

# Unlocking the Power of Foods - Nutraceuticals

– by Peter Brodhead CN

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There are an incredible array of compounds found in a large variety of foods that have effects on the body in preventing disease that go well beyond vitamins, minerals, proteins, fats, and carbohydrates. This is an overview of some of these compounds and what they do in protecting the body and what foods they are found in. A pharmacy found in the organic produce department of your natural foods market.

**Fermented Foods and Probiotics** - Research on the bacterial biome is now the most cutting edge in health. There are way more bacteria living in us and on us than there are cells in the body. There are 150x the amount of genes in our bacteria than our own. The bacteria communicate and are in the driver's seat as to how body function and regulation happens. We are finding out that GI tract gut bacteria regulate much more than digestion. Immune functioning the majority of immune cells are in the gut, allergies, depression and brain chemistry more serotonin is made in the gut than in the brain. Regulation of blood sugar, hypertension, mood and so much more is being discovered every day. I believe that the future of medicine will be more about supplementing beneficial bacteria than drugs. Eating a large variety of fermented foods such as yogurt, kefir, cultured cottage cheese, miso, tempeh, fermented vegetables such as sauerkraut, kim chi and pickles. are some of the fermented foods. We also need to consume higher amounts of beneficial fibers such as Inulin and FOS (Fructooligosaccharides. - found in Jerusalem Artichokes, Chicory, Flax Seed Meal, Psyllium Husks and many other foods high in fiber - the beneficial fibers are a probiotic fertilizer. FOS causes a 10x increase in beneficial bifidobacteria in the colon with corresponding decreases in bacteria known to be pathogenic and putrefactive. Anti-biotic use in animals and given to infants shifts the balance of beneficial bacteria to unfriendly bacteria. Persons who are overweight have different bacteria than persons who are lean. Gut health is the key to our health and longevity  
Lactobacillus strains live in the small intestine and Bifidus strains live in the large intestine.

See separate handout on How to Get Cultured - Incorporating cultured foods into your diet.

**Alpha Carotene** found in many of the same foods Beta Carotene is found in - protects against many forms of cancer: cervical, liver, lung, pancreas, skin, stomach, neuroblastoma, also protects against the development of cataracts. In a recent analysis by the CDC found that people with the highest blood levels of alpha-carotene had a significantly lower risk of disease or death. Found in Kiwi Fruit, Mango, Peach, Cantaloupe, Apricots, Carrots the richest source, Pumpkin second richest, Broccoli, Spinach, Kale, Brussels Sprouts, and Sweet Potato. Carotene supplements derived from Palm Oil are the richest supplemental sources of Alpha Carotene. If purchasing a Beta Carotene supplement make sure it is derived from either Palm Oil or D'Salina algae so that you get Alpha Carotene and other Carotenoids. Carotenes are absorbed better when fat is accompanied with it.

**Anthocyanidins** – Give the vivid colors of berries. Cherries, Blueberries and European Bilberry are one example, which benefit all functions of eye health. These compounds are found in virtually all berries, red cabbage and eggplant skins. They have been found to have diverse activity in the body. 1<sup>st</sup> they function as anti-oxidants and counteract inflammation in the body. They strengthen connective tissue in the body and reduce capillary fragility ie. bruising and help prevent edema. Anthocyanidins can help prevent cancer from spreading by strengthening the connective tissue and resist tumor invasiveness. Anthocyanins may help lower blood sugar levels in people with diabetes – in a study with animal pancreatic cell insulin production was increased by 50%

**Apigenin** - found in parsley, thyme, chamomile, celery, and peppermint can down regulate HER2neu in breast cancer.

**Calcium D'Glucarate** – Assists in the detoxification of excessive estrogenic activity in the body and has been considered an alternative to tamoxifen by nutritionists. It is found in Broccoli, Brussels sprouts, Oranges and Grapefruit, Cherries, apples, and spinach (these foods contain glucaric acid). It can inhibit the ability of tobacco smoking to cause lung cancer and has been shown to help prevent Bladder, Breast, Colon, Liver, Lung, Prostate and Skin Cancers.

**Catechin - EGCG** - An antioxidant component of **Green Tea** protects against many types of cancers and protects the liver from alcohol damage and is useful in the treatment of hepatitis. **Theophiline** found in green tea is very helpful for people with asthma. **Green Tea** – protects against 4 major categories of carcinogens: 1- Indirect chemical carcinogens (ie. benzopyrene in diesel fuel) 2- direct chemical carcinogens (Nitrates found in meats) 3 – Physical carcinogens (ultraviolet light). 4 – Tumor promoters (pesticides, DDT). It inhibits tumor initiation, helps with liver detoxification, protects DNA, and blocks abnormal cell growth. - it has been found to inhibit VEG-F which allows a tumor to get a blood supply initiated to feed a tumor. The caffeine in green tea possesses anticancer activity. Green Tea also has an amino acid in it called **Theanine** which is excellent for stress – it increases the alpha wave production in the brain (the brain waves associated with people in prayer or meditation – so it has a calming and centering effect on the brain). Green Tea has been found to enhance cognitive functioning in short term memory in older adults.

**Chili Peppers and Capsaicin** - Chili peppers support circulation in the body and can help increase the metabolic rate. Research has found that chili peppers support lung function in persons with asthma.

#### **Coffee and Chocolate -**

**Coffee** contains numerous polyphenols and anti-oxidants that have been found to protect the body from cardiovascular disease, diabetes type 2, and neurological diseases such as parkinson's and dementia. Persons who drink higher amounts of coffee live longer. Liver and colon cancer are benefited from coffee - it stimulates bile function and helps liver detoxification. Some recent research has found that coffee consumption lowers tinnitus symptoms in women - 15% lower in women who consumed more coffee 5 - 8oz cups a day.

**Cacao (Chocolate)** - Cacao powder may be the most anti-oxidant rich food on the planet. There are hundreds of polyphenols and anti-oxidants found in it. It is the richest food source of a new vitamin compound called PQQ that supports the regeneration of our mitochondria. Cacao opens the blood flow of the arteries and blood vessels by increasing nitric oxide in the blood vessel walls contributing to lowering blood pressure. Theobromine a compound in Cacao is excellent for brain function and supports long term concentration. It also is breast cancer protective the pentameric procyanidin can inhibit human breast cancer cells.

