THE PALEO DIET

# ANTI-INFLAMMATORY WAY OF EATING

## CONVERT RECIPES TO BE PALEO

THE INSIDER Vol. 5, Issue 14

> GREATER VITALITY FOR LONGER

JAPANESE DINING PALEO STYLE

LOREN CORDAIN, PH.D.





## THE PALEO DIET IS AN ANTI-INFLAMMATORY DIET

### Wiley Long, MS

Each organ, and even the bloodstream, contains a part of our immune system, which uses inflammation to protect us from bacteria, viruses, parasites, molds and foreign proteins as well as to heal wounds. Ideally, such threats are neutralized and the associated inflammation is resolved.

An unresolved inflammatory response (chronic inflammation), however, can spread damage throughout the body. Researchers from different areas of medicine have independently and repeatedly concluded that inflammation plays a key role in a variety of illnesses.

- "I am a chiropractic doctor working in a multispecialty setting (with physical therapists, several medical physicians [orthopedic surgery, spine neurosurgery, internal medicine, pain management] and acupuncture). I have been in practice since 1982. I have read The Paleo Diet and The Paleo Diet for Athletes as well as other publications by authors who are generally in concert with what I guess we could call Paleoprinciples. My diet is the Paleo Diet.
- For patients who claim to have tried everything in pursuit of chronic pain relief, addressing underlying pro-inflammatory dietary practices can be a fundamental key to recovery. The Paleo Diet can be the key that unlocks the door to sustained pain relief.
- Many of my patients suffer from chronic pain and the principles of the Paleo Diet are valuable as it is essentially an anti-inflammatory diet. For

instance, chronic pain sufferers who attempt to combat symptoms without addressing underlying omega-3 versus omega-6 imbalances from over reliance on grains and lack of animal sources of DHA and EPA, are fighting an uphill battle. The same can be said for foods with high glycemic indices that also have a proinflammatory effect."

### Robb R.

### HOW THE PALEO DIET RELIEVED CHRONIC PAIN

Adopting the Paleo Diet resulted in both pain relief and improved athletic performance for a patient working with Dr. Russell. An endurance athlete in his mid-50s suffered from persistent back pain due, in part, to two degenerated lumbar discs. He was beginning to make some improvement in spinal pain with some specific Flexion-Distraction Mobilization (chiropractic treatments) and exercises.

Dr. Russell also suggested The Paleo Diet for Athletes as an anti-inflammatory diet based on the patient's athletic endeavors and the inflammatory nature of his psoriasis.

The patient's pain improved more rapidly than expected, and his recovery time was rapid and with far less physical discomfort than he had experienced previously. As a bonus, the patient judged his athletic performance to also be improved.

# CONNECTION BETWEEN INFLAMMATION AND ALZHEIMER'S DISEASE IDENTIFIED

Inflammation is involved in almost every disease process, and reducing chronic inflammation is often found to be therapeutic. Neurologists have also reported an inverse relationship between anti-inflammatory medications and Alzheimer's disease. In 1997, the journal Neurology published findings that people who had been regularly taking anti-inflammatory medicine had much lower rates of Alzheimer's disease.<sup>1</sup>

As recently as September of 2009, the journal Gerontology published a study linking neuroinflammation with the development of several central nervous system diseases, including late-onset Alzheimer's disease.<sup>2</sup>

### LINK BETWEEN CHRONIC INFLAMMATION AND CANCER FOUND

Other researchers have also connected inflammation with cancer. The journal Cell published a study that identified a basic cellular mechanism that may link chronic inflammation with cancer.

The researchers identified a protein called p100 as allowing communication between inflammation and cancer development processes.<sup>3</sup> Chronic inflammation might lead to unrestrained cancer development.<sup>3</sup>

# CHRONIC INFLAMMATION ASSOCIATED WITH HEART ATTACK AND STROKE

In 2003, the American Heart Association and the Centers for Disease Control and Prevention published a joint statement associating inflammatory markers (such as C-reactive protein or CRP) with coronary



heart disease and stroke. CRP is one of the acute phase proteins to increase during systemic inflammation.

