Consensus is emerging in the scientific and medical literature that what we eat or fail to eat is an important contributor to the incidence and prevalence of cancer. Many foods, herbs, and nutritional factors have been identified as being cancer-protective. What remains more elusive is the degree to which various combinations of foods, herbs, and nutrients can ameliorate or reverse an existing progressed cancerous situation. The international data points to dozens of natural and non-toxic substances that negate cancer in the test tube and in animal experiments, and yet no conclusive human trials have heralded a cure for existing cancers.

There is no doubt, however, that diet and nutrition play a fundamental role in a cancer patient’s recovery process. Major institutions such as Memorial Sloan-Kettering Cancer Center in New York City and the University of Texas MD Anderson Cancer Center in Houston, Texas are finally evaluating comprehensive programs for people with cancer, treating them with current medical oncological procedures along with natural health practices.

Nutrition and the Allopathic Treatment of Cancer

There are three primary strategies for skillfully complementing the allopathic treatment of cancers:

- Advise all patients and their family members to follow a cancer-preventive diet. The American Cancer Society and numerous studies indicate the benefit of a plant-based, whole food diet. The Eating For Health™ model recommends these four principle food groups as the staple foods in the diet (also see chart on the next page):
  - Fresh fruits;
  - Fresh vegetables;
  - Seeds; and
  - Whole grains and legumes.

- Additional booster foods, consisting of:
  - Spirulina;
  - Nutritional yeast;
  - Sea vegetables;
  - Herbal teas; and
  - Culinary spices.

- Occasional foods, eaten in moderation may include:
  - Poultry;
  - Eggs; and
  - Dairy products from organic free-range animals.
### Eating for Health

**A Rejuvenating Food System**

© by Edward Bauman, Ph.D.

Organic, Seasonal, Nutrient-rich, and Individualized

<table>
<thead>
<tr>
<th>Daily Servings</th>
<th>SEEDS/OILS</th>
<th>PROTEIN</th>
<th>LEAFY VEGETABLES</th>
<th>CRUNCHY VEGETABLES</th>
<th>UNREFINED STARCHES</th>
<th>SEASONAL FRUIT</th>
<th>BOOSTER FOODS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-3</td>
<td>2-4</td>
<td>1-3</td>
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<td>2-4</td>
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</table>

**Serving Size**

<table>
<thead>
<tr>
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<th>UNREFINED STARCHES</th>
<th>SEASONAL FRUIT</th>
<th>BOOSTER FOODS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Tbsp. oil</td>
<td>3 oz. animal</td>
<td>1 cup</td>
<td>1/2 cup</td>
<td>1/2 cup root vegetable, grains, bread.</td>
<td>1/2 cup or 1 med. piece</td>
<td>1 tsp. to 1 Tbsp.</td>
<td></td>
</tr>
<tr>
<td>2 Tbsp. seeds</td>
<td>6 oz. vegetable</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Examples**

<table>
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</tr>
</thead>
</table>
Optimum Nutrition For Cancer Control—CONTINUED

Educate and support patients with cancer through their treatment and recovery with a Cancer Recovery Diet (Bauman, 2000), plus a well-considered supplement program based on the individual client’s constitution, condition, context, and commitment.

Conduct research on the therapeutic outcome, using nutrition as an adjunct to oncological treatment in order to:
- Improve treatment tolerance;
- Shorten recovery time;
- Protect non-malignant cells;
- Improve digestive competency;
- Decrease treatment morbidity (side effects); and
- Increase survival time.

A Cancer Recovery Meal Plan

Cancer patients often lose their sense of taste, have diminished appetites, and experience difficulty swallowing and digesting food during and after treatment. Fresh, wholesome, and appetizing natural foods, simply cooked and easily prepared, should form the basis of the cancer recovery diet. A structured but non-rigid food plan is helpful. It is good to work out an individual nutritional program with the patient and his/her family that takes into account their ethnicity, skill in food preparation, health status, and gastrointestinal competency.

A sample meal plan might consist of the following:

**BREAKFAST**
- Protein smoothie
- Siberian ginseng or green tea

**LUNCH**
- Poached salmon, steamed broccoli, and baked yam
- Fresh juice: carrot, apple, beet, cucumber, or cabbage

**DINNER**
- Miso soup with tofu and ginger
- Stir-fry chicken, shiitake mushrooms, carrots, and onions
- Brown basmati rice
- Chamomile, lemon grass, and spearmint tea with milk thistle or reishi extracts

**SNACKS/DESSERTS**
- Fresh fruit, seeds, nuts, yogurt, soy milk, lemonade

A recovery diet would minimize the intake of:
- Caffeinated beverages
- Refined sugar
- Artificial sweeteners
- Fried foods
- Margarine
- Lunch meats
- Smoked or charred foods
- Processed snack foods such as chips, cookies, and pastries
- Tobacco
- Unnecessary drugs
- More than two alcoholic beverage servings per day
Dietary Macronutrients and Cancer

Lipids and Cancer
Too much fat in the diet is linked with increased tumor growth. This may be the result of fats stimulating the multiplication and spread of cancer cells, fats inhibiting the immune system, or both. The bulk of the oil in the diet should come from plant-based monounsaturated fatty acids found in olive, avocado, almond, and sesame oils. Canola oil, which is reputed to be high in monounsaturated oils, is highly refined, losing much of its beneficial fatty acids. Poultry, meat, and dairy fats should be kept to a minimum. Ghee, or clarified butter, can be used for sautés and in topical skin salves.

Linoleic and linolenic acid
Not all fatty acids are created equal when it comes to treating cancer. Linoleic acid (LA), an Omega-6 fatty acid and the most common fatty acid in the human diet, is abundant in corn, safflower, sunflower, and soy oils and in most prepared foods. It is a precursor for the pro-inflammatory prostaglandin E2 series (PGE2). PGE2 reduces the ability of macrophages and natural killer (NK) cells to kill cancer cells.

Linolenic acid (Omega-3 fatty acids) inhibits the Omega-6 fatty acids by competing for the same enzyme. When fish, flax, and algae are added to the diet, the beneficial E2 prostaglandins are increased. More PGE1 means less PGE2. This ratio is crucial to cancer prevention and treatment. The healthy ratio of dietary Omega-3s to Omega-6s is approximately 1:4. When taken in supplement form, a ratio of Omega-3s to 6s can be 2:1, or one can simply add additional Omega-3 oils to an Eating For Health™ food plan.

The total amount of fat in the diet is also important. Natural killer cell activity is increased when fat intake is decreased to 25% calories from fat. For those with hormone-dependent cancers such as breast cancer, a very low-fat diet (less than 20% calories from fat) may slow the spread of cancer. A non-dairy, seafood, vegetarian diet will facilitate bringing the fat grams down to a healthy and therapeutic level. The total fatty acid picture can be assessed using a red blood cell fatty acid panel.

When supplementing with Omega-3-rich fish or flax oil (1-6 caps per day), add extra Vitamin E at a rate of 100 IU per gram of Omega-3. In animal experiments, the Omega-3 oils taken with Vitamin E increased the uptake of chemotherapy drugs.1 Haas reported in 1998 that one of the most important benefits of Omega-3 fatty acids is their ability to choke off the blood supply to small tumor cells poised to grow and spread throughout the body.2

During chemotherapy, tumors often become resistant to cancer-fighting drugs. Omega-3 fatty acids can make these refractory tumors sensitive to drug treatment. One study showed that after only five weeks of supplementation with Omega-3s, the cell membranes of leukemic cells become saturated with Omega-3 fatty acids. Haas stated in 1998 that studies showed that EPA and DHA can also help kill cervical cancer cells resistant to chemotherapy.2

There are a number of mechanisms by which Omega-3 fatty acids may inhibit cancer initiation and progression. These include:
Increased membrane fluidity;
- Better cell uptake of nutrients;
- Better clearance of metabolic waste;
- Increased free radical protection;
- Increased PGE3 production;
- Reduced platelet aggregation;
- Decreased production of angiogenic factors; and
- Decreased cachexia.

Other lipid substances, such as medium chain fatty acids (MCTs), found in fresh coconuts or in coconut fraction powders, when placed in meal replacement drinks, are easily metabolized and provide a good source of energy and fat that supports the nervous and endocrine systems. MCTs are very beneficial during chemotherapy and radiation treatments.

Greenland shark liver oil has been tested for antitumoral activity. An increased regression of tumor growth was reported in cervical cancer patients receiving extracts of Greenland shark liver oil prior to radiotherapy. The active constituents in the oil are thought to be alkoxyglycerols, natural components of human bone marrow and mother's milk.

Protein and Cancer

Protein is the source of amino acids that the body uses to build and repair tissue. A simple way to establish the amount of protein needed by a healthy person is to divide his or her ideal weight in half and eat that many grams of protein per day to maintain well-being. For example, a 150-pound person would benefit from 75 grams of protein per day to maintain well-being. For example, a 150-pound person would benefit from 75 grams of protein per day. Proteins are essential for enzyme and hormone production. Protein is the major structural molecule of the body; 20 to 30 pounds of an adult’s weight are protein, with 50% being in the muscles.

Opinions vary with regard to protein and cancer. In an immune-compromised condition, protein requirements increase. The cancer cells change the metabolism of protein so that more amino acids are available for tumor growth. This translates into a loss of muscle tissue and predisposes cancer patients to a state of negative nitrogen balance. Protein is needed for the formation of body tissue, enzymes, antibodies, hemoglobin, and hormones. Cancer interferes with protein metabolism by burning some of the body’s proteins for fuel, even when carbohydrates and fats are present.

Natural therapy programs, such as the Gerson Program and that of the Optimal Health Institute, which is based on the work of Ann Wigmore, emphasize a low-protein, living foods diet for cancer patients. This approach contends that uncooked food contains abundant enzymes that are destroyed by the cooking process, rendering cooked food more difficult to digest and assimilate than so-called living food. These low-protein diet programs are embedded in a well-designed format of detoxification practices using foods, herbs, wheat grass, algae, sprouts, and rigorous liver- and colon-cleansing procedures. It is presumed that in the
absence of typical amounts of dietary protein, the body will have a greater cleansing action and metabolize diseased tissue with the greater pool of circulating enzymes. It is advisable for patients to work under the supervision of a practitioner or clinic well trained in these procedures, rather than undertaking such a program at home.