**Curcumin** – Found primarily in Turmeric Root (the yellow color found in curry powder) is a potent antioxidant, liver detoxifier and protector, gallstone prevention and cholesterol-lowering compound. It suppresses the damage to liver cells caused by hepatitis C and stimulates glutathione (a potent anti-oxidant enzyme that prevents tumor growth and formation) by the liver. Anti-inflammatory it is equally effective as NSAIDS in the treatment of inflammation. **A potent cancer prevention** and cancer treatment – it stimulates apoptosis (cellular suicide) of cancer cells. Curcumin assists in stopping all stages of cancer formation: initiation, promotion and progression. Evidence also suggests that curcumin causes cancer to regress i.e. grow smaller. Curcumin in preliminary studies suggest that it is likely to inhibit prostate, breast, skin, colon, stomach, and liver cancers and is suitable for use in conjunction with chemotherapy. It has also been demonstrated to be cytotoxic to both human chronic myeloid leukemia cells and Dalton's lymphoma cells, early stage cervical cancer. Turmeric has been shown to be extremely effective at inhibiting recurring melanoma in people at high risk. Combined with Green Tea has an inhibiting effect on the growth of squamous cell carcinoma. Test tube studies have also found it helpful for breast cancer. As a supplement it absorbs best with the pineapple enzyme bromelain. As a food Turmeric is better absorbed when taken with fat. Turmeric has now been found to cross the blood brain barrier and may modulate inflammation in the brain offering potential protection from Alzheimers disease and other neurological diseases such as ALS, Parkinsons, and mental disorders and depression. A recent study found Curcumin worked for major depression.

**Ellagic Acid** – Found in raspberries, pomegranates are the richest source, cranberries, apples, grapes, cherries, and strawberry. Helps to prevent various types of cancers in rodents such as Esophageal, Lung, Skin cancers. In breast

cancer xenografts a study revealed that ellagic acid significantly inhibited cancer growth and P-VEGFR2 expression. It helps stimulate the manufacture of glutathione. Ellagic Acid is also very cardiovascular protective.

**Glutathione** - Is the critical anti-oxidant pathway that the body uses to support detoxification - especially phase 1 detoxification. Glutathione protects the liver. Tylenol depletes glutathione and overdosing it causes liver failure by the depletion of Glutathione. 2 of the best foods for glutathione are raw tomatoes and avocado's (Guacamole !). Nutrients that support the production of glutathione in the body are Vitamin C, Alpha Lipoic Acid, NAC and the amino acids Glycine, and Glutamine. Avocado and Asparagus are leading sources of glutathione. Broccoli and spinach are also known to boost glutathione levels. Raw eggs, garlic and fresh unprocessed meats contain high levels of sulphur-containing amino acids and help to maintain optimal glutathione levels. Indentured Whey Protein Isolate contains alpha-lactalbumin. Artichoke, Avocado, Asparagus and Cilantro increase GSH. They have discovered a probiotic strain that makes glutathione in your gut. Lactobacillus fermentum ME-3 research at the Univ of Estonia in Europe - Marika Mikelsaar MD,PhD. This is available as a supplement.

**Indole-3-Carbinols, Sulphoraphane** – Found in Broccoli, Broccoli Sprouts are the highest, Cabbage, Brussels Sprouts, Kale and Califlower assist the production of glutathione by the liver cells and help in liver detoxification. Recent research at Oregon State Univ. 12/14 showed a potential benefit for sulforane in the treatment of metastatic prostate cancer by altering the gene expression in metastasized prostate cancer cells it helps the gene to re-express tumor suppressors leading to the selective death of cancer cells and slowing disease progression. Indole-3-Carbinols protects the body from Breast, Colon, Endometrial, and cancers initiated by the papilloma viruses (cervical cancer).

**DIM** is created in the body by indole-3 carbinols and plays a very important role in preventing breast and prostate cancers. DIM also helps the liver detoxify aflatoxin. Glucoraphan also known as sulforaphane glucosinolate (SGS) is present in high levels in broccoli sprouts – has been found to lower the inflammatory response and improve cardiovascular health and help correct major dysfunctions such as hypertension and stroke. It boosts Phase 2 enzyme antioxidant defense systems and functions as a powerful indirect antioxidant detoxifying carcinogens before they can damage cells. **Organo-Sulfurs** found in garlic and onions are also highly protective substances that block chemical carcinogens from turning healthy cells into cancer cells. Garlic also suppresses cholesterol synthesis in the liver.

**Isoflavones** – There are over 600 isoflavanoids – Isoflavones are the best known, daidzein, genistein, formononetin and biochanin A are known for their estrogenic properties. Isoflavones have received a lot of attention in the last decade in their support for menopause and in supporting conditions of overexpression of estrogen as well as supporting and balancing lower levels of estrogen as these compounds can occupy estrogen receptor sites on the cells and assist in balancing estrogen from either direction. They also have been used by men in supporting prostate health. **Daidzein** – the known sources are: Soybeans, Runner Bean, Kudzu Root, Red Clover. **Genistein** – Soybeans, Licorice, Alfalfa, Runner Bean, Butter Bean, Pea Shoots, Kudzu Root and Leaf, Chickweed, Red Clover and Adzuki Bean.

**Kaempferol** – A bioflavanoid found in Green Tea, Black Tea, Garlic, Apples, Strawberries, Broccoli, Grapefruit, Lettuce, Basil, Parsley, Ginger, Thyme, Bee Propolis, Ginkgo Biloba and Passion Flower. Kaempferol inhibits 5-Lipoxygenase which stimulates the growth of prostate cancer cells. It also inhibits aromatase – which converts to estrogen and helps prevent breast cancer cell proliferation. It also inhibits cytomegalovirus (CMV) and helicobacter pylori – the bacteria that causes stomach ulcers and minimizes inflammation in the body.

**Lignans** – Found primarily in the outer husk of the Flaxseed. Lignans block estrogen receptors within the body, thereby inhibiting the toxic effects of excessive estrogens. They inhibit the development of breast cancer (British studies showed that women with breast cancer who had the highest level of lignans in their breast tissue had the lowest rate of the cancer growing, and metastasizing to other parts of the body, it basically put the brakes on any spreading of the breast cancer) and inhibit the development of colon cancer and prostate cancer as well as retard the further progression of prostate cancer. Lignans in the diet also help prevent type 2 diabetes. The easiest way to get plenty of lignans in the diet as well as the beneficial Omega 3 fat ALA (alpha linoleic acid) is to put flax seeds in your blender or coffee mill, grind them to a powder and add to your food – sprinkle on salads, put in orange juice or in your breakfast cereal, flaxmeal tastes decent.

