

# Paleo Diet Challenges & Solutions

## Paleo isn't magic

There's no doubt that the majority of people that switch to a Paleo diet notice significant benefits right away. For some, these can be quite miraculous. I've seen people reverse autoimmune disease, arthritis, insomnia, metabolic problems and so much more in a period of a few weeks, and I'm sure you've read and heard about similar changes — or even experienced them yourself.

However, the transition to Paleo doesn't always go so smoothly. I know this perhaps as well as anyone, as a clinician with a focus on Paleo nutrition that treats patients around the world. I don't get the easy cases and success stories. Why would they call me? My patients are those that didn't get the experience the "Paleo brochure" promised. These are often folks that started Paleo and improved significantly, but either still have some lingering issues, or maybe even developed some new issues.

Does this mean Paleo isn't a good choice for them? Should they give up and try a vegan diet instead? Hardly.

If you've been drinking 4 cups of coffee every day for 20 years, and you finally decide that's not such a good idea, you're going to be in for some serious withdrawal symptoms when you cut down to one cup of decaf a day. Does that mean you shouldn't do it? That it wouldn't benefit your health in the long run? No. It just means you're probably going to need some support along the way.

Digestive distress is the most common problem I see in people switching to a Paleo diet. This can range from mild gas and bloating, to changes in stool frequency and consistency (i.e. constipation, diarrhea or alternating between the two), to severe heartburn or abdominal pain. There are three primary reasons people experience these symptoms when they transition to a Paleo diet:

1. Low stomach acid.
2. Decreased enzyme production.
3. Intestinal inflammation.

## Low stomach acid

Stomach acid is a prerequisite to healthy digestion. The breakdown and absorption of nutrients occurs at an optimum rate only within a narrow range of acidity in the stomach. If there isn't enough acid, the normal chemical reactions required to absorb nutrients is impaired.

Stomach acid plays a key role in the digestion of protein, carbohydrates and fat. When food is eaten, the secretion of stomach acid (HCL) triggers the production of pepsin. Pepsin is the enzyme required to digest protein. If HCL levels are depressed, so are pepsin levels. As a result, proteins don't get broken down into their component amino acids and peptides. These undigested proteins putrefy in the gut, and may cause gas, bloating, heartburn and other digestive issues.

At the same time, proteins that escape digestion by pepsin may end up in the bloodstream. Since this is not supposed to happen, the body reacts to these proteins as if they were foreign invaders, causing allergic and autoimmune responses.

Low stomach acid also impairs carbohydrate digestion. Stomach acid (HCL) supports the breakdown and absorption of carbohydrates by stimulating the release of pancreatic enzymes into the small intestine. If the pH of the stomach is too high (due to insufficient stomach acid), the pancreatic enzymes will not be secreted and the carbohydrates will not be broken down properly. As Dr. Norm Robillard explained in his book [Heartburn Cured](#), undigested carbohydrates provoke an overgrowth of bacteria in the small intestine (a.k.a. "SIBO") which in turn leads to increased gas production and acid reflux. (I've written an [entire series on low stomach acid and GERD](#), so check that out if you haven't already.)

There are numerous causes of low stomach acid. The most common are:

- **H. pylori infection.** This is extremely common; studies suggest that 1 in 2 people are infected globally. (1) H. pylori suppresses stomach acid production as a survival strategy.
- **Stress.** Chronic stress has been shown to decrease stomach acid production.
- **Acid suppressing drugs.** Long-term use of Prilosec, one of the most potent acid suppressing drugs, reduces the secretion of hydrochloric acid (HCL) in the stomach to near zero. (2)
- **Low animal protein (i.e. vegetarian/vegan) diet.** I haven't seen studies on this, but my clinical and personal experience suggest that eating a diet low in animal protein decreases stomach acid secretion over time.
- **Age.** Numerous studies have shown that stomach acid secretion declines with age. In one study researchers found that over 30 percent of men and women past the age of 60 suffer from atrophic gastritis, a condition marked by little to no acid secretion. (3) Another study found that 40% of women over the age of 80 produce no stomach acid at all. (4)

Imagine this scenario: you've been on a vegetarian diet for a few years and under a lot of stress at work. You switch (literally overnight) to a Paleo diet where you are now eating meat at least once and often twice a day. Is it any surprise that your digestive system may not respond well to this? The combination of a vegetarian diet, chronic stress and possibly an H. pylori infection would significantly reduce your stomach acid, and thus ability to digest animal protein.

