

# Revised Protocol for Detoxifying Your Body from Mercury Exposure

By Dr. Mercola

It is likely you are accumulating mercury and other heavy metals at a disturbing rate. This is occurring at a time when your body is already bombarded with multiple chemical assaults, making it harder to keep its natural detoxification system working smoothly and efficiently.

The two primary sources of mercury exposure are dental amalgams (mercury-based fillings) and seafood consumption, followed by thimerosal-containing vaccines and mercury pollution from coal-burning power plants.

Other significant environmental offenders are chlor-alkali plants (which make products like chlorine bleach and PVC), trash incinerators, cement kilns, and gold mining<sup>1</sup>. These industries are loading our environment with inorganic forms of mercury that are then converted in the soil and water to a type of mercury called *methylmercury (MeHg)* — which then accumulates in the [fish](#) you eat.

Dental amalgams are comprised of 50 percent *elemental mercury*. This form of mercury evaporates from the surface of the amalgam and is inhaled, absorbed into the blood, and then converted to inorganic mercury, the most toxic form of mercury to cells. Inorganic mercury builds up far more in your organs of elimination — it's 100 times as high in your kidneys and liver than in your brain. But when it does make its way into your brain, it's far more damaging than any other form.

Dr. Christopher Shade, a mercury and glutathione expert from the University of Illinois, explains how your body's natural heavy metal detoxification system works. It's a lengthy lecture — about three hours. But if you truly want an in-depth understanding of this topic, he gives an excellent presentation of the latest science about the human biochemistry of mercury. I also previously interviewed Dr. Shade about mercury detoxification, which you can listen to here:

[http://www.youtube.com/watch?v=umN\\_fXKKjxM](http://www.youtube.com/watch?v=umN_fXKKjxM) | [Download Interview Transcript](#)

## Mercury Marches into Your Body and Takes Prisoners

Mercury's toxicity is related to inappropriate binding — it's never a “free agent.” Instead, mercury is always paired with a ligand, a molecule or group of molecules that binds to other molecules to form a larger complex. Mercury's favorite ligand is sulfur, especially a reduced form called a thiol. Thiols are found throughout your body for example, cysteine and the super-antioxidant [glutathione](#). [Enzymes](#) use beneficial metals for their activity and hold those metals in place with thiol groups.

But mercury has a far higher affinity for the thiols than do beneficial metals like zinc. How much greater?

In the case of zinc, *a billion times!* This means mercury fiercely grabs onto these groups and refuses to let go, depriving you of the good metals and stopping your normal biological processes in their tracks. Mercury will also grab onto cell membranes, which leads to shattering of the membranes, vascular leakage, and subsequent “spackling” of the damage with cholesterol.

## **A Two-Headed Dragon: Toxicity and Inflammation**

It’s an interesting fact that some people with high mercury exposure don’t become toxic, yet others with relatively low exposure do. Why is this? Why does one person get really sick from her amalgams while another is perfectly fine?

The difference lies in your ability to detoxify naturally. You already have a system in place for removing mercury and other heavy metals from your body. Mercury’s half-life can range from 40 to 120 days, and the faster you can clear it out, the less you’ll be affected.

It’s important to realize that people are either slow detoxifiers or fast detoxifiers, and a small genetic subset are *super slow* detoxifiers. If you are in the super slow group, your detox system is significantly impaired and the result can be mercury overload. How quickly you detoxify on your own depends on a several factors, such as your exposure level, genetic makeup, genetic expression, and overall health. For example, if your progesterone levels are low, you can’t detoxify as well, and unfortunately, decreased progesterone levels are common today.

Additionally, people who are hypersensitive to metals will have toxic effects at much lower levels than other people. When it comes to the buildup of heavy metals in your body, the news is all bad. Heavy metal toxicity produces a wide range of adverse biological effects.<sup>2</sup>

Your brain is a primary target for heavy metals, which results in many neurological symptoms, including depression and anxiety, irritability and memory loss. Mercury overload can even lead to major neurological conditions like [Alzheimer’s or Parkinson’s disease](#).

Heavy metals also target your kidneys, liver, heart, pituitary and thyroid glands, and increase your risk for developing [type 2 diabetes](#). In fact, a mercury detoxification protocol can significantly improve insulin sensitivity and metabolic syndrome. Mercury, especially from dental amalgams, can accumulate heavily in your digestive tract where it attaches to your gut epithelium.

## **Amalgams BATHE Your Brain and Digestive Tract in Mercury**

Besides creating a significant [environmental burden](#), the biological damage from [amalgams](#) is two-fold. Mercury vapor emitted from amalgams passes readily through your cell membranes, across your blood-brain barrier, and into your central nervous system where it causes immunological, neurological, and psychological problems.

