



ACUPUNCTURE & ACUPRESSURE

Environmental Toxins: Cause of Modern Illness, Part 2

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In Part I of this article, we detailed the variety of environmental toxins assaulting our bodies. These include pesticides and herbicides (glyphosate); plastics (polychlorinated biphenyls, bisphenol A, phthalates, polyvinyl chloride); preservatives (parabens, formaldehyde, formic acid); cosmetics; gasoline additives, solvents and glues (benzene, toluene); and heavy metals (principally mercury and lead). In that article, we talked about the health consequences of accumulating toxins. Here, we will examine some of the available diagnostic labs, and then go on to detail Chinese herbal formulas and nutritional supplements that can neutralize environmental toxin overload.

Lab Testing For Environmental Toxins

Heavy metal testing can be done by several different methods. Hair or urine testing is available. Lab values for heavy metals in a urine sample reflect inorganic mercury, basically that from dental amalgams. Analysis from hair shows organic mercury, the kind found in fish.

Treatment with Chinese Herbal Formulas

Chemicals cause inflammation to the liver and the heat leads to stagnation. Stagnation of liver *qi* and blood inhibits detoxification. In functional medicine, detoxification of the liver involves supplying chemical intermediaries to regulate Phase I and Phase II detoxification, which I describe below.

In Chinese medicine, moving liver *qi* and blood regulates detoxification. If *qi* and blood can flow normally, the liver cells can easily accomplish their enzymatic activity to detox the blood without added nutrients (as long as there is adequate dietary intake of the necessary nutrients). If the movement of *qi* and blood is inhibited, liver cell function, including the secretion of detoxifying

enzymes, is inhibited. If the liver can keep *qi* and blood moving, liver cells will function normally. The question for the TCM herbalist is to determine what is inhibiting normal liver function.



As a foundation, herbs are necessary to move liver *qi* and blood. These can be as simple as a two-herb combination such as combining *chai hu* (*Radix Bupleuri*) and *bai shao* (*Radix Paeoniae Alba*). Other useful herbs to move liver *qi* include *xiang fu* (*Rhizoma Cyperi*) and *chuan lian zi* (*Fructus Meliae Toosendan*). Useful herbs to move liver blood include *dan shen* (*Radix/Rhiz. Salviae Miltiorrhizae*), *yu jin* (*Radix Curcumae*) and *chuan xiong* (*Rhizoma Ligustici Chuanxiong*).

We need to assume that heat is being created in the liver due to chemically induced inflammation. *Huang qin* (*Radix Scutellariae*) is often effective alone or could be reinforced with *zhi zi* (*Fructus Gardeniae*). Next, liver yin and liver blood should be reinforced. Inflammation due to liver toxicity destroys liver cells and using blood and yin herbs is necessary to regenerate them. Combining *dang*

gui (Radix Angelicae Sinensis) and gou qi zi (Fructus Lycii) accomplishes this.

In known liver cell damage, mai men dong (Radix Ophiopogonis) can be added. Finally, the movement of liver *qi* requires sufficient spleen *qi*, and adding bai zhu (Rhizoma Atractylodis Macrocephalae) is helpful.

I use the following formula for liver detoxification, using xiao chai hu tang as a foundation. It can be used for liver regulation in general, as well as liver detoxification: bai zhu (Rhizoma Atractylodis Macrocephalae) 9g, dang gui (Radix Angelicae Sinensis) 11g, gou qi zi (Fructus Lycii) 9g, bai shao (Radix Paeoniae Alba) 9g, mai men dong (Radix Ophiopogonis) 8g, chai hu (Radix Bupleuri) 11g, ban xia (Rhizoma Pinelliae) 8g, huang qin (Radix Scutellariae) 9g, zhi ke (Fructus Aurantii) 9g, chuan lian zi (Fructus Meliae Toosendan) 9g, chuan xiong (Rhizoma Ligustici Chuanxiong) 8g.

Existing Chinese herbal formulas can also be used for liver detoxification. (For formula details, see my new book, *Essential Chinese Formulas*). Chai Hu Shu Gan Wan addresses stasis of liver *qi* and blood, without addressing any deficiency of *qi*, yin or blood. For liver stasis with spleen deficiency, use Xiao Chai Hu Tang. For liver stasis with blood deficiency, use Xiao Yao San. For liver fire, use Long Dan Xie Gan Tang. For liver blood stasis, use Ge Xia Zhu Yu Tang. For liver stasis inhibiting the descent of stomach *qi*, with signs of nausea or abdominal fullness, use the patent medicine Shu Gan Wan. For liver yin deficiency, use Yi Guan Jian. (This formula is effective when liver cells need to be regenerated.)