The statement was based on evidence implicating inflammation as a key factor in atherosclerosis.<sup>4</sup> That's the process of fatty deposit build up in arteries. High levels of hs-CRP consistently predict recurrent coronary events in cases of unstable angina and heart attack.<sup>4</sup> Higher hs-CRP levels are also associated with the likelihood of an artery reclosing following balloon angioplasty, and lower survival rates.<sup>4</sup> High levels of hs-CRP also predict prognosis and recurrent events for stroke and peripheral arterial disease.<sup>4</sup>

# LEAKY-GUT SYNDROME LINKED TO CHRONIC INFLAMMATION

Increased intestinal permeability, also known as leakygut syndrome, can affect overall health by allowing passage of lipopolysaccharide (LPS) from the intestinal lumen into peripheral circulation.

LPS comes from the cell walls of resident gram negative gut bacteria, and is one of the most potent pro- inflammatory antigens known.<sup>5</sup> Increased passage of LPS into circulation induces pro-inflammatory cytokines (communication proteins of the immune system) leading to low-grade chronic inflammation.

Dietary saponins from potatoes, beans, and legumes induce a leaky gut,<sup>6,7</sup> as do dietary lectins, alcohol, and NSAIDS. Lectins survive cooking and processing, as well as digestive enzymatic degradation, so they arrive in circulation intact in physiological concentrations to activate the immune system. Lectins are also able to increase E. coli and gram-negative bacteria overgrowth in the intestinal lumen.<sup>8</sup>

### WHY THE PALEO DIET IS AN ANTI-INFLAMMATORY DIET

Returning to the diet that humans evolved to eat addresses many underlying pro-inflammatory modern dietary practices. The Paleo Diet corrects the proinflammatory effects of omega-63/omega-6 3 fatty acid imbalance that can result from consumption of vegetable oils, grain-based products, and a lack of DHA and EPA from animal sources.

The diet also eliminates other modern food products that have been implicated in the inflammatory basis of disease, such asincluding dairy products, refined sugar,

and lectins. Lectins are found in beans, grains, and legumes, which are not part of the Paleo Diet.

While the diet also excludes processed foods (such as refined or hydrogenated vegetable oils in margarines, potato chips and baked goods that can be pro-inflammatory), it does include olive oil. This highly mono-unsaturated oil can actually reduce inflammation. The high-fiber content of the diet also helps to reduce inflammation.

In addition, foods with high glycemic indices also have a pro-inflammatory effect. The low glycemic load foods of the Paleo Diet avoids such high-glycemic foodsaddress this , which also helps to lower insulin levels, and help to maintain optimum weight.

For sources see References: Section I

## **CONVERTING RECIPES TO BE PALEO**

### Nell Stephenson, BS USC EXSC

One of the most frequent questions I'm asked is 'what are your favorite Paleo recipes?' This really catches me off-guard because ALL the meals I cook, whether I use a recipe or not, are Paleo!

I'm certainly not implying that all the cookbooks out there are designated Paleo books. It's just that it's not that hard to convert a recipe to conform to Paleo foods!

Maybe you can't use your Mom's Betty Crocker cookbook from 1953 and figure out a way to make the perfect yellow cake while keeping Paleo, but if we're talking about main dishes, it's not so hard to stay Paleo.

Here are a few tips to help you transform a recipe, which may have some very non-Paleo origins.

If a recipe calls for butter to sauté, replace that with olive oil. If you're working with recipes that call for a really high temperature, try grape seed oil because that has a higher burning point than olive oil. A recipe utilizing cheese as a topping or garnish is easily changed; too. If it's a soup or stew, try shredded green or red cabbage on top. The crunch makes a nice balance to the soft texture of a stew.

If you've found a great sauce recipe that seems Paleo, and then realized that you won't have pasta for the sauce, worry no more. Just use baked spaghetti squash for pasta. It's delicious with a homemade marinara that includes some diced grilled chicken!

A recipe using flour as a thickener can sometimes be altered with the substitution of almond meal. Be open- minded because the flavor will obviously be a bit different.

A main dish that was meant to be served on top of rice or pasta can easily be served over a bed of steamed kale, chard, spinach or collard greens, to name a few.

