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## IS A DETOXIFICATION PROGRAM NECESSARY?

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Many medical scientists deny that the body needs help in clearing out toxins. It's believed that the body is able to detoxify itself without help from detoxifying regimens such as special diets, herbs, supplements, or other methods. It is true that our bodies engage in ongoing detoxification functions and may be efficient at purging toxins produced during normal bodily processes as well as those we may ingest (food, water, medications, etc.), inhale, or get on our skin. Sheila Dean, DSc, RD, says, "If you were to stop detoxifying, you'd be dead in about four hours." Our **built-in** detox devices—lungs, kidneys, colon, lymphatic system, skin, and most important, the liver (with the gallbladder)—all participate in this function. A number of other scientists admit that, very often, these channels require extra help. Much research points to a present-day **increased** body burden of toxic substances. If detoxification is not needed, then why is there an unprecedented accumulation found in our bodies? It's hard to argue that, in recent decades, we have been exposed to huge amounts of human-made toxins. Air pollution, pollutants in water supplies, pesticide residues in foods, mercury contamination in seafood, chemicals leached from plastics, additives and toxic chemicals placed in processed foods and cleaning products and cosmetic products, flame retardants, chemicals in building materials...the list can go on and on. A buildup of toxins contributes to poor overall health and low energy, plus it can increase risks for a myriad of diseases and disorders.<sup>1</sup>

Take pesticides (including residues in food) for example. Studies link pesticides with a number of diseases including Alzheimer's disease, asthma, chronic bronchitis, breast cancer, endometriosis, female and male infertility, Parkinson's disease, multiple chemical sensitivity, non-Hodgkin lymphoma, skin diseases, hearing problems, type 2 diabetes, and many others. Bisphenol-A (BPA)—a chemical used in polycarbonated plastics of all sorts, food cans and paper receipts—is found in the bodies of almost all people. The BPA is metabolized into a compound that impacts our cells and not only adds to the toxic load, but may contribute to excess production of fat cells. There is evidence connecting exposure to toxins which impact nerve cells (neurotoxins) to chronic fatigue syndrome, fibromyalgia, Lyme disease, and other syndromes that affect the nervous system. Heavy metals slowly accumulate in organs such as the liver, kidneys, pancreas, central nervous system (including the brain) and others. Over time, as they build up, health problems are created, many of which are misdiagnosed because they are not recognized as being associated with heavy metals. Dr. David Quig, research scientist, noted that "We now know that heavy metals are additive and synergistic. If you get a little thallium, and a little lead, and a little cadmium in your system, you've got one plus one plus one equals five or six, not just three." Metals and other toxic chemicals might each have different effects by themselves, but they "share similar sites of action where they disrupt metabolism." According to the Commission for Environmental Cooperation, "Persistent bioaccumulative toxic substances (PBTs) are chemicals that do not degrade easily in the environment. PBTs typically accumulate in the fatty tissues and are slowly metabolized, often increasing in concentration within the food chain. Certain PBTs have been linked to adverse health effects in both humans and animals." Frankly, that's putting it conservatively. According to the Environmental Protection Agency, U.S. Department of Human Services, many scientific studies and toxicology textbooks, whether heavy metals, pesticides, PCBs, dioxins, volatile organic hydrocarbons, or other toxins are studied, it is confirmed that these chemicals can produce **numerous** diseases—from cardiac disease, autoimmune diseases, recurrent and chronic inflammation, allergies, cancers, immune and endocrine and neurologic diseases, congenital defects, low IQ, thyroiditis, endocrine disruptions, and other diseases of any organ or system. In 2004 researchers at two major laboratories even found an average of two hundred industrial chemicals and pollutants in umbilical cord blood from babies. Our toxicity levels build up and create much abnormal body chemistry. There are about **80,000** synthetic chemicals in commerce today. Thousands are routinely present in consumer products used every day, including food. It is established that, in foods, even small doses of several chemicals can have significant negative effects if they are present together; it's the "cocktail" combinations that can be most harmful. So, we are putting a huge amount of stress on our detox systems and **accumulating** high levels of toxins in our cells.<sup>2</sup>