**Limonene** – The highest concentrations are found in the spongy white inner parts of citrus fruit i.e. orange peel, lemon peel, kumquats and cranberry. Limonene can dissolve gallstones. It helps to prevent Breast Cancer and

inhibits the progression of established breast cancer and in animal studies with rodents it prevented the development of pancreatic cancer and caused the regression of existing pancreatic cancer. In animal studies with breast cancer (rodents) it caused the complete regression of the majority of advanced rat breast cancers. Limonoids seem to work against cancer three ways: prevent it from forming, slow the growth of existing cancer and kill cancer cells. Neuroblastomas a type of brain cancer which accounts for 10% of all cancers in children – in laboratory tests limonoids found in citrus killed neuroblastoma cells in 48 hours or less when exposed to relatively small amounts of concentrated limonoids. The newest research with limonene is its use in treating problems with esophageal reflux and chronic acid indigestion it has the potential to put nexion ie. “the purple pill” out of business. Limonene has the potential to lower cholesterol more effectively than some prescription drugs, and without side effects, according to a study by U.S. and Canadian researchers.

**Lutein** – Protects the eyes against the development of Age-related Macular Degeneration, Cataracts, it is concentrated in the lens of the eyes and concentrates in the Macula (yellow spot on the back) of the retina of the eye. It has also been shown to help Retinitis Pigmentosa in blue eyed people. Helps prevent Breast, Colon, Lung Cancers and reduces the risk of Prostate Cancer (*when avocado extract was added to 2 lines of prostate cancer cells, cell growth was inhibited by up to 60%*). Best foods Spinach, Kale, Broccoli, Calendula Marigold (Best Source), Avocados are the richest fruit source. Egg yolk contains a significant amount of Lutein in it and the fat in the egg yolk enhances the bioavailability of it, 1 egg yolk contains 200mcgs of Lutein and it is 200% to 300% more bioavailable than vegetable sources - also Corn, Sweet Potato, Brussel Sprouts, Green Beans, Cayenne Pepper and Palm Oil. **Astaxanthin** a carotenoid derived from an algae, it is the same compound that makes salmon meat pink and flamingo feathers pink may be the most potent carotene for macular degeneration. Astaxanthin also has anti-inflammatory effects on nerve cells and has been shown to help carpal tunnel syndrome and problems with inflammation of the optic nerve. In a 1995 researchers reported in the journal, Carcinogenesis, that astaxanthin specifically acted as a preventive agent against bladder, colon, and oral cancers in animals. In other animal studies, astaxanthin was found to have a significant influence on the reduction and size of cancerous lesions on the liver.

**Luteolin** - is a common flavonoid that exists in many types of foods and medicinal herbs including cruciferous vegetable, artichoke, celery, thyme, parsley, peppermint, basil, green peppers, lemons, and chamomile Inhibits TBK1, a signaling enzyme associated with inflammation in the body it inhibits protein kinase C and Src kinase activities both of which have been implicated in oncogenic signaling. It significantly inhibits HER2 expression and tumor growth in nude mice dose-dependently. Luteolin triggers apoptotic cell death through potentiation of both apoptosis pathways and suppression of cell survival pathways

**Lycopene** – Carotenoid found in red vegetables and fruits Tomatoes are the best source. Prostate and testicles are major storage areas for men. It is best known for protecting the body against prostate cancer in men but it protects against the formation of many other cancers including: Bladder, Breast, Cervical, Colon, Endometrial, Esophageal, Leukemia, Liver, Lung, Mouth, Pancreatic, Pharynx and Stomach. Cooked tomato products are the overwhelming best source also pink grapefruit, watermelon cayenne pepper, paprika, red grapes, the skin of red delicious apples, red papaya and apricots are good sources. New research shows it is highly beneficial to the cardiovascular system and helps lower elevated blood pressure.

**Omega 3 Fatty Acids – EPA & DHA** the best food sources are Salmon & Sardines and also Albacore Tuna., Flax seed oil is the best plant source of these fatty acids. Omega 3's play a critical role in the brain and in cell membrane fluidity. They are potent controllers of the inflammatory processes in the body - anyone with an auto-immune problems and allergies or any inflammatory problems should include more omega 3 fatty acids in the diet. DHA which is stored in the brain and in the lens of the eye has been shown to be beneficial in the treatment of depression, attention deficit and learning disorders and in memory loss in the elderly. DHA is especially important in brain function as it is used to build nerve endings in some of the most vital brain regions. DHA is required by the areas of the brain that provide us with judgment and the ability to stay focused and complete tasks. EPA is involved in reducing inflammation in the body. It has been shown to support persons with depression by enhancing the functioning of serotonin.

**Phytoestrogens** – Protect the body from the detrimental effects of excessive exposure to estrogens. Help to prevent breast cancer. They possibly can protect the body from the effects of endogenous estrogens in the environment such as pesticides and plastics that can mimic the action of estrogens. Soy products and red clover are two of the better known phytoestrogens. See the above information on Genistein and Diadzen.

**Quercetin** – Found in red onions, apples and the skins of russet potatoes - quercetin helps prevent cataracts and is especially beneficial for diabetics who accumulate higher levels of sorbitol in the lens of the eyes. It has significant antitumor activity against various form of cancer i.e. Brain, breast, colon, leukemia, lung, ovarian, squamous cell carcinoma and stomach. **It is currently one of the most powerful (along with Curcuma from Turmeric and Resveratrol) nutritional weapons in both preventing and as a treatment during cancer.** Used during chemotherapy it prevents cancer from mutating around chemotherapy drugs and is a first choice for both Breast and Prostate Cancer. It stimulates apoptosis – cellular death in cancer cells. It's best known for it's anti-inflammatory, anti-allergy and for allergic asthma. It inhibits histamine release by basophil mast cells during allergic reaction. **It is the best single nutritional strategy for the treatment of any kind of allergy.** It appears to protect brain cells against oxidative stress, a tissue- damaging process associated with Alzheimer's and other neurodegenerative disorders (*based on a study carried out on rat brain cells*). It can prevent infections caused by viruses. Helps prevent destruction of the pancreas during pancreatitis. A potent antioxidant, anti-cancer, anti-inflammatory and anti-allergy flavanoid. Other foods containing quercetin are Red Wine, Green Tea, Black Tea, Apples, Grapes, Pears, Kiwi, Califlower, Spinach, Broccoli, Kale, Cabbage, Cayenne, Green Beans, Okra, Fennel and Squash.

