NUTRITION CONSIDERATIONS FOR PATIENTS WITH PROSTATE CANCER: *EVIDENCE-BASED ADJUNCTIVE NUTRITIONAL SUPPORT*

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Prostate cancer is the second leading cause of cancer death among men in the United States, Canada and other developed countries. Once diagnosed, patients are faced with various medical treatment options, depending upon whether they have prostate cancer that is localized to the prostate gland or metastatic prostate cancer. In addition to medical treatments, patients are often curious about dietary and nutritional supplement practices that may help to control their disease, slow its progression, or prevent its recurrence, as adjunctive proactive measures. As such, these patients are inclined to request advice on this matter from their Chiropractor and/or other holistic healthcare practitioners.

A significant number of experimental and clinical research studies suggest that certain dietary practices and the use of specific nutritional supplements may be of value in helping to prevent recurrence or progression of certain cancers, including prostate cancer. These measures are not to be used in place of recommended medical protocols, but rather, may be considered as adjunctive (additional) interventions that may provide complementary assistance and specific desirable biological effects:

Basic Dietary Considerations:

1. Low Animal Fat Diet – evidence suggests that the consumption of high fat animal foods is linked to increased risk of prostate cancer development and progression. It appears to be prudent to eat a low animal fat diet.
2. Don't Smoke – although studies do not directly link smoking with increased risk of prostate cancer, smoking is associated with approximately 30% of all cancers and weakens immune function.
3. More Cruciferous Vegetables – cruciferous vegetables including broccoli, cauliflower, Brussels sprouts, cabbage, bok choy, and turnips, contain indole-3-carbinol, a substance that helps the body detoxify cancer-causing agents (and other foreign compounds), and has been shown to act in other ways to help lower cancer risk for several types of cancer, including prostate cancer. Patients should consider consuming any combination of these vegetables on a daily basis.
4. Avoid Alcohol – after smoking, alcohol consumption is considered to be the second most important environmental cause of cancer, being associated with approximately 3% of all cancer cases. Alcohol has been shown to promote cancer development by increasing free radical damage, speeding up the delivery of cancer-causing agents into the cells of the body (co-carcinogen role), weakening the immune system, over-stimulating the release of certain hormones associated with cancer, reducing availability of folic acid (a B-vitamin required for

normal DNA synthesis), and by speeding up rates of cell division. Some studies link as few as three drinks per week with a significant increase in prostate cancer (e.g. *Harvard Alumni Study*). Thus, restricting alcohol consumption is a strong consideration in prostate cancer prevention and management.

5. Ideal Weight – studies indicate that being overweight increases the risk of certain cancers, especially reproductive cancers. Increased body fat tends to encourage the over-production of certain hormones that are linked to the development and progression of certain cancers, which may include prostate cancer. It is, therefore, prudent to remain at or near one's ideal body weight.
6. Avoid Charred Foods and Pan-fried Meats – charred foods and pan-fried meats contain heterocyclic amines that cause cancerous mutations in experimental and animal studies, and are strongly linked to increased risk of some human cancers, including prostate cancer.
7. Consume At Least 5 Servings of Fruits And Vegetables Per Day – studies have shown that individuals who consume at least 5 servings of fruits and vegetables each day, on average, have half the cancer rates as those who consume fewer quantities of fruits and vegetables. Fruits and vegetables contain antioxidants, vitamins, minerals and a variety of phytonutrients that are important in warding off cancer in general.

