D-Mannose
Nutritional therapy

DESCRIPTION
D-mannose is a pleasant-tasting, simple sugar structurally related to glucose. It occurs naturally in relatively small amounts in foods such as peaches, apples, oranges and berries such as cranberries and blueberries.

D-mannose is interesting as it can be used to help treat urinary tract infections. Urinary tract infections such as cystitis mainly occur in women. Approximately 50% of women will have cystitis at least once in their lifetimes and some women several times. Many women are particularly susceptible to urinary tract infections, with infections often recurring.

In 90% of cases, the infection is caused by the uropathogenic Escherichia coli (E. coli) bacteria (UPEC), which is an inhabitant of the human intestinal tract, but which can easily migrate across the ano-genital area to the vagina and the urinary tract. In other cases urinary tract infections can be caused by bacteria such as Chlamydia, Neisseria gonorrhoea, Mycoplasma, Staphylococcus and Proteus.

In the urinary tract, D-mannose attaches to the E.coli which deactivates the adhesive/invasive abilities of these bacteria. The E.coli is then not destroyed or damaged, but flushed away. Through an entirely different mechanism than antibiotics, the infection is combated and the epithelial cells of the bladder protected.

EFFECT
After intake, D-mannose is absorbed almost immediately in the upper portion of the gastrointestinal tract, so it is not converted into glycogen in the liver, but instead enters the blood stream unchanged. Within one hour, 90% of the mannose that has been ingested can be found in the blood. It has no effect on the intestine or the glucose metabolism, so can safely be used by diabetics. D-mannose circulates largely unchanged in the blood stream and is promptly excreted via the kidneys in the urine.

The uropathogenic E.coli (UPEC) has short hair like structures, pili, which allow them to attach to the epithelial cells of the urinary tract. These hairs contain an adhesin, FimH, a type 1 adhesin which attaches specifically to D-mannose. Mannose forms part of the proteins on the urothelial cells of the urinary tract. The E.coli can anchor itself to and subsequently colonise the cellular D-mannose. Although the innate immune system attempts to immediately combat the infection, the bacteria can succeed in penetrating through to the cytoplasm of the large encasing cells. Here the E.coli find the ideal environment to multiply and aggregate. This process is seen as the mechanism of origin of a urinary tract infection. If by ingesting D-mannose sufficient amounts of this sugar stream freely through the urinary passages, the FimH of the E.coli will increasingly become occupied, resulting in these bacteria losing their adhesive properties. The abundance of free D-mannose will cause the bacteria to detach from the urothelial cells, whilst preventing new invasions. This supports the immune system and once the D-mannose-coated E.coli have been excreted with the urine, this no longer poses a threat. Because binding to the cellular D-mannose of the urothelial cells is vitally important for the uropathogenic E. coli to cause infection, this also means that the E.coli cannot become resistant to the use of D-mannose as a therapeutic agent.

INDICATIONS
The primary indication of mannose is mainly cystitis and broadly speaking urinary tract infections that are based on an infection with E.coli. This is the case in around 90% of urinary tract infections. The following can be reported based on many years of practical experience.

Please note, if after commencing D-mannose the symptoms have not obviously diminished after 24 hours, then E-coli is likely not the cause of the infection. In this case, conventional treatment with antibiotics is indicated.

Prophylaxis:
- against “honeymoon cystitis” (also fashionably known as “cystite de la jeune mariée”). This is the bladder infection that occurs after sexual intercourse. Women can be exceptionally susceptible to this.
- against recurring cystitis. Women who are susceptible to bladder infections that are not necessarily related to sexual intercourse can benefit from the preventative use of D-mannose. Recurring urinary tract infections and complications, such as pyelonephritis, can over time lead to serious kidney damage. In this case too, D-mannose as a daily prophylaxis can help to combat the recurrent infections if these are caused by E.coli.
- against urinary tract infections that arise during catheterisation. D-mannose can possibly work preventatively to prevent attachment and colonisation of the pathogenic Escherichia coli (UPEC) following catheterisation. Men with prostate problems who are unable to properly flush away the UPEC because of a weak urine stream and who suffer from recurrent cystitis can benefit from the use of D-mannose.

DOSAGE
Should a single episode of a bladder infection occur, this can be treated by taking 3 grams of D-mannose approximately every 3 hours. Half doses can be given to young children. Generally, the infection will have been combated in 1 to 3 days. If the treatment is effective, the symptoms will already have diminished after 24 hours of taking D-mannose. However, the full treatment should be continued for 4 days.

**SYNERGISM**

Cranberry extract, Vitamin C and probiotics.

**REFERENCES**