At the same time, mercury is leaching into your saliva and being *swallowed*, making its way down your digestive tract where it causes inflammation and damages your immune system — because the frontline of your [immune system](#) is in *your gut*. This blocks one of your body's major detoxification pathways: passage out of your GI tract.

Additionally, mercury shuts off the ability of your liver and kidneys to move mercury into your gut for elimination. So, if you have amalgams in your mouth, you are bathing your digestive tract AND your brain in mercury every day, poisoning your brain while at the same time blocking its route out of the body... the perfect recipe for mercury poisoning.

How do you know if mercury toxicity is a problem for you? Well, if you have a mouthful of amalgams and a laundry list of health challenges, chances are mercury is a factor. According to Dr. Shade, there is *2,000 times* more mercury coating the inside of the mouth (and thus the whole GI tract) of people who have amalgams than in those who don't. The only way to know for sure whether you are accumulating mercury is to have yourself tested. But before you do this, there are some important items you need to know.

## What You Need to Know about Mercury Testing

Traditional mercury testing involves testing either your hair, blood, urine, or stool. Challenge tests that implement a chelating chemical, such as DMPS or DMSA, are also commonly used. However, all of these tests have drawbacks. They primarily measure total mercury load — and inaccurately at that. But most importantly they don't give you any information about the forms of mercury in your system or how efficiently you are getting rid of them.

Traditional mercury tests don't answer questions like, how much of your mercury load is from the seafood you eat? How much from amalgams? How well are your kidneys and liver eliminating it?

The two principal forms of mercury accumulate differently in your body, and are eliminated by different pathways. For example, mercury levels in your hair only reflect the mercury from the fish you eat. But mercury levels in your urine reflect the mercury coming from your dental fillings (plus some of the fish-based methylmercury that has broken down into inorganic mercury). The only way to determine if there is a problem is to compare your hair and urine levels with levels in your blood. So, if mercury testing is to be meaningful, it must measure both of the following:

1. **Exposure level:** Overall mercury level for each of the two main forms of mercury (*methylmercury*, related to your fish/seafood consumption, and *inorganic mercury*, related to dental amalgam exposure)
2. **Excretion ability:** How well your body is getting rid of each kind of mercury, regardless of your overall mercury level

A newer testing method called “mercury speciation” does just this — it measures both of these factors. This test uses blood, urine and hair to give you a more comprehensive picture of how your body is eliminating mercury and where the process may be blocked. This information can

be immensely helpful in preparing a successful detoxification plan. For more information about [mercury speciation testing](#), refer to my recent interview with Dr. Shade.

## Your Body's Natural Detoxification System: The Glutathione Machine

Toxicity is not just the level of a toxin — it's your body's *response* to a toxin, which depends on the strength of your natural detoxification system. Many people don't understand that your body comes with its own built-in detoxification system. It's a common myth that once you ingest mercury, it stays in your body forever.

Your body has a system to efficiently remove mercury and other heavy metals, *as long as your detoxification system is working properly*. The problem is, many of you have one that's broken, and one of the principal causes is inflammation. Your genetic makeup is another factor. As Dr. Shade says:

*“Your genes load the gun, and the environment pulls the trigger.”*

The glutathione “supersystem” is your body's main detoxification system. Glutathione binds to heavy metals, but it doesn't do it alone — it requires the assistance of enzymes, antioxidants, and transport proteins.

Old age, impaired genetics, poor diet, and toxic exposures of all kinds — aflatoxin, chloroform, DDT, organic nitrates, radiation, and others — impair your glutathione system. Some people try to supplement with glutathione or its precursors and expect the system to jump up to speed but for the most part this doesn't work very well as typically this is done orally with non-liposomal forms or done with IV glutathione, which is very expensive, inconvenient, and only marginally more effective. A far more effective strategy is to upregulate the expression of the genes that produce the enzymes and transport proteins that assist glutathione in doing its job.

Efficient detoxification depends on a series of seamless reactions that bind toxins to shuttle molecules and “escort” them out through a series of doors. Specifically, in order for your glutathione detoxification system to operate well, it requires the following three elements. If you have a shortage of *any one* of these three key elements, your cells lose their resistance to mercury, so it can accumulate and make you sick:

1. **Glutathione in your cells:** Your body has to manufacture most of its own glutathione (biosynthesis), so it needs adequate building blocks
2. **Glutathione s-transferase (GST):** An enzyme responsible for prying the mercury OFF the cellular proteins, then linking it TO the glutathione in the cell
3. **Transport proteins:** A series of transport proteins (multi drug resistant proteins, or MRPs) are responsible for getting the conjugated mercury out of your cells and into your blood, as well as from your blood into your liver and small intestine, and into other places so it can be eliminated

## Before You Do Anything Else, Optimize Your Diet

As with nearly every other health challenge, your [diet](#) is a critical factor in supporting your body's detoxification system. In fact, consider dietary optimization the “pretoxication” phase, which should last for two to six weeks before starting the full detoxification phase.