**Resveratrol** – Found in Red Wine, dark especially the Pinot Noir variety but Merlot and other dark red wines also., dark grape juice, dark muscadines, raisins and whole seeded dark grapes the skin and the seeds (contain the richest sources of resveratrol), cranberries, mulberries and peanuts. Resveratrol is a stilbene which plants produce to protect themselves from fungal attack - stilbenes are also found in blueberries. Resveratrol help prevent atherosclerosis and inhibits abnormal blood clotting. Resveratrol lowers total serum cholesterol increasing HDL and prevents the oxidation of LDL cholesterol. Resveratrol may be one of the most potent Cox-2 inhibiting anti-inflammatory substances found in nature. It has major cancer inhibiting effects. In Breast Cancer research it interferes with Estradiol the most active form of estrogen and it binds to receptor sites for estrogen preventing cancer cell promotion. It also is important in helping fight Leukemia, Colon Cancer, Skin Cancer, Prostate Cancer, Melanoma and Thyroid Cancer where it stimulates apoptosis (cellular death of cancer cells ). Finally it inhibits Herpes Simplex type I & II viruses. It supports blood sugar regulation by lowering hemoglobin A1C a long term measurement of blood sugar levels. It also has brain protective effects and supports short term memory in older adults. Resveratrol may help increase lifespan (heavy doses of resveratrol can prolong the life span of yeast 70%).

**Rosemary** – Rosemary, with its pleasant camphor-like scent possesses some of the most powerful antioxidant activities of any agent studied. Rosemary traditionally was used to increase overall vitality and to improve circulation and mental outlook. Rosemary is often referred to as the “Herb of Remembrance.” The antioxidant capability of rosemary is unique for a number of reasons. In rosemary there exists at least six phenolic diterpenoids with antioxidant activity. The most powerful of these diterpenoids appears to be carnosic acid. As a carnosic acid molecule does its job of quenching a free radical, it transforms into another antioxidant compound called carnosol. The transformation of one antioxidant to another repeats itself 3X. The cascade of antioxidant activity is quite uncommon and may explain its positive results in certain studies. Carnosic acid also supports T3 thyroid hormone. Rosemary also contains significant amounts of the phenolic acid, rosemalic acid. Unlike carnosic acid, rosemalic acid is a water-soluble antioxidant and extracts containing rosemalic acid score extremely high on the ORAC (Oxygen Radical Scavenging Activity) analyses. Phenolic acids also delay vitamin E depletion. Some of rosemary's other known anti-oxidand compounds include carvacrol, carvone, cymene, cineole, fenchone, limonene, terpinene, and thymol. Many of these compounds have shown to inhibit aging of the brain, and act through a mechanism referred to as acetylcholinesterase inhibition. Rosemary inhibits the metabolic activation of procarcinogens catalyzed by the phase I cytochrome P450 enzymes, and the induction of phase II detoxification activation for these reasons it is considered to be excellent for enhancing liver detoxification. Rosemary also promotes normal mammary cell growth and prevents disruption of DNA caused by chemical carcinogens. Rosemary potentiates chemotherapy and helps prevent Multi Drug Resistance of chemotherapy to cancer cells. It has been shown to inhibit mammary tumors in mice. Carnosol and ursolic acid are the major constituents both of these inhibit tyrosine protein kinase(TPA), ornithine decarboxylase activity, and tumor promotion. A potent tea blend would be putting rosemary into green tea along with hibiscus.\*\*\*

**Rutin** – Helps strengthen blood vessels and prevent bruising it is useful in treating hemorrhoids (taken with horse chestnut extract and aortic glycans –sold by enzymatic therapy are a very potent and effective therapy for the elimination of even stubborn cases of hemorrhoids). It has been shown helpful for people with Glaucoma by strengthening the connective tissue of the eye and is useful for allergies and inflammation like quercetin though not

as powerful. One study done on mice found that it strongly inhibited melanoma. Best food sources are Bee Pollen, Red Wine, Buckwheat, Yerba Mate, Garlic, Fennel and Hawthorne.

**Vitamin D** - regulates the function of hundreds of genes in the body. Every cell in the body has a vitamin D receptor on it. Almost every chronic health condition can be benefited from optimized vitamin D levels. Get your bloodwork tested for Vitamin D (25OH - vitamin D) and get your bloodwork up to 50ng/dl - ideal range for a person with an auto-immune disease or cancer is 75ng/dl. Vitamin D3 supplements are inexpensive. When supplementing take with a meal containing fat. It will absorb much better.

### **Liver Detoxification –**

The liver is our primary organ of detoxification and living in our polluted world we need to do everything we can to enhance it's ability to do its job correctly and to protect it so it can protect us. There are 2 major phases of detoxification that the liver does.

**Phase 1** – Glutathione is the primary fuel for Phase 1 detoxification. Liver does the initial processing and transforming of toxic compounds, bacteria, drugs, alcohol or pollutants ie. Cigarette smoke taken in by the blood stream. This phase becomes less active in old age.

Activators: Cabbage, Broccoli, Brussels Sprouts, Oranges & Tangerines note that Grapefruit shuts down phase 1 detoxification and must be used carefully especially when taking pharmaceutical drugs as the level of the drugs can build up to higher levels than needed – don't take prescription drugs with grapefruit juice. Curcumin from turmeric slows down phase 1 enzymes but simultaneously speeds up phase 2 and is safe, it may be the best thing that can be taken by cigarette smokers as it can render the carcinogens in tobacco smoke more harmless. (Maybe Phillip Morris should think about putting turmeric into cigarettes?) also B- Complex vitamins, Vit C rich foods ie. Peppers, cabbage and tomatoes activate phase 1. Many people have more active phase 1 systems than phase 2 when this happens – phase 1 enzymes temporarily make more carcinogenic and inflammatory substances faster than the phase 2 enzymes can carry them out of the body. When a persons phase 1 enzymes do this they can be much more sensitive to chemicals and have more chemical allergies. Garlic, Turmeric and Broccoli all help this process of speeding up phase 2 enzymes and slowing down phase 1 enzymes so the body can handle detoxifying chemicals more efficiently and harmoniously. 28% of white Americans, roughly 40% of African-Americans and Hispanics and nearly 70% of Japanese-Americans have a defect in the synchronicity of phase 1 and phase 2 enzymes.