#### Decreased enzyme production

Digestive enzymes break down larger molecules in the food we eat into smaller molecules that can be absorbed across gut lumen into our bloodstream. They're found primarily in the mouth (saliva), stomach and small intestine, and are categorized according to the food substrate they break down:

- **Proteases and peptidases** break down proteins into peptides and amino acids.
- **Lipases** break fats into fatty acids and a glycerol molecule.
- **Carbohydrases** break carbohydrates into simple sugars (i.e. glucose/fructose).
- **Nucleases** break nucleic acids into nucleotides.

If your enzyme production is insufficient, you can't break down or absorb protein, fat or carbohydrates properly. It's not hard to imagine that this could lead to digestive issues, is it?

The primary causes of poor enzyme production are:

- **Low stomach acid.** The pH (acidity) of the chyme (partially digested food in the stomach) must be in a particular range in order to stimulate enzyme production when it enters the small intestine. If the pH is too high due to low stomach acid, enzyme production will be inhibited.
- **Stress.** Once again, chronic stress rears its ugly head.
- **Micronutrient deficiency.** Enzymes don't work alone; they require other nutrients (vitamins and minerals) which act as "co-enzymes". If your diet is low in certain micronutrients (i.e. B12, iron & zinc for vegetarians/vegans, or magnesium, selenium, vitamin C for those on a standard American diet), or you're not absorbing them properly due to low stomach acid, your enzyme production will be impaired.
- **Western diet.** Highly processed, refined and cooked foods contain no enzymes at all. Raw fruits and vegetables are rich in enzymes.
- **Age.** Some evidence suggests that enzyme production also declines with age.

Decreased enzyme production almost always occurs together with low stomach acid, which creates a digestive double-whammy.

#### Inflammation

Inflammation is part of the body's response to harmful stimuli such as pathogens, irritants or damaged cells. It is a crucial aspect of our body's protective system, and we wouldn't live very long without it. It is only when inflammation becomes chronic that it becomes a problem. Chronic inflammation in the gut can lead to constipation

or diarrhea, gas, bloating and abdominal pain, as well as extra-intestinal symptoms like skin rashes, muscle and joint pain and even depression.

One of the little known manifestations of gut inflammation that may be one reason people struggle when adopting a Paleo diet is a sensitivity to insoluble fiber found in certain fruits, vegetables and nuts and seeds. As I discussed in [this article](#), there are two primary types of dietary fiber: soluble, and insoluble. While soluble fiber can be soothing for the gut, consuming large amounts of insoluble fiber when your gut is inflamed is a little bit like rubbing a wire brush against an open wound. Ouch.

Like low stomach acid and decreased enzyme production, gut inflammation has numerous causes. The most common include:

- **Gut infections.** Parasites, pathogenic and opportunistic bacteria, and fungi can all cause a low-grade, chronic inflammatory condition.
- **Autoimmune disease.** Inflammatory bowel disease, including ulcerative colitis and Crohn's disease, are conditions where the immune system mounts an inappropriate attack against intestinal tissue.
- **Western diet.** Gluten, sugar, refined flour and other highly processed and refined foods can inflame the gut.
- **Environmental toxins.** Pesticides and other chemicals like BPA have been shown to disturb inflammatory cytokine production.
- **Intestinal dysbiosis.** An imbalance of good and bad bacteria, including SIBO (small intestine bacterial overgrowth), can create an inflammatory state.

Note that only two of these causes are exclusively related to diet: environmental toxins and western foods. The others are potentially modifiable by diet, but diet is not the primary cause. If you continue to experience digestive issues after a 30-day trial of the Paleo diet, chances are you have some gut inflammation and one or more of these causes is present. There are some dietary tweaks that can help (which I'll discuss below), but ultimately the most important thing is to address the underlying cause, and that will probably require additional support (i.e. supplements or medications) above and beyond dietary changes.

#### [First steps in fixing your gut](#)

A discussion of how to fix the gut could fill an entire book. (Indeed, I plan to write that book after my first book.) While I obviously can't go into that kind of detail here, I can give you some "first steps" that have proven to work well in my practice.

#### [Restore stomach acid production](#)

The first step in restoring stomach acid production is addressing any factors that are inhibiting it. This means getting tested for *H. pylori* if you suspect it, taking steps to [manage chronic stress](#) and avoiding acid-suppressing drugs.

The next step is to take hydrochloric acid (HCL). I describe the rationale and protocol for this in detail in my article called [Get Rid of Heartburn in Three Simple Steps](#), but the short version is this: taking HCL can often help kick start the body's own acid production. Most patients I've treated only need to take HCL for somewhere between 3-6 months, and are then able to gradually titrate off it. A minority of patients, such as elderly people with atrophic gastritis or people that have been on PPIs for many years, may need to remain on HCL indefinitely. That is a much better option than the alternative, which is to suffer from digestive problems as well as the potentially serious consequences of low stomach acid (such as decreased nutrient absorption, bacterial overgrowth, increased susceptibility to infection and even a higher risk of gastric cancer).

