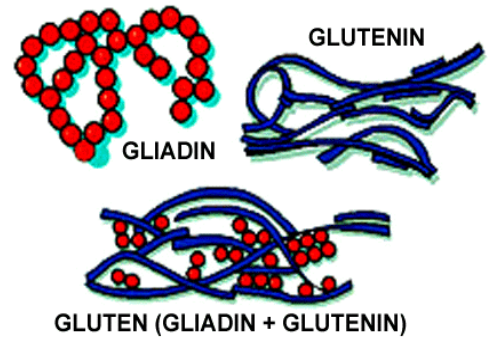


Wheat Allergy, Non-Celiac Gluten Sensitivity, and Celiac Disease

What is Gluten

Gluten is a common connection between all of the above names that involve negative reactions for eating food, but what is gluten? Gluten is a name for proteins found in certain foods such as, wheat, rye, barley, triticale, and much more. Because of manufacturing and farming practices, cross contamination of Gluten into non-gluten containing foods is frequent and always possible. Gluten is often noted for its elasticity and glueyness in baking or processed food products.



Because of this it is an excellent ingredient for creating certain types of food textures in food science.

Technically gluten is a combination of prolamin proteins called gliadins and glutelin proteins called glutenins. When making certain food products like bread, the different protein types come together to form gluten.

Celiac Disease

Celiac Disease (CD) is an autoimmune disorder that occurs because of genetics and is triggered by eating, gliadins, glutenins, or gluten. Reactions to gluten in the body cause atrophy of the villi in the intestine, which can lead to malabsorption of nutrients and numerous other health issues. When someone with CD eats gluten, their body produces cytokines and antibodies (weapons) in defense against the gluten like proteins. Unfortunately, some of the body's own cells are made up of proteins that also look similar to gluten, so the body inadvertently ends up attacking itself! Which creates the autoimmunity and the shortening of intestinal villi.

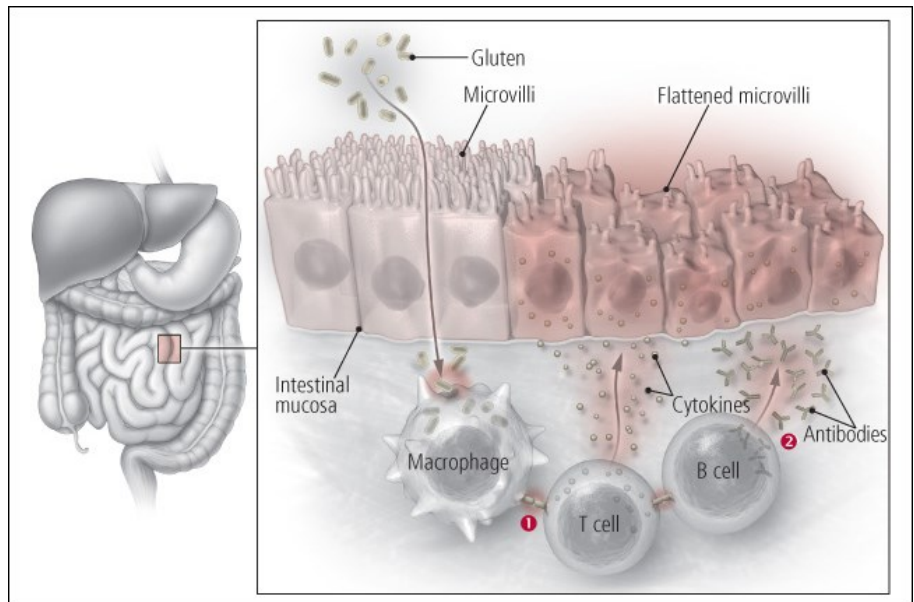


Image obtained from Harvard Health Publishing

Reaction Type: Often slower but can be immediate, or up to 24 hours and can last for days.

In a lot of cases no obvious reactions occur, but intestinal damage still occurs. Which is why 83% of people who have CD are undiagnosed. About 1% of population is estimated to have CD.

Reactions: Damage to the intestine, IBS like symptoms, indigestion, abdominal pain, bloating, nausea, vomiting or diarrhea. Other systems include but not limited to, fatigue, achiness, sweating, chills, dermatitis herpetiformis, foggy thinking, and headaches.

Testing: Blood tests, tTG, EMA, DGP. Sometimes even a biopsy of the intestine.

