Food as Medicine

A foundational nutrition course

Resource Guide

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Riordan Clinic

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A Letter From Dr. Anne:

"Let food be thy medicine and medicine be thy food" is one of the most famous quotes by Hippocrates, a Greek physician who has been termed the father of western medicine. There is a lot wisdom and truth in this statement. We are the product of what we eat. I would even go a step further and say that we are the product of not only what we eat, but how our digestive system is able to break-down and assimilate what we eat. For this reason, most modern, chronic diseases can be traced back to the diet.

We have seen a huge cultural shift in the past century in how we are able to package, prepare, preserve and transport food. The food we eat today is but a shadow of what it used to be. We have figured out how to make food last longer, grow faster, and taste better … but at what cost?

This course will address the fundamental idea that ***our digestive system was not designed for our modern diet****. For this reason, the foods we are eating and the chemicals we are exposed to are slowly eroding away the integrity of our digestive system and leading to chronic disease. This problem is getting worse with each generation. Our children are going to be part of the first generation that has a shorter life expectancy than their parents. Kids are now coming down with chronic diseases that were formerly "adult-onset" only. We are very quickly slipping down a slope and modern medicine does not have an answer for us. Why not take a look back? This course will address the history of how we evolved to eat, where we went wrong, and how we can get back on track.*

This reference guide will help you navigate our modern lifestyle and the impact it has on your health. Take this guide with you to the grocery store so that you can avoid the preservatives and chemicals in your food. Have your nutrients evaluated yearly so that you can be aware of deficiencies and address them before they turn into a disease. Check your house for the most common environmental toxins. Each small step you take will be a move in the right direction for increasing your energy, improving your mood, decreasing your toxic load and setting you on the right path toward a long, healthy life!

In health,

Anne Zauderer, DC

Commentary is provided for educational purposes only and should not be interpreted as diagnostic or treatment recommendations. Please consult with a physician before making any changes to diet, lifestyle, supplementation or medications.

Antioxidants

Vitamin A

Function: Vitamin A is a fat soluble vitamin that has excellent antioxidant properties. Beta Carotene and other carotenoids are converted to vitamin A based on the needs of the body. Provided your absorption, metabolism and thyroid are effective, beta carotene is the safest way to supplement for low vitamin A levels. It is essential for vision, immune function, reproduction and cellular communication.

Food Sources: black-eyed peas, broccoli, butternut squash, cantaloupe, carrot, cod liver oil, egg yolk, fish, kale, **liver**, mango, sweet peppers, pumpkin, **spinach**, **sweet potato**, whole milk

Depleted By: oral contraceptives containing estrogen and progestin, aluminum antacids, chronic alcoholism, hypothyroidism

Complications of Deficiency: night blindness, impaired immunity, impaired tissue healing, increased risk of infection, keratosis

Did You Know? Per serving, sweet potatoes have the highest amount of vitamin A with over 28,000 IU per serving (one serving is considered 1 whole sweet potato baked in the skin).

Vitamin C

Function: Vitamin C is a strong, water-soluble antioxidant. Its ability to limit free radical damage makes vitamin C a great preventative nutrient for conditions in which oxidative stress play a role such as cancer and cardiovascular disease. It is required for biosynthesis of collagen, L-carnitine and certain neurotransmitters. The highest levels of vitamin C are maintained in leukocytes (white blood cells), adrenal glands, brain, eyes and the pituitary gland.

Food Sources: **broccoli**, Brussels sprouts, cabbage, cauliflower, collards, grapefruit, kale, **kiwi**, lemons, mango, **oranges**, papayas, parsley, potatoes, spinach, strawberries, sweet potatoes, **sweet peppers**, tomatoes

Depleted by: oral contraceptives, aspirin, diuretics, NSAIDS, smoking, tetracycline, Flonase®, Lasix®

Complications of Deficiency: scurvy, inflammation of the gums, fatigue, soft tissue ulcerations, poor wound healing, joint pain, depression, increased risk of infection

Did You Know: Most mammals produce their own vitamin C. Goats can produce up to 100 grams per day! Humans have a genetic mutation which makes us unable to produce a crucial enzyme in the biosynthetic pathway necessary to produce vitamin C.

Vitamin E

Function: Vitamin E is a fat soluble antioxidant, helping to protect cells from free radical damage. Vitamin E is important within the cardiovascular system because it helps dilate blood vessels and keeps blood from clotting within them. It is important for optimal immune system functioning as well as regulating cell signaling.

Food Source: **almonds**, avocados, broccoli, eggs, hazelnuts, leafy green vegetables, milk, nuts, oils (olive, sunflower, safflower, corn, soy, canola), seeds, soya, spinach, **sunflower seeds**, walnuts, **wheat germ**, whole grains.

Depleted by: malabsorption, cholestyramine, olestra and certain anti-convulsants (phenobarbital, phenytoin)

Complications of Deficiency: increased risk of cardiovascular disease, cataract formation, age-related macular degeneration, retinopathy, peripheral neuropathy, muscle weakness

Did You Know: Tocopherols (vitamin E) are used as a natural preservative in foods because the potent antioxidant properties naturally prevent oxidation of fats and oils and help maintain the freshness and shelf life of food products.

Beta Carotene

Function: Beta carotene is a fat-soluble vitamin that is converted to vitamin A with a 1:2 ratio when metabolized. The body only converts beta carotene to vitamin A based on its needs. Natural beta carotene in food is the best way to increase your level and to achieve health benefits. Diets high in beta carotene have been associated with a decreased risk of: breast cancer in women prior to menopause, cervical dysplasia, and age-related macular degeneration.

