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Dietary and Nutritional Guidelines for Cancer Prevention and Recovery

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"Let food be thy medicine and medicine be thy food" wrote Hippocrates in 400 BC. This is advice that we as naturopathic doctors strive to share with our patients. Today's food culture, however, requires educated choice in the types of foods we ingest, as many of our foods have been contaminated with pesticides, herbicides, food additives and/or have been genetically modified.

In this article we'll explore the dietary choices that may expose us to greater risk of, help to protect us from, or recover from many forms of cancer.

We'll start by examining food practices that increase our susceptibility to cancer.

Pesticides and Cancer

Certain pesticides have a clearly demonstrated link to specific cancers in children and adults.

Non-Hodgkin Lymphoma (NHL) is more common in farmers, pesticide applicators, pesticide factory workers, landscapers, lumberjacks and golf course superintendents[1] (lumberjacks may apply phenoxy herbicides such as 2,4-D for weed control before taking down trees).[2] A study of 155,000 farmers found an increased susceptibility to Non-Hodgkin lymphoma after exposure to pesticides, proportional to the number of acres sprayed.[3] A Canadian study demonstrated a link between exposure to the weed-killers dicamba and methoprop, the insecticide carbamate, and NHL.[4]

Two studies have found a link between elevated leukemia rates and livestock farmers.[5] Increased rates of all types of leukemia were found in children whose parents used insecticides in the garden and on indoor plants, and whose mothers had been exposed while pregnant.[6] Indeed, the most critical exposure period for later development of leukemia is when the fetus is exposed *in utero*.[7]

Several studies have shown an association between pesticide exposure and brain cancer.[8] Children growing up with parents who were exposed to pesticides at work experience an increased risk.[9]

Exposure to the pesticides hexachlorobenzene,[10] chlordane, malathion, 2,4-D[11] and atrazine[12] has been shown to increase breast cancer risk.[13] A higher incidence of stomach cancer was also found in areas with elevated atrazine contamination in the water.[14]

In one U.S. study of 55,000 male pesticide applicators, an increased rate of prostate cancer was prevalent, especially in those with a family history of prostate cancer, and those who were exposed to methyl bromide, a common pesticide.[15] An association has been found between occupational exposure to pesticides and increased risk of both kidney and pancreatic cancer.[16,17]

Given the numerous studies linking pesticide exposure to a variety of cancers, and that exposure *in utero* can increase risk later in life, it is advisable that we reduce or eliminate exposure across all age groups. Many individuals find it challenging to afford the higher cost of organically grown food. One way to decrease exposure is to grow more of our own food in backyard or community gardens, or participate in a local food co-op.

The Environmental Working Group in the U.S. analyzed pesticide residues of 48 different fruits and vegetables and ranked them as most or least contaminated. The following chart is a guideline to understanding which foods are most contaminated and would be safer if purchased organically grown, and which have fewer pesticides and are safer to consume when not organically grown.[18]

Food Tip: Eat organically grown food as much as possible.

MOST CONTAMINATED FOODS	LEAST CONTAMINATED FOODS
1. apples	1. avocado
2. strawberries	2. sweet corn
3. grapes	3. pineapple
4. celery	4. cabbage
5. peaches	5. frozen sweet peas
6. spinach	6. onions
7. sweet bell peppers	7. asparagus
8. imported nectarines	8. mango
9. cucumbers	9. papaya
10. cherry tomatoes	10. kiwi
11. snap peas	11. eggplant
12. potatoes	12. grapefruit
13. hot peppers	13. cantaloupe
14. domestic blueberries	14. cauliflower
15. lettuce	15. sweet potato

Genetically Modified Food and Cancer

The health risks of consuming genetically modified (GM) foods are largely unknown, and they have not been proven safe for human consumption. Potential health risks that may occur from eating GM food include increased allergies from ingesting foreign proteins, neurological effects and hormone disruption from increased pesticide exposure,[19] reproductive effects, liver and kidney toxicity, and cancer. Many years of research are needed to confirm or disprove these health risks.