**Carbohydrates and Cancer**

Carbohydrates are the water-soluble starches and sugars in foods that provide energy for the body. They are modulated by insulin, a pancreatic hormone. An unregulated high blood sugar level can feed tumors and suppress the immune system. Without a doubt, a diet high in simple carbohydrates, such as refined sugar, refined white flour, alcohol, and various sugar substitutes, does not belong in a cancer-protective diet. According to Barry Sears, Ph.D., author of *The Zone Diet*, as Americans have lowered their consumption of protein and fatty acids, thereby eating a largely carbohydrate diet, the incidence of obesity, cancer, and heart disease has risen precipitously.5

What Sears fails to clarify is the major difference between the beneficial complex carbohydrates and the detrimental refined carbohydrates. Complex carbohydrates will provide necessary co-factors for their proper metabolism, such as the B-complex group, zinc, magnesium, chromium, and Vitamin E. Refined carbohydrates are sadly lacking in these natural ingredients. Americans have been sold on the argument that synthetic vitamins added to cereals and pastry products are as good as, if not better than, plant-based nutrients from the soil. This definitely is not the case.

Simple sugars are present in virtually all packaged foods, condiments, and even medicines. Some names of sugars to look out for are:

- Fructose;
- Glucose;
- High fructose corn syrup;
- Lactose;
- Milk sugar;
- Dextrose;
- Maltose;
- Barley malt;
- Brown rice syrup;
- Honey;
- Molasses; and
- Fruit juice concentrate.

No more than 20% of the carbohydrates in the diet should be from this group. Fresh fruit, while mostly carbohydrate, contains soluble fiber, pectin, Vitamins A, B complex, C, bioflavonoids, magnesium, potassium, water, and phytochemicals. When that fruit is processed, concentrated, frozen, and served to you as juice, much of the useful non-carbohydrate co-factors are lost.

Nan Fuchs, Ph.D., author of *Nutrition Detective*, suggests you keep your “carbohydrates complex and your life simple.”
Cancer Loves Calories
High calorie intake has been associated with increased cancer risk, independent of fat intake. A review of data from 100 animal experiments found that both high-calorie and high-fat diets independently increased spontaneous mammary tumor incidence. The effect of a high-fat diet was two-thirds the magnitude of the high-calorie effect. Other researchers have reported that a small reduction in calorie consumption (12%) substantially reduces mammary tumor development in animals, whereas large reductions of fat are required to reach the same effect.

Diets high in fat or calories have been associated with five of the six most common cancers: Breast; Colorectal; Pancreatic; Prostatic; and Uterine; but Not lung.

One mechanism by which high-calorie diets may increase cancer incidence is by increasing insulin production, disrupting metabolism, and, therefore, increasing free radical generation.

In 1998, Monsanto sought fast-track approval from the FDA for a new artificial sweetener, Neotame, which is 800 times sweeter than cane sugar. Approval was granted in 2002 for this unique (and questionable) “food.” Can this even be considered a food, if it provides no nutrients or calories? NutraSweet has been found to be a brain chemistry-altering substance (excitotoxin) in people with sensitivities, including children, the elderly, and the infirm. These artificial sweeteners contribute to the body burden of chemicals that the liver and immune system must address and dispose of. They do not belong in a cancer-protective Eating For Health™ program. Artificial ingredients are not the way to cut either costs or calories.

Phytonutrients and Cancer
Phytonutrients are naturally-occurring plant compounds that have been found to be health promoting in humans and animals. They act with nutrients to regulate body systems such as the liver, immune, nervous, and endocrine systems.

We have what appears to be a David and Goliath relationship between natural plant materials and the synthetic technology of “better living through chemistry.” The Goliaths are food-producing giants who bring us genetically engineered foods, irradiation, soil pesticides, herbicides, animal growth hormones and antibiotics, synthetic fertilizers, and xenobiotics (hormone-like petrochemical by-products) that weaken our food supply and burden our body systems. In response, a host of phytonutrients are being identified, catalogued, tested, concentrated, and sold as nutraceuticals to protect us from the denatured food and polluted environments we inhabit. Choosing a chemical-free Eating For Health™ food plan and taking advantage of the phytonutrient-rich booster foods it recommends are important steps toward maintaining and restoring health.

Many health experts believe that phytonutrients contribute to the cancer-protective effects of fresh fruits and vegetables, as well as culinary and medicinal herbs. Naturally-occurring chemicals such as virus-killing polyphenols, the potent antioxidant glutathione, and pectin, which binds excess bile and cholesterol, are important components in a health-promoting, anti-cancer diet. (See the Cancer Protective Foods chart that follows for an extensive list of phytonutrients and their health benefits.) It is important to lean how to assess the freshness of fruits and vegetables using sight and smell in order to gain the most phytonutrient benefit from one’s diet.
Herbs
Rosemary, lavender, orange, oregano, and thyme as fresh or dried herbs, or extracted as pure essential oils, have powerful antioxidant and immune-enhancing effects for cancer patients.

Garlic
Garlic, a proven antibiotic, has been used for centuries to protect against a host of health-threatening microbes, yeast, bacteria, parasites, and viruses. Dried, aged garlic is especially useful as a chemotherapy treatment when the immune system is suppressed and the possibility of infection is high. It is also beneficial when coming off a course of antibiotics, along with lactobacillus acidophilus to restore the balance of friendly organisms in the gut.

Crucifers
Cruciferous vegetables (also called brassicas) — namely broccoli, cauliflower, Brussels sprouts, and cabbage — contain such potential cancer-preventing or cancer-inhibiting substances as aromatic isothiocyanates, glucosinolates, flavones, indoles, and phenols. The National Cancer Institute has linked them to a reduced risk of colon cancer and a protective effect against cancer of the lung, esophagus, larynx, rectum, colon, stomach, prostate, and bladder. The phytochemicals in these sulfurous vegetables slow the development and spread of cancerous cells while stimulating the release of anti-cancer enzymes. Indoles increase the detoxification of estrogen, reducing the impact of that hormone on sensitive receptor cells.

Soy
Eating certain soy products can be beneficial when consuming less animal food in the diet. Soy products appear to inhibit breast cancer by decreasing the level of circulating estrogens, thereby blocking the cancer-promoting action of estrogen. One serving a day of soy may decrease the risk of developing a number of cancers by nearly 40%. Genistein, an isoflavone found in soy products, is protective against colon, breast, lung, prostate, and skin cancers, as well as leukemia. Diadzein, another isoflavone, has slowed the growth of breast cancer cells in vivo. Protease inhibitors in soy products appear to inhibit or prevent cancer growth.4

Asian diets have long used soy-based products as both staple foods and flavorful condiments. One cup of tempeh contains approximately 24 grams of digestible protein, as well as ample soluble fiber, zinc, B vitamins, iron, and an ideal balance of magnesium and calcium. Soy products are most digestible when they are prepared in the traditional Japanese way using natural fermentation. Dried soybeans are rarely used, as they are slow to cook and difficult to digest. Rather, items such as tamari, a fermented soy sauce; miso, a fermented soy paste; tempeh, a fermented soy cutlet; and tofu, a block of cultured soy milk; are traditional fare.

Soy oil accounts for 80% of all U.S. vegetable oil, appearing in margarine, baked goods, and many prepared foods and dressings. Sadly, it is degraded in processing, becoming a metabolic time bomb called trans fatty acids, which damage the liver and cell membranes and support unfavorable anaerobic metabolism. While most soy foods are beneficial, it is best to minimize or eliminate the use of soy oil.

Recent concern has been raised about the genetically engineered soy developed by Monsanto, the largest soybean grower in North America. Monsanto uses Roundup™-resistant seed, which drastically increases the isoflavonoid content while diminishing the tryptophan content. Of the 60 million planted acres of U.S. soy, 10 million were planted with the so-called “Roundup™ ready” seed. Both the active and inert ingredients in Roundup™ are toxic. The combination of increased isoflavonoid content, diminished amino acid availability, and cumulative buildup of pesticide residue makes Monsanto soy potentially dangerous to infants ingesting commercial infant formula and
anyone who frequently consumes commercial soy milk or tofu products made from soy milk. Buying organic foods wherever possible is advised, especially in the case of soy foods. A few reliable brands of organic soy products are Eden, Westbrae, Vitasoy, Pacific Soy, White Wave, and Wildwood.

Mary Enig, Ph.D., has warned that not all people digest soy products well, especially commercial soy milks and soy powders. Noticeable signs of gas, bloating, and indigestion are messages to cut back or discontinue these forms of non-fermented soy products. Soy yogurts are now available, made with intestine-friendly flora.

Remember that any food that is over-consumed can create or exacerbate food sensitivities. One serving of soy food per day is adequate for most people. Mixing soy products with flax seed, garlic, and a sprinkle of nutritional yeast (a great source of B complex vitamins, amino acids, and minerals) will provide optimal cancer defense and a full complement of energy-producing nutrients.

Flavonoids
The flavonoids are a group of over 4000 naturally occurring phenolic compounds (polyphenols) found in a wide variety of plants, including most common fruits and vegetables. In citrus fruits, they may represent up to 1% of the fresh material. Beverages such as beer, wine, tea, and even coffee contain considerable amounts of flavonoids. A recommended daily consumption of flavonoids can be 1g or higher. Flavonoids appear to be the active constituents in numerous medicinal plants valued by herbalists and nutritionists worldwide.