Try using coconut milk in lieu of dairy milk in recipes. Again, the flavor and fat content may be a bit different, but change can be good.

I purposely make each meal different from the last to ensure the most variety in my diet. I'll prepare chicken one night, salmon the next, bison the following day, and so on, always making enough so that I have leftovers the next day for lunch.

As I've said many times, keep it interesting and literally



play in the kitchen! Find what works, what doesn't, and keep your palate pleased!

## **A FAMILY SUCCESS STORY**

Yvonne kindly wrote in about her success with The Paleo Diet, here is her story:

- "About 5 months ago I decided to make the big change in my life. It ended up being a change for my entire family.
- We are a very active family. We all love to hike. I help coach my 8-year-old's soccer team, and my daughter does soccer and gymnastics. I did not make this change because I wanted to lose weight, although it is a great benefit. I made this change because of the constant battle I have had with migraines. With every child, my migraines became more frequent and more intense. I have done all the food testing, seasoning testing, medicines, etc. I did not want to live like that anymore...It affected everyone in my household. So, after hearing much about Paleo and reading the book, I decided that it was well worth a try.
- After the first week, something major changed for me - I was sleeping. I have had to take meds to sleep for longer than I care to remember. After the second week, something more incredible happened - my energy level was incredibly higher. From there, it was all good.
- I started exercising more because I had the energy. My 5-year-old was taking walks with





me 3 times a week. The best part was that my headaches were gone. With no headaches, no migraines, I felt like I was 10 years younger. Ok, maybe that was not the best part - the best part was my kids noticing how much more I could keep up with them.

Changing our household to eat properly has changed all of our lives. The huge bonus is that I have lost 15 lbs as well. Now, that is the type of bonus I like. Thank you Dr. Cordain - you and your book have changed the lives of my family for the better, for life."

Yvonne H.

# THE **INSIDER**

## GREATER VITALITY IN LATER YEARS

### Pedro Bastos MA, MS, Ph.D.

Many aspects of the Paleo Diet reduce your risk of disease to improve mental and physical function in later life, while reducing the suffering and debilitation that often accompany illness.

# LONGEVITY DIETS INCLUDE ASPECTS OF THE PALEO DIET

Many diets associated with longevity contain characteristics of the Paleo Diet. For instance, major aspects of the Mediterranean diet are similar to the Paleo Diet. Both diets provide a low omega-6:omega-3 ratio, and emphasize fruits, vegetables and monounsaturated fat1. In a comparison study, though, the Paleo Diet was found superior in improving glucose tolerance.<sup>2</sup>

Similarly, the traditional diet of Okinawa has a low omega-6:omega-3 ratio and avoids trans fatty acids much as the Paleo Diet does. The Okinawan diet is composed of fruit, vegetables, fish, and some pork, which is similar to the Paleo Diet.

Like the Paleo Diet, the diet of Okinawa excludes potatoes that contain harmful glykoalcaloids, as well as gluten-containing grains. However, the Okinawan diet does include rice, a high-glycemic food that may contribute to insulin resistance, and that is avoided by those eating the Paleo Diet.

## **CALORIC RESTRICTION AND LIFESPAN**

Restricting calories is the only method proven to extend lifespan in various animals, including primates.<sup>3-8</sup> This is one of the reasons why Okinawans may live longer, on average, than people in Japan: Okinawans consume fewer calories.<sup>9</sup>

Intervention studies have shown that when people consume the food groups available in the Paleolithic era, the result is that they consume fewer calories, even without being specifically directed to do so.<sup>10, 11</sup>

# WEIGHT MANAGEMENT AND LONG-TERM HEALTH

Overweight and obesity are linked to an array of health problems known as metabolic syndrome, including high blood pressure, high cholesterol and blood fat levels, type 2 diabetes, and cardiovascular disease.<sup>12</sup> Linked to 400,000 deaths annually, obesity is the second leading cause of preventable death in the U.S.<sup>12</sup>

Several aspects of the Paleo Diet make it easy to maintain optimum weight. By emphasizing low glycemic load foods and avoiding high fructose foods, the Paleo Diet helps to keep energy levels balanced so you don't experience an energy crash. This not only makes it easier to avoid eating unhealthy foods, but it also increases stamina and improves mental focus.