General Supplement Considerations:

1. High Potency Multi-Vitamin and Mineral – a number of vitamins, minerals and antioxidants have been shown to help suppress the growth of various forms of cancer under experimental conditions and reduce the rate of cancer recurrence in some clinical trials, as outlined below. A high potency multi-vitamin and mineral provides your body with a strong head start in regards to the overall vitamin and mineral supplementation program that may be considered in these cases.
2. Additional Vitamin E Succinate (2,000-3,000 IU per day) – experimental studies demonstrate that vitamin E succinate can help suppress the growth of various types of cancer by inhibiting cancer cell division and by enhancing programmed cell death of cancer cells, including human prostate cancer cells. Studies have shown that vitamin E, in the form of Vitamin E Succinate, exhibits the most potent anti-cancer effects, compared to all other forms of vitamin E.
3. Additional Vitamin C (2,000-10,000 mg per day) – experimental studies demonstrate that vitamin C can help reduce the risk of cancer recurrence for certain types of cancer by inhibiting the production of cancer-causing nitrosamines, boosting immune function and through other mechanisms of action.
4. Additional Selenium (700-800 mcg per day) – experimental studies indicate that selenium can help suppress the growth of certain cancers, including by inhibiting the cellular replication of cancer cells, inducing programmed cell death of cancer

cells and by boosting immune function. Studies on humans have shown that higher serum levels of selenium and daily supplementation with 200 mcg of selenium are associated with a significant reduction in prostate cancer incidence.

5. Beta-carotene (50,000-90,000 IU per day) – experimental studies indicate that beta-carotene can help reduce the recurrence of certain cancers because it acts as an antioxidant, an immune system modulator and enhances cellular differentiation (increases the maturation) of many human cells. All of these effects are associated with the prevention of cancer and the reversal of some early stage cancers and states of dysplasia (pre-cancerous states).

   It should be noted that high dose beta-carotene supplementation should not be used by smokers or in the adjunctive management of lung cancer, based upon findings from two clinical trials.

6. Coenzyme Q10 (150-300 mg per day) – experimental studies indicate that coenzyme Q10 may help reduce the recurrence of certain cancers because it acts as an antioxidant, immune system modulator and exhibits tumor suppressive effects. Taken in conjunction with other antioxidant supplements (vitamin E, vitamin C, selenium, beta-carotene), several human studies have shown that daily supplementation with up to 390 mg of coenzyme Q10 may be helpful in reducing the risk of recurrence and progression of some forms of cancer.

7. Reishi Mushroom Extract (typically 250 mg, four times per day, standardized to 10-12.5% polysaccharide content) - animal cancer studies have shown a 50% tumor regression outcome with Reishi Mushroom Extract treatment (e.g., connective tissue cancer model in mice). Reishi Mushroom Extract is used by some cancer surgeons in Japan to treat cancer patients and significant anti-tumor and immunostimulation effects have been noted in many of these cases. Polysaccharides from reishi mushrooms and from other types of folk-medicinal fungi are patented in Japan for use as immunomodulators in the treatment of cancer. They are combined with chemo- and radiotherapy and have demonstrated an ability to reduce side effects, increase the efficacy of treatments, and to accelerate recovery from disease.

   Studies from China have shown that Reishi Mushroom Extract potentiates the tumor-killing action of certain immune cells. Reishi Mushroom Extract is known to have other immune modulating effects and antioxidant properties. Animal studies also show that the polysaccharide fraction of reishi mushrooms can induce apoptosis (programmed cell death of cancer cells) in certain cancer cells. These effects were primarily due to the increased secretion of anti-tumor cytokines (signaling agents) induced by Reishi Mushroom polysaccharides, namely TNF-alpha and IFN-gamma. Other studies show that the D-glucan polysaccharide fraction of Reishi Mushroom can also inhibit cell replication of various human cancer cell lines.

8. Astragalus (500 mg, three times per day; 2:1 extract) - experimental studies have shown that the active constituents in astragalus, primarily its triterpene

glycosides and polysaccharide content, can modify immune function and increase the ability of immune cells to recognize and destroy cancer cells. A more detailed explanation of these activities would include the following:

> The active ingredients in astragalus have been shown to significantly increase the proliferation of lymphocytes, enhance interferon and interleukin-2 production and activity- two powerful signaling agents that enhance the effectiveness of immune cells, activate T cell blastogenesis, increase T cell cytotoxicity, enhance the secretion of the immune modifying chemical known as tumor necrosis factor (TNF), enhance phagocytosis by immune cells, increase natural killer cell cytotoxicity.