Harborne and Baxter\textsuperscript{10} have divided the flavonoids into five categories:

\begin{itemize}
  \item \textbf{Anthocyanins}: red-blue pigments found in plants like blueberries, grapes, and pomegranates.
  \item \textbf{Minor flavonoids}: catechin and epigallocatechin 3 gallate (EGCG), found in green and black tea.
  \item \textbf{Flavones and flavonols}, including quercetin and ginkgo biloba: 135 glycosides of quercetin have been isolated, with rutin the most common, used to treat capillary fragility. This group is excellent for allergy and immune support, as well as protection during chemotherapy or radiation.
  \item \textbf{Isoflavonoids}, including genistein and diadzein: found mostly in legumes, including soybeans.
  \item \textbf{Tannins}, including proanthocyanidins (OPCs) and gallic acid phenolics: They bind with proteins and are astringent in nature. Grapeseed, grape skin, and pine bark extracts are valuable therapeutic agents
\end{itemize}

The small molecular-weight flavonoids are responsible for the tartness and bitterness of many fruits. The large molecular-weight flavonoids (tannins) are responsible for their astringency.
Some researchers have challenged the bioavailability of flavonoids. Leibovitz, in his comprehensive 1994 review article on flavonoids, suggests that one-half of the ingested flavonoids are absorbed into the bloodstream through the gastrointestinal tract lining; the other half is metabolized to other compounds by gastrointestinal microflora.11

Szent-Gyorgyi first identified the biochemical actions of bioflavonoids and polyphenols in 1936, when he discovered that crude extracts of Vitamin C from lemon juice were more effective than Vitamin C alone in treating guinea pigs with experimentally induced scurvy.

Flavonoids demonstrate anti-allergic actions, immunomodulation actions, inhibition of platelet aggregation, and antitumoral actions. Flavonoids are needed to stabilize collagen, which weakens with age, and agents that inhibit collagen breakdown may inhibit tumor invasion and metastasis. The basement membrane (the cellular bottom line) surrounding capillaries is composed primarily of collagen, fibronectin, and laminin, a glycoprotein of the extracellular matrix. Flavonoids contribute to the integrity of soft and connective tissue, making it less vulnerable to infection, injury, and cell mutation. Tissue tone looks brighter and feels tighter with adequate flavonoids.

Flavonoids are largely absent in the Standard American Diet.

Green Tea
In human beings, epidemiological studies suggest that green tea decreases risk of cancer of the upper digestive system. There is even evidence from animal studies that green tea may interfere with the ability of cancer cells to metastasize. The polyphenols in green tea, known as catechins, especially epigallocatechin-3-gallate (EGCG), are thought to block cancer through antioxidant activity by interfering with cell cycle enzymes, DNA synthesis, and cell communication.

Epidemiologic studies, while far fewer in number than laboratory studies, have tended to support a dose response to the drinking of green tea and cancer prevention. A 1988 case control study in Kyushu, Japan, compared 139 newly diagnosed cases of gastric cancer with 2574 hospital controls and 278 population controls who reported drinking at least 10 cups daily of green tea (not uncommon in Asia) and had a significantly lower incidence of cancer. Other studies of esophageal and lung cancer for subjects matched for age and gender suggest a protective effect of green tea consumption.12

Two simultaneous studies are being conducted at Memorial Sloan-Kettering Cancer Center in New York City and at the University of Texas MD Anderson Cancer Center in Houston, Texas. 30-40 patients with a variety of solid tumors will be recruited and given capsules of green tea equivalent to the amount that would be drunk in 6-7 cups. Waun Ki-Hong, M.D., chair of the Department of Thoracic, Head and Neck...
Medical Oncology at MD Anderson believes that green tea will be more effective for prevention than for treatment, despite the lab studies that have shown actual shrinkage of tumors.

Switching from coffee to green tea, from soda to fresh fruit or vegetable juice, eating brown rice, tempeh, and vegetables rather than pepperoni pizza, is what will bring a favorable flavonoid profile to the diet.

Vitamins and Cancer

To date, fourteen vitamins have been identified as essential to human health and can be obtained from the diet. The American Cancer Association’s suggestion in 1995 to eat five servings a day of fruits and vegetables in order to provide cancer protection is a positive step in community cancer prevention education. Unfortunately, a 1996 survey by the USDA found that fewer than 10% of Americans actually consume five servings per day of fresh fruits and vegetables. Is it surprising, then, that we are losing the war on cancer?

Food quality varies greatly from location to location, based upon soil conditions and cultivation methods. Americans are licking their fingers while eating a cancer-promoting Standard American Diet, full of excess animal fat, growth-hormone-fed animals, irradiated meats and dairy products, pastry starches, and heavily processed, artificially flavored, colored, and preserved convenience foods lacking in vital nutrients.

The majority of epidemiological studies on vitamins and cancer have been conducted through investigation of diet reports, rather than vitamin supplementation. This makes it impossible to identify exact amounts of vitamins, as eating habits are complex, reporting is notoriously inaccurate, and the exact amounts of vitamins being absorbed and eliminated cannot be gauged. Vitamins A, C, E, B6, and folic acid are especially relevant to the discussion of cancer.

Vitamin A and Beta Carotene

Data from animal and in vitro experiments almost uniformly support the role of Vitamin A in preventing cancer. The preventive role is due to the vitamin’s ability to support normal differentiation of epithelial cells. Vitamin A also plays a part in regulating apoptosis, or programmed cell death. Its main function is in supporting healthy vision, immune function, and growth, especially in the bones, reproduction, respiration, and glandular systems.

It is commonly cautioned that high doses of Vitamin A (above 25,000 IU/day), such as those that might be employed in a therapeutic program for cancer, may be toxic to the liver. As a result, modest supplementation has been the rule. However, Israel and his colleagues (in 1985) administered 350,000-500,000 IUs of Vitamin A to menopausal women with metastatic breast cancer who were treated by chemotherapy. This significantly increased response rates, duration of response, and projected survival.

A major Finnish study of smokers in 1994 questioned the use of beta-carotene for those with lung cancer. In a study of 29,133 male smokers, 50-69 years of age, administration of beta-carotene (20mg per day = 10,000 IU) for 5-8 years increased the rate of lung cancer by 18%. Vitamin E at 50 IU/day had no effect on incidence of lung cancer. However, fewer cases of prostate cancer were diagnosed in the group receiving Vitamin E. The authors stated that in the absence of other published studies on the harmful effects of beta carotene, the adverse reaction may well have been due to chance. Other variables not addressed were the subjects' continued heavy smoking, alcohol patterns, medication use, and dietary factors such as meat, saturated fat, and refined carbohydrate intake. It is unrealistic to expect beta-carotene to reverse the damage from a cancer-promoting lifestyle that has been ongoing for decades and is little changed during treatment, except by adding
the synthetic beta-carotene. This is a clear case of a single nutrient demonstrating that it does not act like a drug in the absence of fundamental changes in diet, lifestyle, and environment.

Many epidemiological studies of the cancer-preventive effects of antioxidants have been inconclusive for similar reasons, partially because the beneficial effects have been small and confounding factors have been great. Blood samples were stored for 25,802 adults in Maryland; 28 of them later developed oral pharyngeal cancer. Analysis of blood samples revealed that high levels of beta-carotene and Vitamin E were associated with decreased cancer risk. Persons with the highest tier of total carotenoids exhibited approximately a 66% reduction in risk compared to the lowest tier.16

**Vitamin C (Ascorbic Acid):**
Theoretically, Vitamin C may inhibit carcinogenesis or tumor growth through at least four mechanisms:

- Vitamin C is necessary for health of the extracellular matrix and may inhibit tumor invasion. Low Vitamin C levels produce scurvy, in which there is destruction of the matrix, vascular disorganization, and undifferentiated cellular proliferation.

- Vitamin C intake can stimulate the immune system by increasing natural killer cell activity and the proliferation of T lymphocytes in response to mitogens. The ability of neutrophils and other immune cells dependent on adequate Vitamin C to kill bacteria is reduced when Vitamin C is deficient.

- As a powerful antioxidant, Vitamin C may inhibit carcinogenesis.

- Vitamin C has an antihistamine effect, which may be due to an inhibition of lipoxygenase activity and an associated decline in leukotriene B production. In animal studies, histamine and inflammation are associated with tumor promotion.

Linus Pauling and his colleague Ewan Cameron were long-time advocates of the use of Vitamin C when treating cancer patients. In a study of 100 terminal patients, Cameron and Pauling reported that administration of 10 grams of Vitamin C daily resulted in a four-fold increase in survival (210 days vs. 50 days).17 Follow-up studies conducted by the U.S. government of the lifespan of patients treated with large doses of Vitamin C did not hold the same positive results. A volley of criticisms between Pauling and his detractors demonstrated the unfriendly conditions that existed at that time, over 20 years ago, and continue to this day in some circles. Cameron suggests that in Vitamin C therapy, the Vitamin C should be administered intravenously for the first ten days and orally thereafter.18 A desired plasma level of Vitamin C is 3mg/dl, which can be achieved in an oral dose of 10-30g daily. Vitamin C is rapidly excreted in the urine, and administration must be continuous or at frequent intervals (at least every six hours when taken orally).

High doses of Vitamin C, even 1g/day, induce increased levels of Vitamin C-degrading hepatic enzymes, which persist for some time after discontinuation of treatment. For this reason, abrupt cessation of treatment can deplete serum Vitamin C to levels well below non-supplemental values. This rebound effect can produce a sharp decline in immuno-competence, and may explain the decline in survival after patients were removed from Vitamin C in the government's replication study in 1985. Cameron states that the common response to Vitamin C treatment is either retardation or stasis of tumor growth, but not cure.18 Oral administration can and should be continued indefinitely, with intravenous "booster" treatments given as needed.

In a study of 1826 terminal cancer patients in Scotland, 294 patients who had received supplemental doses of Vitamin C (10g/day) exhibited a median survival almost double that of controls, 343 days vs. 180 days.19 Due to its effects on the
immune system and the likely interference with response to Vitamin C, the authors chose to exclude from the study any patients receiving chemotherapy. Plasma Vitamin C levels associated with optimal survival was greater than 3mg/dl.