The diet's correct balance of carbohydrate, protein and fat improves blood-lipid profiles, helps you feel full for longer periods between meals, and enables your body to burn more calories. People in our Paleo Diet Implementation Program routinely report loss of body fat, without going hungry or consciously cutting calories.

### A PALEOLITHIC LIFESTYLE IMPROVES HEALTH

Beyond diet, the lifestyle of our hunter-gatherer ancestors included other factors shown to improve health. They enjoyed enhanced vitamin D production from sunlight, more exercise, and better sleep patterns. Although they experienced acute stress, they had less exposure to chronic stress than is prevalent today.

The diet, exercise, sleep, and sun exposure needs of living organisms are genetically determined. While there have been a few genetic changes since the Agriculture Revolution,<sup>13-19</sup> most of the human genome is composed of genes selected during the Paleolithic<sup>20-25</sup> in Africa.<sup>26-40</sup>

It is being increasingly recognized that the profound changes in diet and lifestyle of the last 10,000 years have occurred too recently for the human genome to have adapted.<sup>41-58</sup> There are no genetic adaptations



that protect us from our modern lifestyle because our genome suits the primitive environment of our ancestors.

### CHANGES IN THE HUMAN GENOME HAVE NOT SUPPORTED LONGEVITY

Most of the genetic alterations that occurred postagriculture were not in response to changes in diet, exercise or sleep patterns.<sup>59</sup> They occurred in response to pathogens, diseases, and a harsh environment.<sup>59</sup> The goal of these changes was not to increase longevity, or resistance to chronic degenerative diseases.<sup>60</sup> It was to increase survival and reproductive success, even if such changes resulted in a liability in post-reproductive years.<sup>20, 24, 60, 61</sup> These single gene mutations are important for health practitioners treating patients. However, they are imperfect models to prevent chronic degenerative diseases, such as cardiovascular disease, cancer, metabolic syndrome, etc. The clinical symptoms of chronic degenerative diseases normally affect post-reproductive years, and involve hundreds of genes.60

Hunter-gatherers and other populations minimally affected by modern habits exhibit superior health markers, body composition and physical fitness in comparison to those consuming a typical Western diet. When hunter-gatherer societies adopt a Western lifestyle, their risk for chronic degenerative disease is similar or even greater than that of more Westernized populations.<sup>25, 62-84</sup> Their risk markers for chronic degenerative disease sometimes improve, though, if they return to their original hunter-gatherer lifestyle.<sup>85, 86</sup>

## IMPROVING MENTAL AND PHYSICAL FUNCTION IN LATER LIFE

To optimize your health and decrease your risk of disease, here are some key steps. First, let the Paleo Diet helps you maintain optimum weight. With the Paleo Diet, you'll also be eliminating substances (such as dairy, grains, legumes, etc.) thought to contribute to inflammatory and autoimmune diseases.

Beyond diet, emulate the lifestyle of our Paleolithic ancestors by getting some vigorous exercise on a regular basis. It's also important to make time for plenty of sleep not only for your health, but also for learning (the Paleo Diet improves sleep quality for many people). Taking action to reduce chronic stress,

and to lessen its impact on your health prevents disease, as well.

Maintaining adequate levels of vitamin D is also critical. Low levels of vitamin D have been associated with increased risk of death from all causes.<sup>87</sup>

Getting just 15 to 20 minutes of sunlight a day may be enough to convert a form of cholesterol in the skin into vitamin D.<sup>88</sup> If you're not getting adequate sunlight, we recommend taking approximately 2000 IU of vitamin D per day.

For sources see References: Section II

## **JAPANESE DINING PALEO STYLE**

### Nell Stephenson, BS USC EXSC

I could live on sashimi, so I was thrilled during a recent trip to Hawaii to find that the breakfast buffet (while unfortunately offering the typical American horrors like waffles, pancakes, muffins and so on) also had a Japanese section! This included poached fish, an assortment of fresh seaweed, several different fresh and steamed vegetables along with regional fruit. I was in heaven!

