



## Natural Remedies for Your Urinary Tract

Urinary tract infections (UTIs), also referred to as bladder infections and cystitis, are the most common bacterial infection experienced by women, and many women develop recurrent infections. UTIs can be treated with antibiotics, although not without complications. Alternative and safer therapies exist. Let's look at some natural alternatives—cranberry products, probiotics, D-mannose, and the most recent discovery SuperMannan with MOS (mannan oligosaccharides).

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# Natural Remedies for Your Urinary Tract

Clair Brown, Richard Katz, Michael McCulloch<sup>1</sup>

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## BACKGROUND

Urinary tract infections (UTIs), also referred to as bladder infections and cystitis, are the most common bacterial infection experienced by women, especially under 30 and over 50 years old. (Raz 2011) Approximately 50-60% of all women in the United States will be diagnosed with UTIs at least once in their lifetimes. (Griebing 2005) Many of them develop recurrent infections (Albert, Huertas et al. 2004), and the frequency tends to be higher as women age. UTIs can be treated with antibiotics, although not without complications. (Li, Andrew et al. 2009) Treatment of UTI is becoming more complicated because of the increasing incidence of multi-drug-resistant *Escherichia coli* (*E coli*), which is the most common cause of UTI. (Manges, Johnson et al. 2001)

Typically therapy for healthy women with uncomplicated UTIs is antibiotics. There are many limitations to this approach, such as adverse effects from antibiotics, including digestive problems, tiredness, yeast infections, and the development of drug-resistance. (Rahn 2008) This approach is costly, and the total cost of treatment for UTIs in 2000 was \$3.5 billion. (National Kidney & Urologic Diseases Information Clearinghouse))

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Clair Brown, PhD, is professor of economics at University of California, Berkeley, with expertise in impact analysis, high tech industries, and Buddhist Economics. Richard Katz is a biochemist who discovered SuperMannan and holds patent 8,063,026 “Method of palliating lower urinary tract infections by treatment with mannan oligosaccharides.” Michael McCulloch, LAc MPH, PhD, is licensed acupuncturist and practices complementary and alternative therapies. All three have a financial interest in SuperMannan. They are careful in their work so that people can trust their investigations and reporting of results.

## NATURAL ALTERNATIVES

Alternative and safer therapies exist. Let's look at some natural alternatives—cranberry products, probiotics, D-mannose, and the most recent discovery MOS (mannan oligosaccharides).

It is hard to evaluate the effectiveness of a home remedy or natural treatment for UTI because many studies show positive outcomes in the lab—tested “in vitro”—where the proposed remedy successfully prevents the E. coli from clinging to the cultured human cells. However when tested on women with UTI—tested “in vivo”—the treatment doesn't work. In order to evaluate natural remedies for UTI, we must look at how the remedy actually works for women when they have an acute UTI.

### *Cranberry*

Cranberry products, including juice and cranberry extract supplements, have been widely used by women (hopefully) to reduce the pain of their bladder infections and to reduce how soon the next UTI happens. Many women have claimed that they found cranberry products helpful, and researchers in the lab found encouraging results that cranberries could prevent bacteria from attaching to human cells growing in a plastic dish in a lab.

Unfortunately clinical research has not found cranberry products to be effective in vivo, that is, when being used by women to treat their UTIs. Most of the research on natural remedies for treatment of UTI has focused on cranberries to reduce the incidence of UTIs so that women experienced a longer time period between UTI episodes. (Raz 2011) The National Institutes of Health (NIH) has funded these studies over many years, and in 2013 the NIH publicly acknowledged that cranberry products do not prevent UTIs:

“Women who keep getting urinary tract infections (UTIs) are sometimes advised to use cranberry products to try to prevent further infections. But research has shown that these products do not have a preventive effect.” (Informed Health Online 2013) This conclusion is based on a major study that examined data from 24 studies that compared cranberry products with a placebo (or other treatment) and included a total of 4,473 people. (Jepson, et al 2012) The research team found that cranberry juice, capsules or tablets did not effectively prevent UTIs. The authors concluded “cranberry juice is less effective than previously indicated. Although

some small studies demonstrated a small benefit for women with recurrent UTIs, there were no statistically significant differences when the results of a much larger study were included.”

