

Gluten: What is it?

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Gluten can be a very difficult issue to understand. When I suggest a gluten-free diet to someone, I am often asked, “Is it ok to eat a little gluten?” My response typically is: “That is like asking me if it is ok to eat a little poison or a lot of poison.”

I understand the resistance to eliminating gluten, as I experienced the same resistance when it was first suggested I become gluten-free many years ago. After doing research on what gluten actually is, I decided it was important to eliminate it from my diet. So, I am going to share the findings of my research in this article. Hopefully this information will enable you to better understand why this has been suggested to YOU and why this might be a good choice for you.

As you read this article you will find I include so much more information than defining “what gluten is.” This is because as I embarked on this journey defining ‘what gluten is’ my initial goal was to enable you to better understand gluten. During this process I uncovered and learned some fascinating information which I thought relevant enough to include in this article.

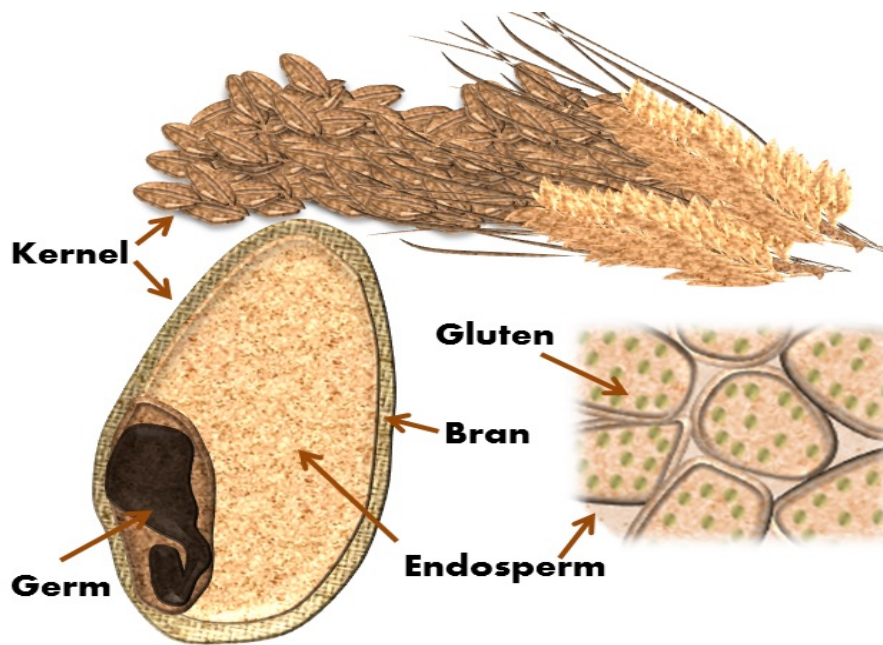
Here is some basic background information.

What is Gluten?

Gluten Definition

Gluten is a protein found in most grains. In Latin, gluten means “glue” and that’s exactly what it is: two proteins, gliadin and glutenin, stuck together. Gluten is a mixture of hundreds of distinct proteins within the same family, although it is primarily made up of two different classes of proteins: **gliadin**, which gives bread the ability to rise during baking, and **glutenin**, which is responsible for dough's elasticity. Gluten helps foods maintain their shape, acting as glue that holds food together. Not all grains contain gluten.

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The Gluten protein is mainly found in the endosperm of grain Kernel (seed)

What foods contain Gluten?

Gluten is a general name for the proteins found in wheat, wheatberries, durum, emmer, semolina, spelt, farina, farro, graham, barley, rye, KAMUT® (also known as Khorasan rye), and triticale (a cross between wheat and rye). This means it is in a myriad of products, from the usual suspects like bread, bagels and cereals to those that are not nearly as obvious. Sometimes you need to read, then think, about what is in the product's ingredients list. For example, meat substitutes, bouillon cubes, licorice, condiments, granola, sauces, gravies and lip balm may have gluten ingredients in them. This list serves as a partial list only. Reading the ingredients listed on the label is key to ensuring you are purchasing 'gluten free' foods. Many manufacturers have added the terms "GF" and/or "Gluten Free" to their labels to educate the consumer about the product not containing gluten.