For most people, symptoms of toxicity are general and diffuse. They develop slowly over time. This makes toxicity more challenging to identify. There is a pattern that develops, so a thorough case history is essential. **Body burden**—our toxic load—will not always show up in tests of urine or blood (which government agencies such as the Centers for Disease Control and National Institutes of Health use in surveys). Some chemicals and/or their metabolites pass through our bodies in a short time before being excreted, but frequent or continuous exposure can create a "persistent" body burden. Many chemicals are not readily excreted and can remain for years in our fat cells, blood, semen, muscle, bone, brain, liver, or other organs. Because many toxins are fat-soluble, large quantities of such toxins can be stored in fat. Individuals have **unique** chemical loads. Since we're all exposed to some toxic chemicals and have a level of "bioaccumulation," wouldn't it make sense to occasionally support the body's ability to get rid of toxins? The first and most effective thing that can be done to reduce toxic chemical levels is to avoid as many of such chemicals as possible. But not all can be totally

avoided and toxic chemicals will unavoidably get into our bodies. There are methods to help your body flush them out. Recent scientific evidence shows, for example, that regular exercise and sweating are effective in helping to purge them out. Moreover, aiding the liver, kidneys and other bodily organs and cells with a detoxification program is advantageous.<sup>3</sup>

The object of a legitimate detoxification is to stimulate the organs of elimination to process and remove toxins from the body. **Supporting** the body in this process can be done in many ways—specific dietary regimes, herbal and nutritional supplementation, saunas, sweat lodges, hot baths and exercise. Diet is extremely important since avoiding foods and beverages that may contain toxins is essential, and giving the body the clean, nutrient-dense, whole natural foods that assist, facilitate and sustain the body's detoxification processes is crucial. By supporting your natural detoxifying systems with good food, whole food supplements if needed, exercise, and other natural means as well as reducing exposure to harmful chemicals, your body will be best able to reduce its toxic load and boost your energy and wellbeing. A detox program can help remove environmental toxins, identify food intolerances, support organ systems, address cellular insults and injuries, and prevent a number of chronic, degenerative or inflammatory conditions.<sup>4</sup>

**Detoxification processes.** Detoxification is a **complex** process that requires all bodily pathways to be in balance to work effectively. Most bodily cells play a role in detoxification, but the **liver** is the prime player since it breaks down harmful chemicals. In a two-step enzymatic process, the liver converts foreign substances into compounds the body can eliminate, primarily via urine or feces. The **kidneys** filter blood to remove waste and toxins. The **skin** and **lungs** purge chemicals that don't belong in the body. The **intestinal** lining is important in the handling and elimination processes. Though all these pathways are always working to accomplish detoxification (on top of their other functions), they may need more help. If they (particularly the liver) become overwhelmed by all the poisons they have to neutralize, transform, or process, their ability to function properly is reduced. To help the detox pathways, several things can be done. Crucial is a **nutrition** reset, focusing on eliminating nonfoods (which contain few if any real nutrients) and any items that contain chemicals that are foreign to the body (including pesticide and drug residues, chemical preservatives and additives, etc.). Regular **exercise** is needed to stimulate our metabolism, burn fat (cells of which accumulate toxins), and allow the liver, kidneys, lungs and skin to cleanse at a higher capacity. Perspiration through the skin removes various toxins—thus the benefits of sweating during exercise and saunas. The goal is to effectively remove deeply embedded chemicals from the body and support repair of any damage that may have taken place as a result toxic insults. Accumulated toxic chemicals can create a barrier to cellular recovery in any number of diseases, disorders and chronic conditions. So it makes sense to accelerate the body's normal ability to detoxify and repair. The **first** objective is to remove stubbornly embedded toxic chemicals from tissues and flush them out of the body. This involves, not only organs of elimination (liver, kidneys, and colon), but every bodily cell. Getting rid of toxins supports regeneration and proper function of all cells. **Second**, it is essential to supply adequate nutrients for repair to any damaged tissues and cells, and help restore functional balance of all systems.<sup>5</sup>

