

Nutrition and Cancer

by Chelsea O'Callaghan for The D tente Group

The three most compelling arguments made in the correlation between nutrition and cancer concentrate on the intake of fiber, protein, and phytochemicals. Additionally, research conducted on sugars and high-fructose corn syrup, preservatives, hydrogenated and refined foods, and pesticides and genetic modification, have demonstrated the impact of modern diet on the cause and prevention of cancer. In *The Doctors Book of Food Remedies*, Keith Block, MD (Medical Director of the Block Center for Integrative Cancer Care in Evanston, Illinois) asserts: "Our experience over the past 2 decades indicates that diet plays an important role with cancer. We're discovering that there are compounds in foods that can actually prevent and help fight cancer at the cellular level." (Yaeger, 2007, p. 131) The overarching implications in recent studies illustrate that nutrition plays a pivotal role in either promoting or inhibiting cancer development.

Fiber versus Refined Foods

Fiber operates in a complex way through vegetables, fruits, and grains, which makes it impossible for scientists to distill its properties or extract its benefits and create a synthetic alternative. What is conclusive is that fiber naturally absorbs water and facilitates the process through which substances travel in the intestines, reducing the incidence of toxins affixing themselves inside our bodies. However, plant foods that are high in fiber, such as brown rice, are often mistaken for their refined and processed counterparts, such as polished white

rice. Whole grains, which have the kernel in tact, nuts, seeds, cereals, fruits and vegetables, have a soluble, viscous property that operates as binding glue, pulling toxins cleanly through the digestive system. The most recent research determines that chia seeds, flax, oatmeal, muesli, legumes (especially kidney and garbanzo beans), quinoa, bulgur wheat, lentils, and leafy vegetables (including seaweed) provide the most concentrated and abundant amounts of fiber.

Refined grains, such as white rice, breads, and flours, have been milled, and in the process, their fiber and other nutrients are removed. These foods are still considered carbohydrates, but have far less dietary fiber, which is replaced by sugar. The glucose in carbohydrates provides the body with sustained energy. On the contrary, refined sugars found in the form of high fructose corn syrup, as opposed to glucose, spikes insulin levels for an immediate and short-term physical response, and is assimilated differently and almost entirely by the liver. In addition to refined white foods, fructose is found in the commonly-consumed sodas and sweeteners. Stevia and honey, in their natural and raw forms, are safe alternatives.

Animal Protein versus Plant-Based Protein

In February 1968, Indian scientists, T.V. Madhavan and C. Goplan, published their study in the journal, *Archives of Pathology*. Their research indicated that a deprivation of animal protein (5% of a diet) inhibits cancer cell growth in rats

exposed to aflatoxin, a potent carcinogen. Alternatively, rats exposed to the same amount of aflatoxin and fed 20% protein, developed cancer. These results inspired subsequent experiments that led to conclusive and undeniable findings. In an extensive analysis of nutrition, *The China Study* (2006), T. Colin Campbell, PhD (the Jacob Gould Schurman Professor Emeritus of Nutritional Biochemistry at Cornell University) explained:

“We had discovered that low protein intake reduces cancer initiation and works in multiple synchronous ways. As if that weren’t enough, we were finding that high protein intake, in excess of the amount needed for growth, promotes cancer after initiation. Like flipping a switch on and off, we could control cancer promotion merely by changing levels of protein, regardless of initial carcinogen exposure.” (Campbell & Campbell, 2006, p. 60)

Further research established the nutritional composition of our diets as the primary determinant of cancer occurrence, rather than genetics or environmental pollutants. Dietary factors include promoters and anti-promoters, which either stimulate or decelerate cancer growth, respectively. The most powerful of these promoters is animal protein. More specifically, casein, which constitutes 87% of the protein in cow’s milk. “Casein affects the way DNA reacts with carcinogens and the way cancerous cells grow.” (Campbell & Campbell, 2006, p. 65)

Evidence shows that casein enhances mutation of cells, which ultimately causes

cancer. The elimination of animal protein can reduce or reverse malignant growth. Regardless of carcinogen exposure, a food regimen that is high in animal protein plays a pivotal role in the existence and accumulation of cancer cells. “On the other hand, plant-based foods are filled with nutrients like phytochemicals and antioxidants that can fight cancer. Eating these foods can help your body repair mutated cells, or cause apoptosis (death of the cells), reducing your risk of developing cancer.” (Stone, Campbell, & Esselstyn, 2011, p. 22) Reducing or eliminating animal protein does not predicate malnutrition. A plant-based diet yields all the essential nutrients in meat and dairy (with the exception of vitamin B₁₂), but with the additional benefits of phytochemicals unavailable in animal foods.

