

Damn Dirty Grains: This Time it's Personal

BY Robb Wolf

Do you ever feel like you have something completely dialed? You know the issue inside and out, can argue it from every angle and... discover you were at best wrong, but more accurately, you were delusional. Such was my foray into vegetarianism. I mean EVERYBODY knew fat was bad, meat was full of toxins and the enlightened humane thing to do was to not eat critters. So my fare revolved around beans, rice and whole grains. I'm handy in the kitchen. I made it work. The fruits of my labors included high blood pressure, horrible blood lipids and gastrointestinal problems that were eventually diagnosed as gastritis. I was a pudgy bloated mess who was dying from doing what I thought was right.



Concurrent to and actually preceding my downward spiral into vegetarianism, my mother had been battling a slew of health problems. Fatigue, lethargy, diffuse but intense bouts of pain. My mom had not been doing well for a very long time. Eventually a diagnosis of Rheumatoid Arthritis and Lupus were issued from a specialist. Immune suppressing drugs were prescribed in an attempt to cool the over active immune response that seemed bent on dispatching my mom. Along with the Lupus and RA diagnoses, an afterthought of a condition was also discovered: Celiac Sprue. In technical parlance, Anti-glidan enteropathy. My mom was experiencing a profound reaction to wheat, dairy and a long list of other problematic substances.

The autoimmune diseases I had heard of, but this Celiac Sprue was news to me. When I started researching the topic I got the feeling that the CS was THE problem and likely the causative factor in the other interrelated autoimmune conditions. What became clear was that humans were not designed to eat cereal grains. That obviously was a position that not many people were talking about and it seemed to be outright heresy at the time. I think that was late 1998 or early 1999. Suffice to

say I was stumped. I knew the Standard American Diet had some serious problems but now it appeared all the rice, beans and whole wheat bread I'd been eating might actually be killing me. If vegetarianism was not going to work, what would? I thought about science, evolution... evolutionary biology... huntergatherers... I remembered hearing someone mention of the term "Paleolithic Diet" once. I put that term in a search engine (before Google... crappy returns) and found www.paleodiet.com. From there I found [Art Devany's website](#) and things really started to make some sense.

If my meandering down memory lane was a bore, I apologize, but I do have a point and it does pertain to performance, health and longevity. Most of you folks who read this publication also likely participate in some form of high-level physical activity like [CrossFit](#) or [Olympic Lifting](#). I think it is safe to say that the people who are drawn to CrossFit and its affiliated specialists are people who are looking for the BEST. The best training, the best performance, the best health possible. That being the case, the question of nutrition inevitably arises and it is hoped that the best nutritional recommendations are made. For many communities, even beyond CrossFit, that nutritional answer of answers is the [Zone](#). The Zone is the genius of Barry Sears and it is waiting with open, warm, non-judgmental arms, ready to bring you in regardless of your food preferences, so long as you partition your slop into the Golden Ratios of 40-30-30. It has been put forward that cottage cheese and a snickers bar can fit the bill for Zoners. Now obviously the Zone recommends "good" carbs like veggies and fruit, but if we are about Elite Fitness and the health that should be associated with that fitness, is an anything-goes Zone really the answer? Is that the best we can do?

Let me use an analogy here and let's assume for a moment we are looking at fitness through the eyes of CrossFit and the four-part definition of fitness as described in the [CrossFit Journal](#). Some of the key points of that definition are to create as broad an adaptation as possible and that segmented training produces segmented results. These concepts fit together in that if you are training in a segmented fashion you will be lacking in some breadth of adaptation. A bit chicken-and-egg, but stay with me. Now we can make the argument that from a "fitness" perspective, things like Olympic weightlifting, sprinting and gymnastics yield enormous benefit, especially when compared to marathons, Pilates and Jazzercise. No arguments there, and I think no one would argue that an individual who O-lifted one day, did sprint work the following day and some gymnastics the day after that in some fashion that allowed for recovery... well, this person would be pretty "fit".

According to the CrossFit definition of fitness, however, this individual would be segmented and it would not be hard to cook up a workout that would expose that segmented training. Interestingly, the exploration of that segmentation (CrossFit style, multi-modal training) would likely improve the game of this person in all of their activities as that very segmentation is likely limiting performance. Make sense? So this is why, from the broad, highly-refined definition of fitness that CrossFit offers we need to do both specialized skill work in the areas of O-lifting, sprinting and gymnastics, but also multi-modal work.

