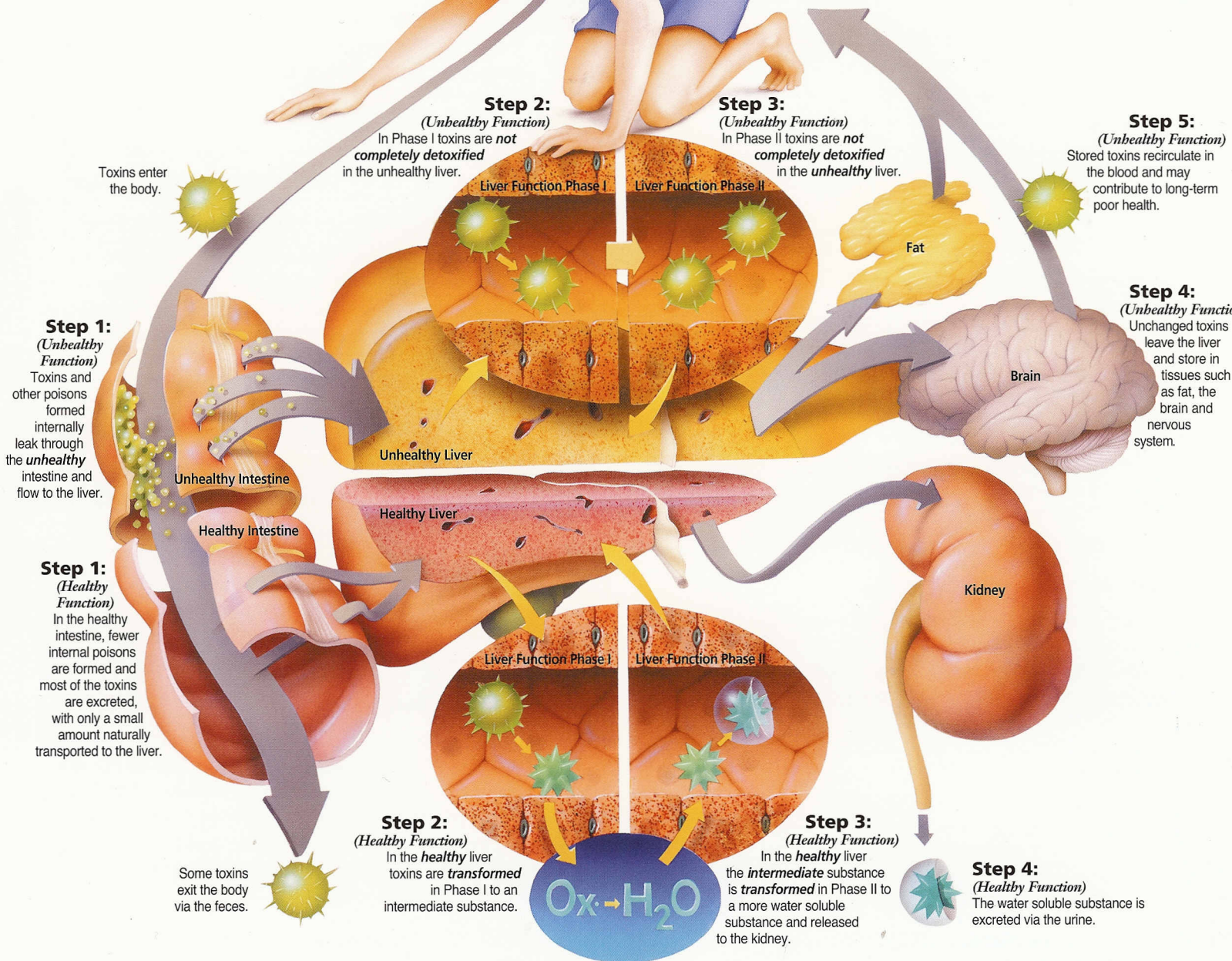


# DETOXIFICATION



Toxins enter the body.

**Step 1: (Unhealthy Function)**  
Toxins and other poisons formed internally leak through the *unhealthy* intestine and flow to the liver.

**Step 1: (Healthy Function)**  
In the healthy intestine, fewer internal poisons are formed and most of the toxins are excreted, with only a small amount naturally transported to the liver.

Unhealthy Intestine  
Healthy Intestine

**Step 2: (Unhealthy Function)**  
In Phase I toxins are *not completely detoxified* in the unhealthy liver.

**Step 3: (Unhealthy Function)**  
In Phase II toxins are *not completely detoxified* in the *unhealthy* liver.

Liver Function Phase I    Liver Function Phase II

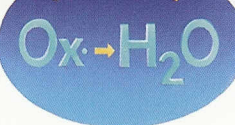
Unhealthy Liver

Healthy Liver

Liver-Function Phase I    Liver-Function Phase II

**Step 2: (Healthy Function)**  
In the *healthy* liver toxins are *transformed* in Phase I to an intermediate substance.