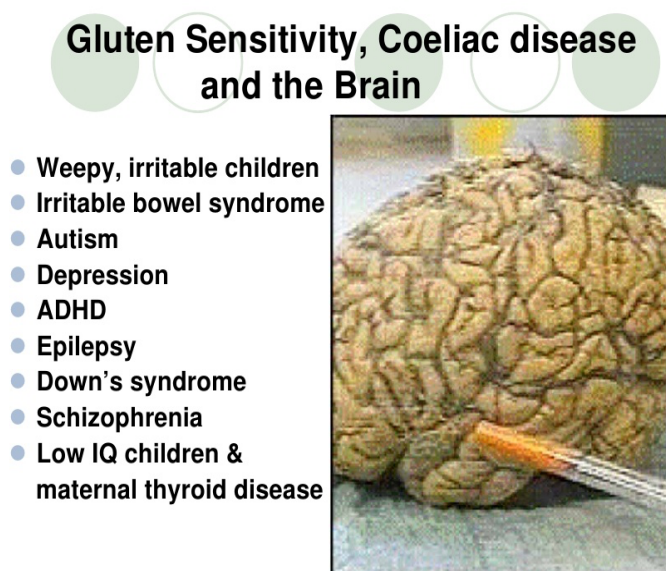
How does gluten affect the body?

With celiac disease, the villi – tiny, finger-like projections in the small intestine that act as gatekeepers to the rest of the body – reject gluten for some unknown reason. This rejection can affect the absorption rate of many other nutrients that are key to our wellbeing, including calcium, iron and vitamin A.

The gluten found in wheat, barley, rye and triticale (a cross between wheat and rye) can trigger serious health problems or other insensitivities. While other grains such as corn, rice and quinoa also contain gluten, they don't seem to cause the same problems as wheat, barley, rye and triticale. Because wheat, rye, barley and foods made from these are so common, removing them from your diet likely changes your overall intake of fiber, vitamins and other nutrients. Therefore, it's important to choose your foods wisely to meet your overall nutritional needs in addition to knowing how to replace the foods you are eliminating. Gluten can cause **serious health related issues** such as:

- **Celiac disease** is a condition in which gluten triggers immune system activity that damages the lining of the small intestine. When gluten is ingested, the body mounts an immune response that attacks the small intestine which destroys the lining of the small intestines. These attacks lead to damage of the villi, small fingerlike projections that line the small intestine and promote nutrient absorption. This reaction and damage reduce the area for absorbing virtually all nutrients and over time this damage prevents the absorption of nutrients from food. Celiac disease is an autoimmune disorder.
- **Non-celiac gluten sensitivity** causes some signs and symptoms associated with celiac disease — including abdominal pain, bloating, diarrhea, constipation, "foggy brain," rash or headache — even though there is no damage to the tissues of the small intestine. Studies show that the immune system plays a role in this response.
- **Cancers** can develop with people with celiac disease. The later the age of diagnosis, the greater chance of developing some cancers if gluten is continued to be consumed without discretion.
- **Gluten ataxia** is an autoimmune disorder which affects certain nerve tissues and causes problems with muscle control and voluntary muscle movement.
- **Wheat allergy**, like other food allergies, is the result of the immune system mistaking gluten or some other protein found in wheat as a disease-causing agent, such as a virus or bacteria. The immune system creates an antibody to the protein, prompting an immune system response that may result in congestion, breathing difficulties and other symptoms.
- **Autoimmune disorders** refer to a condition that occurs when the body's immune system, which is our infection-fighting system, mistakenly attacks and destroys the body's tissue.
- **Other** serious conditions have a greater chance of developing such as *other* autoimmune disorders.

