

Genetic Roadblocks

How to get around them by using Herbs and Nutrition

-by Amy Gonzalez Daniel

We are exposed to a great number of xenobiotics during the course of our lifetime, including a variety of pharmaceuticals and food components. Our environment has become more and more polluted with new toxins that our bodies have not previously encountered and yet we are capable of managing environmental exposure by detoxifying them. To accomplish this task, our bodies have evolved a complex systems of detoxification enzymes. These enzymes generally function well to rid our bodies of damage from xenobiotics. However much literature suggests a relationship between impaired detoxification (enzymes) and disease such as, cancer, Parkinson's, autism, fibromyalgia, and chronic fatigue/immune dysfunction syndrome and others.

DETOXIFICATION

There are two known phases of detoxification. In Phase I detoxification, enzymes, known collectively as the cytochrome P-450 system, use oxygen to modify toxic compounds, drugs, and steroid hormones. Because there are many different toxic compounds the body might encounter, there are many variants of Phase I enzymes. In Phase 2 detoxification, large water soluble molecules are added to toxins, usually at the reactive site formed by Phase I reactions. After Phase 2 modifications, the body is able to eliminate the transformed toxins in the urine or the feces (bile).

Polymorphism (errors) in the genes coding for a particular enzyme can increase or more commonly, decrease the activity of that enzyme. Both increased and decreased activity may be harmful. Increased phase I clearance without increased phase 2 clearance can lead to the formation of toxic intermediates that may be more toxic than the original toxin. Decreased Phase I clearance will cause toxic accumulations in the body. For example, adverse reactions to drugs are often due to decreased phase I capacity for clearing them from the system.

NUTRIGENOMIC TESTING

Nutrigenomic testing is a relatively new diagnostic test that can test for genetic weaknesses in the cytochrome P-450 system. In June 2,000, The Human Genome Project completed it's goal of identifying all of the approximate 30,000 genes in human DNA. They were able to determine the sequences or "spelling" of the 3 billion chemical base pairs that make up human DNA. As a direct result of having this genetic information, Science is now able to identify particular genes that are involved with specific diseases. A change in the "spelling" of your DNA in a specific area may identify a genetic weakness making you more susceptible to disease. While we cannot change our genetic susceptibility, we can look at our genetic profile and use nutrition and herbs to help strengthen these underlying weaknesses and lower the risk for disease. By combining this protocol with a lifestyle that reduces exposure to environmental toxins (as much as possible), an individual can achieve optimal health.

THE METHYLATION CYCLE

The methylation cycle is one very important biological pathway. Proper functioning of this pathway is essential for a number of critical reactions. As a consequence, genetic weaknesses (mutations) in this pathway are risk factors for a number of serious health conditions including heart disease, stroke, cancer, diabetes, MS, Alzheimer's, ALS, Parkinson's, Huntingtons, CFS/FM, proper immune function, Downs Syndrome, and Autism. The methyl cycle's functional status determines our resistance or susceptibility to environmental toxins and microbes. In the chemical sciences, methylation denotes the addition of a methyl group to a substrate or the substitution of an atom by a methyl group. Methylation is catalyzed by enzymes. Methylation is involved in the detoxification of heavy metals, the hormones estrogen, testosterone and progesterone and the neurotransmitters-dopamine, norepinephrine, epinephrine and serotonin. It is also involved in the regulation of gene expression, regulation of protein function, and RNA metabolism.