Several studies in mice have shown no harmful effects when GM corn was consumed for 90 days. One controversial study, in contrast, found that rats fed Roundup-tolerant genetically modified corn over a 2-year period developed more cancers than rats that were not fed the GM foods. The female rats in the study died 2-3 times more quickly than controls, and were more likely to develop large mammary tumors, with accompanying changes in sex hormone levels. Liver congestion and necrosis was up to 5.5 times higher and kidney disease was more common in the rats that consumed GM food.[20]

Until proven safe, we would be wise to avoid genetically modified foods, and encourage organically grown or Non-GMO Project-verified food instead. Foods that are commonly GM in Canada include corn, soy, beets, and canola. While trace amounts of pesticides and GMOs have been documented in some organic foods, certified organic food is by definition both pesticide-free and non-GMO.

Food Tip: Avoid genetically modified foods until proven safe.

Food Additives and Cancer

Another area of concern in food safety is the presence of food additives, some of which may increase cancer risk. Carrageenan, used as a thickener, has been demonstrated to increase the risk of colon cancer if consumed over a long period of time.[21] Sodium nitrite, added as a preservative in prepared meats, such as hot dogs, can also increase colon cancer risk.[22] Food dyes in general exhibit toxicity and can be carcinogenic, specifically Red 3, Red 40, Yellow 5 and Yellow 6.[23] Read labels to avoid these additives.

Food Tip: Avoid carrageenan, food dyes and sodium nitrite.

Food Packaging and Cancer

Food packaging containing plastics can increase our susceptibility to hormone-driven cancers, such as breast and prostate cancer.

Parabens are used as a preservative, in packaging material and are commonly found in our foods. They mimic the hormone estrogen and are implicated in breast cancer. One study examined eight food groups – beverages, dairy products, fats and oils, fish and shellfish, grains, meats, fruits and vegetables, and analyzed them for traces of parabens. All of these food groups contained parabens. Infants and toddlers consumed the most parabens in their foods when tallied as a percentage of their body weight.[24] The accumulation of parabens in our tissues over our lifetime may make us more susceptible to breast cancer later in life.[25,26]

Phthalates are added to plastics to make them soft and flexible and are found in food containers (often plasticized PVC), as well as being ubiquitous in the environment. Phthalates have been detected in all types of food, and levels are higher when the food has been in contact with plastic materials. Cheese and cream have high phthalate levels, and food is contaminated during processing when exposed to PVC from tubes, conveyor belts or disposable gloves. Paper and cardboard packaging made from recycled fibers also contains phthalates.[27]

Bisphenol A (BPA) is added to plastic to make it hard and durable, and is found in the lining of most canned food. Exposure to BPA has been demonstrated to increase the risk of both breast and prostate cancers.[28,29]

Food Tip: To minimize our exposure to hormone-disrupting chemicals found in food packaging, we can avoid canned and plastic-wrapped food as much as possible, and look for products packaged in glass, stainless steel or paper. Water and juice should also be stored in glass or stainless steel, rather than plastic containers.

Now we'll look at what foods to limit or avoid in our diets in order to deter cancer growth.

Minimize or Avoid Meat

The cooking of meat generates a class of chemicals called heterocyclic amines, which are both carcinogenic and estrogenic, and are implicated in the initiation and progression of breast cancer,[30] as well as cancer of the colon, prostate, pancreas, lung, stomach and esophagus.[31] Meat also contains polycyclic aromatic hydrocarbons, N-nitroso compounds and heme iron, all of which may increase risk of colon cancer.[32] These harmful compounds are increased when meat is grilled or barbecued.

Being higher on the food chain, meat accumulates toxins such as PCBs and dioxin, which are known carcinogens and hormone disruptors linked with breast cancer.[33] Approximately 90-98% of human exposure to dioxins and PCBs comes from our diet, with meat, fish and dairy being the predominant sources.[34] Even organic meat will contain PCBs and dioxin.

A high meat diet causes greater reabsorption of estrogen through the intestinal wall. Meat eaters will therefore have higher estrogen levels than vegetarians, which can make them more susceptible to breast cancer.[35]

Food Tip: Avoid or minimize meat intake.

Minimize or Avoid Fish

Although purified fish oils have anti-inflammatory and anti-cancer benefits, fish themselves may contain mercury, arsenic, cadmium, PCBs, dioxins and PBDEs, potentially increasing cancer risk.[36] Dried fish increase the risk of stomach cancer,[37] and preliminary studies suggest that high fish intake may increase endometrial cancer.[38] Pregnant or nursing women who consume fish may be transferring a higher level of hormone disrupting chemicals to their children,

making them more susceptible to hormonally based cancers later in life.