**Phase 2** – Liver takes compounds converted by phase 1 enzymes and shuttles them out of the body. These foods assist in phase 2 detoxification: Wasabi is one of the greatest inducers of this! Asparagus, avocado, walnuts, cabbage family broccoli, broccoli sprouts & Brussels sprouts especially, orange peel oil, dill & caraway seeds, rosemary, sage, eggs & egg yolks, lecithin, green leafy vegetables, red peppers, garlic, onions, artichoke leaf, turmeric, probiotics i.e. acidophilus, yogurt & kefir, fresh sauerkraut, miso. *Note: The chapter on detoxification in the Encyclopedia of Natural Medicine has an outstanding full explanation of phase 1 and phase 2 detoxification systems. I highly recommend that you read this.*

Methylation is a very important detoxification system in the phase 2 system – B-12, Folic Acid, B-6 and Tri-methyl glycine activate this. Make sure you take a multi vitamin with plenty of these or a B-complex especially if your blood levels of homocysteine are high in bloodwork.

### **Food Facts**

New data using the ORAC analysis (oxygen radical absorbance capacity) is the new definitive measurement of a food's antioxidant capacity. This gives us much more accurate information about rating fruits and vegetables for anti-oxidant activity.

#### **Fruits:**

**Apples** – Contain – Caffeic Acid, Ellagic Acid, Quercetin (*fresh apples have some of the highest levels of quercetin when compared to other fruits and vegetables*) and Chlorogenic Acid. Have been found to prevent Lung cancer. Anti-Viral effects especially the Polio Virus. Reduces total Cholesterol including raising HDL cholesterol due to the

pectin content. Helps prevent Asthma due to the quercetin content. Alleviates Diarrhea, Helps normalize blood sugar levels and suppress the appetite. Apples are also high in calcium d' glucarate which helps the body get rid of excess estrogen.

**Apricots** – High in carotenes that offer some protection against cancers of the mouth, throat, esophagus, stomach, bladder and lung.

**Avocado** – Lowers cholesterol, increase the activity of glutathione-s- transgerase and important anti- oxidant system of the body. Alleviates dry skin. One of the best food sources of potassium and vitamin E. Avocadoes contain very high levels of carotenes especially lutein and zeaxanthin which are great for eye health.

**Bananas** – Strengthen & thicken gastric mucosa, unripe bananas can heal duodenal ulcers. Lowers blood pressure by inhibiting the activity of ACE – Angiotensin converting enzyme.

**Blueberries** – Now tops the list in anti-oxidant function of all berries. The small dark ones are the best such as the European Bilberry. Wild Blueberries have a total antioxidant capacity of 13,427 on the ORAC scale. Improve coordination, short term memory and a sense of balance, inhibit tooth decay, urinary tract infections, may retard the aging process, alleviate eyesight ailments, improve night vision and night blindness and restore eyesight after glare faster and help prevent certain forms of cancer. Blueberries can help fight aging and reduce some of the functional damage caused by brain injury. It prevents an age- related increase in a protein (NF-kappaB) that responds to oxidative stress, a probable cause of brain aging. Blueberries contain the anti-cancer compounds delphinidin and elegiac acid. Delphinidin inhibits multiple cancer related growth factors including VEGF receptor HER2neu and PDGF signaling.

**Cantalope** – Helps prevent abnormal blood clotting, alleviates angina, high in carotenes and SOD. **Honeydew** - is rich in lutein and zeaxanthin and SOD

**Cherries** – Anthocyanidins are potent antioxidants like blueberries, excellent for gout and strengthening connective tissue in the body.

**Dates** – High in the mineral Boron, which helps with osteoporosis and mental alertness, helpful for staying awake at night when driving.

**Figs** – Can inhibit tumors in various forms of cancer due to Benzaldehyde content.

**Guava** – Lowers elevated Blood Sugar Levels in Diabetes Type 2 patients.

**Kiwi** – High in protein digesting enzymes like pineapple, may alleviate heartburn, a good dessert fruit. Kumquats – The rind reduces blood pressure.

**Grapefruit** – Helps prevent breast cancer, lung cancer, melanoma, pancreatic cancer, lowers cholesterol, helps obesity, promotes sleep when taken at night. ( note: one of the flavanoids in grapefruit slows down phase 1 detoxification so be careful taking prescription medicines with grapefruit juice because of this blood levels of the prescription drugs can go up to levels that can overdose a person especially heart medications !)

**Lemons** – Kills roundworms, helps dissolve gallstones, helps prevent cancer due to limonene

**Mangoes** – Alleviate some cases of depression due to the anti-depressant properties of anacardic acid & anacardiol.

**Olives** – Olive fruit pulp may have one of the most potent polyphenols - oleorupin that act as a redox anti-oxidant recharging other anti-oxidants to work over and over again. Olive oil when used on salads liberates nitrite rich leafy salad and vegetables and forms nitro fatty acids that may offer protection against blood pressure and may be one of the benefits of the mediterranean diet. and recycle anti-oxidants over and over again. An olive oil rich diet is related to a significant reduction in all-cause mortality.

**Oranges** – helps prevent cancers, breast, colon, esophageal, pancreatic, stomach, squamous cell carcinoma, lowers cholesterol, inhibits the breakdown of acetylcholine so it can enhance learning and memory.

**Papaya** – Enzymes help with protein digestion and increase glutathione like avocado's, lowers triglycerides, the seeds kill parasites.

**Pears** – Enhance the function of the liver, lowers serum cholesterol due to pectin content.

**Pineapple** – Bromelain the protein digesting enzyme found in the core acts as an anti-inflammatory, Anti-tumor, mucolytic.