Be aware that HCL should always be taken with pepsin — or, better yet, [acid-stable protease](#) — because it is likely that if the stomach is not producing enough HCL, it is also not producing enough protein digesting enzymes.

Another way to stimulate acid production in the stomach is by taking bitter herbs. "Bitters" have been used in traditional cultures for thousands of years to stimulate and improve digestion. More recently, studies have

confirmed the ability of bitters to increase the flow of digestive juices, including HCL, bile, pepsin, gastrin and pancreatic enzymes. (5) The following is a list of bitter herbs commonly used in Western and Chinese herbology:

- Dandelion
- Fennel
- Gentian root
- Ginger
- Beet root
- Goldenseal root
- Milk thistle
- Peppermint
- Wormwood
- Yellow dock

Bitters are normally taken in very small doses – just enough to evoke a strong taste of bitterness. Kerry Bone, a respected Western herbalist, suggests 5 to 10 drops of a 1:5 tincture of the above herbs taken in 20 mL of water.

#### *Replace digestive enzymes*

As I mentioned above, the single most important step in increasing digestive enzyme production is by restoring stomach acid production. This will give the chyme entering the small intestine the proper pH level (acidity), which is what stimulates the pancreas to produce enzymes. [Managing chronic stress](#) and ensuring adequate micronutrient (co-enzyme) intake are also important. Raw, fermented foods like sauerkraut, kim chi, kefir or beet kvaas are rich in enzymes and should be consumed regularly if tolerated.

[Supplemental nutrients](#) can be helpful for immediate relief. These include:

- **Ox bile.** While not technically an enzyme, ox bile is one of the most effective supplements for improving fat absorption.
- **Acid stable protease.** Improves protein digestion; acid-stable protease is able to survive the low pH of gastric juices to further aid in protein assimilation.
- **Pancreatin.** A mixture of enzymes produced by the pancreas, including lipase (fat digesting), protease (protein digesting) and amylase (carbohydrate digesting).
- **Bromelain.** An enzyme found in pineapple that helps with protein digestion, and may have systemic anti-inflammatory effects.
- **Ginger.** A time-tested digestive remedy.

As with HCL, in most cases you will only need to take these nutrients temporarily, until you are able to address the underlying issues. But they can be incredibly helpful in the meantime.

#### *Reduce inflammation*

This one is a little harder to give a quick overview of, because there are so many potential causes, and some of those causes require a fairly complex approach. What I can do is give you a few general tips that are helpful in most circumstances, regardless of the cause.

The first step would be trying some tweaks to your existing Paleo or “real food” diet. (You are on a Paleo or “real food” diet, aren’t you? If not, that is the first step.) There are three tweaks I’ve found to be helpful, and they’re listed in the order I suggest you try them:

1. **Take it easy on the veggies.** Some vegetables (and fruits) are quite high in insoluble fiber, which as I mentioned above, can be very irritating to an inflamed gut. One of the easiest ways to address this is to simply reduce the quantity and variety of vegetables you eat. I know this will sound like heresy to some of you, but keep in mind that while vegetables are nutrient-dense foods, a little goes a long way, and there are other more nutrient-dense foods like organ meat and meat. Read [this article](#) if you need more info and a pep talk.

2. **Try a low-FODMAP diet.** FODMAPs are specific types of carbohydrate that are poorly digested by certain people, particularly those with dysbiosis and SIBO. Read my [article on FODMAPs](#) for more info on how to do this.
3. **GAPS diet.** The GAPS diet is a comprehensive, anti-inflammatory, gut-healing diet. It's especially helpful with SIBO, dysbiosis, and inflammatory bowel disease (IBD). Check out [this article](#) for a primer.

#### Putting it all together

There's no question that healing digestive issues can be a confusing and time-consuming process. In my experience it usually takes a good 3-6 months to unravel a chronic digestive issue — and sometimes longer. This may not be the news you were looking for, but setting realistic expectations will help you to stick with a therapeutic approach long enough for it to work.