In contrast, docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA) inhibit a variety of cancers by increasing apoptosis[39] and modulating the activity of the pro-inflammatory TNF family cytokines.[40] Purified fish oils, therefore, can be taken to inhibit cancer growth.

Food Tip: Avoid fish, but do use purified fish oil as a supplement.

Avoid or Minimize Dairy Fat

Studies on dairy and cancer are mixed, with many studies showing no relationship between dairy intake and cancer risk. However, some studies suggest increased breast, prostate, pancreatic[41] and hepatocellular[42] cancer risk with consumption of dairy fat.

One of the mechanisms that may link dairy fat to cancer is that high fat dairy can increase insulin growth factor 1 (IGF-1) levels.[43,44] IGF-1, a hormone produced in the liver, increases risk of both breast cancer and prostate cancer.[45] One study showed that premenopausal women with high levels of IGF-1 in their blood were seven times more likely to develop breast cancer than women with low levels,[46] while men with the highest levels of IGF-1 were four times as likely to develop prostate cancer as men with the lowest levels.[47] A 1995 study in rats published in the *Journal of Endocrinology* found that casein, a protein found in milk, slows down the breakdown of IGF-1, allowing it to circulate in blood at higher levels for longer periods of time.[48]

A large, case-control study in France in 1986 found that women who ate cheese regularly had 50% more risk of breast cancer than women who didn't eat cheese and those who drank milk regularly had 80% higher risk of breast cancer.[49]

Food Tip: Avoid or minimize dairy, especially dairy fat.

Avoid Sweets – Sugar, Honey, Maple Syrup, Fruit Juice, Soft Drinks etc.

Cancer cells derive their energy from glucose. Glucose increases insulin and IGF-1 levels, which stimulate cancer growth when receptors for these hormones are present. Esophageal cancer is associated with higher glycemic load in dietary patterns.[50] There is also a correlation between high intake of sweets and localized breast cancer in young women.[51] A low sugar diet and avoidance of refined carbohydrates with a high glycemic index may be protective.

Sugars and refined carbohydrates may also promote an overgrowth of unwanted organisms in the intestinal tract, such as *Candida* spp and parasites. Cancer patients are prone to candidiasis when their immune systems have been suppressed during and after chemotherapy and radiation,[52] or after antibiotic use. Care should be taken to identify patients with Candida overgrowth and recommend a diet that discourages fungal growth.

Food Tip: Avoid refined carbohydrates, sugars and high glycemic sweeteners. Choose carbohydrates that have a low glycemic index, such as most legumes, pearl barley, quinoa and green vegetables.

Avoid Alcohol

Alcohol consumption causes individuals to be more susceptible to cancer of the liver, colon, oral cavity, esophagus, rectum, pancreas and breast.[53,54] A weekly intake of up to one drink a day will increase risk. Women who have even one drink a day have an 11% higher risk of breast cancer.[55] In one study, the breast cancer risk was increased 250% in women who drank two or more alcoholic beverages per day.[55] Alcohol may interfere with the liver's ability to detoxify both chemicals and excess estrogen in the body. It is believed that chronic alcohol intake can induce cancer through several mechanisms: 1) induces DNA damage from acetaldehyde, the primary metabolite of alcohol; 2) contributes to oxidative stress and; 3) interference with DNA methylation, leading to chromosome instability.[56]

Use Plant-Based Sources of Protein

A vegetarian diet includes more fibre (which lowers estrogen, insulin and IGF-1), is more alkaline, and keeps estrogen and IGF-l levels lower. It also decreases inflammation.

Although there is little published research on the effects of a more alkaline milieu and cancer suppression, one study suggests that the external pH of solid tumors is acidic because of increased metabolism of glucose. In a mouse model experiment, an acid pH surrounding a tumor was shown to stimulate tumor cell invasion and metastasis, while oral NaHCO(3) selectively increased the pH of tumors and reduced the formation of spontaneous breast cancer metastases. The treatment significantly increased the extracellular pH, but not the intracellular pH, of the tumors.[57]

Another study confirms that increased intake of fruits and vegetables and decreased consumption of meat, creates a more alkaline urine.[58]