A recent large randomized controlled trial (the gold standard of research) of 319 women with UTIs failed to find any difference in the incidence of UTIs over a six-month period for women taking cranberry products compared to the control group. (Barbosa-Cesnik, et al. 2011)

### ***Probiotics***

UTIs are associated by some researchers with alterations in normal levels of bacterial flora, such as Lactobacillus, and these beneficial bacteria purportedly relate to the body’s ability to produce an immune response to bacteria such as E. coli that might cause UTI, for example, by stimulating production of interleukin-10 (IL-10) and other immune modulating factors.

(Konstantinov, Smidt et al. 2008; Amdekar, Singh et al. 2011) However, the research evidence for the ability of probiotics to prevent bacteria-causing UTIs is limited and contradictory, and hampered by trials using different strains and dosing schedules (Minocha 2009). Systematic reviews have failed to yield firm conclusions supporting clinical use of probiotics for prevention or treatment of UTIs. (Barrons and Tassone 2008) Only a few limited strains of probiotics have demonstrated antagonism against urinary pathogens (Hutt, Shchepetova et al. 2006), and only vaginally implanted lactobacillus has been shown in randomized trials to reliably reduce the frequency of recurrent UTIs. (Stapleton, Au-Yeung et al. 2011) Although use of lactobacillus may be useful to reduce UTI frequency for women suffering chronic UTIs, probiotics has not been shown to be an effective treatment of an acute UTI attack.

### ***D-mannose and synthetic mannosides***

Laboratory research, similar to the lab work done with cranberries, demonstrated that mannose compounds (synthetic mannosides) can also block the attachment of bacteria to bladder cells growing in plastic dishes in a lab. (Firon, Ashkenazi et al. 1987) These lab results have been encouraging, just as the lab results on cranberries were encouraging. But similarly to cranberries, the binding inhibition by mannose observed in the lab has not led to successful research results when applied to women as a treatment for an acute UTI. Once again, the successful lab results could not be replicated in successful clinical trials to find a successful alternative UTI therapy for women.

Various mannosides have been tested for inhibiting the binding of *E. coli* to human cells over the years, and the observations are similar—inhibition of binding in a test tube, sometimes with a much higher affinity than the naturally occurring hexose sugar mannose; but the ability of D-mannose to cure acute UTI has not been demonstrated.

Administration of straight D-mannose has been claimed to successfully treat UTI episodes by Dr. Jonathan Wright. (Wright 2001) However this brochure is hard to evaluate because it has not been submitted for independent peer-review. Also the evidence mentioned about how D-mannose works is based upon lab research or animal research only, and only three cases of people taking D-mannose for *E. coli*-related UTIs are described.

The NYU Medical Center wrote a critical summary about the use of D-Mannose for UTI treatment. They stated, “Relying on evidence that is both exceedingly preliminary and highly inconsistent, some alternative medicine practitioners have popularized mannose as a treatment for urinary tract infections.” In particular they criticize the proposed mechanism of action, i.e., D-Mannose binds to the *E. coli*'s pili and “thereby make the bacteria unable to grapple onto the cells of the bladder wall”. (NYU Langone Medical Center 2013)

A recent study indicates that D-Mannose may have some value in prolonging the number of days until another UTI attack, that is, some preventive value. In a clinical trial on 300 women who suffered recurrent UTIs, the women were randomly allocated to three groups, with one group to take 2 g of D-Mannose powder daily for six months; another group to take antibiotic (50 mg of nitrofurantoin) daily for six months; and the third group took nothing. The rate of recurrent UTI was significantly higher for the group that took nothing (60% had another UTI) compared to the two groups taking antibiotics or D-Mannose (15% to 20% had another UTI) during the six months. (Altarac and Papeš 2014)

