Gluten Sensitivity / Celiac

What Is It?

Gluten is the insoluble protein constituent of wheat and other grains, a mixture of gliadin, glutenin and other proteins. It is the gluten in grains that makes the rising of flour possible.

Gluten sensitivity is an inflammatory reaction to eating foods containing gluten. It occurs mainly in the lining of the small intestine where an immune response is triggered against the gluten proteins. The degree of gluten sensitivity can be minor to life threatening. Thus, there are numerous terms, encompassing several different conditions, that involve some degree or form of gluten or grain sensitivity. This can be very confusing for those not acquainted with this subject.

Celiac disease, which is the most severe form of gluten sensitivity, can, in fact, go by six different names: sprue, non-tropical sprue, celiac sprue, gluten-induced sprue and gluten-induced enteropathy. These are terms for true celiac disease.

Due to the fact that many people are gluten sensitive, there has been a paradigm shift, and the new term for this condition is “non-celiac gluten sensitivity” or, simply, “gluten sensitivity.”

Until 200 years ago, the wheat used to make bread had two sets of chromosomes (made up of DNA) in its molecular structure. This is also known as 2N, or diploid chromosome structure. With the development of agricultural hybridization, which combines different varieties and even species of plants to “improve” crop production, the wheat plant has drastically changed over time, so that it no longer has a 2N structure.

Wheat plants of today have from six to even 12 or more sets of chromosomes. This means that wheat has a much more complex DNA structure than it did originally. One particular amino acid sequence in modern wheat, known as 33-mer, not present in wheat before agricultural progress, is unable to break down in the digestive tract. In patients with celiac disease, 33-mer is acted upon by an enzyme that initiates an inflammatory immune response in the small intestine creating the intestinal damage found in these patients.
What Causes It?

There are several causes of gluten sensitivity. They include: bacterial, viral or fungal infections, other food sensitivities, stress, chemotherapy or anything that would cause a chronic increase in leaky gut or intestinal permeability. Gluten sensitivity is a chronic disorder caused by an inability to properly digest foods that contain gluten. These foods include:

- Wheat
- Rye
- Barley
- Possibly oats

The failure to properly digest these foods results in damage to the cells lining the small intestine that in turn causes malabsorption of nutrients from food. Gliadin is the main protein component in wheat that causes difficulty for those suffering from gluten sensitivity. However, similar proteins in other grains may cause the same reaction such as: hordein in barley, secalin in rye and avidin in oats.

Current research suggests that the gliadin is absorbed between cells, and certain fragments of gliadin induce intense immune inflammatory reactions that injure the bowel lining further exacerbating the injury. In addition, antibodies produced in the immune reaction can cross react with other tissues and produce a wide array of autoimmune diseases. Interestingly, gliadin that has been completely broken down by digestion does not activate gluten sensitivity in susceptible individuals. This suggests that gluten sensitivity may arise from a deficiency of enzymes that break down gliadin or other factors involved with protein digestion.

The inflammatory immune response typical of celiac disease eventually destroys the villi of the intestines through which nutrients are absorbed into the bloodstream.

In addition, the inflammation can break the junctions between the cells of the intestinal lining through which larger toxins can be absorbed. Through this increased intestinal permeability, or leaky gut, toxins enter and directly interact with the immune system located within the intestinal wall (gut-associated lymphoid tissue or GALT). These toxins trigger antibodies that go into the bloodstream where they circulate throughout the body. It is important to realize that not everyone with gluten sensitivity has full blown celiac disease. Some people simply lack the enzymes needed to properly break down gluten that can cause leaky gut and inflammation, even if it doesn’t create the full immune response of celiac disease.

The stage may be set for development of celiac disease in infancy. The early introduction of cow’s milk is believed to be a major causative factor in celiac disease. Early introduction of cereals appears to be another factor. In fact, research has indicated that delayed administration of [both] cow’s milk and cereal grains are the primary preventive steps that can greatly reduce the risk of developing celiac disease. Interestingly, these are often the very first foods introduced in an infant’s diet. Another study showed the protective effects of introducing gluten-
containing products before the child was weaned from breast milk. This is likely due to the increased immune benefits that come from breast milk, highlighting the importance of breastfeeding for longer periods of time.