The body detoxifies itself naturally in stages. In **Phase I** (degradation/bioactivation), electrons are moved around through a variety of functions—oxidation, reduction, hydrolysis—which attract conjugating enzymes of Phase II, preparing an “anchor site” for the next processes. Phase I occurs mostly through the cytochrome P450 family of enzymes which can join together many compounds to metabolize at many different sites and perform many different actions. But sometimes a more toxic substance is created in Phase I. For example, this can occur with chemicals that outgas from plastics (such as vinyl chloride and styrene) and trichloroethylene (often in water supplies), among other poisons. Such toxin production (of even cancer-causing poisons) occurs especially if the individual's system is unable to make the chemical less toxic either because of competition or overload from other toxins. A number of nutrients are important to Phase I function and its ability to avoid making more toxic substances. These include vitamin C complex (including flavonoids), vitamin E complex (including tocopherols, tocotrienols, selenium), coenzyme Q10, carotenoids, zinc, magnesium, molybdenum, glutathione, taurine, and quercetin. Inadequate levels of any of these and other nutrients can lessen Phase I functional capacity.<sup>6</sup>

Next is **Phase II**. Now that electrons have been moved around on the surface of the toxic chemical, the body can hook a large molecule onto the chemical at that prepared “anchor site.” Phase II binds a bulking molecule to make the chemical compound heavy, water-soluble and electrically charged (polar), so it is easier for the chemical to be eliminated. These compounds are then washed out by **Phase III** proteins that sit in the external membranes of the cells. Phase III is the elimination phase of detoxification, discharging waste into the liver, bile, gallbladder and the intestines to be passed through the stool or into the plasma and urine to be eliminated through the kidneys. The microflora in the intestines (especially in the colon) are so important to the detoxification process that some researchers are calling them **Phase IV**. For example, ‘sick’ bacteria deconjugate and render Phase II conjugates more lipid (fat)-soluble, so they are reabsorbed and sent back to the liver. Healthy bacteria support conjugation and other needed processes.<sup>6</sup>

There are many types of molecules used for the Phase II conjugation process. Conjugation means a big molecule is coupled or hooked onto the toxic chemical, making it heavier and easier to pull out (eliminate) from the body. These reactions include sulfation, glucuronidation, glutathione conjugation, and glycine conjugation, for instance. The adequacy of each reaction depends on the level of enzyme present (enzyme induction), on the amount of cofactors and conjugation

portions available, and adequate ATP (energy from the mitochondria 'energy factories' in cells). Nutritional components are definitely involved in the enzyme inducements required. Sulfur groups, amino acids (including glutathione—cysteine, glutamic acid, and glycine—and methionine, for example), glucuronic acid, flavonoids, phenols, and other food components are involved. Glutathione is an important conjugating molecule used to get rid of toxic chemicals. It is made in the body, but with the excessive exposure to toxins we experience nowadays, we may not make as much as we need. Each time we detoxify a chemical molecule, we lose or deplete a molecule of glutathione. If your body can't compensate by producing enough glutathione, there is inadequate protection from toxic chemicals that damage cells and contribute to diseases. Sulfate is also easily depleted; it is involved in sulfation reactions. Sulfate reserves can be replenished with nutrients including some amino acids, sodium sulfate, and sulfur-containing foods such as cruciferous vegetables, alliums, nuts, legumes, fish, meats and poultry. Glucoronidation activity, another reaction important to excretion of chemicals, is indirectly enhanced by food components like calcium d-glucarate (found in some fruits and vegetables).<sup>7</sup>

Research confirms that detoxification of our lifelong **cumulative** effects of diet and environment is critical. To do that, we must have sufficient levels of supportive nutrients. Also, there are tremendous differences in the condition of individuals' detoxification systems and their detox performance abilities. A person's degree of stress, diet, nutritional status, age, health conditions, hormones, route of toxin exposure, and circadian rhythm are among the factors affecting the variances. Thus, for example, the same dose of a drug can produce a 1,000-fold difference in individuals' blood levels. Detoxification enzymes exist in two forms: inducible (producing a result by using a specific stimulus) and constitutive (assembling, combining). Inducible enzymes can be up- or down-regulated so their expression can be increased with exposure to toxins such as drugs; but individuals vary in the extent to which their inducible enzyme expression can be increased. Constitutive enzymes, such as certain CYP enzymes (like 2D6), have a base or principal level; they're always present but can't be induced. So, for instance, they are susceptible to significant drug-drug interactions. Compounds coming out of Phase II and III are often acidic and more readily excreted when in an ionized (positively charged) state so they can be transported into the urine as a salt. Supplying alkalizing minerals for the cells, plasma and urine can improve excretion. A highly acidic pH may cause toxic compounds to remain in the body longer. Alkaline-rich diets are detoxifying because they help pull compounds out as ionized acids into the urine for elimination. Moving towards an alkaline pH is desirable in a detox program. Diet is an essential aspect in regulating the expression of CYP genes for CYP450 enzymes that are, according to Jeffrey Bland, PhD, FACN, "biotransformation pathways that do much more than help the body eliminate foreign chemicals; they metabolize native substances that are essential for normal physiological function."<sup>7</sup>