Your goal is to remove inflammatory and allergenic foods such as sugar (especially [fructose](#)/HFCS), processed and packaged foods, fast foods, most starch and grain. Your diet should be low in carbohydrates, moderate-to-low in protein, and high in beneficial fats (as high as 50-70 percent). Proteins repair mangled protein molecules and supply sulfur, and fats repair your cell membranes. This type of diet not only prepares your body for detoxification but also has the additional benefit of improving your insulin sensitivity and reversing type 2 diabetes.

### Overall CAUTION

It is important to realize that mercury detoxification is a marathon and NOT a sprint. You do NOT want to do this quickly. Even if you believe you are healthy you want to start this process SLOWLY as you could easily cause severe flare ups. I am one of the healthiest people I know and when I did my program I did it over six months. Some people may need to do it far more slowly and may need a few years to effectively eliminate the mercury safely.

### Your Most Important Goal: Removing the Source of Exposure

Now that you understand what's required to eliminate mercury, we can start discussing how to support and augment your body's natural detoxification apparatus. That is really what “mercury detoxification” is all about — simply helping your own natural detox system to function better. In other words, you must “upregulate” this system.

The very first goal is to plug the hole in your leaking ship. You must remove your source of mercury exposure, whether it's primarily from the seafood you eat or from amalgams (or both). Mercury speciation testing, as described above, can help you identify which source is problematic. There is little point in embarking on a major detox mission if you continue exposing yourself to the offender... that's like trying to bail water out of a sinking boat. Avoid the consumption of contaminated fish and seafood. Most [fish](#) and seafood are now contaminated, unfortunately, but some types are worse than others. Avoiding fish is relatively easy, but having your amalgams removed is more involved and costly and must be done with great care. You should do this ONLY with the help of a qualified biological dentist as you can become quite ill if your amalgams are extracted incorrectly.

However, if you have a mouthful of amalgams it is no mystery that you have exposure that ideally needs to be addressed. Just be very careful about jumping from the frying pan into the fire and have your mercury amalgam fillings removed by a non-biological dentist like I did. That mistake caused very serious damage to my kidneys that still troubles me 20 years later. You can find a trained and qualified dentist from the following list:

- [International Academy of Oral Medicine & Toxicology \(IAOMT\)](#)

- [International Academy of Biological Dentistry and Medicine \(IABDM\)](#)
- [ToxicTeeth.org](#)
- [Holistic Dental Association](#)
- [Dental Amalgam Mercury Solutions \(DAMS\)](#)
- [Huggins Applied Healing](#)

## I. Boosting Your Glutathione Production

The first requirement for effective mercury detoxification is boosting your glutathione levels. Most forms of oral glutathione are not effective because they are destroyed in the digestive process. But you can consume foods that contain the precursors of glutathione so that your body can make more of it — specifically, cysteine-rich foods. The absolute best source is high quality whey protein. This whey must come from the “clean” milk of organically raised cows, and not have been overly processed, which denatures the fragile proteins.

Just be careful not to consume too much of the whey. For more information on whey, please refer to my interview with Ori Hofmekler, an expert on the health benefits of whey protein. The video below is older than this article but my new position is to be careful with your protein intake and limit the amount you are using.

<http://www.youtube.com/watch?list=PL3B31ECE029540DFA&v=WMzUf94ypKU> | [Download Interview Transcript](#)

Additionally, you may want to try liposomal glutathione. Liposomal glutathione is a relatively new form of oral glutathione that is actually well absorbed and eliminates nearly all the concerns previously mentioned with oral glutathione. It’s encapsulated into extremely tiny phospholipid particles, which increase its bioavailability 100-fold.

## II. Mobilizing Mercury by Boosting Enzymes and Transport Proteins

Now that your glutathione levels are up, you can work on building up the other parts of your glutathione system — specifically, enzymes and transport proteins. Your natural production of these factors can be augmented with superfoods.

Plants contain thousands of natural chemicals (phytochemicals) that help your body to work properly, including production of enzymes and antioxidants. One group of phytochemicals is the polyphenol group, which actually helps activate health-promoting genes.<sup>3</sup> Polyphenols are abundant in a wide range of fruits and vegetables.

[Sulfur](#)-based phytonutrients are particularly important in supporting your glutathione system, since glutathione is a sulfur-based molecule.<sup>4</sup> Therefore, you should consume vegetables from the cruciferous family (cabbage, garlic, broccoli, cauliflower, kale, collards, radishes, wasabi, etc.), which are rich in sulfur. Fermenting these vegetables is the most nutritious way to consume them.