Celiac disease, in some cases, has a hereditary component. Therefore, many family members may be affected. The disease is usually identified in early childhood, but may disappear in adolescence and reappear later in adulthood. It can also make its first appearance in adult years. Celiac disease occurs twice as often in females as in males, and primarily affects Caucasians and people of European descent. It rarely occurs in people of African, Jewish, Mediterranean or Asian descent. The highest incidences of the disease occur in northern and central Europe, the northwestern Indian subcontinent and any other areas where wheat cultivation is a relatively recent development. Estimates of the frequency of the disease in the United States vary widely from source to source, often ranging from one in 1,000 to one in 5,000 people. However, recent studies show that silent, or subclinical, celiac disease affects many more people than previously thought. For every celiac patient diagnosed, there are eight more who have not been diagnosed.

There are many other factors which may contribute to gluten sensitivity. While genetics plays a role; so do factors such as other food sensitivities, intestinal infections (including viral infection), surgery, extreme stress, child birth and the consumption of a Standard American Diet (SAD). Others who have an elevated risk of developing celiac disease are those with Down’s syndrome, Type 1 diabetes or chronic arthritis in childhood.

**What Are the Signs and Symptoms?**

Some people with gluten sensitivity have no symptoms, while others become quite ill experiencing:

- Weight loss
- Gas and bloating
- Diarrhea (which is typical of malabsorption)
- Abdominal pain
- Nutritional deficiencies
- Anemia (due to iron deficiency)
- Edema (fluid accumulation in the extremities due to a decrease in blood protein)

- Steatorrhea (gray or tan, fatty, greasy, foul-smelling stools that float)
- Dermatitis herpetiformis (a chronic skin condition)
- Weakness
- Lack of appetite
- Early satiety (feeling full after eating a small amount of food)
- Nausea/vomiting
- Depression
- Fatigue
- Irritability
- Muscle cramps and wasting
- Joint and/or bone pain

The first five listed are usually the first to develop. Celiac disease may cause slow growth in children, and suppress the onset of menses in adolescent girls. Also, children may exhibit behavior changes, develop blisters and sores, or a red rash all over their bodies; they may also develop mouth ulcers. On the other hand, symptoms in children may be mild and are apt to be dismissed as a simple stomachache.

The immune response that is produced with gluten sensitivity may also occur in other organs. The central and peripheral nervous systems are particularly vulnerable. In fact, in one recent study, neurologic disorders or findings were found in 51 percent of celiac patients.

There are many conditions in which gluten sensitivity is an underlying factor. Some of these include:

- Inflammatory bowel disease (IBD)
- Non-alcoholic fatty liver disease (NAFLD)
- Pancreatic disease
- Infertility
- Insulin-dependent diabetes
- Thyroid disease
- Lupus
- Rheumatoid arthritis
- Chronic fatigue syndrome
- Dementia
- Depression
- ADD/ADHD
- Autism
- Schizophrenia

Bear in mind that, while symptoms of gluten sensitivity and celiac disease may be severe, they may also be absent.
New research shows that traditional gastrointestinal symptoms may be delayed for up to eight years in some adults with the first clinical signs being iron deficiency anemia, bone disease and sterility in women.\textsuperscript{20}

A person with mild wheat intolerance may not have the inflammation in the cells lining the intestine, but nevertheless may experience such symptoms as gas and bloating, distention and even diarrhea.\textsuperscript{21}

### How Is It Diagnosed?

Diagnosis of celiac disease by symptoms alone is not possible with any degree of accuracy because of its similarity to aspects of other disorders: irritable bowel syndrome, gastric ulcers, anemia, intestinal infection, food allergy, gastroesophageal reflux disease, ulcerative colitis, Crohn’s disease, lactose intolerance, HIV-related diseases and certain cancers.\textsuperscript{22-24} It is common, therefore, to run certain tests to rule out or confirm the celiac disease diagnosis.

Traditionally, a blood test to check for IgA and IgG antibodies to gliadin (a subfraction of gluten) and a tissue transglutaminase antibody is often done. The transglutaminase antibody is most specific (found in 95 percent of cases of celiac) and is related to destruction of the intestinal lining. However, it has been determined that this test is ineffective in detecting most patients with subclinical or silent gluten sensitivity.\textsuperscript{25} If these tests yield a positive result, they would ideally be followed by a biopsy of the small intestine that would reveal if damage to the villi is present, giving a definitive diagnosis. The biopsy is typically done in conjunction with endoscopy. Some doctors may choose to forego the biopsy, basing their diagnosis instead upon blood-test results and symptoms.