A 2014 study showed that individuals between 50-65 years of age who had a high animal protein intake had a 75% increase in overall mortality and a 4-fold increase in cancer death risk during the 18 years of the study, in comparison to those with either a low protein intake or those whose protein was plant based. [59] Another study on mice found that a diet containing 20% plant protein inhibited tumor weight by 37% as compared to a 20% animal protein diet.[60] An intake of 0.8 grams of vegetarian protein per kg of body weight (or approximately 35-60 grams) is adequate to meet adult protein needs.[59]

Food Tip: Adequate plant-based protein could include the following daily combination: 1 cup of cooked legumes, 1/2 cup firm tofu, ½ cup quinoa and 2 tbsp. of nuts or seeds. Legumes include kidney beans, soybeans, chickpeas, split peas and lentils. Include 10-20 grams of organic soy protein as part of total protein intake to reduce risk of breast[61] and prostate[62] cancers.

FOOD	PROTEIN CONTENT (GRAMS)	QUANTITY REQUIRED
Miso	5.9	½ cup
Tofu, silken	8.1	½ cup
Tofu, firm	15.6	½ cup
Soybeans, boiled	16.6	½ cup
Soybeans, dry-roasted	39.6	½ cup
Soy milk	5.6	1 cup
Tempeh	19.0	½ cup
Soy protein powder	58.1	1 ounce
Kidney beans	15	1 cup, cooked
Lentils	16	1 cup, cooked
Split peas	17	1 cup, cooked
Chick peas	14.5	1 cup, cooked
Almond butter	5	2 tbsp
Almonds	2.8	12
Sunflower seeds	6.5	1 oz
Pumpkin seeds	7	1 oz (142 seeds)
Sesame seed butter	2.6	1 tbsp
Hemp seed	5	1 tbsp
Flaxseed	2.5	1 tbsp
Quinoa	8.1	1 cup

Use Soy (Organic), Which Contains Genistein.

Genistein influences enzymes that regulate cell growth and division, and has anti-oxidant properties. It induces apoptosis, or programmed cell death, in damaged or cancerous cells of the breast,[63] ovary[64] and prostate.[65] Genistein inhibits the formation of blood vessels that feed cancerous tumors (angiogenesis) helping to starve tumors of their blood supply.[66] A genistein-supplemented diet in studies with mice with breast tumors was found to reduce lung metastases 10-fold.[67]

Soy isoflavones decrease the invasiveness (adhesion and motility) of breast cancer cells[68] and regulate genes and cellular signaling involved with tumor initiation, promotion and progression.[69] A diet high in soy may also reduce IGF-1 levels,[70] inhibiting cancer growth.

Food Tip: Use 10-15 grams of organic soy protein in food form (tofu, tempeh, soy milk) daily or several times a week.

Consume at Least 8 Servings of Fruits and Vegetables Daily

The following chart outlines protective phytochemicals, their mechanism of action, and in which foods they are found.