Vitamin E
A primary function of Vitamin E is to prevent the oxidation of fatty acids in cell membranes. For this reason, the most obvious sign of Vitamin E deficiency in humans is red blood fragility. Vitamin E may also inhibit inflammatory prostaglandins and cytokines. Its anti-carcinogenic activities are likely due to its ability to scavenge free radicals.

The average American is deficient in Vitamin E and typically has a high intake of polyunsaturated fatty acids, which undergo free radical damage and deplete antioxidant reserves, as well as low selenium, which is a vital part of a naturally occurring Vitamin E complex.20

The antioxidant status of an individual can be checked with a red blood panel test for glutathione peroxidase, an enzyme that is primarily synthesized by the liver and supports the optimal clearance of toxic matter in the blood. In maintaining and improving liver function, the immune system is relieved of some of its antigenic load and, therefore, can be more effective in cancer surveillance.

Vitamin B6
Vitamin B6 is a cofactor in more than 100 enzyme reactions, the majority of which are concerned with amino acid metabolism. For this reason, B6 deficiency has been implicated in “Chinese restaurant syndrome,” in which MSG (monosodium glutamate — a form of the amino acid l-glutamine) provokes an unpleasant disturbance in brain chemistry and mood. Dark leafy greens, unrefined whole grains, nuts, and seeds are the primary sources of Vitamin B6 in the diet.

Vitamin B6 deficiency may be involved in carcinogenesis, since B6 is required for DNA repair. In established cancers, however, B6 supplementation may be detrimental. In a study of 248 patients with ovarian epithelial cancer, administration of B6 reduced the neurotoxicity of the drugs cisplatin and hexamethylmelamine, presumably by facilitating the repair of DNA. However, it adversely affected the survival of these patients.21 It must be used cautiously, as it increases immune functioning, as evidenced by increased oxidative metabolism. A number of animal and in vitro studies have indicated that B6 may increase the proliferation of various cancer cell lines. Conversely, B6 deficiency inhibits proliferation. No more than 25 mg of supplemental B6 per day is advised for patients with cancers, unless undergoing radiation or chemotherapy, when that amount can be taken twice per day.

Folic Acid
Folic acid is a cofactor in numerous biochemical reactions in the body, and shares many of the same functions as Vitamin B12. One of these functions is protein synthesis. A deficiency of folate inhibits DNA synthesis. The chemotherapy drugs methotrexate and aminopterin are synthetic analogs of folate that inhibit tumor cell growth by interfering with DNA synthesis. These drugs are most effective against fast-growing tumors, since these cells are sites of rapid DNA synthesis.

Although folate inhibitors are used to treat cancer, adequate folic acid is necessary to prevent some cancers. Low folic acid intake, or low erythrocyte levels, is associated with increased risk of developing colorectal and cervical cancers.22 Folic acid may reduce the risk of cervical cancer by inhibiting the incorporation of human papilloma virus genes into fragile chromosomal sites in affected cells.
Cancer Preventive Foods

<table>
<thead>
<tr>
<th>FOOD</th>
<th>NUTRIENT</th>
<th>ACTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carrots</td>
<td>Carotene</td>
<td>• Neutralize free radicals</td>
</tr>
<tr>
<td>Yams</td>
<td></td>
<td>• Boost lymphocytes</td>
</tr>
<tr>
<td>Squash</td>
<td></td>
<td>• Enhance cell respiration</td>
</tr>
<tr>
<td>Kale</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cantaloupe</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cabbage family</td>
<td>Sulfur</td>
<td>• Inhibit estrogen action</td>
</tr>
<tr>
<td>(Broccoli, cabbage, etc.)</td>
<td>Indoles</td>
<td>• Support liver detoxification</td>
</tr>
<tr>
<td></td>
<td>Isothiocyanate</td>
<td></td>
</tr>
<tr>
<td>Flax seed</td>
<td>Lignans</td>
<td>• Inhibits estrogen action</td>
</tr>
<tr>
<td></td>
<td>EFAs</td>
<td>• Inhibits prostaglandin</td>
</tr>
<tr>
<td></td>
<td>Nutritive</td>
<td>• Neutralizes radiation damage</td>
</tr>
<tr>
<td>Legumes</td>
<td>Isoflavones</td>
<td>• Block cancer-protease enzymes</td>
</tr>
<tr>
<td>Soy</td>
<td>Genistein</td>
<td>• Balance steroid hormones</td>
</tr>
<tr>
<td>Lima</td>
<td>Diadzon</td>
<td>• Inhibit estrogen receptors</td>
</tr>
<tr>
<td>Parsley</td>
<td>Polyacetylene</td>
<td>• Inhibit prostaglandins</td>
</tr>
<tr>
<td>Wheat grass</td>
<td>Chlorophyll</td>
<td>• Destroy benzopyrene</td>
</tr>
<tr>
<td>Spirulina</td>
<td>Nutritive</td>
<td>• Boost white blood cells</td>
</tr>
<tr>
<td>Cucumbers</td>
<td>Phytosterol</td>
<td>• Balance hormones</td>
</tr>
<tr>
<td>Garlic</td>
<td>Sulphur</td>
<td>• Protect liver</td>
</tr>
<tr>
<td>Onions</td>
<td>Selenium</td>
<td>• Anti-microbial action</td>
</tr>
<tr>
<td>Citrus fruit</td>
<td>Terpene</td>
<td>• Increase anti-tumor enzymes</td>
</tr>
<tr>
<td>Peels</td>
<td></td>
<td>• Lymphatic cleanser</td>
</tr>
<tr>
<td>Licorice</td>
<td>Triterpenois</td>
<td>• Inhibits estrogen, prostaglandins</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Adrenal support</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Anti-inflammatory</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Slows cancer cell division</td>
</tr>
<tr>
<td>Raspberries</td>
<td>Ellagic acid</td>
<td>• Protect against smoking-related damage</td>
</tr>
<tr>
<td>Blueberries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Green tea</td>
<td>Polyphenols</td>
<td>• Inhibit tumor initiation</td>
</tr>
<tr>
<td>Grapes</td>
<td>Catechin</td>
<td>• Cell protectors</td>
</tr>
<tr>
<td>Maitake mushrooms</td>
<td>Selenium</td>
<td>• Immuno-stimulants</td>
</tr>
<tr>
<td>Reishi mushrooms</td>
<td>Polysaccharide</td>
<td>• Inhibit tumor growth</td>
</tr>
<tr>
<td>Tumeric</td>
<td>Curcumin</td>
<td>• Liver protective</td>
</tr>
</tbody>
</table>

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Minerals and Cancer

Zinc

Zinc (like Vitamin B6) is required by more than 100 enzymes, such as those involved with the metabolism, function, and maintenance of the skin, pancreas, and reproductive system. Along with copper, zinc is necessary for the synthesis of superoxide dismutase (SOD), a ubiquitous enzyme that degrades superoxide to form hydrogen peroxide. Zinc is also required for proper function of the T-lymphocytes. A zinc deficiency can lead to atrophy of the thymus gland, depression of NK cell and lymphocyte activity, and other immunodeficiencies.

The average American, as well as the average vegetarian, may be deficient in zinc. Symptoms of severe zinc deficiency include:\textsuperscript{23}

\begin{itemize}
\item Growth retardation;
\item Anorexia;
\item Skin lesions;
\item Hair loss;
\item Diarrhea;
\item Loss of taste;
\item Loss of smell; and
\item Impaired wound healing.
\end{itemize}

Zinc is rapidly diminished during chemotherapy. Moderate amounts can be supplemented (25–50mg per day of elemental zinc), along with adding foods that contain zinc to the diet.

Selenium

Selenium, a trace element, activates glutathione peroxidase, an enzyme with significant antioxidant activity. Recently, the results from the first double blind, randomized cancer prevention trial of supplemented selenium were published. High selenium yeast (200mcg/day Se) or placebo was administered for 4.5 years to 1312 patients with a past history of non-melanoma skin cancers. These patients were followed for an average of 6.5 years. Recurrence of squamous and basal cell skin cancer was not reduced in the Se group. However, there was a:\textsuperscript{26}

\begin{itemize}
\item 50% reduction in total cancer mortality (p=0.0009);
\item 45% reduction in total carcinoma incidence (p=0.001);
\item 63% drop in prostate cancer incidence (p=0.002);
\item 58% decrease in colorectal cancer incidence; and
\item 46% decrease in lung cancer incidence.
\end{itemize}

The results were so dramatic that the researchers ended the blinded phase of the trial before the study was completed. Only 12 people in the study developed breast cancer. Of these, 9 were in the Se group and 3 were in the placebo group. No statistical significance was reached, but in this study, the selenium was not shown to be protective for breast cancer.

Emanuel Revici, M.D., of New York has been using organic selenium in cancer therapy for his patients for the past 40 years. In the laboratory, selenium has shown a wide range of anti-cancer effects. It inhibits chemical substances and viruses that cause cancer in many animals, protects against ultraviolet light, fights against the harmful effects of toxic metals, and slows cancer growth, causing a reduction in tumor volume, prolonging survival, and reducing the "take rate" of transplanted tumors.\textsuperscript{24}

Harold Ladis, Ph.D., a Hunter College professor,\textsuperscript{25} has stated that the higher the selenium, the lower the breast cancer.\textsuperscript{25} Similar associations have been found with leukemia, as well as cancers of the intestines, rectum, ovary, prostate, lung, pancreas, skin, and bladder.\textsuperscript{26} Selenium works best coupled with Vitamin E. American soil is seriously deficient in selenium. Plant uptake of this rare mineral is diminished when nitrogen fertilizer is added to the soil.
Digestive Enzyme Therapy

Based on the work of William Donald Kelly in 1972, and his protégé Dr. Nicholas Gonzalez in 1993, digestive enzymes have been utilized as cancer-protective agents in natural therapy programs. Proteolytic (protein-splitting) enzymes, used with dietary supplements and detoxification, have been the core of this approach. With supervision from the National Cancer Institute, Gonzalez is currently conducting a clinical trial in New York on patients with pancreatic cancer. Ingestion of enzymes prior to and between meals is advocated until inflammation is noticed at tumor sites. At this point, detoxification via coffee enemas is employed until the condition is stabilized, at which point the enzymes are resumed.