**Pomegranate** - Contains high amounts of elegiac acid. Anti-cancer effects for lung and prostate cancers.. Recently has been found to lower blood pressure. It is cardiovascular protective inhibiting the build up of plaque in cardiac arteries, inhibits LDL oxidation. Contains 6 compounds that prevent the development of hormone-dependent breast

and prostate cancers. It activates PPAR gamma. It is hormone modulating and contains six compounds that prevent the development of breast and prostate cancers. It also fights obesity ameliorates metabolic syndrome

**Prunes** – Rated #3 on the ORAC scale of the top 100 foods for anti-oxidant capacity of 7,291. Loaded with potassium and fiber. Eating prunes may help weight loss - women given 6oz a day and men 7 oz a day lost 4.4lbs on average in a 4 week study.

**Raspberries** – Helps prevent cancer and fights cancer due to the ellagic acid content – especially known for lung cancer and skin cancer.

**Strawberries** – Contain Fisetin which is a potent sirtuin-activating compound that is gene protective. It exhibits anti-inflammatory and anti proliferative effects in cancer , it down regulates NF-kB and metastatic gene pathways. Suppresses a broad range of cancer types including breast, prostate, colon, lung and melanoma . Inhibits Nitrates and Nitrites to carcinogenic nitrosamines ( found in bacon and processed meats). Reduces cholesterol, the juice whitens teeth.

**Tangerines** – Inhibits the growth of some types of leukemia, increases the effectiveness of tamoxifen, helps with detoxification of the liver – one of the best liver detoxification aids. Tangerines contain a flavanoid that inhibits numerous cancer growth factors – use the skin (organic) in foods

**Watermelon** – Seeds are an excellent diuretic and support kidney function, lowers high blood pressure due to the high citruline content found especially in the rind, helps eliminate toxins, contains Lycopene

### Vegetable Facts:

**Artichokes** – Stimulate the flow of bile from the liver and gallbladder and are highly effective at lowering cholesterol levels in the body. In Europe they are sold as supplement for lowering cholesterol, improves diabetes mellitus.

**Asparagus** – Loaded with vitamins and minerals, especially vitamins K,A and B, iron, selenium contains high amounts of glutathione and quercetin and kaempferoldiuretic, enhances the function of the urinary tract, a potent kidney tonic - supportive for persons with kidney problem and lowered kidney function, the juice alleviates neuropathy. Asparagine causes the odor of the urine to be strong. Asparagus is also good for the lungs.

**Beets** - Anemia - stimulates red blood cell production, benefits bladder and kidney function, high in betaine, a nutrient that helps protect cells, proteins, and enzymes from environmental stress. It's also known to help fight inflammation lowering several inflammatory markers, including C reactive protein, interleukin-6, and tumor necrosis factor alpha. The betalain pigments in beets support the Phase 2 detoxification process in the liver. Beets are speculated to increase aerobic activity of cancer cells diminishing their activity. helps prevent lung cancer. Beet juice has been found to lower systolic blood pressure by an average of 4 - 5 points in a matter of hours. Beetroot juice contains nitrate that increases blood flow and move oxygen into the muscles, it does this by converting nitrates into nitric oxide in the body, nitric oxide helps to relax and dilate the blood vessels improving blood flow and lowering blood pressure. A rat study found that nitrate from beetroot juice resulted in a 38% higher blood flow to the skeletal muscles during exercise and was preferential to the less - oxygenated, fast twitch muscles. Beetroot juice may help people with heart failure by increasing oxygen delivery by 10% this can be the difference between walking and being in a wheel chair. Beet juice also increased the ability to exercise up to 16% longer enhancing the ability to tolerate high-intensity exercise.

**Broccoli** – Protects against X – rays, helps prevent the following cancers: breast, colon, lung & ovarian. Broccoli sprouts contain a much higher amount of sulforaphane (detoxification). Sulforaphane, found in broccoli, "is a potent bacteriostatic agent" even killing antibiotic- resistant H.pylori.

**Brussels sprouts** – Breast & colon cancer protects against, kills' aflatoxin.

**Cabbage** – Peptic Ulcers, duodenal ulcers, Cancer protection same as broccoli but also liver cancer, Protects against X rays, helps lower cholesterol.

**Carrots** – Helps reduce the risk of Cancer: Bladder, Breast, Cervix, Lung, Mouth, Pharyngeal, and Stomach. Increases the # of white blood cells and improves the function of existing white blood cells. High consumption is associated with lower incidence of psoriasis. Carrot fiber is very effective at lowering cholesterol levels especially cooked carrots. The high fiber levels do not cause an increase in blood sugar levels as previously thought. They help prevent respiratory illnesses and they may supply a compound that stimulates the sexual appetite.

**Celery** – Lowers blood pressure 14% - contains a compound called 3NB – eating the equivalent of 4 stalks a day lowers blood pressure, sedates the central nervous system, celery seed is excellent for gout.

**Cauliflower** – Protects against breast, colon, lung, & stomach cancer, increases the body's excretion of Estrone.

**Chives** – Protective against colon cancer, alleviates the common cold, kills some forms of detrimental Bacteria.

**Cilantro** - Helps with the elimination of mercury, copper, lead and other heavy metals from the body. Cilantro leaves contain a chemical that can kill salmonella and other pathogens – it is 2x as lethal to salmonella as the drug gentamicin, a common treatment for salmonella poisoning.

**Cucumber** – Juice helps normalize blood pressure, reduces incidence of stomach cancer, increases urine output, promotes hair growth, and prevents nails from splitting.

**Daikon Radish** – Helps to dissolve hard fat deposits imbedded in body tissue. Contains carbohydrate digesting enzymes.

**Eggplant** – Prevents cancer by counteracting dietary carcinogens, prevents convulsions due to Scopoletin & Scarpaione.

**Fennel** - Improves liver and spleen, suppresses appetite

**Garlic** – There are thought to be more than 2,200 credible scientific papers on all aspects of garlic. It is known to enhance the immune system, support detoxification of the liver (s-allyl cysteine), lower cholesterol and triglycerides, lower high blood pressure, have anti-biotic properties, anti-fungal properties and numerous other benefits. Recently it has been found to prevent glycation (a “caramelizing” effect on the blood vessels and skin caused by chronic high sugar consumption and in diabetes). British scientists have recently found that a compound extracted from garlic is effective against even the most antibiotic-resistant strains of MRSA, the “hospital superbug” that now kills thousands of patients each year.

**Ginger** – Ginger is in the same plant family as turmeric and galangal and shares many of the same therapeutic effects of those 2. It contains many potent anti-inflammatory compounds and inhibits COX-2 inflammation in the body. It is useful for arthritis pain, nausea and the ginger compounds may be effective chemopreventive and/or chemopreventive agents for colorectal cancers (mice studies).