Cancer Fighting Phytochemicals Found in Fruits and Vegetables

PHYTO-CHEMICAL	MECHANISM OF ACTION	FOOD SOURCES
ALLYL SULFIDES	Increases liver enzymes to detoxify carcinogens.[71]	garlic, onions, leeks
CAPSAICIN	Induces apoptosis in cancer cells.[72]	chili peppers
CAROTENOIDS	Neutralize free radicals, enhances immunity, induce apoptosis,[73] promotes cell differentiation.[74]	parsley, carrots, spinach, kale, winter squash, apricots, cantaloupe, sweet potatoes, seaweed
POLYPHENOLS	Neutralize free radicals reduce damaging effects of nitrosamines. Down-regulates tumor necrosis factor, inflammatory cytokines and NfkB.[75]	broccoli, carrots, green tea, cucumbers, squash, mint, basil, citrus
FLAVONOIDS	Block hormone receptor sites, preventing attachment of cancer-promoting hormones. Activate BRM, an anti-cancer gene.[76]	most fruits and vegetables, including parsley, carrots, citrus, broccoli, cabbage, cucumbers, squash, yams, eggplant, peppers, berries
CURCUMIN	Assists liver in detoxifying carcinogens. Anti-inflammatory; inhibits proliferation and induces apoptosis in cancer cells.[77]	turmeric
ELLAGIC ACID	Neutralizes carcinogens in the liver, antioxidant, inhibits cancer cell division, induces apoptosis in cancer cells.	red raspberries, walnut skin
PUNICIC ACID	Inhibits growth and induces apoptosis in breast and prostate cancer[78] cells.	pomegranate seed and oil
URSOLIC ACID	Induces apoptosis in breast, colon, bladder, and prostate[79] cancer cells.	loquat leaf, Greek sage, rosemary
EUCALYPTOL	Induces apoptosis in cancer cells.[80]	rosemary, cardamom, eucalyptis essential oil
ISOFLAVONES (GENISTEIN AND DAIDZEN)	Binds to estrogen receptors, preventing harmful estrogens from binding; blocks formation of blood vessels to tumors, inhibits enzymes associated with tumorogenesis; inhibits activation of breast cancer genes.	soybeans, tofu, miso, lentils, dried beans, split peas, garbanzo beans, green beans, green peas, mung bean sprouts, red clover sprouts
INDOLES	Induce protective liver enzymes, stimulate healthy C2 estrogen production; decrease C4 estrogen that initiates breast cancer.	raw cabbage, broccoli, Brussels sprouts, kale, cauliflower, bok choy, kohlrabi, mustard, turnips
ISOTHIOCYANATES	Prevents DNA damage; blocks production of tumors induced by environmental chemicals, assists liver detoxification.	mustard, horseradish, radishes, turnips, cabbage, broccoli, cauliflower, Brussels sprouts, kale, bok choy, watercress, garden sorrel
LIMONOIDS	Induces protective enzymes in liver and intestines.	citrus fruit rind, essential oils of lemon, orange, celery, lemongrass
LINOLENIC ACID	Regulates production of beneficial prostaglandins.	flaxseeds and flaxseed oil
LYCOPENE	Neutralizes free radicals. Causes cell cycle arrest and induces apoptosis.[81]	tomatoes, red grapefruit, guava
LUTEIN	Neutralizes free radicals.	spinach, kiwi, tomato, grapes
MONOTERPENES	Induces protective enzymes, inhibits cholesterol production in tumors, stimulates destruction of breast cancer cells, inhibits growth of cancer cells.[82]	cherries, lavender, parsley, yams, carrots, broccoli, cabbage, basil cucumbers, peppers, squash, eggplant, mint, tomatoes, grapefruit
PHENOLIC ACIDS	Blocks effects of free radicals; inhibits formation of nitrosamine.	berries, broccoli, grapes, citrus, parsley, peppers, soy, squash, tomatoes, grains
PLANT STEROLS (BETA-SITOSTEROL)	Causes cell cycle arrest in breast cancer cells[83] and lowers fat levels in the body.	broccoli, cabbage, soy, peppers, whole grains
PROTEASE INHIBITORS	Blocks activity of enzymes involved in the growth of cancer.[84]	beans and soy products
QUERCETIN	Slows down cancer cell division.	onions, apples, green cabbage
QUINONES	Neutralizes carcinogens.[85]	rosemary, pau d'arco tea
SULFORAPHANE	Increases ability of the liver's detoxifying enzymes to remove carcinogens.	broccoli sprouts, broccoli, cauliflower, Brussels sprouts

Fresh Vegetable Juices

The cancer-protective phytochemicals listed in the chart above are found primarily in vegetables and fruits. One of the ways to ensure a high intake of these nutrients is through juicing vegetables. Many cancer therapies, such as Gerson therapy, recommend several glasses a day of vegetable juice. A vegetable base to begin with can be carrot, celery, kale and beet.

Food Tip: Consume one or more glasses of fresh vegetable juice daily, and add freshly ground flaxseeds to juice before drinking to decrease the glycemic load. Save the pulp to use in veggie burgers or soup broth.

Consume Brassicas Daily

The brassica family includes cabbage, kale, broccoli, cauliflower, Brussels sprouts, kohlrabi, turnip, rutabaga, garden sorrel, radish, watercress and collards. All of the brassicas contain the phytochemical, indole-3-carbinol, which at 300 mg. daily, doubles C2 hydroxyestrone (a protective estrogen metabolite) and decreases C16 hydroxyestrone (a harmful estrogen metabolite), reducing risk of hormonally driven cancers. This amount would be found in 1/3 of a head of raw cabbage. Indole-3-carbinol decreases the likelihood of metastases in prostate, endometrial and breast cancer[86] cells.