Another legendary enzyme proponent, Max Wolf, M.D., in Germany, reported in 1972 of treating over 1000 cancer patients using a multiple enzyme product called Wobe-Mugos, containing approximately 40mg chymotrypsin, 100mg papainases (6 times), and calf thymus extract. Wolf reported that enzyme therapy was generally not curative but appeared to inhibit metastasis and to moderately prolong survival. He suggested 12 to 20 enzyme tablets/day of mixed plant and animal enzymes. His treatments were often combined with surgery, vitamins, heparin, and other therapeutic agents. Companies that distribute enzymes to health professionals in the U.S. include Tyler Encapsulations, Transformational Enzymes, and Metagenics.

Bromelain

A unique cysteine proteolytic enzyme derived from pineapple, bromelain has been used to treat various inflammatory diseases and mal-digestion. Some authors contend that the active ingredient in bromelain may not be the proteolytic enzyme, but a minor enzymatic component that is responsible for the release of a PGE1-like compound that has anti-inflammatory activities, interferes with arachidonic acid metabolism, inhibits platelet aggregation, relaxes smooth muscles, and protects the endothelial lining of the blood vessels through globulin degradation.

Nutritional Complements to Allopathic Female Cancer Treatment

The following charts outline common side effects, their causes, and practical suggestions for nutritional palliation. It is always wise to work with an experienced nutrition consultant to determine the proper dosage, duration, and possible drug-nutrient and drug-herb effects. Many oncologists have concerns about the counter productive effect of administering nutrients, especially antioxidants, to a person undergoing chemotherapy. They may not be aware of the benefits of combined therapy, if properly administered. As a nutrition professional, I have concerns about the damage to healthy tissues from chemotherapy, and the amount of nutrients lost or destroyed in the process of killing cancer cells. A nutrient-rich diet with moderate supplementation has been documented to mitigate the side or adverse effects of chemotherapy and radiation while improving its therapeutic efficacy (Murray, 2003). Care needs to be taken to consider sensible therapeutic options, and to monitor treatment, pain, and side effects.
## Side Effects of Chemotherapy or Radiation Treatment

<table>
<thead>
<tr>
<th>SIDE EFFECT</th>
<th>CAUSE</th>
<th>NUTRITIONAL SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrient depletion</td>
<td>• Cancer cells are heavy feeders, increasing metabolism and thereby increasing nutrient demands throughout the entire body</td>
<td>• Starve the tumor(s) by increasing fiber and eliminating refined sugars and carbohydrates. Cancer cells thrive on glucose.</td>
</tr>
</tbody>
</table>
| Loss of appetite; Anorexia | • Toxic effects of therapy  
• Location of tumors  
• Surgical removal of a portion of the gastrointestinal tract | • Make breakfast the biggest meal of the day (symptoms usually occur later in the day)  
• Prepare amino powder, green foods, soy milk, yogurt and fresh fruit smoothies, or fresh vegetable juices  
• Eat small meals 6 times daily  
• Avoid raw vegetables; purée steamed vegetables with olive oil or avocado to increase fat content |
| Malabsorption        | • Food not absorbed properly through the intestine into the bloodstream—each segment of the intestines absorbs different nutrients  
• Affected by radiation to the abdomen or surgery to remove part of the intestine  
• Pancreatic cancer affects insulin production | • Prepare a vitamin-rich smoothie containing amino powder, green foods, soy milk, yogurt, and fresh fruit daily  
• Drink fresh vegetable juices daily |
| Food Allergies become prominent | • A compromised digestive system is irritated by foods that are provoking an immune response when the immune system needs to focus on recovery | • Eliminate any suspected food allergens  
• Eat a variety of foods to avoid developing food sensitivity |
| Nausea and Vomiting  | • Most common side effect of chemotherapy  
• Stress from pain, fear, or phobia of treatment  
• Radiation treatment to skull, spine, gastrointestinal, or nervous system tumors | • Anti-nausea drugs can be taken prior to treatment if problem persists and is severe  
• Eat small, frequent meals with small amount of liquids  
• Avoid strong cooking odors, strong perfumes, smoke odors; open windows for fresh air  
• Eat easy-to-digest foods, like yogurt or protein smoothies  
• Take ginger tincture or capsules |
## Side Effects of Chemotherapy or Radiation Treatment (continued)

<table>
<thead>
<tr>
<th>SIDE EFFECT</th>
<th>CAUSE</th>
<th>NUTRITIONAL SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry mouth and difficulty</td>
<td>• Dry mouth increases bacteria, tooth decay, and infections</td>
<td>• Keep teeth, mouth, and tongue clean</td>
</tr>
<tr>
<td>swallowing</td>
<td>• Chemotherapy and anti-nausea drugs cause temporary dry mouth</td>
<td>• Sip water frequently during meals</td>
</tr>
<tr>
<td></td>
<td>• Surgery or radiation to neck may affect salivary glands</td>
<td>• Avoid dry/sticky foods: crackers, nut butters</td>
</tr>
<tr>
<td></td>
<td>• Chemotherapy and anti-nausea drugs cause temporary dry mouth</td>
<td>• Drink lemon juice before eating to stimulate saliva</td>
</tr>
<tr>
<td></td>
<td>• Surgery or radiation to neck may affect salivary glands</td>
<td>• Eat moist foods: soups, fruit, sauces, etc.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Bite a 400 IU Vitamin E capsule, roll around mouth before swallowing</td>
</tr>
<tr>
<td>Taste alterations</td>
<td>• Taste buds, epithelial cells, are most sensitive to cancer therapy</td>
<td>• Eat all four tastes: sweet, sour, bitter, salty</td>
</tr>
<tr>
<td></td>
<td>• Chemotherapy can cause bitter or metallic taste</td>
<td>• Room-temperature food may have more flavor than hot</td>
</tr>
<tr>
<td></td>
<td>• Radiation can injure/kill taste buds</td>
<td>• Increase aromatic sensory foods: garlic, seasonings</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Zinc supplements may improve taste</td>
</tr>
<tr>
<td>Constipation:</td>
<td>• Peristalsis affected by radiation</td>
<td>• Include flax meal, rice bran, or oat bran in fresh fruit smoothies or sprinkle on cereal or</td>
</tr>
<tr>
<td>feces too dry</td>
<td>• Painkillers can reduce peristalsis</td>
<td>yogurt</td>
</tr>
<tr>
<td></td>
<td>• Lack of exercise due to fatigue</td>
<td>• Water: 8 glasses daily (measure amount in the morning and finish by bedtime)</td>
</tr>
<tr>
<td></td>
<td>• Lack of soluble and insoluble fiber</td>
<td>• Increase dietary fiber and add variety of whole grains</td>
</tr>
<tr>
<td></td>
<td>• Stress: body's response to stress is to vomit and diarrhea and hold</td>
<td>• Eat more raw vegetables; chew thoroughly</td>
</tr>
<tr>
<td></td>
<td>food in the small intestine</td>
<td>• Eat more cruciferous vegetables and legumes, nuts and seeds: all contain fiber and good fats</td>
</tr>
<tr>
<td></td>
<td>• Lack of liquids, water</td>
<td></td>
</tr>
<tr>
<td>Diarrhea:</td>
<td>• Chemotherapy and radiation can have toxic effect on intestinal lining</td>
<td>• AVOID:</td>
</tr>
<tr>
<td>feces too moist</td>
<td>and decrease digestive enzymes</td>
<td>• Hot foods; try cold or room-temperature food</td>
</tr>
<tr>
<td></td>
<td>• Some drugs can increase peristalsis</td>
<td>• Raw foods; steam or pressure cook</td>
</tr>
<tr>
<td></td>
<td>• Temporary milk intolerance (lack of lactase enzymes)</td>
<td>• Irritating foods (see “Foods to Avoid”)</td>
</tr>
<tr>
<td></td>
<td>• Change in diet</td>
<td>• Laxative foods: prunes, prune juice, apple and pear juice</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Sorbitol (artificial sweetener)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Cruciferous vegetables: creates gas</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Starchy liquids: split pea soup, rice, oat porridge, mashed ripe bananas</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Soy may protect against chemotherapy-caused diarrhea</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Nutmeg slows peristals</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Replenish potassium: bananas and potatoes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Live yogurt to replenish healthy flora</td>
</tr>
</tbody>
</table>
## DIETARY DOS For Cancer Prevention and Recovery