### ***Mannan oligosaccharides (MOS)***

Biochemist Richard Katz discovered in 2005 that dried dead autolyzed yeast containing yeast mannan oligosaccharides (MOS) is a natural intervention for urinary tract infections in humans, and he was granted a U.S. patent on this discovery in 2011. Yeast mannan oligosaccharides have an exceedingly complex and varied structure, arising from the varied structure of the polysaccharides in the mannan of yeast cell walls. A mixture of oligosaccharides derived from yeast mannan is made up mostly of chains of mannose molecules, but is quite

different from mannose in its size and complexity, in the same way that the pieces of a brick building that has been pummeled with a wrecking ball are quite different from the neat stacks of bricks that the building had been built with. Chains and side chains of mannose in yeast mannan are one and even two orders of magnitude longer than pure mannose or mannose attached to proteins from other organisms than yeast, i.e., a hundred or even a thousand mannose units in length. (Kocourek and Ballou 1969) These complex mannosides, which are yeast mannan oligosaccharides or MOS, are highly antigenic, meaning they provokes an adaptive immune response, and are likely being metabolized by *E. coli* infecting the bladder. In contrast, pure mannose is totally nonantigenic/nonimmunogenic; it does not provoke an adaptive immune response.

The natural supplement, SuperMannan™, contains yeast mannan oligosaccharides (MOS) from dried deactivated yeast. SuperMannan™ is not a probiotic and contains no live yeast. MOS produced from *Saccharomyces cerevisiae* (Alltech and Lallemand) and from *Candida guilliermondii* (Archer Daniels Midland) have been used since 1991 as an animal feed additive, which provides years of data to support the safety of dried dead autolyzed yeast as a dietary supplement.

While more research needs to be done with MOS to understand exactly how it works, it is a safe bet that the efficacy of SuperMannan relies upon the natural innate immune response of our white blood cells to anything that presents itself within our bodies that even remotely resembles a yeast cell.

More randomized clinical trials on large groups of women should be done to compare MOS to antibiotic treatment both for effectiveness of treatment of acute bacteria-related UTI and for frequency of UTIs.

Here we report the results from a study of nine cases to demonstrate the effectiveness in using SuperMannan.

## **CASE SERIES STUDY OF WOMEN TAKING SUPERMANNAN**

The women who took SuperMannan were family members and friends of the Principal Investigators who suffered from both acute and chronic UTI episodes, and requested access to SuperMannan. All women provided consent to have their data and experiences used in this report.

All of the women in our study had been previously diagnosed with multiple episodes of culture-positive UTIs. Thus, they had given open prescription orders for antibiotics by their MDs. These women wanted to pursue alternate strategies of symptom management; repeated antibiotic therapy, whether following positive urine culture or immediate based on symptoms, was no longer desirable.

### ***Mannan Oligosaccharide dosing schedule***

Subjects were provided with SuperMannan™ (dried deactivated yeast; dried yeast is around 40% cell wall material). The women were asked to contact their physicians if UTI symptoms did not improve within 5 hours after beginning treatment, or if they decided to switch to antibiotic therapy. We talked to the women before and after their taking SuperMannan, and we asked them to keep a written diary documenting time of occurrence, intensity, and duration of symptoms, and doses of SuperMannan taken.

### ***Safety Testing***

We used the MEM Elution assay (Pacific Biolabs, Hercules, CA) to test each raw material separately, and in combination of these raw materials to support the safety of their use for human consumption. The *MEM Elution* assay uses Minimal Eagle's Medium as the extracting media and extraction conditions to test materials according to actual use conditions. Extracts can be titrated to yield a semi-quantitative measurement of cytotoxicity. After preparation, the extracts are transferred onto a layer of cells and incubated. Following incubation, the cells are examined microscopically for malformation, degeneration and lysis of the cells.

