Probiotics Prevent Gluten Sensitivity and Intestinal Damage from Gliadin

October 12, 2013


Emerging therapeutic options for celiac disease: potential alternatives to a gluten-free diet.
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Source


Abstract

Celiac disease is an autoimmune disorder of the small intestine that is more common than was previously thought. This disease is caused by an inappropriate immune response to wheat gluten, barley, and rye. Three main pathways cause celiac disease: the environmental trigger (gluten), genetic susceptibility, and unusual gut permeability. The only treatment currently available is a strict gluten-free diet. Unfortunately, a majority of patients have difficulty complying with this diet, and the response to therapy is poor. Therefore, alternative treatments are being developed, and new insights into the pathophysiology of celiac disease have led to research into novel therapies. New treatments include engineering gluten-free grains, decreasing intestinal permeability by blockage of the epithelial zonulin receptor, inducing oral tolerance to gluten with a therapeutic vaccine, and degrading immunodominant gliadin peptides using probiotics with endopeptidases or transglutaminase inhibitors. These nondiet-based therapies provide hope for enhanced, lifelong celiac disease management with improved patient compliance and better quality of life.
In a startling paper discussing treatment alternatives for celiac disease, research from George Washington University School of Medicine finds that probiotics provide a viable solution for gluten digestion and intestinal health – and likely their absence provides the smoking gun for the cause of gluten sensitivities.

Celiac disease – an inflammatory immune response to the gliadin protein in gluten – has been increasing over the past few years, and research is illustrating that celiac disease is more prevalent than previously considered.

Gluten sensitivities also appear to be increasing, with more and more people in western countries – especially in the U.S. – opting for gluten-free diets. This typically comes from a sense many have had that the gluten foods in their diet produce intestinal irritations, including bloating and indigestion. For this reason, the term “gluten-free” has become ubiquitous among health food stores and consumers.

Meanwhile, we find that grain-based foods have been part of the human diet for thousands of years, and some of the healthiest diets – including the Mediterranean Diet – contain gracious quantities of wheat and other whole grains. This is not to mention of course the fiber content among whole grains and the research that has shown foods rich in fiber reduce heart disease and other metabolic disorders.

And many traditional societies – producing the diets of a majority of the world’s population, many of which are known for long lifespans – have grains as the cornerstone of their diet. These cultures also come with an absence of a history of intestinal problems.

This leads to the logical question: Has humanity really been poisoning itself with wheat and other gluten-containing grains (including barley, rye and others)? Or could there be something else going on?

The gluten mystery is solved

The mystery appears to have been solved, as significant research focus and several teams of investigators have confirmed that the inflammatory response to gliadin – initiated with an interleukin-15 mediated response – is inhibited by healthy intestinal probiotics.

A 2012 paper by three medical school professors studied the various means by which the effects of celiac disease may be mitigated – by inhibiting the inflammatory response. The paper’s authors include two professors who are gastroenterology professors at George Washington University School of Medicine, Anita Bakshi, M.D. and Sindu Stephen, M.D. Two other clinical M.D.s co-authored the research.

The researchers focused first upon the mechanisms of wheat gliadin protein upon the intestinal cells – which produce inflammation and intestinal permeability. These include the activation of a CD4+ T-cell response among the intestinal cells – which induces the secretion of a protein called zonulin. Zonulin then stimulates an increase in the spaces in the tight junctions between the intestinal cells, creating gut permeability.
Learn more about intestinal permeability – sometimes called “leaky gut.”

This opening between intestinal cells is accompanied by an even greater inflammatory response as the immune system responds to larger proteins having potential contact with the bloodstream.

While there are a number of studies that have shown these effects, the researchers singled out a few studies that clearly and specifically illustrated how intestinal probiotics in a healthy body will inhibit this process by breaking down gluten through protease (enzyme) activity.

In one of these, Irish researchers found that two enzymes produced from probiotic bacteria – prolyl endopeptidase and endoprotease B – were able to break down gluten into non-reactive elements, completely sidestepping the possible intestinal response.

This research was confirmed in a clinical setting by scientists at the Celiac Sprue Research Foundation in Palo Alto, California. Here 20 celiac patients were given small doses of gluten with and without (double-blind, randomized, cross-over) being pretreated with one of these probiotic-produced enzymes – prolyl endopeptidase. The cross-over study utilized two 14-day treatment periods in total, in a staged format.

The pretreatment with the enzyme allowed a majority of the celiac patients to avoid malabsorption of carbohydrates and fats – a typical symptom of celiac sprue response.

The researchers concluded that:

“Pretreatment of gluten with prolyl endopeptidase avoided the development of fat or carbohydrate malabsorption in the majority of those patients who developed fat or carbohydrate malabsorption after a 2-week gluten challenge.”

In a series of studies from Finland’s University of Tampere Medical School, researchers tested the probiotics strains Lactobacillus fermentum and Bifidobacterium lactis with gluten digestion and the inflammatory effects of gliadin.

They found that these live probiotics were both able to inhibit the inflammation response among sensitive intestinal (Caco-2) cells. In both instances the probiotics prevented the inflammatory response as well as prevented the formation of “membrane ruffles.”