The **liver** filters the blood; it removes foreign chemicals, excess hormones, waste products, and the like. The liver breaks down alcohol and metabolizes drugs. It plays a key role in the digestion of fats, proteins and carbohydrates and stores various vitamins, minerals and sugars. Dr. Bland explains: "When toxins can bypass the liver due to poor detoxification function, they can cause reactions to food that are not allergies, but are instead toxicities resulting from poor metabolism of secondary metabolites." This means adverse reactions to natural foods can develop as **intolerances** (not allergies which involve the immune system). To identify food intolerances—which should be done before an actual detoxification program—an elimination diet is suggested in which the most common or likely candidates are removed from the diet for three weeks. Then each food or beverage is added back, one at a time. If there is a reaction, reintroduction of any other food should be delayed for a couple of days. If there is no reaction, another food can be tried after one more day (skipping a day is helpful since some reactions may not be evident for up to 18 hours). Once the intolerances are determined, the detox program can begin, making sure those items are not consumed, at least not until the detox is completed and the digestive tract is healed. Also possible is increased intestinal permeability ("**leaky gut**") due to poor diet or toxin damage which impedes detoxification processes and allows toxins to easily pass through the intestinal lining and into the body where they can cause any number of symptoms and problems. Various foods and herbs help support and repair the intestinal tract such as pre- and probiotics, plant nutrients and fibers, L-glutamine, aloe vera, deglycyrrhizinated licorice root, and others.<sup>7</sup> The CYP450 detox system is present in **most** tissues of the body. For example, the key enzyme in the liver (CYP3A4) is also highly present in the intestinal mucosa; the proximal tubule in the kidneys has almost all the detox enzymes found in the liver; the CYP450 system is very active in the lining of the nasal passages. Also, the lymphatic system, including the lymph nodes, thymus gland, and spleen, is important in assisting the body to remove cellular wastes and toxins. Nutritional support to the thymus and spleen can be helpful. Drinking plenty of clean water helps to carry off impurities. Exercise including gentle movements to increase lymph flow, and activities such as brisk walking and swimming stimulate lymphatic flow. Probiotics aid the gut-associated lymphoid tissues and improves elimination.<sup>8</sup>

**What to do.** You should plan on investing three weeks for your program. During that time, it is imperative to properly **nourish** your body to ensure optimal detoxification. Nutrient-dense foods not only prevent malnutrition, but they also provide key nutrients and phytonutrients that support detoxification mechanisms. Considering the complexity and overlapping functions of the many facets of the detoxification system, single or isolated nutrients cannot provide all the beneficial effects that whole foods impart on the body's natural response to toxic exposures. This is also contrary to the concept of a rigid three-day water-and-lemon juice fast or days of only water or any other highly restrictive program. Instead, consuming a nutrient-dense, unadulterated, minimally-processed, non-genetically modified real whole food diet is

best. All over-processed, refined, denatured, chemical-additive-laden, concocted non-foods should be avoided. Addictions to items such as refined sugars, other refined carbohydrates, and caffeine have been established, so withdrawal—headaches, fatigue or other symptoms—may develop when they're stopped. It is usually best to wean off such items over the course of a week prior to starting a formal detox program. People's sensitivities and reactions to environmental contaminants varies, not only due to genetic differences and tendencies, but due to degree of exposure, health history, total toxic load, and so on. Effort should be made to avoid toxins—in foods (drug or pesticide residues, added chemicals, etc.), water (chlorine, fluoride, and other chemicals), unnecessary medications, personal care and cleaning products containing toxic chemicals, plastics leaching plasticizers, carpet and furniture emissions, air pollution, and so on. Medications themselves can sometimes cause depletion of nutrients needed to detoxify the drugs.<sup>9</sup>