Food Sources: cantaloupe, **carrots**, mangoes, papaya, **pumpkins**, spinach, **sweet potatoes**

Lutein

Function: Lutein is a fat-soluble carotene that is found in very high concentrations in the portion of the retina in the eye called the macula lutea. This is the area where the lens focuses sharp images. The macula lutea contains a yellow pigment called lutein. The presence of lutein may prevent or limit damage due to oxygen "free radicals" and singlet oxygen, which are generated in the retina as a result of the simultaneous presence of light and oxygen. Damages to this area develop into macular degeneration. Smokers and blue-eyed postmenopausal women each have about half of the lutein in the macula lutea as compared to a premenopausal brown-eyed person or nonsmoker. In addition, they will have a 400-500% greater likelihood of developing macular degeneration. Optimal levels of HDL are also desirable as it serves a role in its ability to transport lutein from the liver to the retina.

Food Sources: broccoli, corn, egg yolk, **kale**, kiwi fruit, melons, oranges, peas, pistachios, **spinach**, squash, **Swiss chard**, zucchini

Lycopene

Function: Lycopene is a fat-soluble carotene. It is one of the strongest antioxidants available and has been shown to reduce the risks of various cancers, especially cancer of the prostate, breast and ovaries. (The incidence of prostate cancer in Italian men, where tomato products are consumed in large quantities, is about 60% less than in the U.S.). Higher lycopene concentration in the serum is also associated with a lower risk of cardiovascular disease, as found in a recently completed study on middle-aged and elderly women. The study found that people whose concentration was highest had a 50% reduction in cardiovascular disease as compared to those whose serum concentration was low.

Food Sources: apricots, papaya, pink grapefruit, pink guava, **red tomatoes**, **tomato products** (catsup, paste, juice), watermelon

Coenzyme Q10

Function: Coenzyme Q10 is a potent antioxidant found in the mitochondria of every cell in the body where it interfaces to produce ATP, which is the fuel that our cells use for energy. 80% of the energy the heart uses comes from ATP. Heart, skeletal muscle and liver cells contain the highest number of mitochondria. Optimal levels help to maintain vitamin E in its active (reduced) form, protect LDL from oxidation thus inhibiting plaque formation in arteries, increase longevity and immunity as well as preventing cancer, cardiovascular disease, hypertension, periodontal disease and various asthma symptoms.

Food Sources: alfalfa, **beef liver**, **beef heart**, canola oil, eggs, fish, poultry, milk fat, nuts, whole grains, spinach, potatoes

Depleted by: several anti-diabetic medications, statins and beta-blockers

Complications of Deficiency: increased oxidative stress, high blood pressure, congestive heart failure, cardiac arrhythmias, neuro-degenerative diseases (such as Alzheimer's), migraines and periodontal disease

Did You Know: Statin drugs lower cholesterol by inhibiting an enzyme called HMG-CoA reductase. This enzyme is also needed in the biochemical pathway to produce CoQ10. Inhibition of this enzyme activity by statin drug therapy has been shown to decrease serum CoQ10 levels.

Vitamin D

Function: Vitamin D promotes calcium absorption in the gut and maintains adequate serum concentration levels of calcium and phosphate. Vitamin D also plays an important role in the reduction of inflammation, modulation of cell growth and neuromuscular and immune function. Research indicates that vitamin D can cut your risks of 16 different types of cancers by up to 60%. It has also been shown to cut the risks of type 2 diabetes, age-related macular degeneration and Alzheimer's disease. Vitamin D should be taken with vitamin K2. While vitamin D promotes calcium absorption, vitamin K2 guides calcium to where your body needs it most, such as your bones and teeth, and directs it away from soft tissues and blood vessels.

Food Sources: butter, **cod liver oil**, eggs, halibut, herring, mackerel, meat, milk, **salmon**, sardines, **swordfish**, yogurt **(best source is from UVB sunlight on the skin)**

Depleted by: aluminum antacids, Pepcid®, Phillips® Milk of Magnesia, Dilantin®, anti-inflammatory drugs (prednisone), Zantac®, Flonase®, colesevelam

Complications of Deficiency: osteoporosis, infection, autoimmune disease, increased risk of certain cancers, hypertension, arteriosclerosis, diabetes and insulin resistance, musculoskeletal pain, increased risk of falls, epilepsy and migraine.

Did You Know: Ultraviolet B (UVB) radiation with a wavelength of 290-320 nanometers on uncovered skin begins the process of converting 7-dehydrocholesterol on the skin to vitamin D3. UVB rays are blocked with a sunscreen of SPF 8 or more. UVB radiation does not penetrate glass, so exposure indoors does not produce vitamin D.

Vitamin B1 (Thiamine)

Function: Vitamin B1 is water-soluble and plays a key role in the body's metabolic cycle for generating energy. It is involved in numerous metabolic processes in the peripheral nervous system and the brain. It aids in the digestion of carbohydrates; stabilizes the appetite; promotes growth and good muscle tone.

Food Sources: brewer's yeast, brown rice, dried legumes, **beans**, **lentils**, milk, nuts, organ meats, pork, poultry, salmon, soybeans, **sunflower seeds**, wheat germ, whole grain cereals

Depleted by: diuretics, oral contraceptives, chronic alcohol use, excessive intake of tea and coffee

Complications of Deficiency: malaise, weight loss, irritability, confusion, dry beriberi (damage to peripheral nerves), wet beriberi (heart failure and weakening of capillary walls leading to edema), Wernicke's encephalopathy, optic neuropathy

Did You Know: Sulfites, added to foods as a preservative, act as an antagonist and will degrade thiamine by cleaving part of the structure and rendering it inactive. Foods that most commonly contain sulfites are: alcoholic beverages, baked goods, dried fruits and trail mixes, jams and jellies, and canned vegetables and soups.

