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In a nutshell

Plant sterols are natural substances that offer an apparently safe and effective mode of treatment for patients with BPH. They can be taken in the normal diet, in some specially enriched food products and as direct supplements.

There is some epidemiological, animal and laboratory evidence that they may be protective against prostate cancer, but as yet no clinical trials.

Plant sterols and the prostate

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NUTRITION RESEARCH REVIEW

Study 1: Meta-analysis

A meta-analysis carried out under the Cochrane Collaboration protocol showed that the use of β-sitosterol for BPH is effective both subjectively and objectively.

Subjects and methods: The authors combined results from 4 trials involving 519 men with BPH, with interventions lasting from 4 to 26 weeks.

Results: There were significant improvements in symptoms and urine flow dynamics in all trials. See Table. There was no reduction in prostate size.

Reference: Wilt T et al. Beta-sitosterols for benign prostatic hyperplasia. Cochrane Database Syst Rev 2000;(2):CD001043

Table: Weighted mean differences after sitosterol intervention: meta-analysis

	Weghted mean diff.	95% CI	Number of studies
IPSS *	-4.9 points	(-6.3 to -3.5)	2
Peak urine flow	3.91 ml/sec	(0.91 to 6.90)	4
Residual volume	-28.62 ml	(-41.42 to -15.83)	4

* = International prostate symptom score

Study 2: Clinical trial

The benefits of using the plant sterol β-sitosterol as treatment for BPH are ongoing over at least 18 months, according to German research.

Subjects: 200 patients with symptomatic BPH were recruited originally. 117 of these patients were available for follow-up at 18 months after original enrollment.

Method: In the original randomised, placebo-controlled clinical trial, patients were treated with either β-sitosterol (60 mg/day) or placebo for 6 months. Thereafter, blinding was stopped and subjects invited to continue the therapy on an ongoing basis.

Results: In the original trial, patients on active treament had had a significant decreases in symptoms, mean residual urine volume and increase in peak urine flow [a] .

After 18 months, those who were on active treatment and had continued had no deterioration in their symptoms of urodynamics. Those who had been on active treatment but subsequently ceased active treatment had slightly worse symptoms and mean residual urine volume but maintained their previous peak urine flow.

Those who had been on placebo and not taken up active treatment had no improvement in their symptoms or urodynamics. Those who had been on placebo but taken up active treatment had improvements similar in degree to the originally active group [b].

\References:
a. Berges RR et al. Randomised, placebo-controlled, double-blind clinical trial of beta-sitosterol in patients with benign prostatic hyperplasia. Beta-sitosterol Study Group. Lancet 1995 Jun 17;345(8964):1529-32

b. Berges RR et al. Treatment of symptomatic benign prostatic hyperplasia with beta-sitosterol: an 18-month follow-up. BJU Int 2000 May;85(7):842-6

Comments

In an earlier issue (#132 on plant sterols and cholesterol) we explained that plant or phyto-sterols are substances (such as β-sitosterol and its glycoside, β-sitosterolin) which are found in the normal diet and which have a chemical structure similar to cholesterol. Food manufacturers have specially enriched some processed foods with them.

As the meta-analysis makes clear, a small number of trials have produced consistent results showing that these compounds can be successfully used to treat the symptoms and urodynamic changes of BPH. Side-effects have not been a problem.

The mechanism for this effect is not clear, but there are severeal feasible possibilities. In animals, plant sterols have shown anti-inflammatory, anti-neoplastic, anti-pyretic, and immune-modulating properties [1]. Of these, the anti-inflammatory actions are the most likely to be relevant to BPH. In a human trial, plant sterols countered the inflammatory post-exertion response to marathon running [2].

More specific to the prostate, β-sitosterol had a modulating effect in vitro on prostatic growth factor (beta 1) and the activity of a protein kinase (C α) in primary prostate stromal cell cultures [3]

There is little evidence as yet as to whether this positive influence of plant sterols will extend to protective or therapeutic benefits for prostate cancer. There is some epidemiological and animal evidence to support this notion, although the epidemiology is complicated by the fact that plant sterols are just one type of phytoestrogen, a class of nutrient with known protective association against prostate cancer [4].

Possible mechanisms of any specific phytosterol effect include membrane modulation and stimulation of apoptosis of prostatic cancer cells and immune stimulation [5, 6]. There is also some evidence that phytosterols may help in the prevention of other forms of cancer as well, such as breast cancer [7].

References:
1. Bouic PJ, Lamprecht JH. Plant sterols and sterolins: a review of their immune-modulating properties. Altern Med Rev 1999 Jun;4(3):170-7
2. Bouic PJ et al. The effects of B-sitosterol (BSS) and B-sitosterol glucoside (BSSG) mixture on selected immune parameters of marathon runners: inhibition of post marathon immune suppression and inflammation. Int J Sports Med 1999 May;20(4):258-62
3.Kassen A et al. Effect of beta-sitosterol on transforming growth factor-beta-1 expression and translocation protein kinase C alpha in human prostate stromal cells in vitro. Eur Urol 2000 Jun;37(6):735-41
4. Strom SS et al. Phytoestrogen intake and prostate cancer: a case-control study using a new database. Nutr Cancer 1999;33(1):20-5
5. Awad AB, Fink CS. Phytosterols as anticancer dietary components: evidence and mechanism of action. J Nutr 2000 Sep;130(9):2127-30
6. Awad AB et al. In vitro and in vivo (SCID mice) effects of phytosterols on the growth and dissemination of human prostate cancer PC-3 cells. Eur J Cancer Prev 2001 Dec;10(6):507-13
7. Awad AB et al. Inhibition of growth and stimulation of apoptosis by beta-sitosterol treatment of MDA-MB-231 human breast cancer cells in culture. Int J Mol Med 2000 May;5(5):541-5

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