Eat whole, organic foods. The fewer chemicals you take in from pesticides, other food contaminants, and chemical additives, the less your body has to detoxify. One of the best ways to activate detox enzymes and processes is through consuming various fresh **fruits** and **vegetables** which provide numerous phytonutrients. They can be consumed in unlimited amounts. Include an array of nutrient-dense, colorful, not canned, produce. Beets, beet greens, carrots, celery, parsley, tomatoes, peppers, dandelion greens, watercress, cilantro, spinach, lettuce (except iceberg), sweet potatoes, cherries, pomegranates, blueberries, raspberries, grapes, apples, and others provide a myriad of helpful components that support specific detox pathways. Even 'white' or light produce such as cauliflower, potatoes and celery provide helpful nutrients. Arugula, bok choy, Swiss chard, collard greens, kale, escarole, endive, chicory, mustard greens, parsley, turnip greens and other 'bitter greens' are all rich sources of vitamins, minerals, fibers, essential amino acids, omega-3 fatty acids, and other phytonutrients that provide numerous health benefits as well as assistance for the body's detox systems. Liver function is strengthened through foods such as beets and artichokes. Garlic, onions and other allium family vegetables contain phytonutrients that help drive and boost detoxification. Flavonoids (plant nutrients in citrus fruits, berries, greens, and other fruits and vegetables) increase activity of liver detoxification enzymes. Cruciferous vegetables (bok choy, broccoli, Brussels sprouts, kale, cauliflower, collard greens, etc.) support the sulfation detox pathway and upregulate Phase II. A beverage made from broccoli sprouts, for instance, was shown to enhance detoxification of airborne pollutants. Roughage (fiber) in vegetables, fruits, whole grains, and legumes help reduce absorption of and aid elimination of toxins through the digestive tract. Bile produced in the liver flushes toxins through the intestines; but without sufficient fiber to bind to the bile and excrete it, toxins may not be quickly or properly removed. Consume lots of raw as well as cooked produce. Soups or broths made of vegetables are easy to digest and enjoyable. **Herbs** and spices such as rosemary, cilantro, and turmeric stimulate the liver to make more detox enzymes. Other herbs that support detox mechanisms include gingerroot, cayenne pepper, red clover, and burdock root. Unpasteurized fermented vegetables (sauerkraut, kimchi, etc.) and other fermented foods (yogurt, kefir, tempeh, miso) aid in degrading toxins plus support intestinal health and function for proper elimination of toxins. Quality pre- and probiotic supplements also supply beneficial gut bacteria to help keep down toxins including those produced by 'sick' bacteria.<sup>10</sup>

The list of **nutrients** that have been found to aid natural detoxification continues to grow. A few are mentioned here. B vitamins and their associates (including thiamine, riboflavin, niacinamide, pyridoxine, and choline) are essential because all the detoxification pathways require them. Zinc, copper, magnesium, potassium, and other minerals support detox systems. Phytochemicals and 'antioxidants' in plant foods help to rid the body of byproducts created during detoxification. Cruciferous vegetables (kale, Brussels sprouts, cabbage, collards, cauliflower, broccoli, etc.) and smoothies made with whey protein concentrate can help increase glutathione levels. Glutathione is required for key Phase II detox processes. (It is produced by bodily cells from three amino acids—cysteine, glutamate and glycine. Raw fruits and vegetables are abundant in glutamate and glycine. Cysteine is found in meats, eggs, red peppers, garlic, onions, Brussels sprouts, oats, raw milk, whey protein and wheat germ. Whey protein increases the liver content of glutathione. Vitamin C complex and selenium from foods help the body produce and increase stores of glutathione.)<sup>10</sup> Grains can be eaten—buckwheat, millet, quinoa, brown rice, teff, amaranth, and oats only, up to a cup per day. Some legumes—lentils and split peas (properly soaked and cooked) also up to a cup per day—are usually fine. A few teaspoons of quality fats and oils (avocado; extra virgin olive oil; unrefined flax, coconut or sesame oils) and small amounts (a teaspoon or two) of raw seeds (ground flaxseed, chia, hemp, pumpkin, sesame, sunflower, and ground flaxseed) can be included daily. After 10 days or so, fish (salmon, halibut, mackerel, sea bass and other clean deep ocean types—not freshwater or farmed), lean beef and poultry (organic pasture-fed and free-range)—3 to 5 ounces cooked per day—can be added; no cured, smoked, or luncheon meats. Fermented milk products (yogurt, kefir,) can be partaken in **limited** amounts for **some** people after 10 days. Vegetable, chicken or beef broths can be used. Most culinary herbs, apple-cider or balsamic vinegar, and dried fruits (not sulfured) or mashed banana for sweetening may be included. Cellular mitochondrial energy production needs essential fatty acids (omega-6s and omega-3s), Coenzyme Q10, lipoic acid, magnesium, calcium, potassium, sodium, and vitamin B complex. Real whole foods like the above provide these and much more.<sup>11</sup>