<table>
<thead>
<tr>
<th>FOOD</th>
<th>BENEFITS</th>
<th>SERVING SIZE</th>
<th>TREATMENT DIET</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cruciferous vegetables:</strong></td>
<td>Broccoli, Brussels sprouts, cabbage, bok choy, kale, cauliflower, collard and mustard greens</td>
<td>1/2 cup cooked</td>
<td>Preventive: At least 2 servings (1 may be juiced)</td>
</tr>
<tr>
<td></td>
<td>Reduces risk of colon cancer and protect against cancer of the lung, larynx, rectum, colon, stomach, prostate, and bladder</td>
<td></td>
<td>Chemotherapy: At least 2 servings (1 may be juiced)</td>
</tr>
<tr>
<td></td>
<td>Contain cancer-preventing or cancer-prohibiting substances that stop carcinogens before they have the chance to alter DNA</td>
<td></td>
<td>Radiation: At least 2 servings (1 may be juiced)</td>
</tr>
<tr>
<td></td>
<td>Accelerate process in which body deactivates or disposes of the type of estrogen that can promote breast cancer</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supports liver detoxification</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Antioxidant vegetables:</strong></td>
<td>Yams, sweet potatoes, carrots, spinach, tomatoes, bell peppers, asparagus</td>
<td>1/2 cup cooked, raw, or juiced</td>
<td>Preventive: 1-2 servings (1 may be juiced)</td>
</tr>
<tr>
<td></td>
<td>Sources for carotenoids (alpha- and beta-carotene, gamma-carotene, lycopene)</td>
<td></td>
<td>Chemotherapy: 1-2 servings (1 may be juiced)</td>
</tr>
<tr>
<td></td>
<td>Antioxidant vegetables: Yams, sweet potatoes, carrots, spinach, tomatoes, bell peppers, asparagus</td>
<td></td>
<td>Radiation: At least 2 servings (1 may be juiced)</td>
</tr>
<tr>
<td></td>
<td>• Contain cancer-preventing or cancer-prohibiting substances that stop carcinogens before they have the chance to alter DNA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Accelerate process in which body deactivates or disposes of the type of estrogen that can promote breast cancer</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Green leafy vegetables:</strong></td>
<td>Swiss chard, escarole, chicory, dandelion, sprouts, sorrel, dark green lettuces (green and red loose-leaf, romaine, butter)</td>
<td>1 cup raw</td>
<td>Preventive: 1-2 servings</td>
</tr>
<tr>
<td></td>
<td>Contain many different antioxidants — including Vitamin C, carotenoids, beta-carotene — that act as free radical scavengers, immune stimulators, and may even be toxic to tumors</td>
<td>1/2 cup cooked</td>
<td>Chemotherapy: 1 serving (optional)</td>
</tr>
<tr>
<td></td>
<td>The darker the green, the more cancer-inhibiting its effect</td>
<td></td>
<td>Radiation: 1 serving (optional)</td>
</tr>
<tr>
<td></td>
<td>Contain both soluble and insoluble fibers</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Other vegetables:</strong></td>
<td>Potatoes, rutabaga, turnips, beets, winter and summer squash, cucumbers, pumpkin, corn, green beans, wax beans, snow peas, sea vegetables, medicinal mushrooms (shiitake, maitake, reishi, or mushroom extract), radishes, okra, kohlrabi, water chestnuts</td>
<td>1/2 cup cooked or chopped raw</td>
<td>Preventive: 1 serving (optional)</td>
</tr>
<tr>
<td></td>
<td>High in fiber, low in fat, provide a variety of vitamins</td>
<td>1/2 cup fresh juice</td>
<td>Chemotherapy: 1 serving (optional)</td>
</tr>
<tr>
<td></td>
<td>Sea vegetables contain thyroid-stimulating substances and are loaded with minerals, calcium, potassium, iron, phosphorus, and iodine</td>
<td></td>
<td>Radiation: 1 serving (optional)</td>
</tr>
</tbody>
</table>
### DIETARY DOS For Cancer Prevention and Recovery (continued)

<table>
<thead>
<tr>
<th>FOOD</th>
<th>BENEFITS</th>
<th>SERVING SIZE</th>
<th>TREATMENT DIET</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fruit:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Citrus fruits</td>
<td>Contain bioflavonoids beneficial to cancer patients (quercetin, rutin,</td>
<td>1 medium</td>
<td>At least</td>
</tr>
<tr>
<td>bananas, plums</td>
<td>aglycone, kaempferol, and myricetin)</td>
<td>whole fruit</td>
<td>2 servings</td>
</tr>
<tr>
<td>peaches, apricots</td>
<td>Work synergistically with Vitamin C to stimulate drug detoxification by</td>
<td>1/2 cup</td>
<td>including</td>
</tr>
<tr>
<td>cherries, apples</td>
<td>the liver</td>
<td>cooked,</td>
<td>1 citrus</td>
</tr>
<tr>
<td>berries, watermelon</td>
<td></td>
<td>or dried</td>
<td></td>
</tr>
<tr>
<td>dried fruits,</td>
<td></td>
<td>3/4 cup</td>
<td></td>
</tr>
<tr>
<td>stewed fruits</td>
<td></td>
<td>juice</td>
<td></td>
</tr>
<tr>
<td><strong>Legumes:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beans, lentils</td>
<td>Contain protease inhibitors, which inhibit tumor growth</td>
<td>1 cup</td>
<td>2-3 servings</td>
</tr>
<tr>
<td>split peas</td>
<td>High in fiber, low in fat</td>
<td>cooked</td>
<td>(can include</td>
</tr>
<tr>
<td>green peas</td>
<td></td>
<td></td>
<td>1 soy food</td>
</tr>
<tr>
<td><strong>Nuts and seeds:</strong></td>
<td></td>
<td>A handful</td>
<td>1 serving</td>
</tr>
<tr>
<td>Fresh nuts, seeds</td>
<td>High in healthy fats and contain no cholesterol</td>
<td></td>
<td>At least</td>
</tr>
<tr>
<td>nut and seed</td>
<td>Excellent sources of protein and fiber</td>
<td></td>
<td>1 serving</td>
</tr>
<tr>
<td>butters, nut</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>milks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Soy products:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soy milk, tofu,</td>
<td>Contain complex carbohydrates; perfect high-fiber, low-fat protein</td>
<td>1/2 cup</td>
<td>1-2 servings</td>
</tr>
<tr>
<td>tempeh, soy nuts,</td>
<td>food</td>
<td>cooked</td>
<td></td>
</tr>
<tr>
<td>soy flour, soy</td>
<td>Fibers bind with toxins in the colon and clean them out before they can</td>
<td></td>
<td></td>
</tr>
<tr>
<td>grits, soybeans,</td>
<td>be reabsorbed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>miso</td>
<td>Stabilize blood sugar by metabolizing carbohydrates</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Contain genistein, an isoflavone protective against leukemia and</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>cancer of the colon, breast, lung, prostate, and skin</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Grains:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-glutinous</td>
<td>Nutrient dense, hypoallergenic, fiber-rich, and contain B-vitaminsand</td>
<td>6-11</td>
<td></td>
</tr>
<tr>
<td>grains, such as</td>
<td>magnesium to control blood glucose</td>
<td>servings</td>
<td></td>
</tr>
<tr>
<td>buckwheat,</td>
<td>Whole grains contain soluble and insoluble fiber</td>
<td></td>
<td></td>
</tr>
<tr>
<td>quinoa, millet,</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>and rice.</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Whole-grain products and bread, bran, germ, cereal</td>
<td></td>
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</tr>
</tbody>
</table>
DIETARY DOS For Cancer Prevention and Recovery (continued)

<table>
<thead>
<tr>
<th>FOOD</th>
<th>BENEFITS</th>
<th>SERVING SIZE</th>
<th>TREATMENT DIET</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dairy products: Yogurt (natural flavors/unsweetened), milk, buttermilk, acidophilus, cottage cheese</td>
<td>• Cultured dairy products contain beneficial flora • Treatments may damage flora population in the gut, which should be replenished</td>
<td>1 cup milk or yogurt</td>
<td>At least 1 serving</td>
</tr>
<tr>
<td>Fats and oils: Olive and nut oils, unrefined and organic</td>
<td>• Assist in cell membrane elasticity • Aid liver in production of beneficial cholesterol</td>
<td>1 serving</td>
<td>Up to 2 servings</td>
</tr>
<tr>
<td>Beverages: Teas (green, ginger, herb), filtered water, coffee substitutes</td>
<td>• 2-3 quarts of liquid should be consumed daily • Make all beverages with purified water</td>
<td>As desired</td>
<td>As desired</td>
</tr>
<tr>
<td>Seasonings: Garlic, onions, leeks, ginger root, hot peppers, rosemary, curry, cumin, basil, caraway seeds, cloves, tarragon, turmeric</td>
<td>• Stimulate digestive enzymes • Enhance flavors, especially if taste has been affected by treatment • Ginger will help settle nausea</td>
<td>Use liberally</td>
<td>Use liberally</td>
</tr>
</tbody>
</table>

FOODS TO EAT OCCASIONALLY For Cancer Prevention and Recovery

<table>
<thead>
<tr>
<th>FOOD</th>
<th>BENEFITS</th>
<th>SERVING SIZE</th>
<th>TREATMENT DIET</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butter</td>
<td>• Salted, unsalted, whipped; organic preferred</td>
<td>2 tsp</td>
<td>2-3 servings per week</td>
</tr>
<tr>
<td>Dairy products</td>
<td>• Cheese, low-fat cream cheese, sour cream, evaporated or condensed milk</td>
<td>1/2 oz or 1” cube</td>
<td>1-2 servings per week</td>
</tr>
<tr>
<td>Eggs</td>
<td>• Cooked; poached or basted are best • Never eat raw or undercooked eggs</td>
<td>1 egg</td>
<td>Up to 6 servings per week</td>
</tr>
<tr>
<td>Poultry and fish</td>
<td>• Cold ocean fish is best • Avoid farm-raised fish</td>
<td>2-3 oz</td>
<td>3-5 servings per week</td>
</tr>
</tbody>
</table>
### MICRO-NUTRIENTS For Cancer Prevention and Recovery