The changes I suggested in this article should give you a good head start. I'd also recommend checking out a [new line of supplements](#) that Robb Wolf and I created specifically to address the challenges we've seen people experience as they adopt a Paleo diet — including digestive problems. One of my biggest frustrations as a clinician has been finding supplements that contain exactly the ingredients I want and don't contain the ingredients I don't want. For example, in the case of a digestive supplement, I wanted something that had HCL, acid-stable protease, carbohydrate and fat digesting enzymes, cholagogues to stimulate bile production, and bitters to stimulate acid secretion — with the right doses and forms of each — but that product didn't exist. So I decided to create it myself. You can learn more about it [here](#), and it will be available for purchase (along with the other products in the “Paleo Transition” pack) next week.

Almost everyone I've worked with has at least a few days of experiencing sugar cravings and uneven energy when they first switch to a Paleo diet. This is especially true if they're transitioning from a “Standard American” or other higher carbohydrate diet such as low-fat/vegetarian/vegan. For some people, though, these symptoms can persist beyond the initial few days. They continue to experience some combination of:

- Intense sugar cravings (that are often unrelieved by eating carbohydrates)
- Energy dips or crashes — especially after meals, or in the late afternoon
- Lightheaded, dizzy, jittery or shaky
- Anxious or agitated
- Brain fog and difficulty concentrating
- Extreme hunger (i.e. feel like you're going to die if you don't eat)
- Spaced out

It's not hard to understand why you might give up on Paleo if you continue to have these symptoms for more than a few days. They're incredibly disruptive and they make it hard to function normally. Fortunately, they're usually not difficult to address once you understand what's causing them. In my work with patients I've discovered that the three primary causes of these symptoms are:

1. Sluggish fat burning.
2. Blood sugar imbalances.
3. Micronutrient deficiencies

#### Sluggish fat burning

Our bodies are capable of producing energy from both fat and carbohydrates. If you've been eating a diet high in carbohydrates and lower in fat, and you abruptly switch over to a lower carb, higher fat diet, there's usually a transition period where your body has to switch from primarily burning carbs for energy to primarily burning fats. During this transition period it's not uncommon to experience intense sugar cravings and dips or even crashes in energy, because your body is not yet getting the cellular fuel it needs.

For the lucky ones, this adaptation only takes a few days. For others, it takes longer and may not happen completely without additional support. The process of turning dietary fat into usable energy requires several nutrients; carnitine and riboflavin (B2) are especially important. Carnitine is a derivative of the amino acids lysine and methionine. It plays a key role in transporting fatty acids into the mitochondria — the “power plant” of the cell — during the conversion of fat to energy. When carnitine reserves are low or enzyme availability is impaired, fatty acids won’t be efficiently shuttled into the mitochondria and energy production will drop.

Though carnitine can be synthesized from the essential amino acid L-lysine, digestive impairment, genetic polymorphisms and a diet low in animal protein or legumes (the primary sources of lysine) can lead to a functional carnitine deficiency. For example, [low stomach acid](#) could potentially lead to deficiencies in L-lysine even if you’re eating adequate protein in your diet.

Riboflavin is another key nutrient in the process of converting fat to energy. Once inside the mitochondria, fatty acids can’t be “burned” for fuel without riboflavin coenzymes. Riboflavin is found in many foods, including asparagus, bananas, green beans, persimmons, okra, chard, dairy products, meat, eggs and fish. While deficiency due to inadequate dietary intake is rare, other conditions such as intestinal inflammation or dysbiosis can reduce the body’s ability to absorb riboflavin and lead to sub-optimal levels. Other signs of riboflavin deficiency include cracked and red lips, inflammation of the lining of mouth and tongue, mouth ulcers and cracks at the corners of the mouth, though these aren’t necessarily present in all cases.

#### [Blood sugar imbalances](#)

The spectrum of blood sugar imbalances includes hyperglycemia (high blood sugar), hypoglycemia (low blood sugar) and reactive hypoglycemia (a combination of both high and low blood sugar). Each of these conditions is associated with fatigue, irregular energy and sugar cravings, along with numerous other symptoms. Glucose is used in all cells for energy production, so any difficulty in delivering glucose into the cells will quite literally affect every system of the body. This is especially true for the brain, which has a higher need for glucose than other body tissues. (Ketones can substitute for glucose as brain fuel if they are being produced in adequate amounts.)

The regulation of blood sugar is a complex and controversial topic. I’ve written about it extensively [elsewhere](#), but in a nutshell the process of developing a blood sugar imbalance happens like this:

Modern diet and lifestyle + genetic predisposition > inflammation and oxidative damage > leptin resistance > insulin resistance and impaired glucose tolerance

Blood sugar problems can also be caused by low cortisol (a.k.a. “adrenal fatigue”) or disruptions of the cortisol/melatonin circadian rhythm, micronutrient deficiencies (which I’ll cover next), [poor thyroid function](#) and stress.