Phytochemicals

Incorporating the spectrum of colors in fruits and vegetables into your diet provides the greatest opportunity to receive all your nutrients, vitamins, minerals, and phytochemicals. These properties enhance our ability to ward off cancer through intricate defensive and offensive strategies. The most comprehensive benefits are found through eating whole foods, rather than supplements. Nutrients are maximized in locally-grown, seasonal, and organic produce because soil, pesticides, storage, and transportation alter the constitution of vitamins and phytochemicals.

Adapted from UC Berkeley's *The Wellness Kitchen*

Phytochemicals

Alpha-Linolenic Acid: an essential fat that can reduce the risk of heart attacks and has anti-inflammatory properties; canola oil, ground flaxseed, soybean oil, walnuts, chia seeds, hemp.

Anthocyanins: contains powerful antioxidant properties; apples, berries, cherries, plums, pomegranates, red cabbage.

Antioxidants: protects the body from the damaging effects of free radicals; fruits, vegetables, whole grains.

Beta Carotene: performs as an antioxidant; apricots, broccoli, butternut squash, cantaloupe, carrots, corn, peppers, pumpkin, spinach, sweet potatoes.

Beta Cryptoxanthin: shows promise in blocking tumor growth and suppression of malignant growth; peaches, oranges, tangerines, nectarines, papayas, persimmons.

Carotenoids: a potent antioxidant that may defend against cancer, heart disease, and age-related vision problems; carrots, kale, peppers, pumpkin, tangerines, sweet potatoes, butternut squash, tomatoes.

Catechins: contains antioxidant that may help protect against cancer and impede harmful plaque buildup in arteries; apples, dark chocolate, grapes, pomegranates, raspberries, red wine, tea.

Chlorogenic Acid: an antioxidant that may block the conversion of nitrates into cancer-causing nitrosamines; berries, cherries, kiwifruit, tomatoes.

Diallyl Sulfide: may lower the risk of certain forms of cancer and help to stimulate cancer-fighting enzymes that detoxify carcinogens; leeks, onions, garlic.

ECGG: a particularly powerful antioxidant; green tea.

Ellagic Acid: an antioxidant that disarms cell-damaging free radicals; berries, grapes, nuts, pomegranates.

Flavonoids: neutralize disease-causing free radicals and may help to suppress the growth of tumor cells and protect against heart disease; fruits, vegetables, whole grains, tea, and wine.

Glucosinolates: exerts numerous anticancer actions, including detoxification of carcinogens, impediment of cancer cell replication, and enhancement of cancer-fighting enzymes; Brussels sprouts, kale, watercress, cruciferous vegetables.

Indoles: appears to elevate levels of anticancer enzymes, block some actions of estrogen, and suppress harmful effects of carcinogens; cruciferous vegetables, such as cabbage, kohlrabi, turnip greens.

Isoflavones: an antioxidant with possible anti-cancer properties and benefits for bones, blood vessels, the brain, and the heart; soybeans, soynuts, tempeh, soy flour.

Lignans: a type of fiber that defend cells against free radical damage; whole grains, flaxseed.

Limonenes: may work against carcinogens and tumors; lemon peel, lime peel, caraway, coriander, thyme.

Lutein: an antioxidant carotenoid; celery, corn, kiwifruit, peas, pumpkin, red grapes, spinach, yellow squash, zucchini.

Lycopene: may lower the risk of cancer and protect against coronary artery disease; tomato sauce and paste, tomatoes, pink grapefruit, watermelon, guava.

Plant Sterols: lowers bad cholesterol without affecting levels of good cholesterol; almonds, cashews, hazelnuts, figs, peanuts, pumpkin seeds, pecans, soybeans, walnuts.

Quercetin: suppresses growth of cancer cells; apples, berries, cherries, red onions, red and purple grapes, tea, tomatoes.

Resveratrol: may suppress tumor growth and neutralize free radicals; peanuts, peanut butter, red and purple grapes, red wine.

Saponins: thought to prevent DNA damage from carcinogens; legumes, nuts, oats, whole grains.

Selenium: has antioxidant properties and may help protect cells from damage; beans (dried), brazil nuts, mushrooms, rye, sunflower seeds

Sulforaphane: appears to detoxify carcinogens and stimulate body's own cancer-protective enzymes; cruciferous vegetables.

Whole Foods

Acorn Squash: fiber, magnesium, B₆, vitamin C.

Almonds: fiber, protein, magnesium, vitamin E, riboflavin, iron, plant sterols, healthy fat.

Apples: insoluble and soluble fiber (pectin), quercetin, anthocyanins (red apples).

Apricots: beta carotene, vitamin C, fiber, potassium.

Artichokes: potassium, magnesium, folate.