Vitamin B2 (Riboflavin)

Function: Riboflavin is a key component of cofactors necessary for energy metabolism and for the metabolism of fats, carbohydrates and proteins. It aids in the formation of antibodies and red blood cells, helps maintain cell respiration, and is also needed for the reduction of glutathione. Riboflavin also aids important steps in the synthesis of vitamins including: B3 (niacin), B6 (pyridoxal phosphate), B9 (5-MTHF, the active form of folate) and vitamin A.

Food Sources: almonds, asparagus, brewer's yeast, cheese, chicken, eggs, **green leafy vegetables**, liver, meat, milk products, organ meats, **soybeans**, wheat germ

Depleted by: chronic alcoholism, oral contraceptives, tricyclic antidepressants, tetracycline, ciprofloxacin

Complications of Deficiency: deficiency of other vitamins (B3, B6, B9), inflammation of the lining of the mouth and tongue, cracked/red lips, sensitivity to light, anemia, oxidative stress, mitochondrial dysfunction

Did You Know: Riboflavin is responsible for giving supplements containing B vitamins their characteristically yellow color. The "flavin" aspect of riboflavin comes from the Latin word *flavus*, meaning yellow.

Vitamin B3 (Niacin)

Function: Niacin is a precursor for the formation of NAD (nicotinamide adenine dinucleotide), which is important for energy production from food. This includes catabolism of carbohydrate, fat, protein, and alcohol. In addition, NAD is needed for cell signaling and DNA repair. Niacin is also a precursor for NADP (nicotinamide adenine dinucleotide phosphate), which is used in fatty acid and cholesterol synthesis. The areas of the body most susceptible to a niacin deficiency are the ones with high turnover rates: the brain, skin, and gut.

Food Sources: brewer's yeast, **chicken**, feverfew, fish, green leafy vegetables, halibut, lean meats, legumes, lima beans, liver, milk, nuts, organ meats, peanuts, pork, poultry, salmon, sunflower seeds, swordfish, **tuna**, **turkey**

Depleted by: oral contraceptive use, tetracycline, deficiencies of B2, B6, iron or tryptophan (a precursor to niacin)

Complications of Deficiency: pellagra (dermatitis, diarrhea, dementia), anxiety, fatigue, poor concentration/ memory

Did You Know: Due to the fact that Niacin plays an important role in DNA repair, it can have a protective effect against development of cancer? In one study, a group of rats was fed a niacin-deficient diet and all developed cancer.

Vitamin B5 (Pantothenic Acid)

Function: Vitamin B5 is a water-soluble vitamin that is involved in a number of metabolic functions in the body. It is an essential component of coenzyme A, a catalyst in the metabolism of fats, carbohydrates, and protein. This vitamin is necessary for the production of cholesterol, steroids, fatty acids and aids in the utilization of vitamin B2 (riboflavin). It helps maintains precise communication between the central nervous system and the brain. It is important in stress management, cardiac stability, healthy joints, supporting the immune system, energy production and in the maintenance of healthy skin, hair, eyes and muscles.

Food Sources: **avocado**, brewer's yeast, cheese corn, eggs, heart, kidney, legumes, **lentils**, liver, lobster, meats, milk, peanuts, peas, rice, soybeans, **sweet potato**, sunflower seeds, vegetables, wheat germ, whole grain cereals

Depleted by: periods of stress, adrenal fatigue, cold weather (increased requirements for coenzyme A and energy production), general antibiotics (tetracycline, penicillin)

Complications of Deficiency: fatigue, headaches, nausea, irritability, malaise, numbness and paresthesia in hands and feet, hypoglycemia, sleep disturbances, tension-related herpes infections (Epstein-Barr virus, shingles, oral and genital herpes)

Did You Know: The prefix *pan* in Greek means “everywhere”. Most foods contain at least a small amount of vitamin B5, or pantothenic acid.

Vitamin B6 (Pyridoxine)

Function: Vitamin B6 is an important, versatile water-soluble vitamin. It participates in more than 100 different enzyme reactions in the body. It helps convert stored blood sugar into glucose, which provides fuel for the brain. B6 is also involved in amino acid metabolism, biosynthesis of neurotransmitters, maintaining normal homocysteine levels, and improved immune function.

Food Sources: avocado, brewer's yeast, **chickpeas**, carrots, chicken, corn, fish, hazelnuts, halibut, ham, legumes, lentils, **liver**, peanuts, rice, salmon, shrimp, spinach, soybean, sunflower seeds, trout, **tuna**, walnuts, wheat germ, whole grain cereals

Depleted by: chronic alcoholism, long-term diuretic use, ciprofloxacin, oral contraceptives, HRT (estrogens), anti-inflammatory drugs (prednisone), tetracycline, theophylline, Flonase®, Vaseretic®, anti-TB meds (cycloserine), L-DOPA or digoxin

Complications of Deficiency: increased homocysteine levels, cognitive decline (e.g. decreased memory, dementia), increased risk of certain types of cancer, impaired immunity

Did You Know: The metabolism of B6 declines after the age of 40; individuals in midlife and older need approximately 20 percent more B6 for optimal cognitive functioning.

Studies have shown that women who suffer from PMS (premenstrual syndrome) might benefit from B6 with decreased irritability, moodiness, bloating, and anxiety. Nausea and vomiting during pregnancy can also be significantly reduced with supplemental B6.

Folic Acid (Folate, Vitamin B9)

Function: Folate, a water-soluble vitamin, is required for cell energy. It serves as a precursor for nucleic acids and as a repair mechanism for damaged DNA. It also plays a major role as a methyl donor in a reaction that lowers homocysteine levels. If optimal levels of folate are not present, an unhealthy buildup of homocysteine may occur, which has been associated with a risk for cardiovascular disease and stroke.

