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Celiac Disease, Non-Celiac Gluten Sensitivity or Wheat Allergy: *What is the Difference?*

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Celiac disease (CD), non-celiac gluten sensitivity (NCGS) and wheat allergy are all conditions whose primary treatment is avoidance of specific dietary components. While celiac disease and wheat allergy are well defined conditions, non-celiac gluten sensitivity is poorly understood at this time. Celiac disease is an autoimmune condition; wheat allergy involves an immune (not auto-immune) response; and the biological processes responsible for non-celiac gluten sensitivity remain undefined. Celiac disease and non-celiac gluten sensitivity have many symptoms in common, whereas those of wheat allergy are usually distinct. Possible symptoms of CD and NCGS include gastrointestinal symptoms such as cramping, diarrhea and constipation, as well as symptoms in other parts of the body such as bone or joint pain, headaches, or fatigue, to name a few. Symptoms of an allergy to wheat can include itching, hives, or anaphylaxis, a life-threatening reaction. Treatment for CD and NCGS is to remove gluten from the diet. Gluten is a protein found in wheat, rye, and barley, as well as in hybrids and products made from these grains. Treatment for wheat allergy is removal of all forms of wheat from the diet.

Celiac disease (CD) is a genetic, autoimmune disorder that occurs in reaction to the ingestion of gluten. To develop celiac disease a person must inherit the genetic predisposition, be consuming gluten, and have the disease activated. Activation triggers include stress, trauma (surgeries, etc.) and possibly viral infections and other environmental factors. While approximately 33% of the general population has the genetic predisposition for CD, only about 1% will develop the condition. The reaction to gluten causes inflammation and villous atrophy or flattening of the cells lining the small intestine, which can lead to malabsorption of nutrients and related health issues. There are over 200 identified symptoms of CD, which include those listed above as well as anemia, behavioral changes, stunted growth and infertility. Dermatitis herpetiformis is celiac disease that manifests as a skin rash, and affects approximately 10-15% of individuals with CD. The rate of CD is higher

It is necessary to be consuming gluten in order for diagnostic tests for CD to provide valid results.

Starting the gluten-free diet without complete testing is not recommended and makes diagnosis difficult.

The first step to diagnosing celiac disease is a panel of blood tests.

Wheat allergy is generally diagnosed through RAST testing (either blood or skin prick), and/or food challenge, which should **only be done under the supervision of a knowledgeable physician.**

Non-celiac gluten sensitivity is diagnosed by first ruling out celiac disease, wheat allergy and other conditions which could be causing symptoms. Then, if improvement is seen on a gluten-free diet, NCGS may be diagnosed.

among relatives of those who are diagnosed, but anyone with the genetic predisposition can develop celiac disease at any age. Approximately half of individuals with celiac disease are still undiagnosed. At this time the only treatment for celiac disease is to maintain a gluten-free diet for life.

Non-Celiac Gluten Sensitivity (NCGS), also referred to as gluten sensitivity (GS) or non-celiac wheat sensitivity (NCWS), is not well defined. It is not an immunoglobulin E (IgE) (as with wheat allergy, see below) nor autoimmune reaction (as with CD, see above). NCGS may have an innate immune component, but this has not been firmly established. There are no tests or biomarkers to identify GS. Since GS is not well understood it is still not clear whether other components of gluten-containing grains may be involved in causing symptoms, at least in some cases. In order for gluten sensitivity to be diagnosed, it is first necessary to rule out CD, wheat allergy, and other possible causes of symptoms. Then, if improvement is seen when following a gluten-free diet, gluten sensitivity may be diagnosed.

Wheat allergy is an immune reaction to any of the hundreds of proteins in wheat. When a person has a wheat allergy, one type of white blood cells, called B-cells, send out immunoglobulin E (IgE) antibodies to “attack” the wheat. At the same time, local tissues in the body send out natural chemical messengers to alert the rest of the body that there is a problem. This reaction happens very fast (within minutes to a few hours) and can involve a range of symptoms from nausea, abdominal pain, itching, swelling of the lips and tongue, to trouble breathing, or anaphylaxis (a life-threatening reaction). A person with a wheat allergy must avoid eating any form of wheat, but does not have trouble tolerating gluten from non-wheat sources. (It is possible for a person to be both allergic to wheat and have CD or NCGS.) In the United States, wheat is one of the eight most common foods to which people are allergic. Children who are allergic to wheat may outgrow the allergy, but adults with an allergy to wheat usually have it for life. The only treatment is a wheat-free diet.