**Green Peas** – Have the ability to dissolve clumps of red blood cells destined to become blood clots. Helps prevent appendicitis.

**Jerusalem Artichokes** – Stimulates Bifidobacteria in the colon because of high FOS. Helps diabetes II Due to Inulin. Very good for people with syndrome X.

**Kale** – Helps prevent macular degeneration (eyes), Breast cancer prevention due to sulforaphane content decreases risk of lung cancer. Swiss Chard - along with Kale is rich in potassium, magnesium, minerals, chlorophyll, and the carotenoids, lutein, and zeaxanthin.

**Kidney Beans** – Benefits Diabetes II due to the lectin content, which influences insulin levels.

**Leeks** – Helps prevent stomach cancer.

**Lentils** – helps control blood sugar levels.

**Lettuce** – Enhances the health of the kidneys, alleviates acidosis, gout, insomnia

**Mustard Greens** – Helps prevent age related macular degeneration.

**Mushrooms** – White, Crimini, Portabella – all contain anti-oxidants that can't be cooked out. Potent aromatase enzyme inhibitor especially important in hormone derived cancers – ie. Breast, ovarian, prostate. Mushrooms - all edible forms are potent immune enhancing and cancer inhibiting. In vitro and in vivo studies with mushrooms and isolated bioactive constituents including anti-tumor, antioxidant, antiviral, cholesterol lowering and blood sugar lowering effects. Several research papers have documented a correlation between dietary mushroom intake and a significant reduction in breast cancer - one study the benefits were enhanced when green tea was consumed daily as well White button mushrooms appear to modulate and reduce aromatase activity and inhibit the proliferation of breast cancer cells.

**Okra** – Stomach and intestinal ulcers the mucilage is very soothing and healing to the digestive tract, promotes regularity.

**Onions** – Helps prevent atherosclerosis, inhibits abnormal blood clotting, and reduces risk of heart attack, lowers blood pressure in persons with hypertension, stimulates the flow of bile, lowers cholesterol, raises HDL 1/2 a raw onion a day raises HDL by 30%, significantly exerts blood sugar lower in effects in type II diabetes due to allyl propyl disulfide, alleviates asthma, Contains FOS and helps the body's level of beneficial bacteria in the intestines & colon. The quercetin content in onions may cut the risk of prostate cancer. Swiss researchers have found a compound in white onions a peptide GPCS that appears to retard bone loss. The stronger the onion flavor the higher amounts of polyphenols found in them – studies found that stronger onions inhibited the growth of liver and colon cancer cells.

**Parsnip** – Facilitates elimination of kidney stones from the body.

**Potato** – Prevents cell mutations that lead to cancer (due to chlorogenic acid). Russet potatoes have an antioxidant capacity of 4,649. Potatoes are rich in fiber, potassium and vitamin C. The peel also contains an anticarcinogenic compound called chlorogenic acid, which helps the fiber in potatoes absorb the carcinogen benzo(a)pyrene, found in smoked foods like grilled hamburgers.

**Radish** – Facilitates the elimination of existing gallstones & kidney stones, reduces incidence of Stomach cancer, alleviates goiter, and alleviates cough. The juice alleviates the pain Associated with insect bites and stings.

**Red Beans** – Red Beans have come out on top of the ORAC ratings of 100 foods tested. Small red beans scored with an anti-oxidant capacity of 13,727 a serving per 1/2 cup. They contain 20 grams of protein, 6 grams of fiber along with folic acid, iron and magnesium.

**Rutabaga** – Lowers total serum cholesterol.

**Saffron** - Lowers uric acid in gout, Exciting research is centering on Saffron's role in the treatment of depression

**Soybeans** – Preventative for Breast, Endometrial, Prostate, Uterine cancers. Lowers serum cholesterol LDL & triglycerides, helps prevent osteoporosis. Fermented forms such as Miso, Tempeh are the best.

**Spinach** – Helps prevent macular degeneration and cataracts due to lutein & zeaxanthin (carotenes). Alleviates diabetes due to its manganese content. Spinach is very high in compounds that actually stimulates muscle growth (The popeye effect)

**Tomatoes** – Helps prevent appendicitis, protects against cancer due to it's Lycopene content, Lung Cancer, prostrates cancer & stomach cancer. Tomato juice stimulates growth of liver tissue. High consumption of tomato is associated with a lowered incidence of Psoriasis. Raw tomatoes are high in glutathione, an anti-oxidant that supports liver detoxification pathways

**Turnips** – May help kill the cancer cells implicated in Lung Cancer.

**Wasabi** - this pungent radish used in Japanese sushi - is a potent activator of phase 2 liver detoxification enzymes.

### Grains:

**Barley** – Helps prevent some forms of cancer due to protease inhibitors in the GI tract. Interferes with The manufacture of LDL Cholesterol. Alleviates constipation, helps prevent colon cancer.

**Oats** – Stabilizes insulin levels, helps with tobacco withdrawal, lowers hypertension, and total cholesterol, increases the production of acetic acid in the intestines which promotes healthy intestinal flora. The fiber in oats lowers the risk of obesity in children who eat oatmeal regularly 50% lower than children that don't. The study found that children and teens who consumed higher intakes of dietary fiber had lower Body Mass Index (BMI) levels or less body fat. Rice – Can dramatically improve Psoriasis (when on a rice diet), helps prevent kidney stones. Rye – may reduce the risk of prostate cancer.

**Quinoa** - Contains the highest protein of any grain with a better amino acid profile. It is the most anabolic grain and contains phytoecdysteroids like spinach. It is also rich in flavonoids and saponins. Available in Black, Red or White.

### Sweeteners:

**Honey** – Researchers at the Univ. of Ill. Found that people who ate 4.Tbs. Of honey 1X a week for 5 weeks had more antioxidant activity in their blood than people who did not. They also had less arterial damage that causes heart disease – dark honey works best the researchers used buckwheat honey. Honey has been shown to have anti-cancer effects - breast, colorectal, renal, prostate, endometrial, cervical, oral and brain cancer.

### Nuts & Seed Facts:

**Almonds** – Lowers cholesterol & LDL cholesterol. A handful a day 1/4 to 1/2 cup of raw almonds lowers lipoprotein (a) the dreaded genetic risk factor for coronary disease.

