

How Gluten and Modern Food Processing Contribute to Poor Health

STORY AT-A-GLANCE

- > Gluten is a protein made up of glutenin and gliadin molecules, which in the presence of water form an elastic bond. Gluten is found primarily in wheat, rye and barley, but other grains may contain it as well
- > For those with celiac disease, a severe gastrointestinal reaction to gluten, a gluten-free diet is vital. But many have some level of gluten intolerance or sensitivity, and fare better on a gluten-free diet as well
- > Besides gluten, other factors contributing to the rise in gluten intolerance and similar symptoms include wheat hybridization for higher gluten content, other wheat components, the milling or baking process and glyphosate contamination

By Dr. Mercola

"Gluten: A Gut Feeling" investigates the health effects of gluten. In recent years, the benefits of a gluten-free diet have become widely recognized, its popularity fueled by celebrity endorsements and an increasing number of books.

This includes The New York Times Best Seller, "[Grain Brain](#)," written by Dr. David Perlmutter, a neurologist, in which he reveals how processed grains can trigger neurological dysfunction and worsen dementia.

My own book on this subject, "[The No-Grain Diet](#)," was published 13 years ago in 2003. My clinical recommendation included eliminating gluten as a first line intervention before I would further fine-tune a patient's diet.

For those with [celiac disease](#), a severe gastrointestinal (GI) reaction to gluten, a gluten-free diet is vital. But physicians are also starting to recognize that many have some level of gluten

intolerance or sensitivity, and fare better on a gluten-free diet even if they don't have celiac disease.

What Is Gluten?

Gluten is a protein made up of glutenin and gliadin molecules, which in the presence of water form an elastic bond. Gluten is most commonly found in wheat, rye and barley.

Gluten can also be found in countless processed foods without being labeled as such. For example, gluten can hide under a variety of labels, including the following:

- Malts
- Starches
- Hydrolyzed vegetable protein (HVP)
- Texturized vegetable protein (TVP)
- Natural flavoring

Celiac.com has a long list of label ingredients that typically contain hidden gluten.¹

How Gluten May Damage Your Health

The word "gluten" comes from the Latin word for glue, and its adhesive properties hold bread and cake together. As noted in the video, bread makers may also add extra gluten in order to create a more spongy texture.

But those same "binding" properties also interfere with the breakdown and absorption of nutrients, including the nutrients from other foods in the same meal. The result can be likened to a glued-together constipating lump in your gut, which can impede proper digestion.

The undigested gluten then triggers your immune system to attack the lining of your small intestine, which can cause symptoms like diarrhea or **constipation**, nausea and abdominal pain.

Over time, your small intestine becomes increasingly damaged and inflamed. This in turn can lead to malabsorption of nutrients and nutrient deficiencies, anemia, osteoporosis and other

health problems.

The condition can also cause a wide array of other symptoms that are not gastrointestinal in nature, including neurological or **psychological problems**, and problems related to the skin, liver, joints, nervous system and more.

Celiac disease is also connected to autoimmunity. If you're diagnosed with celiac's after the age of 20, your chances of developing an autoimmune condition skyrocket from the average 3.5 percent to 34 percent. Undiagnosed celiac disease is also associated with a nearly four-fold increased risk of premature death.²

Wheat Has Changed Dramatically

Wheat is one of the most widely grown crops in the Western world. But the wheat of today is vastly different from the wheat our ancestors grew and ate. This is likely part of the explanation as to why celiac disease and gluten intolerance have risen four-fold since the 1950s.

Some believe the sharp increase is merely a sign of improved diagnosis, but research suggests the rise in prevalence is real, and that dramatic changes in the diet play a distinct role.³

The proportion of gluten protein in wheat has increased enormously as a result of hybridization. Until the 19th century, wheat was also usually mixed with other grains, beans and nuts; pure wheat flour has been milled into refined white flour only during the last 200 years.

The resulting high-gluten, refined grain diet most of you have eaten since infancy was simply not part of the diet of previous generations.

How Gluten Triggers Leaky Gut

According to some experts interviewed in the featured video, including Dr. Alessio Fasano, director of the Center for Celiac Research in Massachusetts, mankind did not evolve to eat gluten and therefore cannot digest it properly.

Research suggests the human gut views gluten as a foreign invader against which it must mount an immune response, and Fasano believes this is true for everyone.

However, that doesn't mean everyone must avoid gluten. Most people, he says, can handle gluten without clinical consequence. Others are not so lucky. People with autoimmune disorders are particularly at risk for complications.

Sixteen years ago, Fasano and his team found that gluten can stimulate a molecule in your gut called zonulin — a protein that triggers the opening of junctures between the cells in your gut lining.

In essence, it makes your gut more permeable, allowing food particles to escape into your bloodstream, causing inflammation, immune reactions and raising your risk of various autoimmune disorders. This is known as leaky gut syndrome, and you don't have to have celiac disease to suffer the consequences of leaky gut.

Glyphosate-Treated Wheat Promotes Celiac Disease, Immune Reactions and More

While the question of whether gluten should be avoided by everyone is a controversial one, it's quite clear that today's wheat is far riskier than the wheat of bygone days, and that it causes problems for many.

Stephanie Seneff, Ph.D., a senior research scientist at the Massachusetts Institute of Technology (MIT), believes the recent rise in celiac disease is related to the use of glyphosate. Together with [Anthony Samsel](#), Ph.D., Seneff has published some fascinating research on this connection.^{4,5}

Glyphosate — one of the most widely used herbicides in the world and an active ingredient in Monsanto's Roundup — has been shown to severely damage your gut flora and cause chronic diseases rooted in gut dysfunction. It's actually patented as an antibiotic.

