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Talk structure: Introduction; Types of cancer studies; Anti-prostate cancer foods and supplements; Summary.

## Introduction

You will find a range of views among health professionals and others on whether diet has a significant effect on prostate cancer. However, the bottom line is this: dietary factors cause between 10 and 80% of cancers, depending on the type of cancer, and prostate cancer is at the upper end of this scale. Numerous epidemiological studies have demonstrated the strong association between diet and cancer rates.

There is generally a genetic component in individual susceptibility to cancer...and to most other diseases. For example, lack of a particular DNA repair gene; lack of a cancer suppressor gene such as p53; or an inherently less efficient immune system. Nevertheless, it is evident that an optimal cancer-preventive diet can minimise the impact of these negative genetic factors.

However, reports on foods and food components, not to mention new drugs and gene therapies, that can either inhibit or cause cancer, are so frequent as to be confusing for the public. What I will look at in this talk are the foods and supplements with the strongest accumulated evidence for risk reduction (prevention) of prostate cancer and/or ability to inhibit disease progression (control). First we will touch on some of the major types of cancer studies and levels of evidence.

## Cancer studies

At the lower end of the scale of levels of evidence are:

- Laboratory (or *in vitro* studies), which include possible inhibitors applied to different cancer cell lines.
- Animal studies. These typically use rats or mice that have been bred to be susceptible to particular cancers, eg the TRAMP mouse model or old beagles for prostate cancer studies.

Then we progress to human studies:

- Epidemiological studies:
  - Whole country (ecological), eg comparison of breast cancer incidence, prevalence and mortality along with diet in Japan v Australia.
  - Cohort studies (prospective and retrospective), in which disease rates can be compared between those people exposed to a particular risk factor and those not exposed.
  - Case-control studies
- Clinical trials (usually intervention studies)
  - Case series
  - Randomised controlled trials (highest level of evidence).

Human trials can be large, long-running and expensive. People tend to drop out over time; if the study endpoint is diagnosis of the cancer itself, rather than specific early biomarkers, large numbers of participants are needed to achieve statistical significance; and large numbers also minimise inter-individual variation (as illustrated by the ubiquitous Normal distribution). But you don't want to wait until 2013 to be told that the SELECT Trial has found that a combination of selenium and vitamin E can reduce prostate cancer risk...or not, as they are not using the most suitable selenium and vitamin E forms for this purpose, nor the right study population: the average baseline plasma selenium concentration of the men in the study is 125 micrograms/litre, which is around the estimated ideal level for minimising prostate cancer risk. For those men above this level, supplementary selenium could even increase cancer risk! They would have been better off trialling men (ideally including plenty of smokers) in a low-Se country like Serbia, where baseline plasma selenium is around 65 micrograms/litre.

You want to adopt a dietary strategy NOW that is likely to assist in preventing or controlling prostate cancer.

### **Anti-prostate cancer foods and supplements**

First, a note on overall diet. It is up to you as to what approach you take to diet. On one hand, you could just take the advice of many doctors and nutritionists: eat most things in moderation; a balanced, varied diet which should include the broad food categories of fruits, vegetables, legumes, whole grains, lean meat/fish...and do /take nothing else. This is reasonable advice, but you will be consuming sub-optimal levels of a number of key anti-prostate cancer nutrients/phytochemicals. At the other end of the scale you could try to adhere to a rigid regimen of up to 30 different supplements and religiously combine fixed proportions of food types at every meal. This would require great motivation and discipline (and expense!) and may be unsustainable.

I recommend something between the two. Eat a varied, low fat diet that includes a range of fruit (including apples and berries), vegetables (including broccoli, carrots, onions, beetroot, tomatoes, spinach, avocados), whole grain, legumes, fish and lean meat. Cook with olive oil and you could drink up to two glasses of wine (preferably red) per day. Sorry ladies, recent evidence suggests that any alcohol consumption tends to increase the risk of breast cancer. And importantly, don't overeat...limit your total caloric intake. There is a good argument for fasting: say, one day per week, when you eat nothing and drink water only. And importantly: get plenty of exercise (30-45 minutes of vigorous activity that increases the heart rate appreciably, per day...including some aerobic work and light weights). Don't smoke. Limit your intake of dairy products and fatty meat. Some men have had excellent results in controlling prostate cancer using a vegetarian diet.

NB: in addition to the list below, I recommend supplementary magnesium (around 300 mg/day) and B-vitamins for most adults. An excellent source of these: Australian Naturalcare Products (who often advertise in the "Sunday Mail"...you can order from Sydney on 1300365020).