[Garlic](#) is especially powerful, but it's *the oil of the garlic* that supports detoxification, not the allicin (which is the compound known for its antimicrobial effect). And you want the smelly kind of garlic — deodorized garlic is useless for detox! Either eat the garlic raw (yes, you have to chew it up), or purchase a garlic oil supplement. Some of the other compounds recommended by Dr. Shade include:

- **Haritaki (*Terminalia chebula*) extract<sup>5</sup>:** An Ayurvedic fruit used extensively in Tibetan medicine, called the “King of Herbs;” it has potent effects on your glutathione system and on expression of other intracellular antioxidants, such as superoxide dismutase (SOD)
- **Sodium R-lipoic Acid<sup>6</sup>:** The most bioavailable and active form of alpha-lipoic acid; also good for increasing insulin sensitivity and treating type 2 diabetes, cardiovascular disease, liver disease, and mitochondrial dysfunction
- **Lumbrokinase<sup>7</sup>:** a enzyme derived from earthworms
- **Pine Bark Extract<sup>8</sup>:** One of the most potent polyphenolic antioxidants; has been found to prolong the activity of vitamin C in your body; good as an adjunct to vitamins C, E and lipoic acid

Your approach with these agents should be to gradually titrate the dose upward to a high therapeutic level, then back it down. It's best to “pulse” the treatments because your body can't sustain upregulation for very long. You will be more productive with shorter bursts at an appropriately stout therapeutic dose. This means taking the treatments for a few days, followed by a few days off. Dr. Shade suggests cycling your treatments on the schedule of five days on, two days off (to start), working up to 10 days on, four days off. He instructs, never go more than 10 days on when upregulating your detoxification system.

Ideally, this should be done with the assistance of a healthcare professional trained in heavy metal detoxification who can help you decide on an optimal dose and schedule. If you begin to feel worse, you may be titrating up too quickly.

### III. Capturing and Eliminating Mercury with Intestinal Binders

***You do NOT want to mobilize mercury without making sure it has an escape route out of your body!***

Once the mercury is in your intestine, you need something to bind it and pull it away from your intestinal wall, and for this we use something called an intestinal binder. Intestinal binders help carry the mobilized toxins out, which prevents them from building up in your bloodstream where they can end up making you sicker.

Binders prevent you from absorbing or reabsorbing the toxic agent, but they also help prevent intestinal inflammation. If your intestine becomes inflamed, the traffic stops because the transport proteins are shut off. That causes toxins to back up into your liver and kidneys, and blood. Removing mercury from your gut will also help prevent [dysbiosis](#), which is at the root of a mind-blowing array of health problems.

#### **Thiol Resins**

There are several types of intestinal binders, but only a couple of them work well for grabbing mercury. Dr. Shade’s favorite binder is thiol resin, because it’s the most specific to heavy metals (mercury, lead and arsenic) and produces high rates of excretion. Thiol resins have a powerful attraction for mercury.

### **Chlorella**

Another good binder for heavy metals is [chlorella](#). Dr. Shade suggests working up to 50 to 70 tablets per day, which is a lot of chlorella. Please work up to that level *gradually*. Other binders you’ll hear about are clay/zeolites, and pectin. For mercury, these bind very weakly, and you would have to take enormous quantities for many years to see any benefit so I don’t recommend them.

If you haven’t yet had your amalgams removed, you may find rinsing with a binding agent helpful. Chlorella, activated charcoal, or N-acetyl cysteine can be prepared as a mouthwash where it binds to the mercury coating your oral epithelium. Levels of mercury can be *very high* in this rinse — make sure you don’t swallow it.

### **Beneficial Bacteria**

Dr. Natasha Campbell McBride believes that one of the most [potent detoxifiers](#) of mercury and heavy metals are beneficial bacteria. Their cell membranes tend to bind very effectively to the metals and they are typically excreted in the stool. One of the best ways to provide your body with this resource is with [fermented vegetables](#)

### **Other Factors to Consider Adding to Your Regimen**

In addition to a healthful diet as discussed earlier, the following supplements and other measures will enhance and support your body’s detoxification ability:

A good whole food multivitamin that includes the full spectrum of B vitamins	A good mineral supplement (consider Thorne Citramins II, citrated minerals without copper or iron)	<a href="#">Fermented foods</a> and probiotics
<a href="#">Astaxanthin</a> , to protect your cell membranes from free radical damage	Cilantro <sup>9</sup>	<a href="#">Vitamin C</a> , a powerful detox agent



Plenty of fresh, pure <a href="#">water</a> daily	Flax seeds (ground) to keep intestines moving	Regular <a href="#">exercise</a>
<a href="#">Infrared sauna</a>	Address your emotional issues (I recommend <a href="#">EFT</a> )	Address malocclusions and cranial trauma