Freshly-made **juice** is a concentrated source of nutrients—a superior supplement. It is also a rich source of enzymes that serve as catalysts for numerous processes including scavenging of debris and eliminating waste and toxins. **Smoothies**—tossing in some fruits and vegetables to emulsify along with a nutrient-dense supplemental powder—are an

excellent way to get more nutrients to support the detox processes. **Herbs** such as milk thistle and dandelion help reduce the effect of toxins in the liver, encourage regular bowel movements, reduce toxic accumulation and support regeneration of liver cells. One “purifying” herbal tea contains 1 teaspoon each of dandelion root, burdock root, gingerroot, fennel seed, nettle, and red clover with 3 cups of water, brought to a boil over medium heat, then immediately reducing heat, simmered (covered) over low heat for 15 minutes. Kelp has a very high mineral content, including iodine; its sodium alginates help remove toxic heavy metals and other environmental toxins including certain pesticides.<sup>12</sup> Cooking foods can affect nutrient production and availability. Some nutrients are very heat sensitive. Enzymes are also destroyed; they are vital to produce biochemicals needed in detoxification, repair and general health. Eat as many raw or lightly cooked fruits and vegetables as possible; other foods should be cooked at as low a temperature as practical.<sup>13</sup>

**Bentonite**, a natural volcanic clay that binds to (adsorbs) toxins and helps to pass them through the digestive tract, may be included. Bentonite contains montmorillonite (the primary mineral thought to be responsible for its beneficial qualities), magnesium and approximately 67 other trace minerals. The particles in the clay contain a negative charge which attracts toxins and pathogens including ‘sick’ bacteria and viruses, heavy metals, pesticides, and other toxins which have positive charges. Used properly, it will not adsorb or deplete nutrients from foods or beneficial flora.<sup>14</sup> Drink plenty of clean, filtered **water** to help flush out toxins through urine and sweat. Even mild dehydration can slow metabolism; a healthy metabolism is crucial for good detoxification. Bowels must be kept moving and bile must keep discharging properly from the liver. **Exercise** stimulates the release of toxins through perspiration and reduces fat reserves throughout the body where many toxins are stored. Saunas, steam rooms, and other ways to **perspire** help promote the release and exudation of pollutants through the skin. Sleep (at least seven hours a night) is restorative, giving the body rest time to heal and recharge.<sup>10, 11, 12</sup>

**What not to do. Avoid** alcohol; caffeine; tobacco; processed and refined nonfoods; any foods not listed above (some grains, most dairy, nuts, eggs, sugars, some meats and seafood, etc.); any foods for which there is an intolerance. A myriad of nutrients are needed, but excessive amounts of any one nutrient, as in high-potency supplements of isolated nutrients, can have a significant negative effect on your detox systems and cause biochemical imbalances.