In human studies, astragalus has also been used to reduce the side effects of chemotherapy and radiation treatment. A large clinical study of 572 cancer patients demonstrated that astragalus supplementation was able to protect adrenal cortical function during radiation and chemotherapy treatment. It also helped to greatly minimize bone marrow depression and gastrointestinal side effects, such as nausea, vomiting and intestinal tract ulcerations in these patients.

In patients with very low white blood cell counts, as a side effect of drugs, radiation or chemotherapy, astragalus supplementation has been shown to help significantly increase the number of circulating white blood cells, helping to restore normal function of the immune system in these severely immune-compromised patients.

9. Chinese Scullcap (150 to 200 mg per day of pure Baicalein Flavonoid derived from Chinese scullcap) - many experimental studies indicate that the baicalein flavonoid, found exclusively in Chinese skullcap, prevents and inhibits cancer growth via a number of direct and indirect physiological actions:

> Baicalein has been shown to inhibit the 12-lipoxygenase enzyme, which converts arachidonic acid into a hormone-like substance that is required for cancer cells to replicate. Studies demonstrate that, by inhibiting the 12-lipoxygenase enzyme, baicalein has been shown to inhibit cancer cell proliferation and induces apoptosis (programmed cell death) of many different human cancer cells, including human prostate cancer cells. Experimental evidence suggests that, in the presence of baicalein, various cancer cells can be prevented from multiplying and metastasizing to other tissues and that a primary mechanism through which this occurs is via the inhibition of 12-lipoxygenase enzyme activity.

Baicalein has also demonstrated an ability to slow or inhibit the replication rate of many different cancers under experimental conditions, which appears to be due to its ability to suppress the release of enzymes required for cancer cell division (protein tyrosine kinase activity and protein kinase C activity).

Baicalein has also been shown to inhibit the 5alpha-reductase enzyme, which converts testosterone to dihydrotestosterone (DHT). DHT is strongly associated

with the development of prostate enlargement (benign prostatic hyperplasia), prostate cancer and prostate cancer progression.

10. Curcumin (480 mg, three time per day) – curcumin has been shown to inhibit the growth of breast, colon and prostate cancer cells, under experimental conditions via several important targeted effects (inhibits epidermal growth factor receptors and the 12 lipoxygenase enzyme system and tyrosine kinase enzymes, which are commonly upregulated in cancer cells). If left unchecked (which is often the case with cancer cells), the upregulation of these pathways leads to uncontrolled cellular replication, and indirectly inhibits apoptosis (programmed cell death) and increases angiogenesis (the ability of cancer cells to form blood vessels to fuel their growth). Animal and human studies indicate that curcumin can decrease proliferation rates of certain types of cancer. A human clinical trial demonstrated that curcumin supplementation (480 mg, three times per day) reduced the size and number of recurring polyps in patients with a previous history of genetically-induced colon cancer (Familial Adenomatous Polyposis – whereby, 100% of patients develop colon cancer for genetic reasons).
11. Essential Fatty Acids (combination of borage seed, flaxseed and fish oil) – this combination of oils provides the body with essential fatty acids that are used by the body to make local hormones (prostaglandin series 1 and 3), which are known to slow rates of cell division and reduce inflammatory reactions. Both of these activities are known to play a role in cancer prevention. The daily therapeutic dosage to be considered would be 4-6 capsules of a 1200 mg essential oil capsule, with each capsule containing 400 mg each, of borage seed, flaxseed and fish oil.
12. Vitamin D (2,000 IU per day) – studies indicate that many human prostate cancer cells posses vitamin D receptors on their outer membrane. Stimulation of these receptors by vitamin D has been shown to increase the maturation of these cells (makes them look more normal), reduces their malignant behavior and slows down their rate of cell division. In experimental studies, Vitamin D has been shown to suppress cancer cell proliferation, induce cancer cell apoptosis (programmed cell death), and differentiation, demonstrating a strong potential role in the prevention and management of prostate cancer.