#### [Micronutrient deficiencies](#)

In addition to carnitine and riboflavin, which are two of the most important nutrients for fat burning, there are several micronutrients essential to energy production and blood sugar regulation. These include chromium, magnesium, biotin, choline and CoQ10.

##### [Chromium](#)

Chromium is an essential mineral that enhances the role of insulin and helps transport glucose into cells. Deficiency due to dietary intake is rare, but diets high in simple and refined sugars deplete body chromium stores, and even mild deficiencies of chromium can interfere with blood sugar regulation and cause fatigue, anxiety and sugar cravings. (1) Infection, intense exercise, pregnancy and lactation, and chronic stress can also reduce chromium levels, especially if they were already low to begin with. (2) This may explain why an estimated 20-25% of Americans are deficient in chromium, despite adequate dietary intake.

##### [Magnesium](#)

Magnesium is another mineral that plays a crucial role in blood sugar regulation. It is used by the body’s enzymes to process glucose efficiently, and it has been shown to decrease inflammation, which is one of the primary drivers of

insulin resistance. A 2010 study showed that people who took in the highest amounts of magnesium were half as likely to develop diabetes 20 years later than people who took in lower amounts. (3)

Studies show that most Americans are deficient in magnesium. The median intake across all racial groups is far below the RDA, which is 420 mg/d for men and 320-400 mg/d for women. Although half of Americans take a multivitamin daily, most don't contain enough magnesium to prevent deficiency.

Magnesium is also difficult to obtain from food. Nuts, seeds and dark chocolate are among the highest sources, but they're also high in phytate, which inhibits the absorption of magnesium. Another issue is that magnesium levels in food have dropped as modern soils have become increasingly depleted. This means is that if you're not supplementing with magnesium, you're probably not getting enough. (Even if you are supplementing, you still might be deficient if you're not taking a chelated form like magnesium glycinate. I can't tell you how many patients I've seen that are magnesium deficient in spite of supplementing for years with magnesium oxide or citrate.)

### Biotin

Biotin is a water-soluble vitamin often referred to as vitamin B7 or vitamin H. It's a coenzyme involved in energy production, and it helps with the metabolism of fats and carbohydrates into glucose. Specifically, biotin is a co-factor for fatty acid synthesis and may increase utilization of glucose for fat synthesis. Studies have shown that biotin levels are inversely correlated with blood sugar levels; in other words, those with higher biotin stores tend to have lower blood sugar, and vice versa. In one human study, biotin levels were significantly lower in 43 patients with type 2 diabetes than controls, and one month of biotin supplementation decreased fasting blood sugar levels by 45%. (4)

Biotin is found in meat, fish, egg yolks, milk, poultry and some legumes and grains. It's also produced by gut bacteria in amounts approximately 2-5x higher than what is generally obtained from the diet. As is the case with chromium and riboflavin, deficiency of biotin due to inadequate dietary intake is not common. However, anything with a negative effect on the gut flora (such as antibiotics, birth control pills, gut infections, inflammation, SIBO, stress, etc.) could potentially decrease biotin production and lead to deficiency.

### CoQ10

CoQ10 is a fat-soluble antioxidant "vitamin-like" substance that is present in the mitochondria of all cells. It plays a major role in generating cellular energy in the form of ATP. 95% of the body's usable energy is produced in this way, so even a mild deficiency of CoQ10 can have a significant impact on energy and cellular function.

CoQ10 deficiency can be caused by low dietary intake (CoQ10 is highest in red meat and liver and some fish), oxidative damage and insufficient levels of B vitamins, vitamin C and selenium.

### How to prevent energy dips and cravings

#### Improve your fat burning capacity

The Metametrix Organic Acids Basic profile has some good markers (adipate, suberate and ethylmalonate) for detecting impaired fatty acid oxidation. If any of these are elevated, it's likely that carnitine and/or riboflavin levels are not sufficient. That said, in most cases this test is not necessary. One benchmark I use for deciding if I should order a test or not is whether the results will affect how I treat. If the treatment would be the same regardless of the test result, it's cheaper and easier to simply go ahead with the treatment. If I suspect someone has problems metabolizing fat, I usually skip this test and go straight to the following interventions:

- **Improve your absorption of amino acids.** Your body uses lysine and methionine to produce carnitine, which is essential for metabolizing fat. [Replace stomach acid and enzymes](#) if they're low, and [address any other digestive issues](#) that may be present.
- **Boost your fat-burning nutrients.** Consider [supplementing with L-carnitine](#), riboflavin and magnesium to enhance fatty acid metabolism. In most cases this need only be done for a short period, ranging from 3-9 months depending on the person.