The following diagram lists other possible symptoms and/or conditions which can result from gluten sensitivity and ingestion.



A gluten-free diet is essential for managing signs and symptoms of celiac disease and other medical conditions associated with gluten.

A gluten-free diet is also popular among people who haven't been diagnosed with gluten-related medical conditions. This is because the claimed benefits of eliminating gluten include improved health, weight loss, increased energy, improved mental clarity and improved cognitive ability.

How does gluten cause these issues?

The herbicide which is tied to the gluten issue is glyphosate. Monsanto is a HUGE company that manufactures pesticides, herbicides (including glyphosate) AND other chemicals which will be discussed later in this article. Glyphosate is found in a product more commonly known as Roundup which is manufactured by Monsanto. Roundup has been used since 1974 and is a widely used herbicide in the U.S. Perhaps you have used Roundup on your lawn or garden.

Do these look familiar?



Glyphosate

What is glyphosate?

Glyphosate is a non-selective herbicide, which means it will kill most plants. It prevents the plants from making certain proteins that are needed for plant growth. Glyphosate stops a specific enzyme pathway, called the 'shikimic acid pathway.' The 'shikimic acid pathway' is necessary for plants and some microorganisms. The enzymes created by the plants are also important for human consumption as they are a necessary part of our daily diet.

Why is there a controversy about gluten and glyphosate?

Part of the controversy regarding whether gluten is 'ok or not' is that Monsanto has been allowed to use its own research to deny claims that glyphosate is safe for consumption. This means the research results are biased in Monsanto's favor. Some researchers and experts wonder if the sensitivity is to gluten or actually to glyphosate? Some Important Facts to Support this argument are:

- In 2015, the **World Health Organization's (WHO) International Agency for Research on Cancer (IARC)** classified glyphosate as “probably carcinogenic to humans” after reviewing years of published and peer-reviewed scientific studies. The team of international scientists found there was a particular association between glyphosate and non-Hodgkin lymphoma.
- Glyphosate was listed as a known carcinogenic in California under their Proposition 65, effective July 7, 2017.
- Research suggests that glyphosate may be an endocrine disruptor, meaning that it interferes with the proper functioning and production of hormones in human cell lines.
- It has also been linked to liver disease, birth defects and reproductive problems in laboratory animals; and may kill beneficial gut bacteria and damage the DNA in human embryonic, placental and umbilical cord cells.
- Fish exposed to glyphosate develop digestive problems that are reminiscent of celiac disease.

How is Glyphosate used?

It is a common practice among farmers to spray their wheat crops with glyphosate immediately prior to harvest. Doing so actually kills the plant, which speeds the required drying of the grain. This mass-spraying of glyphosate has led to the explosion of resistant weeds, which have evolved to survive despite being sprayed. Already, weeds resistant to the herbicide are found on half of all American farmers' fields and are present on upward of 100 million acres of cultivated cropland.

What do the experts say?

Charles Benbrook states, “Anyway you look at it, this is a staggering amount.”

Charles "Chuck" Benbrook has a PhD in agricultural economics from the University of Wisconsin-Madison and an undergraduate degree from Harvard University. He was a Visiting Scholar in the Bloomberg School of Public Health, Johns Hopkins University, and a Visiting Professor at the University of Newcastle in the U.K. Benbrook has served as an expert witness in several pesticide and food-labeling related cases in which government regulatory policy has played a central role.

David Mortensen, a professor of weed and applied plant ecology at Penn State University says, “Anybody working in agriculture would say it's a very serious problem. The rise of glyphosate-resistant weeds has led to the use of yet more herbicides. And companies like Dow AgroSciences are developing crops that are resistant to even more herbicides, such as 2,4-D. But this will just lead to spraying of even more herbicides, more resistance in the future and the need for more herbicide-resistant crops in the future it's a vicious cycle.” That is frustrating to weed scientists like Mortensen who know that there are ways to combat crops without using quite so much herbicide. For example, he says that the use of winter cover crops like wheat can reduce the amount of weeds that grow in the spring, with the additional benefit of reducing erosion and improving water quality.