    A recent study showed that 2000 IU of vitamin D administered daily to 15 patients with prostate cancer helped to control their disease, as evidenced by blood PSA levels. In 9 patients, the PSA level decreased or remained unchanged (no further rise) and these results were sustained during the 21-month course of vitamin D administration. The median PSA doubling time increased from 14.3 months prior to Vitamin D administration to 25 months after commencing Vitamin D supplementation. In fact, 14 of the 15 patients showed a prolongation of the PSA doubling time after Vitamin D supplementation was introduced to this group. There were no side effects reported by any patient. The marked prolongation of PSA doubling time is an extremely important outcome to the administration of Vitamin D in these patients, according to the recent work of Partin and fellow researchers (J Urol, 2003). Partin and fellow researchers showed that the risk of

distal metastasis of prostate cancer (with respect to relapse after prostate cancer surgery) at 5 years was 65% to 75% when PSA doubling time was less than 10 months compared with 10-20% when PSA doubling time was greater than 10 months.

Some Specific Prostate Support Supplements

1. Prostate Support Nutrients – it is known that prostate cancer cells divide and spread through the body under the influence of dihydrotestosterone hormone. Certain natural herbal agents have been shown to block the buildup of dihydrotestosterone, some of which have demonstrated an ability to slow or retard the progression of prostate cancer and/or lower or slow the rate of rise in blood levels of the prostate specific antigen (PSA).

   For this reasons prostate cancer patients (including those who have had their prostate gland removed due to the presence of prostate cancer) may wish to consider taking a combination product containing the following natural prostate support nutrients: Saw Palmetto, Pygeum Africanum, Beta – sitosterol, Stinging Nettle, and Lycopene. The daily dosage to be considered would include:

   A. Saw Palmetto – this herb should be a standardized grade of 45% fatty acids and sterols, taken at a dosage of 720 mg, twice daily (or an 85-90% standardized grade of fatty acids and sterols, taken at a dosage of 160 mg, twice daily).
   B. Pygeum Africanum – this herb should be a standardized grade of 12-14% triterpenes, taken at a dosage of 200 mg, twice daily.
   C. Beta –Sitosterol – this plant-based substance should be taken at a dosage of 120 mg, twice daily
   D. Soy Isoflavones – this special class of flavonoids derived from soybeans should be taken at a minimum dosage of 50 mg per day (up to 200 mg per day)
   E. Stinging Nettle – this herb should used concurrently with other prostate support nutrients at a minimum dosage of 60 mg, twice daily, using 5:1 extract.
   F. Lycopene – lycopene is a carotenoid found in tomatoes and other red and pink fruits and vegetables. It accumulates in the prostate gland once ingested orally from food and supplements. There is some evidence that lycopene may be helpful in the treatment of prostate cancer. In one study, 26 men with prostate cancer were randomly assigned to receive lycopene (15 mg twice a day) or no lycopene for three weeks before undergoing prostate surgery. Prostate tissue was then obtained during surgery and examined. Compared to the unsupplemented men, those receiving lycopene were found to have significantly less aggressive growth of cancer cells. In addition, a case report has been published of a 62-year-old man with advanced prostate cancer who experienced a regression of

his tumor after starting 10 mg of lycopene per day and 300 mg of saw palmetto, three times per day.

2. Ground Flaxseed – 50 gm per day (2 heaping tablespoons) - enterolactone and enterodiol formed from lignan precursors found in flaxseeds, inhibit key enzymes that convert androgens into estrone hormone and estrone into estradiol. It has been shown that these forms of estrogen may encourage prostate cancer development and progression by decreasing the breakdown of dihydrotestosterone. Enterolactone and enterodiol may also compete with other estrogens for binding to estrogen receptors on prostate cells, toning down that estrogenic influence on prostate cancer cells.