There are, of course, some Japanese foods that are very non-Paleo, so here are some suggestions for how



to make your experience with Japanese dining more Paleo friendly.

When ordering, avoid items containing, seasoned with, or marinated in soy-based foods. That includes miso, tofu and edamame.

Pass on rice and noodle side dishes, and go for more protein and vegetable-based dishes. As always, ask what veggie the chef has in-house, and see if that can be easily substituted. Opt for sashimi, rather than sushi, in order to get a great source of omega-3's without the added starch of the rice you'd get with sushi.

A sauté of beef or chicken with veggies can be a great option if you're not feeling the nautical theme. And, many restaurants offer a small serving of sliced fruit as an automatic close to a meal. Fresh orange wedges are perfect in this setting!

## FEEDBACK FROM READERS

We recently received this question:

"What is the effect of the Paleo Diet on seniors with respect to gout? I've heard that protein in one's diet can have an adverse effect."

Although high-protein, meat-based diets contain high amounts of purines and would be expected to promote gout, protein ingestion actually decreases blood uric acid levels by increasing uric acid excretion. This seemingly paradoxical effect occurs because the kidneys increase excretion of uric acid when faced with elevated dietary purines.

If high-protein, meat-based diets actually increase uric acid excretion, and 90 % of all gout patients are under excretors, it makes little sense to implicate meat and high-protein diets as a fundamental cause of gout.

What we really need to look for are dietary factors that can simultaneously increase uric acid synthesis in the liver, and suppress its secretion by the kidneys. It has been known for almost 40 years that fructose ingestion results in hyperuricemia (elevated blood uric acid levels). Only fructose causes this effect. Experimental 3,000 kcal/day diets consisting entirely of glucose among obese patients did not increase plasma uric acid levels, but a high sucrose (table sugar) diet did. Because sucrose is composed of two simple sugars - glucose and fructose, the digestion of sucrose into its two component sugars shows that fructose alone is responsible for inducing hyperuricemia.

Consequently, fructose ingestion either from high fructose corn syrup (HFCS) or sucrose enhances uric acid production, and also slows it excretion. To add insult to injury, long-term ingestion of table sugar (sucrose) and HFCS, which are high glycemic-load carbohydrates, will chronically elevate blood insulin concentrations, and frequently result in insulin resistance.Numerous studies show that insulin is a potent inhibitor or uric acid excretion by the kidneys. Taken together, these biochemical facts indicate that sucrose, HFCS and all high glycemic-load carbohydrates play a central role in causing gout.

In addition to fructose, sucrose and high glycemicload carbohydrates, excessive consumption of alcohol may also promote gout symptoms by simultaneously increasing uric acid production and slowing its excretion.

The Paleo Diet fights gout by eliminating or reducing the main foods that can contribute to gout. You can learn more about the research explaining how gout is related to diet in Vol. 2, Issue 4 of *The Insider*.



Although we can't answer every question personally due to the number of letters received, we are very interested in hearing your thoughts, learning about your experiences, and understanding your questions. Many of the questions that we receive will be answered in future newsletters.

## PALEO DIET Q & A: HOMOCYSTEINE

Dr. Cordain and his associate Pedro Bastos, were recently contacted by Ben Balzer, M.D. a well known Australian GP, friend and colleague regarding homocysteine issues. According to the American Heart Association, homocysteine is "an amino acid in the blood. Epidemiological studies have shown that too much homocysteine in the blood (plasma) is related to a higher risk of coronary heart disease, stroke and peripheral vascular disease."

Included below are Dr. Balzer's original correspondence, as well as the replies from Dr. Cordain and Dr. Bastos.

Dear Loren and Pedro,

I was writing to a cardiologist today about homocysteine (alternate spelling: homocystine), among other issues. I don't think I've raised it with you before, but it occurs that it may be of interest or relevance, so I've repeated it here below. Clinical medicine takes me up a few nutritional pathways that aren't necessarily paleo, but as I always say paleo is the unifying field theory of nutrition, so it has always made it easier.