Do I have celiac disease, non-celiac gluten sensitivity, or wheat allergy?

- Proper diagnosis is the key to answering this question and being able to follow the diet that is right for you. This is also the most important reason not to start a gluten-free diet before being tested and getting a diagnosis.
 - ◇ Celiac disease diagnosis involves blood screening followed (in the case of positive results) by small intestine biopsy. A patient must be consuming a gluten-containing diet for accurate diagnosis, which is usually made by a gastroenterologist.
 - ◇ Non-celiac gluten sensitivity is diagnosed by ruling out other possible causes of symptoms, including - but not limited to - celiac disease and wheat allergy. After the above testing, if the removal of gluten from the diet improves symptoms, this may be diagnostic for NCGS. Diagnosis can be made by a gastroenterologist or primary care physician.
 - ◇ Diagnosis of IgE food allergies, such as a wheat allergy, is generally done through RAST testing and a double-blind placebo test using the allergen. This is usually completed by an allergist.

Celiac disease, non-celiac gluten sensitivity and wheat allergy are conditions that can be treated with the appropriate diet, either elimination of gluten or wheat. Working closely with your doctor and registered dietitian will help you get an accurate diagnosis and create a diet that supports your health and wellness.

References:

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Advances in gluten-related disorders are fast-paced. If this document is more than 2 years old, please visit gluten.org for updated documents.

Table 1: Comparing allergies, celiac disease and non-celiac gluten sensitivity

	IgE Allergy	Celiac Disease	Non-Celiac Gluten Sensitivity
Reaction to:	Proteins (IMMUNE)	Proteins - gliadin and glutenins (AUTOIMMUNE)	Gluten Possibly other components of gluten-containing foods (Possibly INNATE IMMUNE)
Reaction time:	FAST Immediate: Minutes to hours Exposure – reaction may vary in severity, time of onset, and may be affected by when the food was eaten Can be exercise-induced in some	OFTEN SLOWER Can be fairly immediate, or up to 24 hours; can last for days. In some cases no obvious reaction occurs, but intestinal damage still occurs	OFTEN SLOWER Can be fairly immediate or up to 24 hours; can last for days.
Reactions: (reactions vary; could include those listed)	May affect different areas of the body with different exposures. Potentially deadly. GI - IBS, indigestion, abdominal pain, bloating, nausea, vomiting, and diarrhea Systemic - fever, fatigue, sweating, and chills Lungs - food-induced bronchitis and asthma, sneezing, runny nose, and shortness of breath Joints - pain/achiness Muscles and connective tissue - pain, stiffness, and swelling Skin - itching, rashes, hives, redness, swelling, and scaling as in eczema and psoriasis Brain - disorganized, disturbed or foggy thinking, headaches, migraines. Anaphylaxis - affects several areas of the body at the same time. These might include the skin: flushing, itching, or hives; the airway: swelling of the throat, difficulty talking or breathing; the intestines: nausea, vomiting, or diarrhea; and the heart – low blood pressure or unconsciousness and possibly death.	May affect different areas of the body. Damages the intestine. Does not cause death GI – IBS-like symptoms may include indigestion, abdominal pain, bloating, nausea, vomiting, and diarrhea Systemic - fatigue, achiness, sweating, and chills Lungs - food-induced bronchitis and asthma, sneezing, runny nose, and shortness of breath Joints – pain/achiness Muscles and connective tissue - pain, stiffness, and swelling Skin – blistering in cases of dermatitis herpetiformis, the skin manifestation of CD Brain - disorganized, disturbed or foggy thinking, headaches, migraines.	May affect different areas of the body. An irritant. Likely does not cause damage to the intestine. Does not cause death. GI – IBS-like symptoms may include, indigestion, abdominal pain, bloating, nausea, vomiting, and diarrhea Systemic - fatigue, achiness, sweating, and chills Lungs - food-induced bronchitis and asthma, sneezing, runny nose, and shortness of breath Joints - pain/achiness Muscles and connective tissue - pain, stiffness, and swelling Brain - disorganized, disturbed or foggy thinking, headaches, migraines.
Detection	RAST, Skin prick, Double-blind placebo	Screening blood tests: tTG, EMA, DGP. Positive biopsy consistent with celiac disease or DH	Differential diagnosis, “rule out”, elimination diet trial
Treatment	Strict avoidance of allergen food Life long or until allergy gone as shown with testing Immediate administration of epinephrine in case of exposure and severe reaction	Strict avoidance of gluten Life long avoidance	Avoidance of food