Bill Freese, a science policy analyst with the Center for Food Safety states: “It’s troubling, considering that in March 2015 the World Health Organization’s International Agency for Research on Cancer unanimously determined that glyphosate is “probably carcinogenic to humans.” A carcinogen is a substance known to cause cancer. He adds that “EPA's high-end estimate of infant exposure to glyphosate exceeds the level the Agency considered safe for them in 1983. Continuing to rely on glyphosate to control weeds is going to be a dead end...This is what you call a transgenic treadmill, using ever more herbicides and selecting for greater and greater resistance in weeds, and we are already seeing this happen.”

EWG (Environment Working Group) states:

“The world is awash in glyphosate, the active ingredient in the herbicide Roundup, produced by Monsanto. It has now become the most heavily-used agricultural chemical in the history of the world, and many argue that’s a problem, since the substance comes with concerning albeit incompletely-determined health effects.”

A study in the journal *Environmental Sciences Europe* reveals that Americans have applied 1.8 million tons of glyphosate since its introduction in 1974. Worldwide, 9.4 million tons of the chemical have been sprayed onto fields. For comparison, that’s equivalent to the weight of water in **more than 2,300 Olympic-size swimming pools**. It’s also enough to spray nearly half a pound of Roundup on every cultivated acre of land in the world.

So, Who & What is Monsanto?

Monsanto is a multinational agricultural biotechnology corporation based in the United States. They are the world’s leading producer of **Roundup®**, an *herbicide* with the active ingredient glyphosate. Monsanto is also the largest producer of genetically engineered (GE) seeds on the planet, accounting for over 90% of the GE seeds planted globally in 2003. Monsanto introduced genetically modified products like Roundup Ready Soybeans that were resistant to Roundup. The first crops introduced were soybeans, followed by corn in 1998. “Roundup Ready” crops greatly improved a farmer’s ability to control weeds since glyphosate could be sprayed in the fields without harming their crops. However, it is robbing farmers of income, which is diverted to companies that produce herbicides and herbicide-resistant crops like Monsanto’s Roundup Ready corn and soybeans. “The bottom line is that at least 30 percent of the net income that used to go to farmers is now going to [these companies],” Benbrook says, and it continues to get worse.

Monsanto claims that glyphosate does not pose a threat to humans. “Glyphosate safety is supported by one of the most extensive worldwide human health, crop residue and environmental databases ever compiled on a pesticide product,” says a Monsanto company spokesperson. “In evaluations spanning four decades, the overwhelming conclusion of experts worldwide has been that glyphosate, when used according to label directions, does not present an unreasonable risk of adverse effects to humans, wildlife or the environment.”

In addition, the U.S. Environmental Protection Agency has relaxed its rules about what it considers a safe level of glyphosate. For example, fifty times more glyphosate is allowed

on corn grain now than in 1996, according to Freese. The agency has also increased what it considers a safe amount of glyphosate exposure by a factor of 17.

Bayer purchased Monsanto in 2016. Bayer is a huge German pharmaceutical company known as the inventor of aspirin. Perhaps you recognize the name Bayer aspirin? Bayer also has a huge agricultural portfolio responsible for manufacturing many fungicides, herbicides, insecticides and plant growth regulators (PGRs).

What you should know about Monsanto and their history

In early 2017, according to EWG (Environmental Working Group), unsealed court documents revealed possible collusion between Monsanto and the EPA to cover up the carcinogenic risks of glyphosate, the main ingredient in Monsanto's Roundup. Following a conversation with Dow Chemical's CEO, EPA Administrator Scott Pruitt reversed a ban on chlorpyrifos, a dangerous pesticide used on our food that can cause brain damage in children.