Treatment: Severe life long gluten avoidance.

Wheat Allergy or Gluten Allergy (IgE mediated)

A wheat allergy, or a gluten allergy, is an immune reaction to one or more of the numerous different types of protein in wheat, and is often gluten. When a person has an immune mediated allergy, a white blood cell called B-cells, send out immunoglobulin E (IgE) antibodies to attack the wheat or gluten proteins. At the same time, other immune cells send out chemical messengers letting the rest of the body know that the battle is on and to mobilize to the area, which create the inflammation. This reaction often happens fast!

Some people who have a wheat allergy are only allergic to proteins specific in wheat and will not react to

People with wheat allergy must watch what they eat.



other similar foods like barley. However, some people who have a wheat allergy are allergic to certain kinds of wheat proteins like, gliadins and glutenins, (that make up Gluten) and are also found in other types of food. This means there is a clear overlap between different types of proteins in food that are responsible for clinical observations. Someone who has a wheat allergy and is allergic to gliadin pro-

tein in wheat, can also react to many foods who that contain gliadins, for example, most gluten containing foods like barley, rye, and other grass species.

Reaction Time: Fast, minutes to hours.

Reactions: IBS like symptoms, potentially deadly, abdominal pain, bloating, nausea, vomiting, diarrhea, bronchitis, asthma, sneezing, shortness of breath, stiffness, swelling, rashes, hives, eczema, psoriasis, foggy thinking, headaches, and **anaphylaxis**.

Testing: Skin prick test (SPT), double-blind placebo, blood serum IgE (sIgE), basophil activation test (BAT)

Treatment: Sever life long gluten avoidance, or, (but unlikely) until allergy is gone as shown with testing. If allergy is sever, carry epinephrine in case of exposure or sever reaction.

Non-Celiac Gluten Sensitivity (NCGS)

NCGS is a condition when gastrointestinal and extra-intestinal symptoms are triggered by gluten consumption. Problems with gluten consumption that are not CD or IgE mediated are widely reported with 1% of the population being diagnosed and 13% anecdotal self-reports. The presence of NCGS in patients with IBS is 28% according to double blind studies. The exact understanding of why NCGS occurs is not well understood currently in science.

Reaction Time: Often slower but can be immediate, or up to 24 hrs after eating gluten.

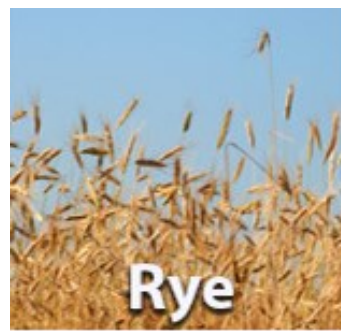
Reactions: Symptoms closely follow the same as gluten allergies or CD.

Testing: Elimination and reintroduction diet, IgG sensitivity testing.

Treatment: Elimination and reintroduction

Where is the gluten!?

Gluten can be found in many types of foods, even ones that would not be expected. See the list below to get some sense of the big gluten-containing foods and places gluten can be found.



- Breads
- Baked Goods
- Soup thickeners
- Pasta/noodles
- Farro
- Farina
- Graham
- Einkorn
- Emmer
- Cereals
- Sauces
- Salad Dressing
- Roux
- Malt
- Malted milk
- Milkshakes
- Malt extract
- Malt vinegar
- Food Coloring
- Soups
- Beer
- Brewer's Yeast
- Brown rice syrup (often made with barley enzymes)
- Soy Sauce
- Candy
- Rye bread
- Pumpernickel
- Rye beer
- Cereals
- Crackers
- Granola
- Breeding
- Croutons
- Gravies
- Potato chips
- French Fries
- Processed meats
- Bread
- Pasta
- Cereals
- Eggs at restaurants, sometimes have pancake batter added to them with triticale.
- Processed potatoes
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Unusual sources of Gluten

- Instant coffee and other instant drinks: Many instant coffee brands and drinks have gluten added as a bulking agent.
- Caramel coloring: Depending on the way it is manufactured it might or might not contain gluten.
- Ground Spices: Many spice mixes like curry powder and cajun mixes contain gluten as an anti-caking agent. Better to make your own mixes.
- Oats are normally gluten free unless they are processed in a facility or farm that also works with wheat, or other gluten containing grains.