SUPPORTING THE METHYLATION CYCLE

The body needs the B-vitamins, Tri-Methyl-Glycine (TMG), folic acid and a unique nutrient known as SAM-e to restore imbalances in the methylation cycle. **SAM-e** is very important to the methylation process. SAM-e, Also known as S-adenosylmethionine can be taken as a supplement in the form of a compound made naturally in the body from the essential amino acid methionine and adenosine triphosphate (ATP). ATP is the energy-producing compound found in all cells in the body. SAM-e is believed to work by being a methyl group donor. **TMG**. Commonly known as betaine, glycine betaine, or oxynurine, is found in most microorganisms and almost all marine and fresh water invertebrates. The best known natural sources of TMG are plants from the chenopodiaceae family, namely, the sugar beet. TMG is a natural methyl donor. A diet high in broccoli, spinach or beets can provide as much as a fifth or even a quarter teaspoon of TMG, just over 500 mg. SAM-e and TMG cannot be activated in the methyl cycle without adequate amounts of certain B-vitamins (**B-2, B-6, B-9 and B12**). Each of these promote methylation by participating in key enzymatic reactions that either recreate SAM-e, or help dispose of homocysteine. Homocysteine is a harmful amino acid. Vitamin B12 is present in animal products such as meat, poultry, fish (including shellfish), and to a lesser extent milk, but it is not generally present in plant products or yeast. Cyanocobalamin is the principal form of vitamin B12 used in supplements but methylcobalamin is also available as a supplement. Cyanocobalamin is available by prescription in an injectable form and as a nasal spray. Over-the-counter preparations containing cyanocobalamin include multivitamins, vitamin B-complex, and vitamin B12. **Folic Acid** is found in green leafy vegetables (foliage) and citrus fruit juices, legumes, and fortified cereals. Folic acid supplements are available in single ingredient and combination products such as B-complex vitamins and multivitamins.

SUPPORTING THE ORGANS OF ELIMINATION AND DETOXIFICATION

Turmeric is a highly valuable herb for the influence it exerts on the digestive system and the liver. It is considered a digestive bitter and a carminative. As a cholagogue, it stimulates bile production in the liver encouraging excretion of bile via the gallbladder. This improves liver health and the body's ability to digest fats. Turmeric is also an anti-inflammatory to the mucous membranes, which coat the throat, lungs, stomach and intestines. Turmeric decreases congestion and inflammation from stagnant mucous membranes. It shares similar liver protectant compounds that milk thistle and artichoke leaves contain. It is said to shrink engorged hepatic ducts, so it can be useful to treat liver conditions such as hepatitis, cirrhosis, and jaundice.

Artichoke has been used for digestive support and liver health since the time of the Roman Empire in the 4th century B.C. Recently, researchers discovered that compounds such as cynarin and chlorogenic acids extracted from artichokes effectively stimulated bile production, which helps to stimulate healthy digestion, relieve occasional indigestion, increase fat metabolism, support liver health, improve gallbladder function and promote cholesterol wellness.

Dandelion is a potent detoxifier. Dandelion stimulates the elimination of toxins from every cell in the body. It is often used in herbal formulas to help restore liver health. Dandelion also increases bile production and stimulates its flow to the gallbladder. The polysaccharide insulin found in dandelion is said to have white blood cell and immune-boosting properties.

Licorice Root is regarded as an important herb for treating kidney ailments and is also recommended for the liver and respiratory tract. Licorice Root's antioxidant, antiviral, and antibody-stimulating properties make it a liver protectant and detoxifier. *Planta Medica* notes that it may help the liver detoxify powerful chemical poisons.

Milk thistle is best known as a liver tonic. The active ingredient is silymarin, which is reputed to repair liver damage due to alcohol, drugs, hepatitis, and exposure to toxins. Milk thistle increases secretion and flow of bile from the liver and gallbladder. It is routinely prescribed by physicians in Europe to patients with liver disorders.

Adaptogens are unique natural substances that help the body adapt to all kinds of stress. They are unique from other substances in their ability to restore balance in systems that are weakened and help the body regain optimal homeostasis. It is not known exactly how adaptogens work in the body but one theory suggests, that they function partially due to their antioxidant and free radical-scavenging effects. Some adaptogens that support the organs involved in detoxification are cordyceps, dang shen, he shou wu, licorice, schisandra.

Alteratives are herbs that help restore function by altering the body's metabolic processes and improving its ability to eliminate waste through the kidneys, liver, lungs, and skin. Some work by stimulating digestive function and some are immunomodulators. They are often referred to as "blood cleansers" Primary alterative herbs include garlic, burdock, cleavers, goldenseal, oregon grape, yellow dock, red clover and nettle.

DIET TO SUPPORT DETOXIFICATION

Eating a whole foods diet and choosing organic foods will help reduce the amount of toxins entering the body. Eating an abundance of toxin reducing foods like fresh fruit will also help. Fruits are extremely high in liquid-content, helping the body wash out toxins. They are also very easy to digest and are high in antioxidants, nutrients, fiber and many important vitamins like vitamin C. Vitamin C is one of the best detox vitamins, because it changes toxins into digestible material. Citrus fruits like lemons, oranges and limes aid the body in flushing out toxins, as well as jump-start the digestive tract with enzymatic processes. They also aid the liver in its cleansing processes. To increase detoxification, start each morning with a warm glass of lemon water.