**Maybe or maybe not.** Proponents of **fasting** maintain that when you don’t eat, the energy normally used for digestion will help heal the digestive tract, rejuvenate the body and facilitate toxin elimination. This concept has been hotly debated, yet most experts agree that a 24- to 72-hour fast is generally not harmful. During the initial 48 hours, the body subsists on stored fat, glycogen and protein extracted from lean muscle. By the third day, hormones become less active so lowered energy and fatigue can set in. Headaches (usually mild), lowered blood pressure, heart rhythm irregularities, irritability, and nausea may also be experienced. Insufficient fluid intake can cause dehydration. Fasting can be very hazardous for anyone with a chronic illness such as diabetes or liver or heart or kidney disease. Pregnant or lactating women and children should not fast. Past the third day of fasting, hunger pains and mild headaches may ease. During the first two or three days, rapid weight loss may take place, but most of the loss is fluid, not fat. As the fast continues, body fat is lost, but also considerable muscle (including heart muscle) and minerals, which can be very detrimental. The body goes into starvation mode and holds onto calories even for a time after the fast. Few people who lose weight by fasting maintain the loss once they start eating normally again.<sup>15</sup> Prolonged fasting can do more harm than good. Nutritionally, water fasts are no longer recommended because they don’t provide adequate nutrients to fuel detoxification enzymes and the organs and tissues involved in detoxification. Nutrients are depleted and metabolism is slowed. Toxins can be recirculated into the body. Repair processes and general health are affected. Any plan based on severe deprivation (such as eating only grapes or grapefruit or liver or subsisting on lemon juice and water) for more than a few days can disrupt the biochemistry, cause multiple nutrient deficits, and reduce energy and stamina. Nutrient deficiencies can interfere with detoxification and deprive healthy gut bacteria of their needed ‘foods.’ The initial rapid weight loss experienced with drastic calorie reduction may increase the risk of gallstones, dehydration, low blood sugar, and electrolyte imbalances. So far, no science shows that fasting or subsisting on meager liquids for any amount of time will get rid of a substantial amount of toxins.<sup>16</sup>

Some research suggests positive results from **intermittent** fasting. This can take on many forms including skipping a few meals during the week, severe restriction in daily caloric intake, or completely avoiding food for up to 24 hours during a specified period of time. Some benefits have been suggested such as weight loss, improved glucose metabolism, better cognitive health, and perhaps prolonged life. But other studies find that intermittent fasting may not be so promising. Excessive caloric restriction can lead to extreme loss of body fat and decline in sex-related steroids which may cause menstrual irregularities, osteoporosis development, loss of sexual desire, and the like. In a lab study, rats subjected to intermittent fasting developed stiffened heart tissue which impaired the heart’s ability to pump blood effectively. Some studies indicate that eating regularly throughout the day may be a better weight loss strategy; it tends to reduce overall food intake and boost metabolism. In a 2013 randomized trial, people who fasted every other day lost about the same amount of weight over two months as those who did **not** fast and ate a ‘standard diet.’ Fasting could also mask eating disorders or trigger unhealthy habits such as preoccupation with food or poor body image. People with diabetes can experience hypoglycemia. So intermittent fasting may not be the best or safest diet for everyone.<sup>15</sup> Most research on intermittent fasting has been performed with lab animals. Rodents and monkeys appear to be healthier and experience

cardiovascular benefits when fed only every other day. This may not apply to humans. So it is still not known if intermittent fasting truly provides benefits. An **alternative**, also referred to as intermittent fasting, is to avoid eating for 11 or 12 hours during each 24-hour period. For example, if you stopped eating at 7 PM, you would not eat again until 7 AM the next morning. Fasting, however, is not necessary for detoxification or for health protection. It is safer to eat some foods. <sup>16</sup>

**Colonics** or **enemas** can facilitate detoxification, but if performed too frequently, they also flush healthy bacteria and other important microorganisms from the intestines. This can undermine proper digestion, excretion of wastes, immune function and many other beneficial effects of the microbiome. When administered too often, laxatives and enemas might prevent normal bowel movements or lead to potentially unsafe depletion of electrolytes and many nutrients. Coffee enemas have a good reputation for aiding the liver in Phase I and II detoxification and to flush out toxins through the bile; but they should be done properly and for a limited time. Colonics can cause complications including accidental punctures made during the procedure and introduction of 'sick' bacteria into the colon. Although some people benefit from the process, supporting the body's own capacity to clean the colon is probably better. Unpasteurized fermented foods and quality pre- and probiotics are among the natural products that can support the health and function of the colon. <sup>17</sup>

If an individual has a health condition (diabetes; heart, kidney, or liver disease, etc.) and wants to do a reasonable detox program, it should be performed under the guidance of a knowledgeable health care provider. Despite wanting a quick fix which doesn't happen, the best and safest detox takes a while and ultimately involves a consistent lifestyle. This means supporting your body's natural detoxifying systems by committing to a real natural food diet and food supplements, exercising regularly, and reducing your exposure to harmful chemicals. You will reduce fat, boost energy, support repair processes, avoid many health problems, and lessen your body's toxic burden.

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