SuperMannan was also extensively and independently tested for microbials and for heavy metals, and it passed the stringent standards of all these tests.<sup>2</sup>

## **RESULTS**

We evaluated the data reported by nine women (aged mid-twenties to early sixties; 7 white, 1 African-American, and 1 South American) who have taken SuperMannan™ (including two types of dried deactivated yeast) during an acute UTI. (See Table 1.) These nine women have a history of recurrent UTI that was confirmed and treated previously by their physicians with antibiotics.

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<sup>2</sup> See the Test Page on SuperMannan.com for details about testing procedures:  
<http://www.supermannan.com/supermannan-purity-testing/>

The women kept a diary of symptoms and number of capsules ingested. All women suffered pain when urinating, frequent urination and blood in urine. After taking approximately 0.8 grams of MOS (0.20 grams every 20 minutes) during the first hour, all seven women experienced marked amelioration of symptoms. They took approximately 0.6 gram of MOS (0.20 grams every 20 minutes) during the second hour and UTI symptoms abated; the women could resume normal activities. The women reported that they felt no side effects.

In addition to these nine women, we have results from other women that we will add to the data base.

Overall SuperMannan provided these women, of varying age and background, relief from acute UTIs without adverse side effects and without taking antibiotics. Additionally, these women experienced a dramatic drop in the number of subsequent acute UTI episodes.

## **THE WOMEN'S EXPERIENCES TAKING SUPERMANNAN**

Here are what women wrote about their experiences taking SuperMannan:

School Teacher, age 28, New York City

*"I had become used to taking antibiotics for UTIs five-six times a year I started 2 SuperMannan pills every 20-30 minutes; I couldn't believe it. Within an hour of taking my first pill, I could already feel my symptoms decreasing. Now, I am able to take 2 pills to completely stop symptoms, whereas years ago, I was taking up to 14 pills. I know that I can count on SuperMannan if my symptoms emerge."*

Technologist, age 54, Salt Lake City, Utah

*"For the last 37 years, I have never had a UTI that did not require antibiotics to relieve symptoms, except for my last bladder infection, which was cured by SuperMannan pills. These symptoms disappeared after I took SuperMannan pills. During my 50s, I always traveled with antibiotics in case I contracted a bladder infection while away from home. Now I travel with nonprescription SuperMannan pills, and remain infection-free."*

Executive Assistant, age 50, SF Bay Area

*“I have been plagued with urinary tract infections since my early twenties. Once symptoms appear, I am asked to come in for an appointment, provide a urine sample, sometimes wait for the urine to culture, and then wait for the physicians to prescribe the meds. During this waiting period, I am having frequent, painful, bloody urination which only stops when I start taking the meds. Having non-prescription access to the SuperMannan pills is a God-send. Once I have the symptoms, I take the medications and within hours, my symptoms are all gone. Period. No phone calls, no stress.”*

Professional, age 60, SF Bay Area

*“Fear of UTIs made me scared to have sex... Two hours after taking SuperMannan for the first time, the symptoms were gone, and I was back to my work and life.”*

SuperMannan has been demonstrated to provide these women relief from acute UTIs without adverse side effects and without taking antibiotics. Additionally, these women experienced a dramatic drop in the number of subsequent acute UTI episodes.

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**Table 1. Summary of subjects taking SuperMannan™ for acute UTI**

Subject ID	Age	How long ago I started SuperMannan™	How long since my last major UTI	Since beginning SuperMannan™, # of UTIs I've had*	Since starting SuperMannan™, # episodes using antibiotics
1	60s	6 years, 1 month	5 years, 1 month	1	0
2	20s	5 years, 1 month	4 years, 0 months	2	0
3	50s	1 year, 7 months	3 months	2	1
4	50s	1 year, 11 months	6 months	1	0
5	20s	1 year, 4 months	3 months	2	1
6	40s	3 years	3 years	1	0
7	50s	4 years	4 years	1	0
8	60s	4 months	4 months	1	0
9	50s	1 month	1 month	1	1

\* Data as of February 2012. In most cases, UTI was confirmed as *E. coli*-related. In the three cases when mild UTI symptoms were not confirmed with laboratory test and patient self-medicated with antibiotics and reported relief, this was listed as UTI episode.

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