There is a strong link between cervical dysplasia, as seen in an abnormal pap spear, and low folate levels. Furthermore, low folate levels have been associated with an increased risk for cancers of the stomach, esophagus, pancreas, lung, colon, ovaries, breast, and cervix, which may be due to its role in repair and production of DNA. Low levels are also seen in patients who are depressed or have Alzheimer's disease and dementia. Preconception folate deficiency appears to be a risk factor for neural tube defects in fetuses (spina bifida).

Food Sources: avocado, asparagus, **black-eyed peas**, beans, beets, Brussels sprouts, dark green leafy vegetables, fortified grains, lentils, **liver**, peas, rice, **spinach**

Depleted by: alcoholism, high-dose NSAIDs, SSRIs, aluminum antacids, oral contraceptives, Pepcid®, diabetic medications, anti-inflammatory drugs (prednisone), tetracycline, Flonase®, certain diuretics and anti-convulsants

Complications of Deficiency: increased homocysteine, low methionine, fatigue, anemia, cardiovascular disease, birth defects, increased risk of certain cancers

Did You Know: Up to 60% of the U.S. population may have a genetic enzyme defect that makes it difficult for them to covert folic acid into an active form that can be utilized by the body. The active form of folic acid is 5-MTHF.

Vitamin B12

Function: B12 is a water-soluble vitamin that is necessary to convert homocysteine back to methionine. For this reason, low vitamin B12 levels tend to raise homocysteine levels. Low vitamin B12 levels are common in the elderly, vegans, and in individuals who cannot absorb it due to GI problems. Vitamin B12 is necessary for DNA synthesis, proper red blood cell formation and neurological function.

Food Sources: beef, cheese, **clams**, dairy products, eggs, fish, flounder, herring, kidney, **liver**, mackerel, milk, sardines, shellfish, snapper

Depleted by: alcoholism, vegan diet, malabsorption, Metformin, Ciprofloxacin, Colesevelam, oral contraceptives, Pepcid®, Prilosec®, Chloromycetin®, Phenytoin, Zantac®, Tetracycline, proton pump inhibitors, H2 blockers, H. pylori infection and atrophic gastritis

Complications of Deficiency: anemia, fatigue, irritability, loss of appetite, frequent headaches, heart palpitations, pernicious anemia, cognitive decline, poor memory and a reduction in reasoning skills, numbness and tingling in the hands and feet, depression and soreness of the mouth or tongue.

Did You Know: Only bacteria and single-celled microorganisms have the enzymes required to synthesize the core structure of B12. Many foods are a source of B12 only because of bacterial symbiosis. Because of the complex nature of this vitamin, bacterial fermentation processes must be used to industrially produce vitamin B12.

Minerals

Magnesium, RBC

Function: Magnesium is a highly important mineral that is involved in over 300 enzyme reactions, some of which are very important to antioxidant function. Magnesium is needed for protein synthesis, blood glucose control, blood pressure regulation, energy production, and proper muscle and nerve function. Magnesium is required for the synthesis of DNA, RNA and glutathione. Maintaining proper magnesium levels is dependent on its interactions with calcium, vitamin D and vitamin K. Balance of these nutrients is crucial for proper deposition of calcium in the bones instead of soft tissue structures.

Food Sources: **almonds**, beans, beef, brewer's yeast, **cashews**, chicken, green leafy vegetables, millet, nuts, oats, peaches, peanuts, peas, seafood, sesame seeds, soybeans, **spinach**, sunflower seeds, tofu, whole grains

Depleted by: soil depletion by modern farming techniques, renal disorders, diuretics, hyperparathyroidism, diabetes, chronic alcoholism, oral contraceptives, anti-inflammatory drugs (prednisone), raloxifene, sartan drugs, tetracycline, ciprofloxacin, Flonase®, digoxin, Lasix®, Vaseretic®, prolonged use of proton pump inhibitors (e.g. Nexium®, Prevacid®)

Complications of Deficiency: hypertension, heart arrhythmias, muscle cramps and tightness, fluid retention, bronchial spasms, high cholesterol, restless leg syndrome, chronic fatigue syndrome, seizures, personality changes

Did You Know: Magnesium can help control cholesterol levels by regulating an enzyme called HMG-CoA reductase. This enzyme is required for the synthesis of cholesterol. (This is the enzyme that is blocked by statin drugs). By naturally controlling this enzyme with magnesium, proper cholesterol levels can be maintained.

Copper, RBC

Function: Copper is a trace mineral that aids in the formation of bones, conversion of iron into hemoglobin, and works with zinc and vitamin C for the production of elastin. Elastin is an important component of connective tissues throughout the body. In addition, copper imbalance can raise cholesterol by disrupting the HDL to LDL cholesterol levels.

Food Sources: almonds, avocados, beans, Brazil nuts, broccoli, **cashews**, green leafy vegetables, hazelnuts, lentils, liver, mushrooms, nuts, oats, oranges, oysters, peanuts, pecans, salmon, **sesame seeds**, shrimp, **soybeans**, sunflower seeds, walnuts

Depleted by: antiretroviral medications, high zinc levels interfere with storage of copper

Complications of Deficiency: general fatigue, paleness, skin sores and rashes, edema, loss of appetite, slowed growth, hair loss, anemia and diarrhea

Did You Know: Copper is essential for growth and development. At birth, a healthy human infant will have four times the amount of copper than an adult stored in his/her liver.

Manganese, RBC

Function: Manganese is essential for skeletal and connective tissue synthesis. High concentrations of manganese are found in bone. Like the other minerals, manganese is important in the production and activation of many enzymes that aid in the metabolism of carbohydrates, amino acids, and cholesterol. Levels of manganese that are too high can have a neurotoxic effect.