By normalizing the liver, the lymphatics and the interstitial fluids all become regulated and a general detoxification can proceed. Sometimes, the kidney is working suboptimally and in these cases the use of Wu Ling San or Fang Ji Huang Qi Tang can be helpful to flush out toxins.

The Physiology of Liver Detoxification

The liver detoxifies in two stages, whether they are endogenous metabolites produced in the body (hormones, cellular toxins, etc), or exogenous environmental toxins. In Phase I, ten families of enzymes are produced, the most predominant being Cytochrome 450. By combining with oxygen, these convert toxins into an intermediary form that can be further detoxed in Phase 2. The forms produced in Phase 1 are very toxic and also produced large amounts of damaging oxygen radicals. The amino acid Glutathione is the main antioxidant to neutralize the free radicals in Phase I.

In Phase II, toxic compounds from Phase I are "conjugated" with water-soluble enzymes. These either directly neutralize toxins, or facilitate excretion in the urine, sweat and bile. There are six major pathways of Phase II detoxification, all requiring specific nutritional components.

The first is Glutathione conjugation, which is created from three amino acids - glycine, cysteine and glutamic acid. Low amounts of glutathione can be due to dietary deficiencies or from chronic free radical exposure found in chronic infections, inflammation in the intestines (Leaky Gut Syndrome), cancer and over exposure to toxins including smoking. Besides its component amino acids, glutathione production is also dependent on magnesium, potassium, B6, folic acid and manganese. In cortisol stress, potassium levels drop; in exposure to toxic metals or prolonged inflammation, B6 sources are depleted. Both deficiencies can aggravate glutathione production. Other necessary nutrients are Vitamin C, copper, zinc and selenium.

The second is Acetylation, which is a conjugation process using acetyl-Coenzyme A (CoA). It is

dependent on pantothenic acid (B5), thiamin (B1) and Vitamin C.

The third is Methylation, which conjugates methyl groups from Phase I end products. This is a complicated process requiring methionine (a sulfur containing amino acid), Vitamins C, E, B6, B12, choline, magnesium and folic acid.

The fourth is Sulfation, which conjugates end products of Phase I with sulfur-containing compounds. It is the main detox pathway for neurotransmitters, toxins, steroids and protein based hormones. The nutrients required are sulfur amino acids (cysteine, taurine and methionine), whose source are animal foods, nuts and beans. Molybdenum is required for absorption through the gut lining and compromises to gut wall integrity inhibit absorption.

The fifth pathway is Glucuronidation, which conjugates toxins with glucuronic acid. This requires B vitamins, magnesium and glycine. The final pathway is Bile Excretion, which is required to remove toxins from the liver into the small intestine. Congested bile, due to liver or gallbladder heat, can inhibit this pathway.

Most people perform Phase I adequately, but if there is interference with any of the Phase II pathways, toxic reactions manifest due to the enhanced toxicity of the Phase I metabolites. These are the patients who complain of chemical sensitivity, with reactions to perfume, detergents and cigarette smoke.

Nutritional Support for Liver Detoxification

In the main, the patient needs adequate amounts of glutathione and its precursors to facilitate healthy liver detoxification. Glutathione is not absorbed very efficiently through the gut. Many believe that supplying N-acetyl Cysteine is the best strategy for creating glutathione, although there is controversy as to the amount needed. Dr. Marty Hinz at NeuroResearch, makes a good argument for the need of 4 grams of cysteine a day, but this amount can produce nausea or epigastric pain in some patients; taking with food helps. Other nutritional agents used in liver detoxification include lipoic acid, an important antioxidant, and Crucera compounds (sulforaphane glucosinolate), which aids detoxification of environmental chemicals.

In my clinical practice, I will combine nutrient detoxifying agents with Chinese herbal formulas and acupuncture. The combination helps to keep liver and kidney functioning as best as possible in an overly toxic environment. It is impossible to keep air, food and water toxins out of our bodies altogether, but it is helpful to eat organic vegetables, fruits and animal proteins that provide the nutritional components necessary for natural detoxification.

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