Tahoma Clinic in Tukwila, Washington, infections caused by a **bacterium other than E. coli** may be eliminated by taking a saturated solution of potassium iodide (SSKI). Both treatments are

recommended by Wright, who is also the author of the book, "D-Mannose and Bladder Infection: The Natural Alternative to Antibiotics."

For UTIs caused by bacteria or fungi other than E. coli, Wright suggests taking 15 drops of SSKI in water every three to four hours for two days (three days maximum). To know which of these treatments would work best, you'd need to perform a culture test to identify the bacteria responsible for your infection.

Alternatively, Wright suggests taking D-mannose first, and if significant improvement doesn't occur, move on to SSKI. A culture test is also advisable when symptoms do not quickly abate to rule out a drug-resistant infection, as this will require close medical supervision to avoid serious complications. Women can take several specific hygienic steps that may help prevent the development of a UTI.

Drink plenty of pure, filtered water every day	Urinate when you feel the need; don't resist the urge to go
Wipe from front to back to prevent bacteria from entering your urethra	Take showers instead of tub baths; avoid hot tubs/Jacuzzis
Cleanse male and female genital areas before sexual intercourse	Avoid using feminine hygiene sprays, which may irritate your urethra
Use a bidet	

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