Recently, a more sensitive anti-gliadin stool antibody test has been developed by EnteroLab (see the Appendix). They found that, in hundreds of tested patients, only nine percent had anti-gliadin antibodies present in the blood, while 79 percent had the antibodies present in stool.\textsuperscript{26} This is possible because the very first immune response occurs inside the intestine where the intra-epithelial lymphocytes are located. They release antibodies in the intestine that are then carried out of the body with stool. What does this mean? It means that it is now possible to detect gluten sensitivity before it has damaged the intestine. If anti-gliadin antibodies are detected in the blood, it is likely that the intestine has already been damaged, and that the antibodies may also be damaging other tissues in the body. By detecting the first stages of gluten sensitivity, possible with the stool test, the patient can then remove gluten and related grain proteins from the diet before the intestine becomes damaged.

Another test that is available is a saliva test for IgA antigliadin and transglutaminase antibodies. In patients with active celiac disease, this test has been shown to be reliable.\textsuperscript{27}

Many people have found that, once they implement a gluten-free diet, their health greatly improves. This alone can be a simple tool for those who believe that they may have a gluten sensitivity.
Lactose intolerance is common in those with celiac disease due to the fact that the damaged intestinal cells temporarily lose their lactase enzyme activity making it impossible to digest the lactose in dairy products. Some doctors may therefore choose to also test for lactose intolerance using a lactose breath test (see the Appendix), in addition to using the tests described above for celiac disease.

A patient who is making antibodies to gluten, but has no intestinal damage, would be diagnosed with gluten sensitivity rather than celiac disease, which is a more progressed form of gluten sensitivity. With either diagnosis, there is a probability of increased intestinal permeability (leaky gut). Physicians who are aware of this condition may elect to order intestinal permeability screening. (See the Appendix.) It is also useful to assess digestive efficiency with the comprehensive stool analysis (CSA).

**What Is the Standard Medical Treatment?**

Once diagnosed, prompt and thorough treatment of celiac disease is essential, for without treatment, the disease can result in malnourishment that will adversely affect the entire body. There is no known cure for celiac disease, but it can be controlled by a lifelong adherence to a totally gluten-free diet. The removal of gluten-containing grains and other gluten-containing foods from the diet eliminates irritation giving the intestine a chance to heal. Strict adherence to a totally gluten-free diet results in the disappearance of symptoms, prompt healing of the intestinal lining and the gaining back of lost weight.

The problem is that it is not always easy to identify—much less avoid—all gluten-containing food products, particularly when there is such an abundance of processed and genetically modified foods that are wheat-based or wheat-containing. It has been shown that the closer a grain is related to wheat, the greater its ability to activate celiac disease.\(^\text{28}\) There has been some controversy as to whether those with celiac disease can safely eat oats. Although several studies suggest that people with the disease can safely eat them, since oats are often processed along with other grains, cross contamination may occur.\(^\text{29}\)

The list in the chart on this page is by no means comprehensive, but it gives a good idea of how much hidden gluten there is in commonly consumed foods. Add to this the fact that celiac disease patients may also need to avoid dairy products, as well as any foods to which they may be allergic, it is easy to see how food selection and preparation can be quite problematic.

The good news for the patient with gluten sensitivity is that there are many supportive organizations (see Resource Directory), periodicals and products to help make life easier. The magazine “Living Without” (www.livingwithout.com) carries current information about many lines of gluten-free products of all types. These including baked goods and pastas made with safe grains: rice, soy, potato, corn, quinoa, millet, amaranth, sorghum and buckwheat (which is not actually wheat).

Some people with a severe or long-standing case of celiac disease may not respond to dietary management. In other words, their symptoms may not subside when they eliminate gluten. In such cases, doctors often prescribe corticosteroids to bring down the inflammation in the intestine. If damage to the small intestine is extensive, affected sections of tissue may have to be surgically removed.