Brassicas also contain thiols, which improve liver detoxification, and isothiocyanates, which help to prevent DNA damage. Cruciferous vegetables may reduce risk of gastric and lung cancers.[87]

Broccoli sprouts and watercress are high in sulforaphane, which improves liver detoxification and protects from environmental chemicals. Sulforaphane inhibits growth of various cancer stem cells.[88]

A word of caution with the raw brassicas - they may interfere with thyroid function and cause a rise in TSH unless a source of iodine, such as sea vegetables is used as well. Check TSH levels every few months to assess thyroid function.

Food Tip: Consume at least 1/2 cup daily of brassicas. Include coleslaw 3x a week.

Watercress

Watercress contains sulforaphane and helps to suppress the invasiveness of breast cancer cells[89] and causes apoptosis (cell death) in breast cancer cells.[90]

Food Tip: Use watercress in soups and salads.

Seeds, Sprouts and Cereal Grasses

Seeds, sprouts and cereal grasses are rich in protective phytoestrogens, vitamins, minerals and enzymes. The sprouts highest in phytoestrogens include clover, mung bean, soybean, yellow pea, green lentil, chick pea, fenugreek and adzuki bean.

Seeds high in phytoestrogens include flax, pumpkin and sunflower. Phytoestrogens offer a protective effect by binding to estrogen receptors, displacing the body's stronger estrogens, estradiol and estrone.[91]

Barley greens decrease proliferation and increase apoptosis of leukemia and lymphoma cells while wheat grass[92] has been shown to induce apoptosis and arrest cell division in human breast and cervical cancer cells.[93]

Food Tip: Include seeds, sprouts and cereal grasses in the daily diet.

Consume Flaxseed Daily

Flaxseeds contain lignans, which have anti-viral, anti-bacterial and anti-fungal properties. Flaxseeds inhibit the growth of breast[94] and prostate[95] cancer. In studies with mice, a diet containing 10% flaxseed reduced breast cancer tumor cell proliferation and increased apoptosis, causing decreased tumor size by 74% in the presence of high estradiol levels and 22% when estradiol levels were low. It increased the inhibitory ability of Tamoxifen at both low and high estradiol levels.[96]

Food Tip: Eat at least 2 tbsp of freshly ground flaxseeds daily, added to cereal, smoothies, juice, soups, or salads.

Fiber

We need both soluble and insoluble fiber in our diets. Dietary fiber improves elimination, decreases a tendency to constipation, helps to eliminate toxins through the bowel, maintains the health of the intestinal flora and decreases cancer risk. Wheat bran and psyllium, when used together, confer protection from breast cancer.[97] A high fiber diet also offers protection from prostate and colon cancer.[98]

Food Tip: Consume a combination of bran, psyllium, ground flaxseeds, chia seeds and legumes regularly, for an optimal 45 grams of fiber daily.

Consume Garlic, Onions and Leeks

Garlic helps prevent the initiation, promotion and recurrence of many cancers, including breast cancer.[99] Garlic is high in the trace mineral selenium, which can inhibit cancer growth.[100] Garlic's antibacterial, antifungal and anti-viral properties may deter cancers related to infectious organisms (*H. pylori* in stomach cancer; HPV in cervical cancer). The garlic family contains sulphur-bearing amino acids and allyl sulfides, which help with liver detoxification.

Food Tip: Consume 3 cloves of raw garlic daily, added to salads, stir-fries and green smoothies.

Sea Vegetables

Sea vegetables include arame, nori, hijiki, kelp, dulse, wakame, kombu and mekabu. They are rich in minerals and confer increased alkalinity to the body. Sea vegetables are high in iodine, which

suppresses the development and size of both benign and malignant tumors.[101] The high consumption of seaweed in Japan has been associated with their low breast cancer incidence. Studies on rats show that kelp inhibits the binding of estradiol to alpha and beta estrogen receptors and reduces serum estradiol levels.[102] Mekabu causes apoptosis in breast cancer cells.[103] Brown seaweeds have anti-inflammatory, anti-microbial, anti-viral and anti-tumoral properties.[104]

In addition, brown seaweeds can help to protect us from radiation toxicity, as they contain sodium alginate, which binds to radioactive molecules so they can be excreted.[105]

Food Tip: Consume sea vegetables daily in soups or salads, unless there is hyperthyroidism or autoimmune thyroid disease.