**Step 3: (Healthy Function)**  
In the *healthy* liver the *intermediate* substance is *transformed* in Phase II to a more water soluble substance and released to the kidney.



**Step 5: (Unhealthy Function)**  
Stored toxins recirculate in the blood and may contribute to long-term poor health.

**Step 4: (Unhealthy Function)**  
Unchanged toxins leave the liver and store in tissues such as fat, the brain and nervous system.

**Step 4: (Healthy Function)**  
The water soluble substance is excreted via the urine.

Fat

Brain

Kidney

Some toxins exit the body via the feces.

**Step 2-A: (Healthy Function)**

Harmful free radicals (OX<sup>-</sup>) are formed as a result of Phase I activity, but are *transformed* to harmless water (H<sub>2</sub>O) by antioxidant nutrients.

# DETOXIFICATION

## Toxicity is a Major Problem

Did you know that in the year 2001 alone, more than 6 billion pounds of chemical pollutants were released into the environment? Over the course of a lifetime, we will be exposed to thousands of foreign compounds that can enter our bodies through the food we eat, the air we breathe, and directly through our skin. To make matters worse, many of us have substituted healthy meals with a poor diet that significantly lacks nutritional value to fuel the body's detoxifying capacity. All of these factors can contribute to an accumulation of toxins, or *toxicity*.

## Where Do Toxins Come From?

Toxins can derive from chemical pollutants, heavy metals, pesticides, drugs, alcohol, active/passive cigarette smoking, and food additives. However, toxins can also come from normal metabolism and intestinal build-up of unhealthy bacteria within your own body.

## How Toxicity Can Affect Your Health

A number of symptoms and conditions have been associated with possible toxic exposures and toxicity, including:

- Migraine headache
- Fibromyalgia
- Generalized arthralgias
- Chemical sensitivity
- Chronic fatigue syndrome

## You Can Reduce Your Risk for Toxicity

Listed below are some practical suggestions to help lower your exposure to toxins.

To minimize toxins in the diet:

- Avoid foods high in fat, additives, and preservatives
- Eat organically grown vegetables, fruits, and grains
- Drink plenty of water

To minimize toxins in the environment:

- Use an effective air purification system
- Wear protective clothing and/or apparatus when working with toxic materials
- Replace furnace and air conditioning filters regularly

## Your Body Can Remove Toxins

The term *detoxification* refers to our body's natural ability to transfer and eliminate toxins. The illustrations on the front side of this information sheet outlines the body's natural detoxification steps and helps us understand how to best strengthen and support this protective mechanism.

## Detoxification of Stored Toxins Involves 3 Stages

Only substances that are easily dissolved in water, or *water-soluble*, can be effectively excreted from the body. Toxic compounds, however, are typically stored as fatty molecules and, therefore, do not mix well in water. The detoxification process transforms these toxic, fat-soluble substances into harmless, water-soluble molecules which can then be excreted out of the body.

Detoxification systems in the body can be summarized in 3 phases:

### Liver Function Phase I:

- Fat-soluble toxins are transformed into intermediate compounds which can be more reactive, but bind more easily to non-toxic, water-soluble molecules in Phase II

### Liver Function Phase II:

- Formation between the reactive intermediates and water-soluble molecules make the entire compound harmless and ready for excretion out of the body
- Without enough supportive Phase II substances, the reactive intermediates can attack healthy tissues and may cause damage

### Excretion:

- Neutralized toxins, now made water-soluble, are removed from the body in urine via the kidneys or in bile/feces through the intestines

## Prolonged Fasting May Do More Harm Than Good

Because the detoxification process needs a lot of energy, fasting with water or juice has been shown to be both ineffective and even dangerous. In fact, prolonged fasting may weaken muscles and other organs, eliminating the essential nutrients required for healthy detoxification rather than toxins.

## There is Nutritional Support for Detoxification

Studies have shown that the overall detoxification process is heavily nutrient-dependent, whereby key steps are fueled by vitamins, minerals, and other major food components.

Here are a few nutrients that may help maintain and improve detoxification:

- Zinc, pantothenic acid, and beneficial probiotics
- Vitamins A, B<sub>3</sub>, B<sub>6</sub>, B<sub>12</sub>, C, E, beta-carotene, and folates
- Amino acids L-cysteine, L-glutamine, and taurine
- N-acetylcysteine, sodium sulfate, and L-glutathione
- Green tea catechins
- Low-allergy-potential protein/carbohydrates

## Healthy Detoxification Requires Healthy Nutrients

Without optimal detoxification, your body will not efficiently remove harmful toxins. Your kidneys play a major role during the final step of detoxification by excreting transformed toxic compounds in urine. An alkaline pH level may be an important consideration for proper kidney function. Therefore, a focused, high-impact, low-allergy-potential nutritional support program to promote an alkaline pH level and improve detoxification capacity may be helpful.