### *Regulate your blood sugar and restore micronutrients required for energy production*

This is, of course, a huge topic that I can't possibly cover in adequate detail in this short post. However, I can give you some basic pointers I've found to be helpful with most of my patients.

- **If you have high blood sugar:** you'll probably benefit from a lower-carbohydrate approach, perhaps limiting carb consumption to less than 75 grams per day. There's no hard and fast rule here; some do better with more, and others do better with less. The best way to figure out where you are on the spectrum is to experiment. In addition to reducing carbohydrate intake, additional steps such as intermittent fasting and eliminating snacks may be helpful.
- **If you have low blood sugar:** you may benefit from eating more frequently (every 2-3 hours), eating a high protein breakfast within 30 minutes of waking up, eating a snack with protein and fat just before bed, and possibly even eating a small snack if you wake up in the middle of the night.

[Managing your stress](#) is crucial with blood sugar abnormalities, because as I mentioned above, adrenal and brain dysfunction are often involved.

Several micronutrients can be helpful in restoring insulin sensitivity and glucose tolerance and improving energy production, including biotin, vanadium, alpha lipoic acid, chromium, magnesium and manganese. Some of these can be obtained through the diet. Biotin can be increased by eating prebiotic foods (such as onions, leeks, jerusalem artichokes that increase the production of intestinal bacteria; however, people with digestive issues are often [intolerant of these foods in the FODMAP family](#), so be careful. Nuts and seeds are good sources of magnesium, but only if they're soaked and dehydrated or roasted at low temperature to inactivate the phytate they contain before consuming them.

Along the same lines, since blood sugar issues are often at least in part caused by inflammation and oxidative damage, nutrients like green tea extract (EGCG), CoQ10 and glutathione precursors such as alpha lipoic acid, glycine, NAC can also be helpful. CoQ10 can be obtained from red meat and liver, and glutathione levels can be increased by eating raw fruits and vegetables (again, be careful if you have digestive issues) or by consuming raw dairy products.

Because many of these nutrients are somewhat difficult to obtain even in the context of a healthy diet, I often recommend [supplementing with a blend of them](#) until your blood sugar normalizes and your fat and carbohydrate burning become optimally efficient.

### [Putting it all together](#)

Energy dips and sugar cravings are probably the most common reason that people fall off the wagon with Paleo. Digestive problems are no fun, but most people are willing to put up with them for a while during the transition. But if you can't think straight, you feel shaky and jittery all the time, you have insomnia and you are so tired at 3pm that you can hardly keep your eyes open, it's going to be pretty hard to stick with a Paleo diet — no matter how much you believe in it or want it to work.

As a clinician that specializes in working with people experiencing these kinds of issues, the most important thing for me is to help them get through that difficult transition period. Solving these problems with dietary changes alone is always the goal, but in my experience people often need additional support. This is where targeted, therapeutic supplementation comes in. The supplements can be like a raft that gets you from one side of the river ("struggling with Paleo") to the other side of the river ("thriving with Paleo"). Once you're on the other side, you don't need the raft anymore.

The final challenge to adopting a Paleo diet is impaired detox capacity. If you can't detox properly, even the healthiest Paleo diet won't be enough to resolve your symptoms.

The liver is the main organ of detoxification. It's primary job is to convert toxins — most of which are fat-soluble — into water soluble compounds that can then be excreted. But there's so much more to detoxification than the liver.

The list of symptoms caused by impaired detox capacity is nearly endless, but in my work with patients I've observed the following common patterns:

- **Hormone imbalances (especially in women).** Defects in detoxification cause hormones to become partially metabolized, blocking the action of active hormones and throwing off natural feedback mechanisms.
- **Skin breakouts and rashes.** The skin is the largest organ in the body, and the most likely to be affected by detox issues.
- **Energy problems.** One important aspect of detoxification, called methylation, plays a key role in cellular energy production.
- **Depression and mood disorders.** Methylation is also crucial for proper neurotransmitter synthesis.
- **Brain fog and cognitive decline.** Proper methylation is required for the production of acetylcholine, a neurotransmitter that profoundly affects mental clarity.

As you can see, there's not much that goes on in the body that doesn't depend on healthy detoxification. That's why it's so important to ensure that your liver is functioning as efficiently as possible.