Food Sources: avocados, barley, beans, blackberries, blueberries, **brown rice**, **cloves**, coffee, egg yolks, ginger, grapevine, green leafy vegetables, hazelnuts, kelp, legumes, nuts, **oats**, peanuts, peas, pecans, pineapples, rice bran, seeds, spinach, walnuts, wheat bran, wheat germ, whole grain cereals

Depleted by: magnesium-containing antacids or laxatives, excess intake of iron, calcium, copper, and/or phosphorous

Complications of Deficiency: impaired growth of bone and/or connective tissue, inflammation, loss of muscle tone

Did You Know: Manganese is an essential component of manganese superoxide dismutase (MnSOD), a potent antioxidant in the mitochondria of our cells. Mitochondria are the "powerhouse" of our cells and they consume over 90% of oxygen used by our cells, which leaves them especially vulnerable to oxidative damage.

Selenium, RBC

Function: Selenium is one of the few trace minerals that acts as a true antioxidant compound. It is an essential component of a particular type of proteins called selenoproteins. Some important functions of these proteins are: reproduction, thyroid hormone metabolism, DNA synthesis, and protection from oxidative damage. Selenium forms part of a very important antioxidant enzyme, glutathione peroxidase. High levels of this enzyme in cells protect them against excess free radical release. Selenium has also been found to stimulate the immune system, protect the heart, reduce prostate, lung, colorectal, and breast cancer, lower miscarriage rates, and increase chances of conception.

Food Sources: **Brazil nuts**, brown rice, butter, cereals, chicken, clams, crab, dairy products, eggs, kidneys, lamb, liver, lobster, nuts, oats, salmon**, shrimp**, spinach, **tuna**

Depleted by: anti-inflammatory drugs (prednisone), Flonase®, long-term hemodialysis

Complications of Deficiency: increased risk of certain cancers,

Did You Know: Brazil nuts (1 ounce) have the highest content of selenium with 544 mcg per serving.

Zinc, RBC

Function: Zinc is a very important trace mineral that functions in over 100 different enzymes systems in the brain alone. It is a co-factor in biochemical reactions and is necessary for the synthesis of DNA and RNA. Zinc protects the cellular membrane and is important in cellular growth. It commonly affects the hair, skin and gastrointestinal system.

Food Sources: beans, **beef**, brewer's yeast, chicken, **crab**, egg yolk, fish, lamb, legumes, liver, maple syrup, meats, milk, **oysters**, peanuts, pork, poultry, pumpkin seeds, seafood, sesame seeds, soybeans, sunflower seeds, turkey, whole grains

Depleted by: malabsorption, alcoholism, diabetes, excess copper or iron, diuretics, aluminum antacids, Pepcid®, Phillips® Milk of Magnesia, Prilosec®, prednisone, Zantac®, diuretics, tetracycline, ciprofloxacin, Flonase®, Lasix®, ACE inhibitors, digoxin

Complications of Deficiency: adult acne, body odor, foot odor, stretch marks, canker sores, delayed wound healing, impaired digestion and immunity

Did You Know: Zinc has many antimicrobial properties and is involved in the metabolism of dihydrotestosterone, which contributes to the development of acne. Especially during the adolescent period and menstruation, increased intake of zinc could decrease the risk of acne.

Chromium

Function: Chromium is a cofactor for insulin. Insulin is responsible for transporting sugar in the blood into the cells where it can be converted to energy. If chromium is deficient, the body may be more prone to building up an excess of glucose in the blood and development of diabetes. Chromium deficiency also causes elevation of the harmful types of cholesterol as well as decreases in HDL, the good cholesterol. Chromium also helps stabilize nucleic acids (DNA and RNA) against structural changes and helps stimulate the synthesis of fatty acids and cholesterol in the liver.

Food Sources: apple peel, banana, beef, beer, brewer's yeast, butter, cheese, chicken, corn, dairy products, dried beans, eggs, fish, liver, meat, mushrooms, oysters, potatoes with skin, seafood, shell fish, stevia leaves, whole grains

Depleted by: aluminum salts, magnesium salts, H2 blockers (Tagamet®, Pepcid®, Zantac®), proton pump inhibitors (Prevacid®, Prilosec®, Protonix®), HRT

Complications of Deficiency: impaired glucose tolerance, confusion, weight loss

Did You Know: Very few foods provide a source of biologically active chromium. The best source of biologically active chromium is yeast (whole grain bread).

Medication-Induced Nutrient Depletion

Prescription medications work to alleviate symptoms because they decrease certain biochemical pathways. However, do we take the time to consider what other effects they are having on us? By shutting down a biochemical pathway, you could be having an impact on the utilization of certain nutrients. Or by taking a particular drug, you could be stressing the liver and causing the depletion of nutrients. All of these have an impact on our nutrient reserves and can contribute to the progression of chronic disease.