<table>
<thead>
<tr>
<th>SUPPLEMENT</th>
<th>BENEFITS</th>
<th>DOSAGE</th>
</tr>
</thead>
</table>
| Multivitamin, broad-spectrum | • Creates a baseline nutrient level on which to build  
• Activates immune—lymphocytes, monocytes, and macrophages  
• Promotes differentiation of cancer cells in epithelial cells  
• Blocks both initiation and promotion phases of cancer  
• Increases synthesis of glycoproteins (proteins with sugar attached)  
• Glycoproteins stick to cells, thereby stopping cell growth.  
• Beta-carotene increases production of tumor necrosis factor (TNF), which kills cancer cells  
• Regulates apoptosis (programmed cell death)  | As directed                   |
| Vitamin A             | • Activates immune—lymphocytes, monocytes, and macrophages  
• Promotes differentiation of cancer cells in epithelial cells  
• Blocks both initiation and promotion phases of cancer  
• Increases synthesis of glycoproteins (proteins with sugar attached)  
• Glycoproteins stick to cells, thereby stopping cell growth.  
• Beta-carotene increases production of tumor necrosis factor (TNF), which kills cancer cells  
• Regulates apoptosis (programmed cell death)  | 5,000-10,000 IU mixed carotenes |
| B Vitamins            | **B-Complex**  
• Dietary sources preferred.  | 10-50mg (or part of multi-vitamin) |
|                       | **B-6 Pyridoxine**  
• Low in cancer patients  
• Cofactor in over 100 enzyme reactions, primarily amino acid metabolism  
• Required for DNA repair  
• May inhibit cell proliferation of human melanoma cells in vitro  
• Tumors require B-6, will obtain at the expense of the host  
• Stimulates anti-cancer immune responses (T-helper, T-lymphocytes)  
• Necessary for proper collagen and elastin production—integrity of connective tissue deters the metastasis of some cancers  | 50mg total  
(Check multi-vitamin and B-complex) |
|                       | **B-5 Pantothenic Acid**  
• Inhibits tumor growth  | 50-150mg total of multi-vitamin and B-complex |
|                       | **Folic Acid**  
• Deficiency of folate inhibits DNA synthesis  
• Although folate inhibitors are used in chemotherapy, adequate folic acid is necessary to prevent cervical and colorectal cancers  
• Inhibits human papilloma virus replication  | 800mcg-5mg                   |
|                       | **Vitamin B-12**  
• Exhibits immuno-stimulatory effects in studies  
• Do not exceed recommended doses  | All sources:  
1mg                           |
## MICRO-NUTRIENTS For Cancer Prevention and Recovery (continued)

<table>
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<tr>
<th>SUPPLEMENT</th>
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</table>
| **Vitamin C** | May retard or stabilize tumor growth because:  
• 20-30 times more toxic to cancer cells than normal cells  
• Required for maintaining extracellular matrix — prohibiting tumor invasion  
• Stimulates the immune system  
• Potent antioxidant, may inhibit carcinogenesis  
• Anti-histamine effect — histamines associated with tumor promotion  
• Reduces toxicity and increases effectiveness of chemotherapy and radiation  
• 10g per day increased survival (343 vs. 180 days) in terminal cancer patients in Scotland  
• Essential for optimal function of the immune system — boost *natural-killer* (NK) cells and Interferon  
• May improve appetite and reduce pain | 1-10g daily (to bowel tolerance) taken at frequent intervals |
| **Vitamin E** | • Antioxidant, prevents oxidation of fatty acids in cell membranes — when deficient, red blood cells are fragile  
• Primarily supportive of cell membrane elasticity and integrity  
• May inhibit blood clotting (platelet aggregation)  
• Boosts effectiveness of chemotherapy drugs — deficiency increases toxic side effects of chemotherapy  
• Protects against radiation side effects  
• Increases immune response: may suppress PGE2 biosynthesis, which causes additional burden on the immune system  
• Inhibits infection: many cancer patients have complications during treatment from microbial infection | 1600 IU per day may prevent hair loss  
1200-1600 IU mixed tocopherols  
Take with meals |
| **Bioflavonoids** | • Quercetin dramatically inhibits cancer cell growth in studies  
• Effective free radical scavengers; potent antioxidants  
• Flavonoids interact with a protein, laninin, to maintain the extracellular matrix which prevents spread of cancer cells | 250-1000mg |
| **Calcium** (mixed amino chelates) | • May inhibit colon cancer by binding fat in the stool, thereby reducing lipid damage  
• May reverse rapid growth (hyper-proliferation of colon cells)  
• Needed by some enzymes involved in energy production  
• Take with magnesium concurrentl — 1/2 of calcium and potassium — 1/4 of calcium | 800-1500mg |
| **Co Enzyme Q10** | • Important for proper mitochondria function and energy production  
• Strong antioxidant  
• Enhances some chemotherapy drugs and protects healthy cells, especially the heart, kidney, and liver | 90-400mg with meals |
### MICRO-NUTRIENTS For Cancer Prevention and Recovery (continued)

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| Iron (iron citrate)  | • Adequate supply required to transport oxygen for red blood cell production in bone marrow  
|                      | • Excessive iron is a free radical and may promote cancer  
|                      | • Have blood test prior to taking                                                                                                             |                                                                                             |
| Magnesium (mixed amino chelates) | • Relieves cramping  
|                       | • Improves sleep  
|                       | • Aids digestion and elimination                                                                                                               | 200-800mg                                                                                  |
| Selenium (selenium methionine) | • Synergistic relationship with Vitamin E  
|                       | • Studies show people with low selenium at 2–6 times greater risk of developing cancer than people with high selenium levels  
|                       | • Often deficient in cancer patients  
|                       | • Key effect on DNA metabolism, cell membrane integrity, and optimal liver and pancreas function  
|                       | • Cancer preventive: interferes with initiation and promotion of cancer phases  
|                       | • Immune enhancing: natural killer cells response improved  
|                       | • Impedes recurrence of cancer cells after regression  
|                       | • Inhibits viruses and chemical substances that cause cancer in cells in animal studies                                                                                                             | 200-500mcg daily taken in small doses throughout the day                                      |
| Zinc (zinc methionine) | • Needed in nearly 100 enzymes in the body  
|                       | • Decreases tumor incidence by slowing cell division  
|                       | • Enhances immunity: effectively combating microbial infection common in cancer patients                                                                                                             | 15-50mg                                                                                    |

### DIETARY SUPPLEMENTS For Cancer Prevention and Recovery

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| Bromelain  | • Interferes with malignant cell growth by inhibiting the production of a mucous substance protecting the surface of cancer cells, inhibiting its crude and undiluted identification and eluding the immune system  
|            | • Inhibits PGE2, which interferes with tumor-killing function of macrophages, preventing metastasis                                                                                                   | 2000 G.D.U.           |
| Curcumin   | • Antioxidant (free radical scavenger)  
|            | • Prevents DNA damage; reduces level of mutagens  
|            | • Blocks tumor growth  
|            | • Inhibits all stages of cancer process                                                                                                       | 200-450mg with meals  |
| EPA (fish oil) | • Decreases ability of cancer cells to aggregate  
|             | • Decreases PGE2 synthesis                                                                                                                   | 1-3g as fish oil      |
## DIETARY SUPPLEMENTS For Cancer Prevention and Recovery

<table>
<thead>
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</table>
| Flax seed and flax oil         | • Contains 100 times more lignans than other plant foods, which may reduce tumor size  
                                  • Lignans bind to estrogen receptors, obstructing cancer-enhancing effect on breast tissue  
                                  • Inhibits inflammatory prostaglandins  
                                  • Protects against radiation toxicity | 1 Tbsp. twice daily          |
| Garlic extract                 | • May prohibit proliferation of breast, skin, and nerve cancer cells  
                                  • Gastrointestinal and liver cancers respond well to garlic and onion treatments  
                                  • Anti-fungal and anti-viral | 4–5 capsules                  |
| Grape seed extract and pycnogenol | • Effective free radical scavengers  
                                   • More powerful antioxidants than Vitamin E and Vitamin C  
                                   • Improve blood and lymph circulation | 100-500mg                     |
| L-Glutamine                    | • Prevents muscle wasting  
                                  • Protects red blood cells during chemotherapy and radiation  
                                  • Protects gastrointestinal lining from irritation by treatment | 1g or 1 tsp twice daily       |
| Melatonin                      | • Improves sleep (sleep loss is a common side effect of treatment) and reduces anxiety  
                                  • Stimulates the immune system  
                                  • May lower estrogen levels body, which may prevent and help cure cancer.  
                                  • Boosts chemotherapy effectiveness: protects healthy cells during chemotherapy and radiation  
                                  • Protects DNA  
                                  • Supports liver detoxification  
                                  • Blocks tumor growth and metastasis in animal studies  
                                  • Doses greater than 1 gram may cause free radical damage | .5–20mg  
                                  • NAC • Converts to 250-1000mg |
| Silymarin (milk thistle)       | • Protects healthy cells during chemotherapy and radiation treatment  
                                  • Neutralizes free radical damage to liver cells — powerful antioxidant | 60mg twice daily             |

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Breast Cancer Dietary Supplements

In 1998, Stephen Austin, N.D., from the Center for Natural Medicine in Portland, Oregon, reviewed the efficacy of six supplements used for treating breast cancer. The variables of diet, lifestyle, and psychosocial support were not included in his discussion, though he acknowledged their importance in the recovery process. The supplements discussed included Coenzyme Q10, Melatonin, DHEA, Polysaccharide Krestin (not reviewed here), Vitamin D, and Selenium (reviewed above).

Coenzyme Q10

The literature on Coenzyme Q10 (CoQ10) reveals that increased immune function in humans can result from CoQ10 supplementation. In 1994, Danish and American workers reported previously unpublished results on treating 32 node-positive breast cancer patients for 18 months with a protocol of supplements plus conventional allopathic treatment. The protocol included 2850mg Vitamin C, 2500 IU Vitamin E, 32.5mg beta carotene (presumably synthetic), 387mcg selenium, 1.2g gamma-linolenic acid, 3.5g Omega-3 fatty acids from fish oil, 90mg CoQ10, and a low-dose multivitamin/mineral per day.

Only some of the 32 had evidence of metastatic disease at the start of the study, but specifics were not given. All 32 patients survived the 18 months. None showed further evidence of distal metastasis. Since the number of patients who were Stage IV (advanced) was not provided, proper evaluation of this study is impossible. Six of the 32 showed evidence of "partial remission". However, patients were also treated with tamoxifen or chemotherapy. Higher doses of CoQ10 were used in two of the 32 patients. In one case, after two years at 90mg, the dose of CoQ10 was increased to 390mg. Local recurrence apparently disappeared after one month on high-dose CoQ10. Evidence given was from physical exam and mammography, but was not confirmed by biopsy.

Later reports, published by the same group, described three additional patients successfully treated with 390mg of CoQ10 for 3-5 years: one with remission of a liver metastasis, one with remission of a pleural metastasis, and the third disease-free following a previous lumpectomy. Omissions of important data, and the small number in the trial, make this a very provocative pilot study for further evaluation and replication.