Back to food. Taken that this all-encompassing definition of fitness requires non segmented training and performance, we can infer that we indeed want a complete "fitness", and since nutrition—the molecular basis of health—is the FOUNDATION of an optimized fitness regime, we should want the very best nutritional strategy we can find, especially if our definition of fitness includes ALL parameters of health. If that is indeed the case, then before we start slicing and dicing our food into exacting proportions we need to have the right stuff on the plate. Grains are not among those things. We can be apologists and try to be all things to all people, but much like the argument that too much power lifting or long distance running will hamper your overall fitness, so too will consumption of foods that are at odds with health. This is a long introduction to what is destined to

be a longer paper on grains: what they are and what they do to us when we eat them, especially if they take a prominent role in our diets.

Anatomy of the Grain

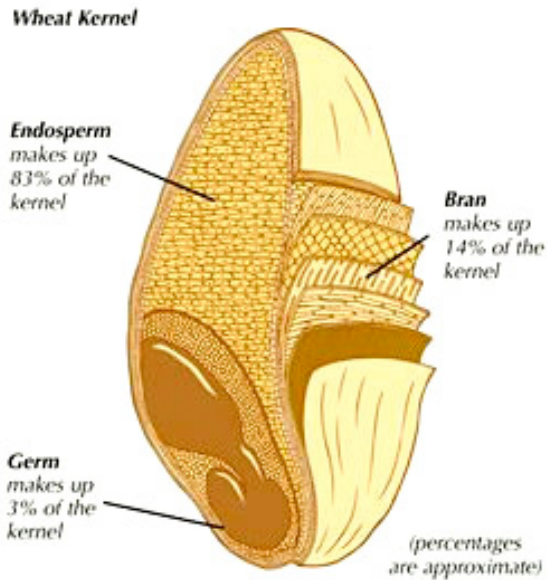
You have likely heard terms like Bran, Kernel and Germ as they relate to grains, but I want to take a moment to cover what exactly these structures are and what they contain. This general [diagram](#) from the Linus Pauling Institute illustrates the normal grain constituents. Here is what we find in the grain:

Bran: The tough outer coating that contains proteins, vitamins and minerals. That's the standard [ADA](#) position. (Eatright.org... what a damn farce. Keep your eyes open for that topic and others at our new blog... Sorry, back to bashing grains.) So the bran appears to be a bountiful harvest of nutrition. We will take that fallacy apart in greater detail later. For now just know that bran is also home to most of the antinutrients and gut-irritating protein constituents.

Kernel: This is where most of the nutritional action is, at least with regard to caloric content. This is where we find most of the carbohydrate in grains. If you have seen white rice you have seen the kernel.



Germ: This is actually the plant embryo and it contains a fairly dense source of fatty acids, mostly n-6, some protein and assorted vitamins and minerals. This is your average grain, and it is representative of grains ranging from wheat to rice to popcorn. A detailed understanding of grain taxonomy and structure is not my intent here, but it is important that you understand the components grains, as we will be talking about processing methods that may remove certain problematic fractions but inevitably leave others.



The Real Problems

Most of the problems related to grain consumption can be lumped into one of two categories: those related to hyperinsulinemia and those related to irritant/toxicant properties inherent to the grains. It is interesting to note that these properties of irritation and inflammation via hyperinsulinemia may be multiplicative with regards to deleterious health effects, i.e. one makes the other worse.

Did the food pyramid make all the Dieticians Chubby or did the Chubby Dieticians make the food pyramid?

Possibly the longest introduction for a paragraph you have ever seen but it is at the crux of the first problem with grains. Grains are mostly starchy carbohydrate, and starchy carbohydrate, when consumed in any amount, causes the release of a significant dose of insulin. The starch in grains can be subdivided into two basic forms, **amylose and amylopectin**.

Amylose is a long chain of glucose molecules and amylopectin is a highly branched, interwoven structure also comprised of glucose molecules. Think of amylose as a rope and amylopectin as a **dust bunny**. Grains are made up of differing amounts of amylose and amylopectin, and this variation accounts for differences in the glycemic index of various grains.