Consume Lycopene, Found in Tomatoes, Guava, Watermelon, Grapefruit, Rosehips

Lycopene is a form of carotene and antioxidant, reducing susceptibility to ovarian,[106] prostate,[107] breast,[108] cervical, oral and esophageal cancer. It gives the red color to fruits and vegetables. Tomatoes are its highest source, comprising 80% of dietary lycopene. Lycopene is 5x more bioavailable when tomatoes are cooked, and olive oil improves its absorption.

Food Tip: Use tomato sauce or stewed tomatoes weekly in your cooking. Limit tomatoes and use guava instead if you experience joint pain.

Flaxseed Oil Inhibits Breast and Colon Cancer

Flaxseed oil improved the effectiveness of Herceptin on breast cancer cells when used with it in a mouse study.[109] Flaxseed oil reduced breast cancer tumor size by 33%, tumor cell proliferation by 38%, and increased cell death by 110% when added to the diet in studies on mice.[110] Flaxseed oil makes Tamoxifen more effective in reducing the growth of ER+ breast tumors.[111] In studies on rats, colon cancer is inhibited by flaxseed oil.[112]

Food Tip: Use 2 tbsp of unheated flaxseed oil daily as part of your diet. Keep refrigerated.

Olive Oil is Protective

Olive oil has anti-inflammatory and anti-cancer effects.[113] Olive oil contains oleic acid (omega 9), which is anti-HER2, and slows growth of HER2 driven breast cancer.[114] When cooking with olive oil, add a small amount of water to the pan first, then add the olive oil, so that its temperature is not higher than that of boiling water.

Food Tip: Use olive oil and garlic liberally in salad dressing.

Use Foods to Aid Glycemic Control

Elevated blood sugar and insulin resistance encourage the growth of many forms of cancer, including breast and prostate. Along with maintaining a low sugar, low glycemic diet, foods that can be added to the diet to regulate blood sugar are listed below.

Food Tip: Add cinnamon, berries, chamomile tea, garlic, onions, leeks, chives, parsley, avocado, olive oil, flaxseed, oat bran, psyllium, lemon and prickly pear cactus[115] to your diet to regulate blood sugar levels.

Include Shiitake and Oyster Mushrooms

Shitake mushrooms have traditionally been used to treat cancer, rheumatoid arthritis, poor circulation, parasites, lack of stamina, and cerebral hemorrhage. Lentinan, from shitake mushrooms, increases the number of macrophages, T-killer cells and T-helper cells and prolongs the life of some cancer patients.[116] Oyster mushrooms inhibit breast cancer cell growth.[117]

Food Tip: consume 3-4 shiitake or oyster mushrooms a day for a month at a time, taking a break for a week and then include them in your diet again.

Use Turmeric Liberally

Turmeric has antioxidant, anti-tumor and anti-inflammatory activity. Curcumin, the main active ingredient in turmeric, is thought to prevent the formation of a blood supply to cancerous tumors, so they are less able to proliferate. It actively targets stem cells of various cancer lines (brain, head, neck, breast, lung, colorectal, pancreatic) that may be resistant to chemotherapy.[118]

Curcumin reduces the growth of both hormone-dependent and hormone-independent breast cancer cells.

Food Tip: Have one tbsp or more of turmeric powder daily. Absorption is best when heated with oil and taken with black pepper, so consider adding it to stir-fries and soups.

Grow and use Greek Sage (*Salvia triloba*) as tea or add to food

Greek sage contains the highest amount of ursolic acid (as do rosemary, lavender, winter savory, thyme), which is antimicrobial, anti-tumor and anti-inflammatory. It inhibits the growth of *Candida*, *staphylococci*, and Epstein-Barr virus and is active against many forms of cancer.[119]

Food Tip: Consider growing your own Greek sage and using it in tea.

Use Rosemary in Tea and Cooking

Rosemary contains the essential oil eucalyptol, which helps to kill *Candida albicans*, bacteria and parasites. It also contains ursolic acid, which helps to kill breast cancer cells. Rosemary contains a phytochemical called a quinone that acts to neutralize carcinogens. An extract of rosemary leaves increased the 2-hydroxylation of estradiol and estrone by 150% in mice to form more of the "good" C-2 estrogen and decreased the formation of the "bad" C-16 estrogen by 50%. It also increased the linking of estradiol and estrone to form the glucuronide complex in the liver, allowing estrogen to be eliminated more effectively. Thus rosemary can reduce the risk of estrogen related cancers.

Food Tip: Grow rosemary indoors and pour boiling water over a sprig to make tea.