I'm a firm believer in homocysteine related issues, but the way modern medicine works it will never be driven hard as there is no commercial imperative--as all the treatments are vitamins and cannot be patented. Though there have been attempts to make a "drug" that will lower homocysteine, which would then magically spark interest.

I am also aware that choline has been given vitamin status and also participates in the 1-carbon cycle. Perhaps you could let me know how the choline intake of the SAD compares to our modern day urban hunter gatherer. Maybe we can shorten that to urban hunter gatherer, but I don't think UHG will catch on, though it

does have a caveman-like ring to it.

What is amazing about homocysteine and triple B therapy is how little most Australian cardiologists knew about it. Yet when Lange published a highly flawed negative paper, they all knew about it overnight- highly suggestive of a commercial push.

Regards,

Ben

#### Hi Ben,

Good to touch bases with you and hopefully we can get together when I am in Sydney in June. Although we havent done the computerized dietary analysis yet -- specific to homocysteine, it is almost certain

Food	Serving	Total Choline (mg)
Beef liver, pan fried	3 ounces*	355
Wheat germ, toasted	1 cup	172
Egg	1 large	126
Atlantic cod, cooked	3 ounces	71
Beef, trim cut, cooked	3 ounces	66
Brussel sprouts, cooked	1 cup	63
Broccoli, cooked	1 cup, chopped	f 62
Salmon	3 ounces	56
Shrimp, canned	3 ounces	49
Peanut butter, smooth	2 tablespoons	20
Milk chocolate	1.5-ounce bar	20

Adequate Intake (AI) for Choline			
Life stage	Age	Males (mg/day)	Females (mg/day)
Infants	0-6 months	125	125
Infants	7-12 months	150	150
Children	1-3 years	200	200
Children	4-8 years	250	250
Children	9-13 years	375	375
Adolescents	14-18 years	550	400
Adults	19 years +	550	425
Pregnancy	All ages	-	450
Breastfeeding	All ages	-	550

that sub- artic hominids would have had high plasma concentrations of folic acid, B6 and B12 (see my paper: Cordain L. "The nutritional characteristics of a contemporary diet based upon Paleolithic food groups." J Am Nutraceut Assoc 2002; 5:15-24.) Hence hyperhomocysteinemia likely was not an environmental seletive pressure that routinely affected Homo until very recent times (evolutionarily speaking -- ergo the past 10,000 years). I suspect that modern western diets are significantly lower in choline-rich foods than diets based upon fruits, veggies, meats, seafood, nuts, fish, and organ meats. Once again, we have not done the computerized dietary analyses.

#### Best wishes,

Loren

#### Hi Ben,

Good to hear from you.

I definitely agree with Loren. Regarding choline, I would just like to add that from computer analysing several types of diets, I have come to the conclusion that without eating liver or a high amount of egg yolks, it is virtually impossible to achieve 500 mg of choline a day. So, I believe our H/G ancestors got their choline from organ meats. Since today, most of us do not eat organ meats, I would like to know how we can ingest the choline we need.

To the left is a table from the Linus Pauling Institute with some dietary sources of choline. Below it the table for adequate choline intake. In addition, I would refer you to two papers: one by Bruce Ames on choline and another on food sources of choline and betaine.

It would be very interesting to estimate the various micronutrient intake of various H/G diets based on Loren's model.

Best wishes,

Pedro

## **PRIMAL IN THE KITCHEN**

### **BAKED HOLIDAY STUFFING**

2 Tb. extra virgin olive oil
4 large celery stalks, diced
1 medium yellow onion, diced
4 portobello mushrooms,
coursely chopped
1 medium shallot, minced
1/2 cup chicken broth (made
paleo)
2 Tb. freshly ground flaxseed
2 Tb. minced fresh sage
4 oz. brazil nuts, toasted and
coarsely chopped

Preheat oven to 350 degrees.

Heat olive oil in a cast iron skillet over medium flame. Add celery, onions, and mushrooms and stir occasionally for ten minutes. Toss in shallot and continue cooking for two minutes. Pour in broth and stir. Remove from heat.

Stir in flaxseed, sage, and brazil nuts. Bake for twenty minutes.

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