### Are You Boosting All 3 Phases of Detoxification?

Detoxification can be broken roughly into three stages:

1. Phase I: conversion of fat-soluble toxins (hormones, bacteria, neurotransmitters, endotoxins, medications, chemicals, etc.) into water-soluble toxins.
2. Phase II: neutralizes the free radicals generated in Phase I, and acts on some toxins that aren't processed by Phase I enzymes.
3. Phase III: excretion of toxins from Phase I and Phase II in feces and urine.

Detoxification is a complex process, involving hundreds of enzymes and multiple genes. But don't worry — I'm going to make it easier to understand by using an analogy (borrowed from Charles Poliquin).

Phase I is like taking the garbage from the various cans in your house to your big trash can in the backyard or side yard. Phase II is like taking the large garbage can out to the curb. And Phase III is like the garbage truck coming and removing the contents of your garbage can. As you can imagine, if any one of these steps doesn't happen, there's going to be a build-up of garbage (toxins) in your house (body).

Let's look at the three main causes of impaired detox capacity.

### Increased toxic burden

The liver is naturally designed to rid the body of excess toxins. But the environment we (and thus our livers!) evolved in did not have even remotely the level of toxins we're exposed to now, nor were we faced with the numerous aspects of the modern lifestyle that decrease detox capacity (i.e. stress, sleep deprivation, chronic disease, etc.). This means that in many cases our exposure to toxins has exceeded our body's ability to safely process them.

Let's face it: we live in a toxic world. Each year the toxic burden in our air, food and water – and thus our bodies – grows higher than ever before. Companies manufacture **6.5 trillion pounds of 9,000 different chemicals** each year. That's about 3.25 billion tons – enough to fill an ocean supertanker. And the same companies release over 7 billion pounds of 650+ different pollutants into the atmosphere and water.

A recent study by the Environmental Working Group (EWG) found the average person has over 91 toxic chemicals in their body. Some people had as many as 165, including 76 known to cause cancer, 94 known to be toxic to the brain and nervous system, and 79 known to cause birth defects and abnormal fetal development. (1)

As if that wasn't enough, the Standard American Diet itself is highly toxic. Processed and refined foods, industrial seed oils, high fructose corn syrup, and even so-called healthy foods like whole grains and soy all have a toxic effect on the body.

### Methylation defects

Methylation plays a crucial role in detoxification, and it's a vital metabolic process that happens in every cell and organ of the body. It's so important that it takes place more than a billion times a second in the body, and human

life would not exist without it. Methylation is involved in everything from tissue growth and repair, to cellular communication, to turning genes on and off, to cellular energy production to the production and regulation of neurotransmitters like dopamine and acetylcholine.

Proper methylation is dependent upon adequate levels of B12 and folate, among other nutrients. B12 helps to convert the potentially toxic compound homocysteine into the much safer compound methionine, and also helps feed fuel into the Krebs cycle to produce ATP, the fundamental energy “currency” of the cell. B12 deficiency is common with vegetarian and vegan diets, as many of you know. (2) What you may not know is that low stomach acid and other digestive issues can impair the absorption of B12 and cause deficiency even in those that are eating meat and other B12 containing foods. What’s more, some people may have sufficient levels of the inactive form of B12 (cyanocobalamin), but due to impaired liver function they have sub-optimal levels of the active forms of B12 (methylcobalamin and adenosylcobalamin). Regardless of the cause, low levels of active B12 will lead to poor methylation. (See [my article on B12](#) for more on identifying and treating B12 deficiency.)

Folate deficiency can also cause poor methylation. Inadequate dietary intake is rarely the cause. Instead, genetic defects in the enzyme (MTHFR) that convert less active forms of folate into more active forms of folate are more commonly to blame. Statistics suggest that roughly 40% of Americans are carriers of MTHFR mutations, while 10% have the condition. (Some clinicians, myself included, have observed that even carriers — who are supposedly not affected — have impaired methylation capacity.) Some ethnic groups may be affected more than others; for example, up to 12% of Caucasian Americans and 15% of Hispanic Americans have MTHFR deficiency, while only 2% of African Americans and 3% of Asian Americans have it.

#### [Modern lifestyle and chronic disease](#)

One of the foundational principles of the ancestral health movement is that humans are not genetically and biologically adapted to our current lifestyle. This “mismatch” has numerous consequences, but in the context of our discussion on detoxification the most important one is glutathione depletion. Glutathione is the master antioxidant, a tripeptide composed of three amino acids (cysteine, glutamate and glycine) that’s found in all cells. It conjugates several different types of toxins in Phase I, and in Phase II it quenches free radicals produced in Phase I. Glutathione also protects us from oxidative damage. I like to think of it as a bullet-proof vest: if we have enough glutathione, we’re relatively well-protected against oxidation. If we don’t, we’re much more vulnerable to the harmful effects of oxidation. This is significant since most, if not all modern, chronic diseases involve oxidative damage.