Arugula: folate, beta carotene, potassium.

Asparagus: fiber, iron, beta carotene, vitamin C, B vitamins.

Avocados: B vitamins, folate, healthy fats.

Bananas: potassium, soluble fiber, vitamin B₆.

Barley: complex carbohydrates, thiamin, niacin, vitamin B₆, iron, zinc, soluble fiber.

Beans (Dried): complex carbohydrates, fiber, B vitamins (especially folate), potassium, magnesium, selenium, insoluble fiber.

Beans (Fresh): beta carotene, lutein, folate, vitamin C.

Beet Greens: beta carotene, vitamin C.

Beets: fiber, potassium, folate.

Blackberries: fiber, vitamin C, folate, ellagic acid.

Blueberries: vitamin C, soluble fiber, anthocyanins.

Bok Choy: beta carotene, vitamin B₆, vitamin C, folate, calcium, fiber, potassium, indoles.

Brazil Nuts: protein, fiber, vitamin E, selenium, thiamin, iron, magnesium, zinc.

Broccoli: fiber, folate, riboflavin, vitamin B₆, vitamin C, potassium, beta carotene, lutein, sulforaphane, indoles.

Brussels Sprouts: vitamin C, fiber, folate, B vitamins, lutein, indoles, sulforaphane.

Buckwheat: protein, niacin, fiber, all 9 essential amino acids, magnesium.

Bulgur: fiber, iron, magnesium, niacin, lignans, saponins.

Butternut Squash: complex carbohydrate, carotenoids, fiber, vitamin C, magnesium, potassium.

Cabbage: vitamin C, folate, fiber, indoles, anthocyanin (red cabbage), sulforaphane.

Cantaloupe: potassium, vitamin B₆, vitamin C, beta carotene.

Carrots: carotenoids, vitamin B₆, fiber.

Cashews: magnesium, zinc, vitamin E, plant sterols.

Cauliflower: vitamin C, folate, vitamin B₆, indoles.

Celery: potassium, vitamin C, folate, fiber, lutein.

Cherries: soluble fiber, vitamin C, quercetin, anthocyanins.

Chia Seeds: omega-3 fatty acids, alpha-linolenic acid, soluble fiber.

Chocolate: magnesium, copper, iron, zinc, catechins.

Corn: fiber, thiamin, folate, potassium iron, magnesium, complex carbohydrates, beta carotene, lutein.

Cranberries: vitamin C, fiber, anthocyanins.

Cucumbers: potassium, lutein.

Dates: potassium, fiber.

Eggplant: fiber, anthocyanins.

Figs: potassium, soluble fiber, plant sterols.

Flaxseeds: alpha-linolenic acid, omega-3 fatty acids, potassium, lignans.

Flour (Whole Wheat): vitamins, minerals, fiber, phytochemicals.

Grapefruit: vitamin C, beta carotene, lycopene, potassium, soluble fiber.

Grapes: resveratrol, quercetin.

Guava: vitamin C, fiber, lycopene.

Hazelnuts: thiamin, vitamin B₆, iron, magnesium, vitamin E, plant sterols, alpha-linolenic acids, omega-3 fatty acids.

Hemp: alpha-linolenic, omega-3 fatty acids, all 9 essential amino acids.

Honeydew Melon: potassium, thiamin, vitamin C.

Jicama: vitamin C, fiber.

Kale: lutein, vitamin B₆, vitamin C, beta carotene, sulforaphane, indoles.

Kiwifruit: vitamin C, fiber, potassium, folate, magnesium, lutein, vitamin E.

Kohlrabi: potassium, fiber, vitamin B₆, vitamin C, vitamin E, indoles, sulforaphane.

Leeks: fiber, iron, diallyl sulfide.

Lemons: potassium, vitamin C, limonenes.

Lentils: protein, fiber, folate, thiamin, vitamin B₆, potassium, iron, zinc.

Lettuce: vitamin C, folate, beta carotene.

Lima Beans: vitamin B₆, niacin, folate, protein, soluble fiber, potassium, magnesium.

Limes: vitamin C, limonenes.

Mangoes: soluble fiber, vitamin C, vitamin E, beta carotene.

Mushrooms: riboflavin, niacin, vitamin B₆, soluble fiber, selenium (Shitake).

Nectarines: potassium, fiber, beta carotene, anthocyanins.

Onions: fiber, vitamin C, potassium, vitamin B₆, quercetin (red onions), diallyl sulfide.

Oranges: vitamin C, potassium, folate, fiber, limonenes.

Papaya: vitamin C, fiber, folate, vitamin E, potassium, beta carotene.

Parsnips: soluble fiber, vitamin C, folate, Thiamin, vitamin E, iron, magnesium.