**Black Pepper** - Bioperine in black pepper helps with the absorption of nutrients from foods. It protects against neurodegeneration and supports cognitive functioning. It is cancer inhibiting - inhibits angiogenesis (VEGF). Inhibits P-glycoprotein, suppressing multi-drug resistance and is liver protective. It also helps the body break down excessive mucous.

**Black Seed (Black Cumin)** - contains potent anti-cancer, anti-inflammatory compounds that may rank it up there with Turmeric. Used widely in the Middle East as the plant to go to for health issues. *"A rising superstar"*

**Brazil Nuts** – Highest food in selenium, helps prevent cancer it also contains ellagic acid.

**Caraway** – Alleviates Gas

**Cardamom** – Stimulates saliva, helps halitosis, stimulates appetite

**Celery seed** – Lowers high blood pressure, is diuretic, helps alleviate gout, rheumatoid arthritis

**Cinnamon** - compounds in it have been found to support the regulation of blood sugar levels and have cholesterol lowering effects. The form from Sri Lanka is the best for blood sugar levels - it also inhibited cancer signaling VEGFR2.

**Chia Seeds** - Rich in protein, phenols and a good omega 3 ratio - contains phenol compounds including caffeic acid, chlorogenic acid, myricetin, quercetin and kaempferol which enhance the quenching of free radicals, inhibit chronic disease and slow the aging process - the fiber is excellent for colon health as it is high in mucilage and is very soothing to the colon. Its also known to enhance stamina and was used by long distance runners in Mexico.

**Coconut** – Inhibits many types of detrimental bacteria & fungi & viruses and is good for the intestinal system, high in MCT's –medium chain triglycerides provides stable energy the fats are burned as fuel by the body. Excellent for people with cancer who are losing weight, coconut milk can help stabilize weight loss.

**Cumin** – Alleviates intestinal cramps, helps prevent liver cancer, helps prevent squamous cell carcinoma

**Dill** – Helps enhance lactation, alleviates insomnia by sedating the CNS (central nervous system)

**Fenugreek** – Helps with lactation, helps constipation, alleviates gastric ulcers, improves health of the eyes, lowers cholesterol, lowers elevated blood sugar levels in type II diabetics by increasing plasma insulin, alleviates tinnitus, reduces inflammation in the lungs.

**Filberts** - contain naturally occurring taxanes

**Flax** – Helps prevent Breast and Prostate Cancers due to high lignin level, lignans bind to estrogen receptor sites and prevent the over stimulation of a cell by estrogens, helps prevent prostate, breast, ovarian, and colon cancers, constipation, high cholesterol, eczema. Flax fiber is excellent for stimulating the growth of beneficial probiotic bacteria especially in the colon. The lignins are converted in the intestinal flora to enterolactone and enterodiol that inhibit the activation of NFkB, and VEGF. The lignin reduced seem estrogens in ER+ breast cancer and inhibits angiogenesis. They also strengthen the tumor-inhibitory effect of Tamoxifen

**Mustard Seeds** – increases the basal metabolic rate (weight loss)

**Peanuts** – Are high in resveratrol and high consumption may prevent atherosclerosis. Recent research has found peanuts are very good for diabetics. Florida researcher found that peanuts contain high concentrations of polyphenols – particularly p-coumaric acid – and that roasting can increase the level of the compound, boosting overall antioxidant content by as much as 22%. Roasted peanuts are about as rich in antioxidants as blackberries or strawberries, and richer than apples, carrots or beets. Peanut butter and peanut eaters has increased levels of vitamin A, Vitamin E, folic acid, magnesium, zinc, iron and dietary fiber in their diets. Peanut eaters had leaner bodies as measured by body mass index (BMI) than non-peanut eaters.

**Pecans** – Lowers total cholesterol due to Beta-Sitosterol content, rich in magnesium as are all nuts, zinc, manganese and potassium. Pecans rate higher than any other nuts on the ORAC list with a score of 5,095. Pecans contain 25% more Oleic acid than a serving of olive oil. Oleic acid has been found to be more resistant to oxidation than other oils.

**Pistachios** - Highly nourishing and high in potassium and magnesium may potentially improve blood lipids and blood pressure. Eating up to 20% of total calories a day pistachios do not contribute to weight gain or body fat.

**Poppy Seeds** – Helps prevent various forms of cancer by increasing endogenous anti-cancer enzymes 78%, prevents squamous cell carcinoma.

**Pumpkin Seeds** – Treats parasites, high zinc levels support prostate health in males. Lowers DHT and inhibits prostate cancer.

**Sesame Seeds** – Enhance the activity of Vitamin E contains a powerful antioxidant sesaminol. Contains lignins sesamin and sesame.

**Sunflower Seeds** – Reduce the craving for cigarettes they cause a release of adrenal hormones in a similar way to tobacco smoking.

**Walnuts** – High in Omega-3 fatty acids (alpha linolenic like flax seeds 25% of the oil content). Walnuts lowers total cholesterol levels as well as LDL or “bad “ cholesterol. Walnuts contain elegendic acid and are cancer inhibiting - it inhibits angiogenesis via VEGF

**Super Foods** - Super green foods such as Barley and Wheat Grass juice or juice powders as well as the micro algae Spirulina and Chlorella all contain very high concentrations of chlorophyll (plant blood) that supports healthy hemoglobin and healthy detoxification. They are loaded with high quality proteins and packed with a large spectrum of carotenes that support immunity. Adding the powders to smoothies can be a powerful way to increase the nutritional value of them.

#### **Environmental Working Group - 2015 list**

**Dirty Dozen** - highest pesticide residue fruits and vegetables 1 - apples, 2 - strawberries 3 - celery, 4 - peaches, 5 - spinach, 6 - nectarines, 7 - grapes, 8 - sweet bell peppers, 9 - potatoes 10 - blueberries, 11 - lettuce, 12 - kale/collards

**Clean 15** - least sprayed with pesticide residues 1 - onions, 2 - corn (avoid GMO corn), 3 - pineapples, 4 - avocado, 5 - asparagus, 6 - sweet peas, 7 - mangoes, 8 - eggplant, 9 - cantaloupe, 10 - kiwi, 11 - cabbage, 12 - watermelon, 13 - sweet potato, 14 - grapefruit, 15 - mushrooms

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