Add Goji Berries to Salads, Cereals, Snacks

Goji berries are one of the highest food sources of antioxidants. They also regulate estrogen metabolism and inhibit growth of breast cancer cells dependent on estrogen[120] by increasing the formation of the protective C2 hydroxyestrone.[120]

Food Tip: Add goji berries to cereals, salads and snacks.

Use Spices that Inhibit NF-kB, a Switch that Activates Cancer Genes

NF-kB is cancer's master switch, which activates more than 400 genes involved in tumour proliferation, survival, angiogenesis and invasiveness. The triggers to activate NF-kB are carcinogens, oxidation, viral infection, inflammation, radiation, chemotherapy and stress.[121]

The spices listed below inhibit NF-kB and can be included in our daily diets.

Food Tip: Use anise, basil, black pepper, caraway, cardamom, chili pepper, cinnamon, clove, coriander, cumin, fennel, fenugreek, flaxseed, garlic, ginger, Holy basil, lemongrass, licorice, mint, mustard seeds, nutmeg, oregano, parsley, rosemary, saffron, tamarind, turmeric[122] to deter cancer.

Use Antioxidant Rich Foods and Spices

Antioxidant containing foods can be divided into 4 primary categories:

Legumes: small red bean, kidney bean, pinto bean, black bean, navy bean

Berries: goji, blueberry, raspberry, strawberry, cranberry, blackberry, amla (Indian gooseberry)

Tree Fruit: apple, cherry, plum, pear, orange

Nuts: pecan, macadamia, walnut

Other foods rich in antioxidants include raw cacao powder, white tea, green tea and dark chocolate (unsweetened of course).

Spices and herbs also contain high amounts of anti-oxidants. The richest in amount of antioxidants of these, in descending order are: cloves, peppermint, allspice, cinnamon, oregano, thyme, sage, rosemary and saffron.[123]

Food Tip: Include at least one serving of food from each of the antioxidant food categories in your daily diet. Use herbal teas such as chai, rosemary, peppermint, sage and green or white tea.

Pomegranate

Pomegranate extracts have been shown to prevent proliferation of stem cells and can cause apoptosis (cell death) in breast cancer cells, as well as reducing angiogenesis (blood supply). Pomegranate extracts contain ellagic acid, ursolic acid and luteolin, all of which reduce cell proliferation and can act as aromatase inhibitors[124] Pomegranate extracts are strongest when fermented and have a synergistic effect with soy in cancer prevention.[125] Pomegranate seed oil contains punicic acid, which inhibited ER+ and ER- breast cancer cells in a laboratory setting by more than 90%[126]

Food Tip: Use pomegranate in salads, cereals, juices and snacks.

Rotate Your Foods

Consuming the same foods day after day can lead to the development of sensitivities to those foods, which may result in weakened immunity. Brewer's and baker's yeast, wheat, gluten, eggs, sugar, peanuts, citrus, corn, dairy and tomatoes are common allergies. Tofu and soy products can also provoke sensitivities in some people.

Food Tip: Prepare a diet plan that rotates foods frequently.

Practice Fasting Once Weekly, Consuming Less than 500 Calories During that One Day

Intermittent fasting helps to reset IGF-1 and insulin to normal levels. Studies demonstrate intermittent fasting and chronic caloric reduction to be equivalent in causing weight loss, which will deter many forms of cancer. Intermittent fasting can reduce visceral fat stores, insulin-like growth factor 1 (IGF-1) levels and cell proliferation, and increase insulin sensitivity and adiponectin levels.[127]

With the dietary guidelines suggested in this paper, you can reduce your risk of developing various forms of cancer and can help patients recover from existing cancers.

About the Author

Sat Dharam Kaur has been practicing as a naturopathic physician since 1989. She is the author of The Complete Natural Medicine Guide to Breast Cancer and the Complete Natural Medicine Guide to Women's Health and specializes in treating cancer and women's health issues at Trillium Healing Arts in Owen Sound, Ontario. She travels extensively facilitating the Healthy Breast Program, creating an international network of Healthy Breast Educators to help reduce the global burden of breast cancer through education in prevention. Sat Dharam co-produces a monthly ezine related to breast health and is co-founder of the MammAlive Foundation for Women's Health and Education. When at home, Sat Dharam enjoys living on an off-the-grid organic farm with her husband and family.
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