Starches are digested by the enzymes salivary amylase and pancreatic amylase. Amylase acts on the last glucose molecule in the polymer, whether it is amylose (rope) or amylopectin (dust bunny). I think it's pretty clear that the rope has far fewer locations for the amylase to attack in the digestion process than the dust bunny does. The more locations for the enzyme to attack, the faster the digestion, the quicker the rise in blood glucose levels, and typically the larger the insulin release. Any type of processing (cooking, milling) breaks up both the varieties of starch molecules, thus facilitating digestion. Easier digestion means a greater insulin response. The making of pizza crust fractures the starch grains in such a way that the body produces more insulin in response to pizza crust than raw glucose! No one knows why, but the processing inherent in most grain products can increase the insulin response far above what would otherwise be expected.

So grains can have a fairly wide-ranging glycemic index and thus insulin response and various forms of processing can greatly increase both those numbers and consequently their impact on our health. One of the fallacies that is still spewed forth by the likes of the ADA is that slow-releasing carbs (beans, whole grains) causes a flat insulin response and consequently do not pose a problem. This is true only if one is consuming grains as condiments, as in a tablespoon here and there. Eat them a cup at a time, and not only does blood glucose level rise dramatically, but it stays elevated for a long time. Research is pretty conclusive that the insulin spike is more detrimental than the lower level chronically elevated insulin, but the end results are the same: Syndrome X, AKA the Metabolic Syndrome (You always need multiple names for things in science and medicine to ensure that as few people as possible have an idea of what is going on). Grains, both processed and unprocessed, are a major player in metabolic derangement in that they are almost entirely carbohydrate and they are typically consumed in large quantities.

Now that we understand the relationship of grain consumption and the inevitable and deleterious rise in insulin levels, let's look more closely at what Syndrome X is. The word Syndrome is defined as "A collection or group of signs and symptoms that occur together and characterize a particular disease or abnormality." The signs and symptoms of Syndrome X include high triglycerides, low

HDL cholesterol, high blood pressure, high risk of stroke and heart attack... and a bunch of other stuff. Professor Loren Cordain wrote a paper that sheds some light on some of that "other stuff" Called "[Syndrome X: Just the Tip of the Hyperinsulinemia Iceberg](#)". That other stuff runs the gamut from cancer to myopia, but many diseases that have been associated with Syndrome X and hyperinsulinemia are slowly being put under the umbrella of Chronic Inflammation. We know that we are onto something hot when Barry Sears has a new topic that allows him to re-hash his Zone offerings. The [Anti-Inflammation Zone](#) is his most recent contribution to the Zone book club.

[Just a small digression here, but I think we are going to adopt Barry Sears's approach to rehashing material and combine that with the consistent subject lines of my Spam and we will start re-releasing the P-Menu with catchy titles like "The Anti-Penile Dysfunction P-Menu" or the "Better than Cialis P-Menu". No new content... just a new topic to hang the material from.]

Anyway, inflammation has many factors, including antioxidant and essential fatty acid status, but one of the key contributors to the condition we call inflammation is insulin level. Here is a detailed look at what happens with [elevated insulin levels](#) (Scroll down to insulin dysregulation).

The insulin and inflammation topic is absolutely huge and far beyond the scope of this article or publication for that matter. The main point is grains pack a potent impact with regards to insulin response and that can lead to a variety of problems.

Irritant/Toxicant

The next broad category I want to look at falls under the irritant/toxicant label. Let's look first at antinutrients. Grains are essentially a reproductive structure and contain not only a dense energy source for the developing embryo, but also a number of control mechanisms that prevent both predation and abnormal germination. Sequestering away key nutrients like calcium, zinc and magnesium prevents abnormal germination. One of the main antinutrients is a chemical called [Phytic acid](#) of which there are several varieties, all going by the general term "phytates".

Now the phytates are powerful chelators; that is they bind to metal ions very tightly. This is postulated to be the main reason why cultures that consume large portions of their diets as grains and/or legumes tend to be shorter than their westernized transplants. The

Okinawan vs. Japanese story is clearly illustrative of this. Okinawans have historically been significantly taller than their Japanese counterparts. The diets of the two groups differed in that the Okinawans consumed more protein and most of their carbohydrates in the form of highly nutritious tubers and only a modicum of rice. Japanese Americans show a markedly different phenotypic expression than their rice and tofu-eating ancestors. Just look at [Jeff Oji](#).

It is interesting to note that phytates are used in some alternative medicine circles as an [anti-cancer agent](#). Apparently phytates exert some influence on the growth of tissues by removing metal ions such as calcium, magnesium and zinc that are important for growth. This seems like a nice closed system: feed people grains, let them get cancer from the elevated insulin levels then use grain extracts (phytates) to try to treat their condition.