### **The A Team**

The first list contains those dietary anti-prostate cancer agents that are backed by the strongest evidence:

Selenium      200-400 micrograms/day: sodium selenite, selenomethionine, Brazil nuts, high-selenium cereal products (such as Laucke's *WaferGrains* expanded grain

biscuits and wholemeal bread mix with biofortified selenium; see their website: [www.laucke.com.au](http://www.laucke.com.au) ). NB: 1000 micrograms = 1 milligram.

Vitamin E      alpha-tocopherol: take 150 milligrams/day (eg Cenovis, Herron, Blackmore capsules). NB: natural vit E better than synthetic. Vitamin E appears to be synergistic with selenium, lycopene and vitamin C. I currently do not recommend a vitamin E dose above 150 mg/day. In recent studies, high-dose vitamin E has tended to increase mortality.

Lycopene      the red carotenoid in tomatoes. Eat a dessertspoon of tomato paste (eg Leggo's)/day. This processed form is more effective than that in raw tomatoes.

Pomegranate juice: has significantly inhibited prostate cancer in clinical, animal and laboratory trials. The Arifoglu brand of pomegranate syrup is available at Gaganis Bros, Hindmarsh, Adelaide. Definitive dose rates have not yet been determined, but 2-3 tablespoons/day should suffice.

Green tea polyphenols: notably epigallocatechin-3-gallate. If, like me, you don't like green tea and the prospect of drinking 1-2 litres per day is uninviting, take capsules. Check the Internet: [www.youngagain.com](http://www.youngagain.com) (2-3/day). Synergistic with soy polyphenols and curcumin.

Omega-3 fatty acids: notably DHA & EPA. Probably synergistic with Se. There are various brands around, with 1000 mg/capsule. Take 2/day. Also appears to be effective in reducing risk of heart disease and Alzheimer's disease.

Resveratrol: from grape seed and red wine. There are grape seed extracts available.

Quercetin: another flavonoid, found in apples, red wine. Available on the Internet, as for green tea.

Soy polyphenols: notably genistein. These are synergistic with green tea polyphenols. There are two ways that soy polyphenols can be included in an anti-prostate cancer program: firstly, take 30-40 mg daily; or try a high-dose, short-term treatment, namely a 10-day treatment of 160-200 mg, which can be repeated after six weeks. Blackmore's Phyto life Plus tablets (16 mg of polyphenols) is a good source.

Vitamin C: take the ascorbate form (calcium or sodium), rather than ascorbic acid. Take 3-10 grams/day, depending on how unwell you are. Note that one heaped teaspoon = 5g. It is better to split the dose up if you can...it will cause diarrhoea if you take too much at once!

Vitamin D3: from sunlight and supplements.

Curcumin: from turmeric (the yellow pigment in curry). Synergistic with green tea, and appears to have an effect against a range of cancers. Turmeric powder is available from Gaganis Bros. Suggested dose: one dessertspoon daily.

## The B Team

These are probably not quite as important as the items on the “A-list”. Several are very promising, but not enough evidence exists for unequivocal efficacy.

Silymarin (from milk thistle). Try health food shops, chemists, Internet.

Black Cohosh (*Cimicifuga racemosa*)

Beta-sitosterol: this is a natural plant hormone, and Saw Palmetto is a good source, although it is variable in beta-sitosterol concentration. A more concentrated form is in the capsules from [www.youngagain.com](http://www.youngagain.com) (1-2/day).

Phenethyl isothiocyanate (from watercress, broccoli)

Dark chocolate (about the highest antioxidative-capacity food there is)

Boron (boric acid, avocados, nuts)

Epilobium (Willow herb)

Aspirin (one-third tablet/day)

Pau d'Arco (S American tree-bark herbal preparation)

Beta-glucan (from the Shiitake mushroom)

Phytate (in whole grains & legumes)

Coenzyme Q10

Alpha-lipoic acid

Gamma-linolenic acid (from borage, blackcurrant seed, Evening Primrose oil)

Oleuropein (from olive leaf)

Citrus pectin

## Summary

Dietary factors play an important role in the development of most cancers, and in particular prostate cancer. A varied diet based on vegetables, fruit, wholegrains, legumes and fish, supplemented by appropriate levels of several key anti-cancer agents (eg selenium, vitamin E, lycopene, soy, green tea, pomegranate juice, omega-3 fatty acids), along with plenty of exercise, is likely to reduce prostate cancer risk, and also to slow its progression. Moreover, in general, whatever is good for your prostate is also good for your cardiovascular system (e.g. in lowering blood pressure, triglycerides and LDL-cholesterol, and reducing risk of diabetes) and brain (eg in lowering risk of Alzheimer's disease), and is also likely to lower risk of a range of other cancers.

As a qualifier, genotype (your genetic make-up) is an important factor in whether any of these dietary interventions will work for you. And for micronutrients like selenium, zinc, iron, etc as well as most vitamins, there may be no benefit if your baseline levels are adequate.