3. Soy Isoflavones – 100- 200 mg per day – a study showed that men with prostate cancer who ingested 100 mg per day of soy isoflavones showed a slower rise in their blood PSA levels. In this study men with existing prostate cancer, who were supplemented with 100 mg per day of soy isoflavones showed a favorable outcome in stabilizing PSA levels. Soy isoflavone supplementation was shown to decrease the rate of rise in serum PSA levels in patients with androgen dependent and androgen-independent prostate cancer. The researchers concluded that their data suggests that soy isoflavones may benefit some patients with prostate cancer by slowing the progression of the disease and therefore, potentially delaying the development of symptoms, improving quality of life, and perhaps even prolonging survival. A large body of experimental evidence suggests that soy isoflavones and other derivatives of soy extract can inhibit the development and progression of prostate and other cancers via a number of mechanisms.

4. Modified Citrus Pectin - Modified Citrus Pectin is a dietary supplement that has demonstrated an ability to prevent the spread of cancer (metastasis), with strong evidence to support its use in the prevention and/or management of prostate cancer metastasis. Modified Citrus Pectin is a special form of pectin that has been altered in the laboratory by a proprietary process that shortens the length of pectin's polysaccharide chain. One of the dominant carbohydrates contained within Modified Citrus Pectin is galactose. Galactose has a strong affinity for binding to the surface of metastatic cancer cells, which express a particular cell surface receptor known as galectin-3 (a galactoside-binding lectin). In turn, the binding of Modified Citrus Pectin to the galectin-3 receptor on metastatic cancer cells creates a type of galectin-3 blockade. With the galectin-3 receptor blocked in this fashion, cancer cells are less able to adhere to other healthy tissues and cells, essentially inhibiting cancer cells from invading and spreading to new areas and tissues in the body (anti-metastatic effect). As well, the blockade of the galectin-3 receptor prevents cancer cells from adhering to each other, discouraging their ability to form colonies (tumor mass). If cancer cells are deprived of their own adhesive ability, they fail to thrive and can be more easily destroyed by the body's immune system. Thus, Modified Citrus Pectin has been shown to attach to galectin-3 receptors on metastatic cancer cells, preventing their clustering and colonization into a larger tumor mass and blocking their ability to spread to other tissues.

A pilot study involving prostate cancer patients who failed first-line androgen-deprivation therapy, were in relapse after radical prostatectomy external beam radiation therapy or cryosurgery, and were either untreated or off intermittent hormone blockade, demonstrated that supplementation with 15 gms per day of Modified Citrus Pectin (5 gms, three times per day) increased the length of the PSA doubling time by 30% in 4 of 7 patients, one patient had a partial response, one patient had stable disease and one patient did not respond. The researchers conclude that Modified Citrus Pectin appears to slow the PSA doubling time in prostate cancer patients with low levels of PSA, and that all patients were still alive three years after the official end of the study. The therapeutic dosage is typically 5 gms, three times per day. Dilute Modified Citrus Pectin powder in a favorite beverage. Up to 30 gms per day may be taken safely. It is also available in capsules and tablets.

5. Melatonin -10-20 mg per day (requires physician monitoring) - preliminary studies in Italy suggest that melatonin can suppress cancer growth of prostate cancer in human subjects. However, this is a high dosage and physician monitoring is required with this intervention.

Summary

The body of evidence suggests that certain proactive dietary and supplementation interventions may help to arrest or slow the progression of prostate cancer in certain cases. It is unlikely that the patient will be provided with a comprehensive program of this nature by their attending oncologist or urologist in most instances. Thus, it is incumbent upon natural healthcare practitioners to provide prostate cancer patients with evidence-based recommendations pertaining to adjunctive nutrition support for prostate cancer in situations where the patient would appreciate becoming more enlightened on this subject.

This article has outlined the most current considerations pertaining to the adjunctive nutritional support for prostate cancer patients, based upon my interpretation of the scientific, peer-reviewed literature on this subject. These interventions are not to be used as a substitute for medical care, but rather to be considered as adjunctive nutritional support in these cases.

For more information on this or other related topics, visit Dr. Meschino's website at: http://meschinohealth.com

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