CLASSIFICATION	DRUG	INDICATION FOR USAGE	NUTRIENTS DEPLETED
ACE Inhibitor	Lisinopril, Altace, Accupril, Capoten, Prinivil, Zestril, Vasotec	High Blood Pressure	Zinc, Sodium
Anti-diabetic	Metformin, Glucophage, Actos, Avandia	Diabetes, Pre-diabetes	Folic Acid, B12, CoQ10
Benzodiazepines	Valium, Konopin, Xanax	Anxiety	Melatonin
Beta Blocking Drugs	Atenolol, Corgard, Lopressor, Tenormin, Toprol XL, Metoprolol	High Blood Pressure	Coenzyme Q10, Chromium, Melatonin
Beta-2 Adrenergic Receptor Agonist	Albuterol, Aerosol, Brethine, Proventil, Tornalate, Ventolin, Xopenex	Asthma, COPD	Potassium, Calcium (possibly), Magnesium, Phosphorus
Bisphosphonate	Fosamax, Actonel, Boniva, Didronel, Skelid	Osteoporosis	Calcium Magnesium, Phosphorus
Calcium Channel Blocking Drugs	Amlodipine (Norvasc), felodipine (Plendil), Nifedipine (Procardia, Adalat), nimodipine (Nimotop), nisoldipine (Sular)	High Blood Pressure	Vitamin D
Cardiac Glycoside	Digoxin, Digitek, Lanoxin, Lanoxicaps	Heart Failure, Arrhythmias	Calcium Magnesium, B1 Phosphorus, Potassium
Conjugated Estrogen	Premarin Hormone replacement therapy	Hormone Replacement Therapy	B6, Vitamin D, Calcium, Zinc, Magnesium, Folic Acid, B12
Corticosteriod	Flonase, Beclovent, Beconase, QVar, Vancenase, Vanceril	Asthma, Allergic Rhinitis	Beta-Carotene, B6, Folic Acid, Vitamin C, Vitamin D, Calcium, Magnesium, Potassium, Selenium, Zinc, Melatonin
Corticosteroid	Prednisone, Deltasone, Celestone, Cortisone, Cortef, Cortone, Dexamethasone, Decadron, Hydrocortone, Medrol, Methylprednisolone	Severe Inflammation, Autoimmune	Beta-Carotene, B6, Folic Acid, Vitamin C, Vitamin D, Calcium Magnesium, Potassium, Selenium, Zinc

Fluoroquinolone Antibiotic	Levaquin, Avelox, Cipro, Floxin, Noroxin, Penetrex, Trovan	Bacterial Infection	Biotin, B1, B2, B3, B6, B12, Zinc, Healthy intestinal bacteria
Loop Diuretic	Furosemide, Lasix, Ethacrynic acid, Edecrin, Bumex	High Blood Pressure, Heart Failure	B1, B6, Vitamin C, Calcium, Magnesium, Zinc, Phosphorus, Potassium
Macrolide Antibiotics	Erythromycin, Azithromycin, Biaxin, Zithromax	Infection	Healthy Intestinal Bacteria, B1, B2, B3, B6, B12, Vitamin K, Folic Acid, Biotin, Inositol
Opiate	hydrocodone/acetaminophen	Narcotic for pain relief	Folic Acid, Vitamin C, Iron, Potassium
Oral Contraceptives	Ortho-cyclen, Lo-Ovral, etc.	Contraception	Folic Acid, B1, B2, B3, B6, B12, Vitamin C, Zinc, Trace minerals, Selenium
Penicillin Antibiotic	Amoxicillin, Amoxil, Trimox, Penicillin	Infection	Healthy Intestinal Bacteria, Inositol, Biotin, B1, B2, B3, B6, B12, Vitamin K, Folic Acid
Potassium Sparing Diuretics	Amiloride, Spironolactone, Triamterene, Aldactone, Dyazide, Dyrenium, Maxzide	Heart Failure, High Blood Pressure	Calcium, Magnesium, Phosphorus
Proton Pump inhibitor	Omeprazole, Prilosec, Prevacid, Nexium, Protonix, Aciphex	GERD, severe gastric ulceration	Beta carotene, B1, B12, Folic Acid, Calcium, Zinc
SSRIs (Selective Serotonin Reuptake Inhibitors)	Prozac, Zoloft, Paxil	Depression	Sodium, Folic Acid,| Melatonin
Statin Drugs	Lipitor, Crestor, Lescol, Pravachol, Zocor, Mevacor	Lowering Cholesterol	Coenzyme Q10
Sulfonylurea	Glyburide, Glipizide, Glimepiride, Amaryl, Diabeta, Glucotrol, Glynase, Micronase	Diabetes	Coenzyme Q10
Synthetic Thyroid	Levothyroid, Synthroid	Hypothyroidism	Calcium
Thiazide Diuretic	Hydrochlorothiazide	High Blood Pressure	Vitamin D, Calcium Magnesium, Phosphorus, Potassium, Zinc, Coenzyme Q10
Tricyclic Antidepressants	Amitriptyline, Clomipramine, Doxepin, Imipramine, Anafranil, Asendin, Elavil, Tofranil, Vivactil	Depression	Coenzyme Q10, B2, Sodium

Over the Counter (Non-Prescription Medications)

CLASSIFICATION	DRUG	INDICATION FOR USAGE	NUTRIENTS DEPLETED
NSAID	Ibuprofen, Naproxen	Inflammation, Pain	Folic Acid, Iron, Vitamin C
Acetaminophen	Tylenol	Pain, Fever	Coenzyme Q10, Glutathione
Antacids	Amphojel, Aluminum Hydroxide plus Magnesium, Gaviscon, Gelusil, Maalox, Mylanta, Basaljel	Gastritis, GERD	Beta-Carotene, Folic Acid, Vitamin D, Calcium, Magnesium, Chromium, Iron, Zinc, Phosphorus
Aspirin		Pain, Inflammation, Fever (adults)	Folic Acid, Vitamin C, Iron, Potassium, Zinc
H_2 Inhibitors	Famotidine, Pepcid, Tagamet, Zantac	Ulcer, GERD	Folic Acid, B1, B12, Vitamin D, Calcium, Iron, Zinc
Laxatives with Bisacodyl	Correctol, Dulcolax, PMS-Bisacodyl	Constipation	Calcium, Potassium

Source: www.invitehealth.com

Toxins and Preservatives in Food

The food industry has become a huge, booming business. Companies are out to make food cheaper, faster, and tastier. They want us to consume more and more of it. The focus has shifted away from food that is nourishing to our body to larger quantities of food that just satiates our appetite. In an effort to deliver this, the food industry has started using questionable chemicals that make food more shelf-stable, look more appealing, and taste better. The FDA has approved these chemicals, but long-term effects have not been studied. In addition, the bioaccumulation and combination of these chemicals in the body has also not been studied. Foods and products that contain these chemicals should be avoided.