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**Hidden Sources of Gluten**

- Modified food starch
- Caramel coloring
- MSG
- Malted milk
- Flavored and instant coffees
- Soy sauce (some brands)
- Hydrolyzed vegetable proteins
- Packaged rice mixes
- Creamed vegetables
- Some non-dairy creamers
- Prepared meats (like sandwich meats, hot dogs)
- Salad dressings
- Vodka, ale, whiskey, beer, gin, wine, malt
- Ovaltine
- Ice cream
- Soup or bouillon cubes
- Chocolate
- Catsup
- Pie fillings
- Baking powders
- Chewing gum
- Dry seasoning mixes
- Processed cheeses
- Vanilla and flavorings made with alcohol
Dr. Smith’s Comments

I have personally seen patients with a wide variety of conditions in which gluten sensitivity has been implicated. One case was a 19-year old college student with a gradual history of pressure sensations in the back of his head and visual difficulties, especially precipitated by exercise. His MRI scan and neurologic exams were normal. ELISA food-sensitivity testing showed a 2-3+ sensitivity to wheat and dairy, and he was a blood type O. Strict removal of gluten and dairy foods, while adding antioxidants and fish oils, has decreased his symptoms considerably over several months.

Another case involved a 52-year-old truck driver, who, over a period of several years, noted increasing abdominal cramping and diarrhea, especially after eating pizza. He could relieve the symptoms somewhat if he took a probiotic product before eating pizza. He presented to the hospital with massive bloody diarrhea and toxic megacolon. He improved somewhat on strict hospital treatment; however, on colonoscopy, he had severe ulcerative colitis. He eventually had to have a subtotal abdominal colectomy.

What is the common link in these cases, as well as the many others with conditions ranging from childhood type 1 diabetes, to multiple sclerosis to colon cancer? I believe it begins not with a sensitivity to wheat, but with leaky gut or increased intestinal permeability. There are many causes of this that have nothing to do with wheat. Some common causes are:

- Excessive sugar and simple carbohydrates in the diet, which can promote an overgrowth of yeast, especially Candida, and pathogenic bacteria.
- Stress, dehydration, poor mucus production, poor nutrition, antioxidant status and genetics
- Alcohol consumption and food sensitivities

It is known that a protein produced in the intestine called “zonulin” can, under certain conditions, increase the paracellular permeability. When this happens, the gliadin gets by the lining into the submucosal area, and it is here that a variety of severe immune events can take place. It could be that when children have a gastrointestinal flu syndrome with diarrhea, the resultant transient increased permeability may set the stage for serious sensitivities to wheat and dairy if they are introduced back into the diet before the intestinal tract has healed. This could be as long as three to five days during which time soups and cooked vegetables should be the diet of choice. Similarly, over-consumption of alcohol while eating commonly sensitive foods, such as wheat and dairy, could be the start of a sensitivity to a previously tolerated food.

There is data in the pediatric literature showing that pre-treating of wheat- and dairy-sensitive children with sodium chromoglycate (a histamine blocker) will actually prevent the expected increase in intestinal permeability. In addition, there is data suggesting that the herb quercetin can block histamine release and prevent leaky gut as well. Any symptoms suggestive of gastrointestinal dysfunction, particularly in combination with inflammation in the body, such as arthritis or fibromyalgia, should warrant food sensitivity testing and elimination of sensitive foods as a starting point.
In this chapter, two conditions are addressed: gluten sensitivity and celiac disease. With both conditions, the solution is the same: take gluten out of your diet.

I am glad to see that the science behind detecting gluten sensitivity and celiac disease has really progressed since I first started practicing in a clinic 20 years ago. During my years of helping others, I encountered many people with terrible health problems who never knew that they had gluten sensitivity. The methods of testing for this in the past have been inaccurate. Unfortunately, these same inaccurate methods are used by traditional medicine still today.

At EnteroLab, Dr. Fine has developed a stool test that is able to detect gluten sensitivity where it happens first—in the gut! The testing used by traditional doctors looks for gluten sensitivity markers only in the blood, but the markers make their way into the bloodstream only after there is considerable damage to the intestine which allows them to get through. By the time these gluten-sensitive or celiac markers have entered the bloodstream, the condition is quite progressed. The beauty of the stool test is that it can detect if you are reacting to gluten in the gut before too much damage is done to the intestine.