Learn more about getting healthy with probiotics.

The researchers stated:

“B. lactis inhibited the gliadin-induced increase dose-dependently in epithelial permeability, higher concentrations completely abolishing the gliadin-induced decrease in transepithelial resistance.”

This of course means the probiotics reduced the amount of intestinal damage caused by the inflammatory response related to the gluten ingestion.
And in their conclusion, the researchers stated:

“We conclude thus that live B. lactis bacteria can counteract directly the harmful effects exerted by coeliac-toxic gliadin and would clearly warrant further studies of its potential as a novel dietary supplement in the treatment of coeliac disease.”

While the inflammatory response in celiac sprue is typically described as being the result of a genetic abnormality, intestinal irritation and indigestion to gluten in non-celiac people provokes similar mechanisms of inflammation – though not as vigorous – and not linked with genetic abnormality (yet).

The UGW researchers concluded after reviewing the research that:

“Inclusion of probiotics appears to be able to reduce the damage caused by eating gluten-contaminated foods and may even accelerate mucosal healing after the initiation of a gluten-free diet.”

These results have been confirmed by other research. In a study from earlier this year, researchers from Argentina’s University of Buenos Aires tested a probiotic supplement with 22 adults with celiac disease. The patients were given either capsules with the probiotic Bifidobacterium infantis or a placebo for 3 weeks.

Those taking the probiotic supplement had significantly lower levels of indigestion, constipation and other intestinal symptoms as gauged by the Gastrointestinal Symptom Rating Scale. Levels of IgA antibodies to gluten were also lower among the probiotic group.

The researchers stated:

“The study suggests that B. infantis may alleviate symptoms in untreated celiac disease.”

**How celiac research applies to gluten intolerance**

Certainly adult celiac patients are dealing with a dramatically heightened genetic response to the gluten protein, which is significantly greater than what is experienced by those even with some gluten sensitivity. And we cannot necessarily suggest that the the inflammatory immune response of a celiac sprue patient can be completely eliminated by gliadin enzymes released by probiotics, which break down those gliadin proteins. This is because the gliadin genetic imprint may still be recognized by the immune system – producing the antibody-driven inflammatory response.

However, the non-genetic immune response that produces some bloating and/or indigestion for non-celiac people sensitive to gluten has many of the same mechanisms – especially when it comes to creating intestinal permeability. And the research is showing that even among celiac patients, symptoms of gluten intolerance are reduced. So it would only be logical to conclude – as have many researchers – that gluten sensitivities outside of celiac disease may be alleviated with healthy intestinal flora.
We also have only been looking through a narrow beam of research investigating only a few enzymes and probiotics. A healthy human intestine is a microcosm of thousands of strains of probiotic bacteria which produce a myriad of enzymes that assist our body with the digestion of nature’s foods. So we are merely scratching the surface, yet the surface truly reveals the culprits involved.

After reviewing the research (before this last study), the GW medical professors supported this conclusion by stating:

“Supplementation with a variety of bacterial strains can help inhibit gluten/gliadin-induced damage in the small intestine.”

The ‘smoking gun’ for growing gluten sensitivities is identified

The research clearly identifies the smoking gun for the growth of intestinal irritability and gluten insensitivity: The steady and growing destruction of healthy probiotics within our intestines through an unbridled use of antibiotics and antiseptics.

When we examine the evidence: The fact that gluten sensitivities have been growing as the use of antibiotics and antiseptics have become increasingly utilized together with the findings that enzymes produced by probiotics break down gluten and gliadin into non-toxic constituents, we can only arrive at the conclusion that our gut microflora has everything to do with wheat and other gluten sensitivities.

And with this conclusion, avoiding all forms of gluten in our diets can not only be an arduous and close to impossible task – but it may become unnecessary if we learn to maintain healthy intestinal probiotics.

Wheat and grains are necessary for healthy intestinal probiotics

In fact, research from UK researchers has determined that gluten grains – and wheat in particular – also provide critical nourishment (prebiotics) for our intestinal probiotics. This has now been established in a number of laboratory and human clinical studies over the past couple of years.

For example, in research led by Professor of Food Microbial Sciences at the UK’s University of Reading, Dr. Glenn Gibson, 55 healthy men and women were given different doses of a wheat bran for three weeks. Those eating more wheat bran showed an increase in healthy probiotic bifidobacteria in their intestines and colons.

Another study led by Dr. Gibson tested 40 adults, and found the same conclusion: A polysaccharide named arabino-xylan-oligosaccharide – a component of wheat bran – was found to be the prebiotic. After many additional studies, it has been confirmed that arabino-xylan-
oligosaccharide is critical for the health of our intestinal probiotics – and this nutrient is now considered a prebiotic.

*Learn more about natural ways to reverse food allergies and sensitivities.*


**About the Author**

Case Adams is a California Naturopath and holds a Ph.D. in Natural Health Sciences. His focus is upon science-based natural health solutions. He is the author of 25 books on natural health and numerous print and internet articles. A listing and description of many of his books can be found on [Realnatural.org](http://Realnatural.org). His new video series on low back pain can be found at [Healthy-back.net](http://Healthy-back.net).

**REFERENCES:**