INGREDIENT	FOUND IN	HEALTH HAZARDS
Arsenic	Poultry	EPA classifies inorganic arsenic as a "human carcinogen"
Aspartame	Sodas, gum, "diet" or "sugar free" products	Possible carcinogen (leukemia, lymphoma), weight gain and increased hunger, decreased insulin sensitivity, and neurotoxic effects
Azodicarbonamide	Breads, frozen dinners, boxed pasta mixes, and packaged baked goods	Linked to asthma
BHA and BHT	Cereal, nut mixes, gum, butter, meat, dehydrated potatoes, and beer	BHA may be a human carcinogen, a cancer-causing agent
Brominated vegetable oil (aka BVO)	Sports drinks and citrus-flavored sodas	Competes with iodine for receptor sites in the body, which can lead to hypothyroidism, autoimmune disease, and cancer. The main ingredient, **bromine,** is a poisonous, corrosive chemical, linked to major organ system damage, birth defects, growth problems, schizophrenia, and hearing loss
Coloring agents: blue #1, blue #2, yellow #5, yellow #6, red #3, red #40	Cake, candy, cosmetics, macaroni and cheese, medicines, sport drinks, soda, yogurt, pickles, and cheese	Most artificial colors are made from coal tar, which is a carcinogen. Some are linked to hyperactivity and behavioral effects in children
Mercury (methylmercury)	Fish, shellfish (see chart below for types of fish highest in mercury)	CNS issues: cognitive thinking, memory, attention, memory, language, fine motor and visual spatial skills. In addition, impairment of peripheral vision, disturbances in sensations, lack of coordination of movements and muscle weakness

Monosodium Glutamate (MSG)	Flavor enhancer added to fast food, Chinese food, canned soups, canned vegetable, dips, crackers, processed meats	Excitotoxin (damages nerve cells), headaches, fatigue, depression, rapid heart rate
Olestra (aka Olean)	Fat-free potato chips	Depletion of fat-soluble vitamins and carotenoids. Side effects include oily anal leakage
Potassium bromate (aka brominated flour)	Rolls, wraps, flatbread, bread crumbs, and bagel chips	Associated with kidney and nervous system disorders, gastrointestinal discomfort (See bromine above).
Sodium Benzoate	Preservative found in salad dressings, jams, condiments, fruit juices, dips, cheese, mouthwash, toothpaste, cough syrup, lotion, and other cosmetic products	May be a human carcinogen, a cancer-causing agent
Sodium Nitrate	Bacon, ham, hot dogs, lunch meats, smoked fish, corned beef	Preservative that has been linked to various types of cancer
Sucralose	Sodas, gum, "diet" or "sugar free" products	Reduction of healthy intestinal bacteria (by up to 50%), weight gain, increased pH, and neurotoxic effects
Synthetic hormones: rBGH and rBST	Milk and dairy products	Linked to breast, colon, and prostate cancers
Trans Fats (Partially hydrogenated oils and Hydrogenated Oils)	Fried fast food, baked goods, crackers, cereal, margarine, shortening	Shelf-stable fat that has been shown to cause heart disease by increasing LDL or “bad” cholesterola

Pesticides

*For a complete list of foods that have a high content of pesticides, look at the Environmental Working Group site at **www.EWG.org**. This website has a “Shopper’s Guide to Pesticides” that includes their “Dirty Dozen and the Clean 15.” Listed are foods that should never be eaten unless they are organic and the foods that may be eaten freely without fear of pesticide residue, whether organic or conventional.*

If you are unable to purchase organic, there is a rinse for fruits and vegetables that can easily be made at home:
1 teaspoon white vinegar
1 teaspoon lemon juice
8 oz filtered water

With this mixture you will be removing about 85% of the pesticides that may exist on the fruit or vegetable. While not organic, it is certainly safer than eating an unwashed fruit.

Household Toxins

There are literally thousands of organic cleaning products listed on the Internet, so choosing products can be a difficult task. Rather than recommend specific products, start evaluating and replacing the things you use now. The Environmental Working Group, ***www.EWG.org****, has spent years looking at various cleaning supplies, food sources, cosmetics, as well as sunscreens. Access this site for ratings on your soaps, shampoos, conditioners, deodorants, toothpaste, makeup etc. Look for products rated 0-2 for toxicity. These are the best bet to help you avoid the myriad of chemicals that we are subjected to every day in ways that you may not even consider.*

Ingredient	Found in	Health Hazards
BPA (Bisphenol-A)	Plastics, water bottles, tuperware	Hormonal disruption (has a structure that is very similar to estrogen)
Formaldehyde	Pressed wood products	Used as a glue, this can cause cancer in animals. Exposure can cause watery eyes, difficulty breathing, burning eyes and throat, and asthma attacks
Lead	Paint	CNS problems, damage to brain, blood cells and kidneys
PBDEs (Polybrominated diphenyle ethers)	Mattresses, upholstery, TV and computer castings, flame retardants	Learning and memory problems, lowered sperm counts, and poor thyroid function. Possible carcinogen
Phthalates (DBP, DEP,BBzP)	Plastic containers, shower curtains, air fresheners, cosmetics, hair sprays, cleaning products	Hormonal disruption, possible infertility, increased risk for Type II diabetes, and asthma trigger
Triclosan	Antibacterial soaps, make-up, toothpaste, anti-perspirants, fragrances and facial cleaners	Antibacterial agent that could be contributing to bacterial resistance. May possibly increase the risk for allergies
VOCs (Volatile organic compounds)	New carpet (glues and dyes), paints, paint strippers, permanent markers, dry-cleaned clothing	Eye, nose and throat irritation, headaches, nausea, damage to liver, kidney and CNS. Possible carcinogen

