



Doctors' Choice N U T R I T I O N

The Role of Detoxification in Chronic Illnesses:

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In today's world of exceptional technology and medical breakthroughs, why is it that such a large percentage of our population continue to suffer from chronic illnesses?

Since 1976, the Environmental Protection Agency (EPA) in the United States has been conducting the National Human Adipose Tissue Survey (NHATS). The study measures adipose/fat samples from all regions of the country and measures the level of toxins present.

In 1982, they expanded the list to look for the presence of 54 environmental chemical toxins. The level of toxins found in these adipose tissue samples were as follows:

- 100% of the sample population showed 5 of the toxins
- 91-98% of the sample population showed 9 of the chemicals including:
 - benzene, toluene, chlorobenzene, ethylbenzene, DDE & Dioxins.
- 83% of the sample population showed positive for PCBs (highly toxic to the immune system)
- 76% of the sample had a total of 20 toxic compounds

With the above statistics in mind, we are beyond wondering whether we have been exposed to toxic xenobiotic compounds, but rather how much is being stored in our body and what role they play in our health.

Xenobiotics and foreign chemicals cause illness either by its direct toxic effects or their toxic intermediates formed during the body's detoxification process. Furthermore, toxic compounds that are not completely eliminated may be reabsorbed into circulation for further detoxification by the liver resulting in increased free radical production that results in cellular damage.

Essentially, endogenous and exogenous toxic chemicals from widespread environmental contamination leaves us with increased rates of illnesses ranging from toxin-related cancers, neurological diseases, autoimmunity, allergies, Chronic Fatigue Syndrome and fibromyalgia.

The correlation between chronic illness and environmental toxicity is so prevalent that in my clinical practice, I often begin treatment protocols with strategies that include the avoidance of further toxic exposure, vitamin/mineral supplementation to replace nutrient deficiencies and last but not least, detoxification to support the individual in reducing body stores of toxins.

Reducing further toxic exposure may include avoiding inhalation of new paint fumes, avoiding new carpeting, dry cleaning establishments, tobacco smoke, gasoline & diesel fumes, exhaust and silver amalgam fillings which contain trace amounts of mercury.

In addition to the above, I advocate the consumption of organic fruits/vegetables and free-range meats as much as possible. In general, foods that contain a high content of pesticide residue include beef, peaches, grapes (Chile), cantaloupe (Mexico), cucumbers, spinach, celery, strawberries, apples, pears, bell peppers, apricots, cherries (USA) and green beans.

While the avoidance of herbicide and pesticide residues on foods is an obvious choice, many are not conscious about the role of nutrition the detoxification pathways of our body. Nutritional status including micronutrient

deficiencies and imbalanced macronutrient status affects our body's ability to deal with the daily onslaught of toxic chemicals.

Toxins are broken down in the liver, kidney, and intestines; they are eliminated via the lymphatic system, through fecal matter, urine, skin, and respiration. If the organs of elimination are not functioning at its optimum, toxins are re-circulated in our body via blood and lymph, causing cellular destruction, and eventually accumulation in various organs and body tissues (ie. Fat stores are high in toxins while cadmium is stored in the kidney and lead in the bone).

When toxins enter the body, they go through 2 detoxification pathways in the liver. In very simplified terms, the first pathway (Phase I) breaks toxic compounds into intermediate compounds. A consequence of this biotransformation is the increase in oxidative stress and free radical formation (therefore, it can be more toxic than the original compound). This phase involves the process of oxidation, reduction, or hydrolysis (via Cytochrome P450 isoenzymes) where toxic molecules are exposed to functional groups to allow the second phase of detoxification to occur.

The second pathway (Phase II) is where the intermediate compounds are rendered more water soluble so as to be excreted through the kidney in the form of urine and bile in the form of feces. This process involves various chemical reactions such as glucuronidation, amino acid conjugation, sulfation, glutathione conjugation, acetylation and methylation. The more effective Phase II is at removing the biotransformed products, the less tissue damage will occur.

Problems with either of these phases of detoxification result in toxic substances being re-circulated in our body, and stored in the brain, bone, fat, and organs.

In order to facilitate the detoxification pathways, adequate nutritional intake of protein, carbohydrate and fats is essential with concomitant supplementation of vitamins and minerals.

For example, complex carbohydrates (ie. pectin) facilitate the Cytochrome P450 isoenzymes during Phase I of the detoxification pathway in the liver while long-term dietary protein deficiency decreases Phase II conjugation reactions. Dietary intake of saturated fats promotes the uptake and storage of numerous carcinogens while polyunsaturated fats like Omega 3 essential fatty acids are protective against chemical carcinogens.

Aside from the three basic food groups, we need to also realize that numerous vitamins essential for the body's systemic processes are depleted in the face of toxins. For example, vitamin B1 (Thiamine), which is used in Phase II of liver detoxification and is needed to restore oxidized glutathione and lipoic acid (both potent antioxidants), is often deficient in the presence of chlorinated pesticides and formaldehyde (2 common toxins). Furthermore, a deficiency of Thiamine increases the toxicity of chlorinated pesticides, PCBs & aniline dyes.

Vitamins and minerals are also essential in facilitating both phases of liver detoxification. For example, Phase I of liver detoxification requires copper, zinc, magnesium and vitamin C while Phase II of liver detoxification requires glutathione, glycine, cysteine, methionine, molybdenum, acetyl Co-A and vitamin B6.

While these vitamins and minerals can be attained from supplements, you can also do your part to support the process of detoxification by eating foods rich in natural sulphur (i.e. onions, garlic, free range eggs, and cruciferous vegetables such as broccoli, brussel sprouts, cauliflower and cabbage), increasing your intake of essential fatty acids which have anti-inflammatory properties and repair cellular membrane (i.e. freshly ground flaxseed, avocados, raw nuts and seeds, cold pressed vegetable and seed oils, cold water fish such as salmon, halibut, and tuna) and lastly, avoid chemically processed foods and additives as well as saturated fats which cause additional burden to an already compromised individual.

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