This antinutrient concept is found in all eggs including those of birds and reptiles. [Avidin](#) binds to biotin, which is an important growth factor for bacteria. Hide away the biotin and it's hard for the egg to spoil. These antinutrients are so powerful that avidin has even been [genetically engineered](#) into some grains... to extend their storage. Avidin is destroyed with cooking but phytates are not. Bon appetite!

Another sub category of irritants/toxicants includes items such as gluten. Gluten is a protein found in wheat and other grains. It is also categorized under a huge family of molecules called lectins. Many of these lectins actually damage or destroy the gastrointestinal tract. In the small intestine we have structures called [microvilli](#) that interact with the food in our intestines. Microvilli are covered with enzymes that help to digest and transport food particles into the blood stream or lymph. Certain proteins such as gluten found in wheat, rye and barley cause a severe autoimmune reaction in some individuals, which is called [Celiac Sprue](#). Celiac is a full-blown autoimmune reaction in which the microvilli of the intestines are destroyed. This condition makes it nearly impossible to absorb fats, minerals and many vitamins.

Not everyone shows a full blown celiac response; however, irritation is present with virtually all grain consumption. This lower level irritation has been broadly labeled as "leaky gut syndrome" and is emerging as a primary player in all autoimmune disorders. The theory is that once the gut lining is damaged, large food particles are able to make their way into the blood stream. Once there, the immune system mounts an attack against the foreign, undigested food particles. These particles may have elements that are similar in structure to body proteins and thus antibodies are produced that have affinity for one's own tissues. The seed of autoimmunity has then

been sown (nice grain cliché, no?). This is something that has been kicked around for many, many years, but some other very interesting disease processes have been uncovered, like **schizophrenia and congestive heart failure**, which appear to owe their existence, at least in part, to leaky gut. Nay Sayers (read also: The Ignorant) frequently make the point that not everyone gets celiac. That is true, but across all species tested, grains cause gut irritation. Check PubMed. This knowledge has even allowed the design of **experiments** looking at gut permeability and autoimmunity.

It is worth mentioning that dairy is a potent cross reactor for celiacs. It is fairly easy to assay dairy and get high concentrations of grain lectins. It has also been noted that grass-fed dairy shows little or no cross reactivity in celiacs. I'm going to look at some of the other deleterious effects of grain consumption for animals later, but this is obviously a source of grains that most people would not have considered.

Just to completely beat this into the ground, let's look at **quinoa**. Quinoa is similar to a grain in its carbohydrate content and layout as a reproductive structure, but **quinoa** is botanically a fruit, and if you remember your botany, is a dicotyledon, whereas wheat, obviously a grain, is a monocotyledon. Relevance? They differ phylogenetically at the class level. To put that in perspective, mammals are a class, as are fish, as are reptiles. This is a huge difference and denotes ages since a common ancestor. Despite that fact, quinoa still has a **protein** fraction that can cause problems with celiacs. What I take from this is nature found a similar answer to reproductive strategies with quinoa and grains, and not surprisingly, quinoa presents similar potential problems.

I want to mention just a few more things here. Grains also have a highly addictive nature beyond the carbohydrate content. They contain **opiate-like** substances that can be very problematic. Not surprisingly, these opioid constituents can be concentrated in dairy. Makes one look at pizza in a new and frightening way.

Grains are not just bad for humans; they give livestock some serious problems as well, ranging from creating heat and acid resistant forms of **E. Coli** to completely altering the fatty acid and nutrient content of **meat**. Grass-fed meat should contain significant amounts of n-3 fatty acids, alpha lipoic acid, CLA, Vitamin E and loads of carotenoids. Grain fed meat is the protein version of cardboard.

You Have It!

So, there you have it! Likely more than you EVER wanted to know about grains. But considering that our mission with the Performance Menu is to provide the best possible information on how to feed, water and exercise your person to optimize performance, health and longevity, avoiding such thoroughness with the topic would be a dereliction of our responsibilities. We advocate a Paleo/Zone approach to nutrition and jazz that up with some Intermittent Fasting. We feel strongly that both anecdotal and scientific research supports these positions. Grains obviously play a major dietary role for many people, but I hope this exploration helps to clarify why they may not be a wise choice for optimized health.