Mercury Levels in Fish

LEAST MERCURY	MODERATE MERCURY	HEAVY MERCURY	HIGHEST MERCURY
Enjoy these fish	*Eat 6 serving or less per month*	*Eat 3 serving or less per month*	*Avoid eating*
Anchovies	Bass (Striped, Black)	Bluefish	Mackerel (King)
Butterfish	Carp	Grouper	Marlin
Catfish	Cod (Alaskan)	Mackerel (Spanish, Gulf)	Orange Roughy
Clam	Croaker (White Pacific)	Sea Bass (Chilean)	Shark
Crab (Domestic)	Halibut (Atlantic)		Swordfish
Crawfish/Crayfish	Halibut (Pacific)		Tilefish
Croaker (Atlantic)	Jacksmelt (Silverside)		Tuna (Bigeye, Ahi)
Flounder	Lobster		
Haddock (Atlantic)	Mahi Mahi		
Hake	Monkfish		
Herring	Perch (Freshwater)		
Mackerel (N. Atlantic, Chub)	Sablefish		
Mullet	Skate		
Oyster	Snapper		
Perch (Ocean)	Weakfish (Sea Trout)		
Plaice			
Pollock			
Alaskan Wild Salmon			
Sardine			
Scallop			
Shad (American)			
Shrimp			
Sole (Pacific)			
Squid (Calamari)			
Tilapia			
Trout (Freshwater)			
Whitefish			
Whiting			

Quick Guide to Grains

Whole grains can be a great source of nutrition. They can add a lot of flavor and dimension to different food dishes. The below guide will introduce you to some new grains (most of which are gluten-free) that you can add to your repertoire.

Amaranth	This ancient Aztec grain is a good source of fiber and protein. It contains high amounts of B vitamins, calcium, iron and Vitamin C.
Barley	Hulled barley does contain gluten; however, it can be a nutritious addition to soups and salads.
Brown Rice	Brown rice contains the entire rice kernel with only the outer, inedible husk removed. It is a staple for people all over the world.
Buckwheat	Triangular in shape, this whole grain is actually the seed of an herb. It is rich in flavonoids and magnesium.
Bulgur	This cracked, steamed wheat kernel can be simply soaked to rehydrate.
Millet	Gluten free grain that is easily digested and has a sweet, nutty flavor. It has a good balance of essential amino acids and is alkalizing to the body.
Quinoa	This powerfood is actually not a grain, but rather a small dried seed with a great nutty flavor. This protein powerhouse contains all of the essential amino acids.
Rolled oats	Oatmeal is a great breakfast option that pairs wells with nuts, seeds and fruit. Oats are gluten free; carefully check the package to confirm they have not been contaminated with gluten-containing grains.
Rye berries	This high-protein grain is more slowly digested than other grains. Combine with beans for a particularly good match.
Spelt	This grain may be well tolerated by wheat sensitive folks. Use spelt just as you would wheat and look for spelt flakes, too, which can be used like rolled oats.
Steel cut oats	These are steamed and cut whole oat groats (a.k.a. hulled grains). They're chewy and make for a particularly delicious hot cereal that is high in soluble fiber and protein.
Teff	This tiny ancient grain has a sweet and malty flavor. It contains high amounts of calcium and Vitamin C.
Wheat berries	These whole, unprocessed kernels are great cooked for pilafs or as a nutty addition to grain salads.
Wild Rice	Actually the seed of a marsh grass plant, this grain-like seed needs to be thoroughly cleaned before cooking and offers a striking contrast in grain-based sides and salads.

Helpful Hints to Reduce Environmental Toxicity

Air Purification:

Ideally, an air purifier will have a combination of a charcoal and a HEPA filter. If you have issues with mold, bacteria, viruses or pets you may wish to add an ultraviolet light.

When trying to determine the size system to get, consider the cubic square feet of the area you wish to cleanse. You should filter the total cubic feet of air in a given room 3 times an hour. As an example, if you have a 10' x 10' room with 10 foot ceilings that is equivalent to 1000 ft^3. Therefore, you would need an air filter capable of handling 3000 ft^3 an hour or 50 ft^3 a minute.

Some reputable companies are:

IQ Air

The Foust Company - www.FoustCO.com. This company will offer a 20% discount to Riordan Clinic patients. For best results, call them on the telephone to discuss your needs.

If those options are not within your budget, check into getting a MERV filter for your air conditioning/ furnace for a reasonable price. MERV stands for Minimum Efficiency Reporting Value. MERV ratings range from 1-16, the higher the MERV rating on a filter, the fewer dust particles and other contaminants can pass through it. The downside is that they only work when your furnace or air conditioning is running. Work with an HVAC professional to avoid getting a filter that is too dense for your air conditioning compressor.

Water Purification:

Look at the specifications to be sure that the system you are choosing will remove the contaminants that exist in your water supply. To do this, you will need to have your water independently tested. Beware that many companies that offer water testing, also sell filtration systems. Avoid using the same company to test and buy from. National Testing Labs is a widely recognized lab for water analysis. You can order their kits online at http://www.ntllabs.com/

Some reputable products are:

AquaSana (www.aquasana.com/Direct) - whole house system

Berkey system (www.berkeyfilters.com/) - simple tabletop model

Whatever system you may have, or want to purchase, if your community fluoridates the water you should get a special filter to have it removed. (Wichita water is not fluoridated, but most cities do fluoridate.)

If you do not have a whole house filter you should invest in a simple chlorine filter for your shower. These usually cause less than $20 and can be purchased at most building supply stores. While chlorine may be important to keep our water supply clean, the amounts and types of chlorine in use are also very toxic to us as living beings. The side benefit of eliminating chlorine is that your hair and skin will immediately start to thank you by becoming more lustrous and soft.