Peaches: soluble fiber, vitamin E.

Peanuts: protein, vitamin E, folate, niacin, magnesium, fiber, plant sterols.

Pears: soluble fiber.

Peas (Dried): fiber, folate, thiamin, potassium, iron.

Peas (Fresh): thiamin, riboflavin, niacin, vitamin C, iron, magnesium, zinc, protein, folate, vitamin B₆, lutein.

Pecans: thiamin, zinc, fiber, plant sterols.

Peppers: fiber, vitamin B₆, vitamin C (red and yellow peppers), beta carotene (red and yellow peppers).

Persimmons: vitamin C, beta carotene, potassium.

Pine Nuts: magnesium, iron.

Pineapple: vitamin C, thiamin, manganese.

Pistachios: vitamin B₆, vitamin E, thiamin, iron, magnesium, fiber potassium, plant sterols.

Plums: vitamin C, fiber, anthocyanins.

Pomegranates: vitamin B₆, vitamin C, potassium, ellagic acid, catechins, anthocyanins.

Potatoes: vitamin C, thiamin, iron, niacin, fiber, potassium, vitamin B₆.

Prunes: magnesium, iron, potassium, soluble fiber. (**highest antioxidant status)

Pumpkin: beta carotene, potassium, fiber, riboflavin, vitamin C, vitamin E, iron.

(**canned pumpkin is more nutritious than fresh)

Pumpkin Seeds: magnesium, zinc, vitamin E, iron, plant sterols.

Quinoa: riboflavin, vitamin E, iron, magnesium, potassium, zinc, fiber, protein.

(**one of the best sources of plant protein)

Radishes: vitamin C.

Raisins: iron, potassium, soluble fiber.

Raspberries: vitamin C, fiber, anthocyanins.

Rhubarb: fiber, vitamin C, potassium, manganese, calcium.

Rice (Brown): complex carbohydrates, thiamin, niacin, vitamin B₆, fiber.

Rye: fiber, protein, magnesium, thiamin, niacin, iron, zinc, selenium, saponins.

Sesame Seeds: vitamin E, iron, zinc.

Shallots: vitamin B₆, diallyl sulfide.

Soybeans: thiamin, riboflavin, vitamin B₆, folate, iron, potassium, magnesium, plant sterols, vitamin E, all 9 essential amino acids, protein, isoflavones.

Spinach: folate, magnesium, thiamin, riboflavin, vitamin B₆, vitamin C, vitamin E, beta carotene, lutein, iron, calcium.

Strawberries: vitamin C (**more than any other berry), anthocyanins, ellagic acid.

Sunflower Seeds: thiamin, vitamin B₆, folate, iron, magnesium, selenium, zinc, protein, fiber, vitamin E, lignans.

Sweet Potatoes: vitamin B₆, vitamin C, iron, potassium, vitamin E, beta carotene, lutein.

Swiss Chard: magnesium, vitamin C, vitamin E, potassium, fiber, vitamin K.

Tangerines: vitamin C, thiamin, soluble fiber, lutein, beta carotene.

Tomatoes: fiber, thiamin, vitamin B₆, potassium, vitamin C, lycopene, quercetin.

Turnip Greens: beta carotene, vitamin C, folate, isothiocyanates, indoles, sulforaphane.

Turnips: fiber, vitamin C.

Walnuts: vitamin B₆, magnesium, alpha-linolenic acid, omega-3 fatty acids, plant sterols.

Watercress: fiber, potassium, beta carotene, vitamin C, isothiocyanates.

Watermelon: vitamin B₆, vitamin C, potassium, lycopene.

Whole Wheat: saponins, lignans, thiamin, vitamin E, folate, iron, riboflavin, fiber, niacin, magnesium.

Zucchini: vitamin C, potassium, fiber, beta carotene, lutein.

References

- Campbell, T. C., & Campbell, T. M. (2006). *The China study: the most comprehensive study of nutrition ever conducted and the startling implications for diet, weight loss and long-term health*. Dallas, Tex.: BenBella Books.
- Madhavan, T., & Goplin, C. (1968). The effect of dietary protein on carcinogenesis of aflatoxin. *Archives of Pathology*, 85(2), 133-137.
- Stone, G., Campbell, T. C., Esselstyn, C. B., & Popper, P. (2011). *Forks over knives: the plant-based way to health*. New York: The Experiment.
- UC Berkeley and The wellness kitchen: bringing the latest nutrition information to your table*. (2003). New York: Rebus.
- Yeager, S. (2007). *The doctors book of food remedies: the latest findings on the power of food to treat and prevent health problems--from aging and diabetes to ulcers and yeast infections* (Fully rev. and updated. ed.). Emmaus, Pa.: Rodale.