For years I followed a diet that was very low in gluten, but did not exclude it entirely. Then one day, recently, I woke up with pain and inflammation in the joints of my hand. I went to the doctor who told me that it was arthritis—just a normal part of getting older. I did not accept this as my final answer. Because I know that many health conditions are rooted in gut health, I did the gluten sensitivity stool and gene test from EnteroLab. (See the Appendix.) I discovered that I have two genes that make me more likely to develop gluten sensitivity or celiac. I also had elevated levels of the IgA immune markers, indicating an immune response to gluten in the gut.

After that I was very careful to avoid all gluten, but it still took six months of the diet and supplementation before my hand pain completely healed. For more complex health conditions that are triggered by gluten sensitivity it can take a while for the body to heal. It takes a high level of commitment, and the results can be amazing.

**Rule Out:**

- Candida overgrowth (See the Candidiasis section.)
- Parasites (See the Parasitic Disease section.)
- Dairy (casein) sensitivity

**Recommended Testing**

- Gluten sensitivity test (See the Appendix.)

**Diet**

- Follow either the Candida Diet or the Fiber 35 Eating Plan minus any gluten-containing foods.
- Gluten sensitivity is much more common than most people are aware. Most of us can benefit from a gluten-free diet regardless of whether or not we have celiac disease.
- Remember that beer, ale, gin, whiskey and vodka are distilled from grain.

**Lifestyle**

- Learn to read labels carefully. Educate yourself on the many foods, other than wheat, that may contain gluten such as luncheon meats, grain vinegars, condiments and seasonings.
- When dining out, inquire about sauces or “secret” ingredients. Let the waiter and cook know that you are on a no-wheat or gluten-free diet restriction.
- Join support groups as they offer lots of food ideas.

**Complementary Mind/Body Therapies**

- Colon hydrotherapy can be helpful in removing toxins from the colon.
- Massage, yoga, biofeedback and meditation can help you relax and assist in the healing process.
<table>
<thead>
<tr>
<th>Recommended Nutraceuticals</th>
<th>Dosage</th>
<th>Benefit</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Critical Phase</strong></td>
<td></td>
<td></td>
<td>Daily maintenance recommendations should also be taken during this phase unless otherwise indicated.</td>
</tr>
<tr>
<td><strong>Follow daily maintenance protocol below</strong></td>
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<tr>
<td><strong>Helpful</strong></td>
<td></td>
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<tr>
<td>High Potency Multi-vitamin/mineral</td>
<td>Use as directed</td>
<td>Provides needed nutrients that can be deficient with those who are gluten sensitive or celiac.</td>
<td>Powder formulation would be helpful as it is easier assimilated and absorbed.</td>
</tr>
<tr>
<td>Antioxidant Supplement</td>
<td>Use as directed</td>
<td>Protects tissue from damage.</td>
<td>You can purchase a high potency antioxidant formulation from most health food stores.</td>
</tr>
<tr>
<td><strong>Daily Maintenance</strong></td>
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<tr>
<td>Probiotics</td>
<td>50 to 200 billion cultures daily</td>
<td>Numerous benefits to intestinal health, helps reduce gut permeability and food sensitivities.</td>
<td>For Celiacs: 200 billion powdered formulation For Sensitivity: 50-80 billion capsule</td>
</tr>
<tr>
<td>Digestive Enzymes</td>
<td>Take with meals</td>
<td>Helps break down proteins and other nutrients, possibly reducing reactions to undigested food.</td>
<td>Make sure it has high amounts of protease, amylase, lipase and cellulase.</td>
</tr>
<tr>
<td>Essential Fatty Acids</td>
<td>At least 2 grams daily of omega combination</td>
<td>Helps restore moisture to the intestinal tract. Provides lubrication.</td>
<td>Best combination is flax, fish and borage oils.</td>
</tr>
<tr>
<td>Fiber</td>
<td>4-5 grams twice daily</td>
<td>Helps keep food moving through bowel, reduces toxic colon and accumulation of wastes.</td>
<td>Look for a flax-based fiber with added ingredients such as glutamine, probiotics and healing herbs.</td>
</tr>
<tr>
<td>L-Glutamine Powder with Gamma Oryzanol</td>
<td>5,000-10,000 mg daily in divided doses</td>
<td>Helps repair the intestinal lining, reducing permeability and severe reactions to foods.</td>
<td>Best if taken in powder form.</td>
</tr>
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See further explanation of supplements in the Appendix