The use of moderate-to-high-dose CoQ10, in conjunction with other nutrients and medical procedures for breast cancer patients with high risk of recurrence, demonstrated no toxicity, and, in certain cases, showed strong efficacy.
Dehydroepiandrosterone (DHEA)

DHEA has been shown in animal studies to inhibit mammary cancer. No human intervention trials have been conducted, so caution is advised. DHEA appears to be low in patients with premenopausal breast cancer, with higher levels of DHEA and DHEA sulfate reported in post-menopausal patients. Higher levels increase estrogen levels.

Caution is warranted. Studies conducted on trout and rats found that DHEA caused cancer. Austin states that it is not unreasonable, in the presence of low-serum DHEA (as opposed to DHEAs) in premenopausal women, to consider low-dose DHEA supplementation to restore age-specific normal serum levels. Monitoring of serum DHEA hormone levels and cancer activity is advised prior to and during treatment.

Melatonin

Melatonin is a free radical scavenger known to inhibit cellular replication of human breast cancer cells. Melatonin protects against the promotional phase of mammary cancer in animals. Melatonin may indirectly lower estrogen levels. Estrogen receptor level-positive breast cancer patients have been reported to have low melatonin levels.

Melatonin is also being investigated as a possible treatment for late-stage disease. In a study with 14 Stage IV breast cancer patients previously unresponsive to tamoxifen, 20mg of melatonin per evening, plus tamoxifen, led to objective partial remission (median duration 8 months) in 4 of 14 patients (28%).

A reduction in anxiety was reported in these patients, perhaps due to improved sleep patterns. Prolongation of life has been reported for lung cancer patients in a trial using 10 mg per evening. The Neri group in 1994 reported positive results for patients with metastatic renal cell carcinoma. It is critical to not take melatonin during the day. Animal data suggest that AM administration stimulates cancer growth in the same species in which PM administration of melatonin inhibits such growth. The known circadian effects of this pineal hormone are likely responsible for these effects.

Vitamin D

Vitamin D is needed for normal cell replication. Activated Vitamin D suppresses cancer cell growth. Vitamin D may have anti-estrogenic activity. Some breast cells have receptors for Vitamin D. Patients with higher levels of Vitamin D receptors have been reported to have longer disease-free survival compared with those lacking such receptors.

Non-Hodgkin’s Lymphoma patients with high levels of receptors for Vitamin D have responded to activated (1,25 dihydroxycholacalciferol) Vitamin D in a small Scottish trial. Some Vitamin D analogues inhibit breast cancer cell growth, a process dramatically facilitated by addition of tamoxifen.
A topical Vitamin D analogue led to 50% reduction in locally advanced or cutaneous metastatic breast cancer in three of 14 patients. Activated Vitamin D at a dose of 800-1000 IU/day can be safely added to a protocol for the treatment of breast cancer in patients who do not have hypercalcemia.

Antioxidant Use in Cancer Treatment

An issue of central concern in comprehensive oncology is the prudent use of antioxidant supplementation during cancer treatment. Long-term prospective studies are lacking to definitively evaluate the timing, use, efficacy, dose, and duration of antioxidants, such as Vitamins A, C, E, zinc, selenium, and glutathione. It is common for oncologists to warn cancer patients that the use of antioxidants during chemotherapy or radiation will interfere with their therapeutic effectiveness. This position is coming into question by researchers and clinicians who want to reduce cancer morbidity and mortality by using nutrition adjuvant to conventional treatment.

A recent landmark review of 71 articles on the application of antioxidant nutrition with oncology, published in 1999 by the eminent cancer researcher Dr. K. Prasad, concluded that supplemental antioxidants:

- Potentiate the efficacy of chemotherapy;
- Potentiate the efficacy of radiation therapy and hyperthermia;
- Induce normal cell growth in cancer cells; and
- Regulate gene expression in cancer cells.

The use of antioxidant supplementation before and after surgery, radiation, and chemotherapy, and during hormone and immune-stimulating treatment, is more widely accepted. A nutrient-rich diet with adequate antioxidants will protect the healthy tissues against trauma, infection, neurotoxicity, and cytotoxicity.

A brief review of recent peer-reviewed literature of antioxidants and chemotherapy shows the following:

- In a 1994 study on nutrition and cancer, a mixture of vitamins was shown to enhance the growth-inhibitory effect of chemotherapy commonly used for melanoma.
- A 1991 study of Vitamin C shows it reduces the toxicity of adriamycin without reducing the antitumor activity.
- A study of Vitamin C published in Cancer Letters in 1996 found that Vitamin C actually improved the tumor kill from chemotherapy agents commonly used for breast cancer.
- A large body of work has compared the use of cisplatin for ovarian cancer with the same treatment combined with the antioxidant glutathione. Repeatedly, the studies have shown better outcomes with less toxicity when glutathione was used adjunctively. A study in the Annals of Oncology (1997) reported that treatment with glutathione raised the response rate from 62% to 73%.
- A 1998 study demonstrated that green tea appeared to increase the effectiveness of doxorubicin — even in tumors, which do not normally respond to doxorubicin use. Green tea is a potent antioxidant, yet it was noted to enhance the effect of doxorubicin by only two-and-a-half-fold.

Further clinical research into the use of antioxidants and chemotherapy with human subjects is needed. Meanwhile, a cancer patient is advised to work with a qualified nutrition consultant to address the multiple needs that arise before, during, and after treatment. To protect a vulnerable patient from conflicting therapeutic opinions, oncologists, nutritionists, and other providers...
should work together with patients and their significant others, supporting them in being actively engaged in the recovery process through diet, nutrition, lifestyle, and spiritual practice.

REFERENCES

3. Brouhult, et. al. 1986
33. Kothari, LS. "Influence of Chronic Melatonin on 9,10-dimethyl-1,2-benzanthracene-induced Mammary Tumors in Female Holtzman Rats Exposed to Continuous Light." Oncology. 44:64-66, 1987.


JOURNAL REFERENCES


BOOK REFERENCES


Cancer Recovery Diet Plan
by Edward Bauman, M.Ed., Ph.D.

Upon Arising
- Liver Chi Tea with Reishi, Maitake, cordyceps, milk thistle, and dandelion: 1 dropper in lemon water, herbal tea, or green tea
- Stretch
- Breath
- Pray
- Meditate
- Affirmations
- Visualization
- Plan the day
- Journal

Breakfast
Protein smoothie (drink half in the morning and the rest in the afternoon):
- 1 digestive enzyme
- 1-2 Tbsp. whey powder
- 1 Tbsp. green powder (spirulina, chlorella, wheatgrass, and/or barley grass)
- 1-2 Tbsp. flax seeds
- 1 Tbsp. dried unsweetened coconut
- 1 Tbsp. L-Glutamine
- 2 oz. Mangosteen juice or aloe vera concentrate
- 1 cup fresh fruit, berries are best
- 16 oz. water

Lunch
Salad with protein:
- 1-2 digestive enzymes
- 1 cup salad greens
- 1/2-1 cup chopped veggies (carrots, beets, cucumbers, celery, etc.)
- 1/2 avocado OR
- 2 Tbsp. sunflower or pumpkin seeds
- 4 oz. tuna, chicken, tofu, OR
- 2 boiled eggs
- 3 Tbsp. lemon, olive oil, herb salad dressing
- 2-4 rice or rye crackers (avoid wheat)

Snack
Remainder of protein smoothie or:
- 1 cup plain yogurt
- 1/2 cup fresh fruit
- 1/4 cup chopped nuts (almonds, filberts, cashews)
- Liver Chi Tea: 1 dropper in lemon water, herb or green tea

Dinner
- 4 oz. steamed or poached fish (e.g. wild salmon, halibut, sole, trout) OR
- 4-6 oz. lentils, black, red or green beans, or tofu
- 1 cup brown rice or 1 baked yam
- 1/2-1 cup steamed veggies (broccoli, shiitake mushrooms, kale, onions, etc.)

Dessert and Snacks
- Occasionally, popcorn with olive oil and nutritional yeast OR
- Yogurt and fruit sundaes (see snack above)

(For more information, see “Explanations of Dietary Supplements Advised” on the next page.)
Explanation of Basic Dietary Supplements Advised
by Edward Bauman, M.Ed., Ph.D.

**Liver Chi:** a liquid concentrate of Chinese herbs — such as reishi, maitake, shiitake, cordyceps, and milk thistle — that enable the liver to detoxify waste from cancer, clear dead cells from treatment, and calm and protect the nervous system from neuropathy. 1 dropper, 2-4 times per day.

**Green Magic:** a powder blend of 17 nutritive, organic foods, such as spirulina, chlorella, wheat grass, barley grass, sea vegetables, co-enzyme Q10, rice bran fiber, lecithin. Protects against red and white blood cell deficiency, protects non-cancerous cells from being damaged from medical treatment. 1 Tbsp., 1-3 times per day.

**Whey Powder:** a protein powder high in sulphur amino acids, such as N. acetyl cysteine, glutathione and lysine, that protects against cachexia (mal-nutrition), and supports all systems of the body. 1-2 Tbsp., 1-3 times per day.

**L-Glutamine:** a single amino acid that protects against muscle wasting and gut degeneration, and supports liver detoxification and healthy brain function.

**Mangosteen Juice or Aloe Vera Concentrate:** antioxidant, anti-inflammatory, antitumoral. Slows cancer progression, inhibits metastasis, induces apoptosis (peaceful cancer cell death), protects healthy cells from side effects of chemo and radiation. 2-3 oz., 1-3 times per day.

**Digestive Enzymes:** complete plant-based capsules to improve the digestion and uptake of nutrients from food. Help allay nausea, loss of appetite, and indigestion. 2-4 caps with each meal and before bed.

**NOT E:**

*There are literally hundreds of anti-cancer remedies with research literature supporting their use. I have found that this is a powerful combination that most people can begin with and note an immediate and persistent benefit, before, during and after medical treatment. It is best to modulate the amounts of each of these based upon need, progression of illness, and side effects. All are safe, health-promoting, and can be taken with benefit by anyone to prevent, control, or reverse cancer.*