Eating green plants like barley, wheatgrass, kale, spinach, spirulina, alfalfa, chard, arugula or other organic leafy greens give a chlorophyll-boost to the digestive tract. Chlorophyll rids the body of harmful environmental toxins from smog, heavy metals, herbicides, cleaning products and pesticides. Raw Vegetables like onions, carrots, asparagus, broccoli, cabbage, kale, brussel sprouts, cauliflower, garlic, beet, and oregano help the liver purge toxins during the cleansing process. Broccoli Sprout is especially high in antioxidants, and can help stimulate the detoxification enzymes in the digestive tract. Cruciferous vegetables are high in naturally occurring sulphur and glutathione. Sulphur helps the liver detoxify harmful chemicals. Garlic stimulates the liver in producing detoxification enzymes that help filter out toxic residues in the digestive system. Healthy oils like hemp, avocado, olive and flax seed help lubricate the intestinal walls, allowing the toxins to be absorbed by the oil, and eliminated by the body.

Drinking lots of clean filtered water throughout the day keeps the toxins flushed out and the body hydrated. Regular exercise reduces stress and keeps the lymphatic system moving and purging toxins through the skin. Practices like qi gong, tai chi and yoga focus on the breath and help to cleanse the lungs and the whole body this way.

LIFESTYLE PRACTICES TO SUPPORT DETOXIFICATION

Hot cold/sauna therapy has been shown to be a powerful detoxifying process. It involves heating the body to perspiration for about 20 minutes in a sauna and then cooling it quickly with a cold shower or pool for at least thirty seconds. This stimulates bile flow from the liver and toxins are excreted through the skin and washed off. Repeating the process two or three times consecutively makes it even more effective. It is an effective means of purging heavy metals from the body. It is important to replenish minerals afterwards that are also excreted during the process. This is safe to do a few times per week.

Dry skin brushing is a practice of brushing the dry skin of the body daily for about 3-5 minutes, usually before a shower or bath. This removes old dead skin cells so that the new ones can surface and toxins are released more easily. It stimulates circulation and can improve skin tone.

Epsom salt baths Epsom salt is rich in both magnesium and sulfate. Researcher shows that a great many people are depleted of magnesium. This may be because both magnesium and sulfate are poorly absorbed through the stomach. However magnesium and sulfate are both easily absorbed through the skin. Magnesium is utilized by the body for all sorts of detoxification pathways including methylation and is necessary for the neutralization of toxins, overly acidic conditions that arise in the body, and for protection from heavy metals. It plays a vital role in protecting us from the onslaught of man-made chemicals all around us. Glutathione, an antioxidant normally produced by the body and a detoxifier of mercury, lead and arsenic among others, requires magnesium for its synthesis. Sulfates play an important role in the formation of brain tissue, joint proteins and the proteins that line the walls of the digestive tract. They both stimulate the pancreas to generate digestive enzymes and are thought to help detoxify the body of medicines and environmental contaminants. Soaking in about two cups of epsom salt for 15 minutes two to three times per week will help restore levels of magnesium and sulfate. People who do this regularly report an easement of muscle pain and cramping, elevated mood, reduced inflammation and less migraine headaches.

REFERENCES

Deann J. Liska, Ph.D. [The Detoxification Enzyme System](#). Alternative Medicine Review
Volume 3, Number 3, 1998.

Genovations. [Detoxigenomic Profile](#). Great Smokies Diagnostic Laboratories
June 22, 2006.

“Basic Methylation Pathway Diagram.” <http://www.holistichealth.com>
Holistic Health International, 2011.

Hoffman, David. [Medical Herbalism: The Science and Practice of Herbal Medicine](#).
Rochester, Vermont: Healing Arts Press, 2003.

Winston, David. [Adaptogens: Herbs for Strength, Stamina, and Stress Relief](#)
Rochester, Vermont: Healing Arts Press, 2007.

Wood, Mathew. [The Earthwise Herbal-A Complete guide to Old World Medicinal Plants](#).
Berkley, California: North Atlantic Books, 2008.

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