The good news is that our bodies are capable of producing glutathione. The bad news is that glutathione is easily depleted by stress, environmental toxins, medications, trauma, aging, illness and micronutrient deficiencies. Studies have repeatedly found the highest glutathione levels in the young and fit, and the lowest in the elderly, infirm and inactive. (3) Moreover, according to Dr. Mark Hyman, approximately 1/3 of Americans are missing an important gene needed to create and recycle glutathione. (4) Taken together, this means that nearly everyone is subject to some degree of glutathione depletion, which in turn means that most people are not detoxing or protecting themselves from oxidative damage at full capacity.

#### [How to supercharge your detox capacity](#)

As I’ve explained above, impaired detox function can be caused by either an increase in the toxic burden, a decrease in detox capacity, or both. It follows, then, that to optimize your detox capacity you should address the issue from both sides.

#### [Reduce your toxic burden](#)

The most obvious first step is to [remove all food toxins](#) from your diet. This means ditching processed foods, industrial seed oils, and refined sugar, as well as improperly prepared grains, legumes and other foods with toxic effects on the body. Fortunately, the Paleo diet is inherently low in food toxins (which of course is one of the reasons it works so well), so if you’re already following a Paleo template you’ll be in good shape here.

The second step is to take steps to reduce your exposure to chemicals at home. This means choosing non-toxic household cleaning, bath, beauty and hygiene products. Mark Sisson wrote a great article about this a while back. Check it out [here](#) if you need some tips in this area.

### *Improve your detox capacity*

The next step is to improve your detox capacity. This means ensuring that all three phases (I, II & III) are functioning optimally. One of the biggest problems with many commercial detox products is that they only contain nutrients that upregulate Phase I detox. This is dangerous, because for every toxin that is converted in Phase I a free radical is generated. (Free radicals damage cells and contribute to oxidative damage.) These free radicals are neutralized in Phase II, but if you boost Phase I detox without addressing defects in Phase II, you'll increase the amount of free radicals produced without improving the body's ability to deal with them. That's making a bad situation worse. For most people, focusing on improving methylation and boosting glutathione levels is the best approach to restoring optimal detoxification.

- **Methylation:** the key to improving methylation is ensuring adequate levels of active B12 and folate and methylation co-factors like B6 and betaine (a.k.a. trimethylglycine). For best results [look for a blend](#) that contains all of these nutrients in synergistic amounts.
- **Glutathione:** glutathione levels can be naturally increased by consuming raw dairy products, sulfur-rich foods (garlic, onions and cruciferous veggies); by exercising regularly; and by avoiding things that deplete glutathione when possible (mentioned above). There are several nutrients that are required for glutathione synthesis and/or can help boost glutathione levels, including N-acetyl cysteine (NAC), alpha lipoic acid, selenium, B12, folate, B6, and glycine. In addition to these nutrients, several botanicals have been shown to increase the intracellular recycling of glutathione, including milk thistle, cordyceps, gotu kola, and broccoli seed (which has a particularly beneficial effect on Phase II detox). I think it's best to take a [wide range of these nutrients and botanicals](#) in moderate doses rather than very high doses of any one of them.

If you've been following this series, you'll notice a theme developing:

- In my work with patients, I started to notice three main challenges to adopting and feeling great on a Paleo diet: digestive issues, impaired fat burning, and impaired detox capacity.
- In many cases, dietary tweaks alone were not enough to resolve the issues these patients were experiencing (which is why they came to see me in the first place).
- When I looked for supplements that could address these issues, there weren't any that were a perfect fit. There were a lot that came fairly close, but they all had at least one fatal flaw or they were missing some key ingredients.
- So I decided to create them myself, with the help of one of the smartest guys (with a background in microbiology) in the Paleo world: Robb Wolf.
- Thus the [Paleologix](#) line was born.

The detox formula is no exception. When I looked around at what was available, I wasn't satisfied. Too many products didn't address Phase II detox. Or they didn't include substances that improve intracellular recycling of glutathione, which is just as (if not more) important than boosting glutathione levels. Or they contained folic acid instead of folate (read [this article](#) to find out why that's bad), or inactive B12 (cyanocobalamin) instead of active B12 (methylcobalamin). Or they didn't include anything for Phase III detox. (This is one reason we recommend taking all four Paleologix formulas together; it made more sense to put the cholagogues that improve Phase III in the [digestive formula](#).) And being the perfectionist that I am, I couldn't deal with those compromises. I wanted the perfect blend — so I made it.