I am not going to delve into the politics of glyphosate, however. Unfortunately, if you do the research you will find that there are several ex-employees of Monsanto who are now holding US government positions with titles such as Senator, Director of FDA, US Supreme court judge, Administrator of EPA & USDA, etc.

As a side note I find it interesting to point out that Monsanto is responsible for the following:

- The manufacture of saccharin which was sold to Coca-Cola as an artificial sweetener. Saccharin has been associated with pancreas issues, other digestive or 'gut' issues and it is a known carcinogenic.
- In the 1930s Monsanto created the first hybrid seed corn.
- Monsanto started manufacturing polychlorinated biphenyls (PCBs) which are widely used coolant fluids that have been determined to be carcinogenic.
- In the 1940s Monsanto began production of plutonium. Plutonium is used for atomic weapons. The Department of Health and Human Services (DHHS), International Agency for Research on Cancer (IARC), and the EPA's Office of Air and Radiation consider plutonium to be a human carcinogen.
- In 1944 Monsanto became the first manufacturer to produce the insecticide DDT, which is a known carcinogen.
- In 1945 Monsanto began the use of dioxin in their herbicides and also combined it with pesticides. Studies have shown that very high levels of certain dioxins can be harmful to health. The International Agency for Research on Cancer (IARC) classified one dioxin, TCDD, as carcinogenic to humans.
- In the 1960s Monsanto began the manufacture of Agent Orange, which was used for 9 years in the Vietnam War from 1962-1971. Agent Orange contained a deadly chemical called dioxin. This herbicide/defoliant later proved to create many health issues in US servicemen and Vietnamese families.
- In 1955 Monsanto created petroleum-based fertilizers which deplete the soil of nutrients making the soil dependant on synthetic replacements.
- In the 1970s Monsanto created glyphosate, more commonly known as Roundup which kills weeds overnight, allowing farmers to saturate fields with weed killer without killing the crops. Roundup has been found in samples of

groundwater, streams, air and soil. It has been linked to the butterfly mortality rate and the creation of “superweeds.” Many health concerns have been linked to glyphosate such as tumors, organ dysfunction, infertility, cancer and premature death.

- In 1985 Monsanto purchased the company responsible for aspartame’s manufacture and then began marketing the product as NutraSweet, also known as Equal, despite information indicating serious health issues associated with the product. There are currently over 94 health-related issues associated with aspartame.
- Bovine Growth Hormone (rBGH) was created by Monsanto. This is a genetically modified hormone developed to be injected into dairy cows to produce more milk. Cows subjected to rBGH suffer excruciating pain due to swollen udders and mastitis, and the pus from the resulting infection enters the milk supply requiring the use of additional antibiotics. rBGH milk has been linked to breast cancer, colon cancer, and prostate cancer in humans.
- In the 1990s Monsanto began creating genetically modified crops such as corn, cotton, soy and canola. They started gene-splicing crops with DNA from viruses and bacteria in combination with Roundup in order to cause insect stomachs to rupture if eaten.
- In the late 1990s, Monsanto developed the technology to produce sterile grains unable to germinate. The goal of these “Terminator Seeds” was to force farmers to buy new seeds from Monsanto year after year, rather than save and reuse the seeds from their harvest as they had been doing for centuries.
- In 2018 Bayer (aspirin), a major pharmaceutical and agricultural company, purchased Monsanto and dropped the name Monsanto.
- June 2020 Bayer admitted that Glyphosate causes cancer and agreed to a \$10 billion settlement in lawsuit to end the tens of thousands of lawsuits filed over Roundup weedkiller.

I included the above information regarding Monsanto’s history because I believe it is important to know their contribution to our world’s history and environment. Hopefully, this information will enable you to determine how gluten may adversely affect your health.

So, in conclusion, after reading the above, I must ask: Are you better informed to make your own conclusion about the effects of gluten and glyphosate regarding YOUR health?

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