In March 2015, the International Agency for Research on Cancer (IARC), which is the research arm of the World Health Organization (WHO), determined glyphosate is also a "**probable carcinogen**" (Class 2A). Their determination was based on "limited evidence" showing it can

cause non-Hodgkin's lymphoma and lung cancer in humans, along with "convincing evidence" it can cause cancer in animals.

The use of glyphosate on wheat crops specifically has risen in tandem with the rise in celiac disease. In fact, according to Samsel and Seneff, it correlates to a greater degree than glyphosate usage on corn and soy.

You may not have realized this, but desiccating⁶ non-organic wheat with glyphosate just before harvest became popular about 15 years ago. When the mature wheat is exposed to a toxic chemical like glyphosate, it releases more seeds. This results in slightly larger yield, which is why most wheat farmers do it.

But it also means that most non-organic wheat — and all the processed foods that contain it — is contaminated with glyphosate. And we now know this may have serious health ramifications.

Not only does the glyphosate seriously impair the villi in your gut, it also inhibits a process that normally helps your body digest wheat proteins. The gliadin in gluten is difficult to break down and digest. Normally a reaction takes place that builds connections between different proteins in the wheat.

Glyphosate appears to attach to the gliadin as a consequence of a chemical reaction, and by interfering with the protein connections, glyphosate makes the wheat highly indigestible — more so than it already is — and more likely to cause an immune reaction and gut dysbiosis.

Other Intolerances Can Mimic Gluten Sensitivity

Researchers are also looking into other ingredients in wheat and have discovered there are a number of other proteins and compounds that can cause sensitivity. So if you find yourself feeling better on a gluten-free diet, even if you've been cleared of celiac disease, you could be sensitive to some of the other ingredients in wheat.

These include proteins like albumins, globulins and amylase trypsin inhibitors, and the carbohydrate fructan, a type of fermentable oligo-di-monosaccharides and polyols (FODMAP).⁷

FODMAPs (which also include fructose, lactose, galactans and polyols) are sugars that are either poorly absorbed in your small intestine or completely indigestible. They can cause symptoms very similar to those of gluten sensitivity, and FODMAPs are often found in things that contain gluten.

While FODMAPs are typically beneficial for your gut microbes, in those who are sensitive to them, such as those with irritable bowel syndrome (IBS), FODMAPs can cause severe GI distress. The Paleo diet is low in FODMAPs, which is likely one of the many reasons for why people tend to feel better when switching to this kind of diet.

Panification and Wheat Milling — 2 Additional Culprits

Aside from glyphosate contamination, which is not discussed in this video at all, two other explanations for the rise in celiac disease and gluten intolerance have to do with how wheat is milled and bread is baked these days. The way we mill wheat changed significantly with the advent of modern food processing.

The endosperm and the starch are roller milled, but all the other ingredients are first extracted and then added back in at varying proportions, depending on the requirements of the end product. What you end up with is highly refined wheat flour that is more likely to cause GI problems.

Whole grain flour is made by grinding the whole grain using a stone mill. Nothing is taken out and nothing is added in. The end product contains the entire grain, hence the term "whole grain." The process is much simpler and less destructive to the nutritional content of the grain.

While whole grain bread still contains gluten, it might not cause as severe a problem if you don't have celiac disease. Some believe the problems attributed to gluten may in fact be related more so to the chemicals used during the processing of refined wheat flour, than to gluten itself.

"Panification," referring to the process of baking bread, has also undergone dramatic changes. In the past, flour was mixed with water and yeast, and the dough was then left to rise overnight. This process allowed enzymes in the yeast to break down the gluten. Your body lacks these enzymes, and cannot replicate this breakdown process.

Today, bread makers no longer let dough rise for up to 18 hours. The addition of various chemicals has cut down the process to about two hours, which is not long enough for the gluten to be broken down. Hence, most bread today contains far more indigestible gluten than breads in the past.

How to Treat Gluten Intolerance and Celiac Disease

The **treatment for celiac disease** and gluten intolerance is a gluten-free diet, which means abstaining from any food that contains gluten. In August 2013, the U.S. Food and Drug Administration (FDA) issued a standard for **gluten-free labeling**. According to the rule, in order for a food to bear the label "gluten-free" it must be:

- Naturally gluten-free. Naturally gluten-free grains include rice, corn, quinoa, sorghum, flax and amaranth seed.
- Any gluten-containing grains must have been refined in such a way to remove the gluten. The final product may not contain more than 20 parts per million (ppm) of gluten.

A **blood test can verify whether or not you actually have celiac disease**. If you do, you'll need to be extremely vigilant, as exposure to gluten could make you severely ill and threaten your long-term health and longevity. If you're gluten intolerant, you do not need to be as strict with your diet, and you may eventually discover your own tolerance level to gluten.

For example, one piece of bread may not result in any discomfort, but two pieces, or bread two days in a row, might. Typically, avoiding gluten for a week or two is enough to see significant improvement. Considering the many potential culprits at play, be it wheat hybridization, gluten, other wheat proteins, fructans, the milling or baking process, or glyphosate contamination, it's not surprising that wheat (and other grains) cause such problems for so many.

In my experience, nearly everyone benefits from avoiding grains, even whole sprouted grains, whether you have a gluten intolerance or not, and that's because grains have high net carbs and avoiding them will help improve your mitochondrial function. Impairing mitochondrial function can exacerbate health problems related to insulin resistance, such as overweight, high blood pressure, **type 2 diabetes**, and more serious problems like heart disease and cancer.