Celiac Disease
and Gluten-Free Diets for the Immune Compromised

The immunodeficient population often experiences a higher rate of celiac disease, which can only be treated with a gluten-free diet.

By Mindy Hermann, MBA, RDN

If one were to judge the prevalence of an illness only by the popularity of particular types of foods, it would seem that a disease that requires gluten-free foods must affect millions and millions of people. Indeed, the number of gluten-free foods continues to grow and earn more space on supermarket shelves. But, in fact, celiac, the disease that requires a gluten-free diet, affects relatively few Americans. However, celiac disease does seem to be more prevalent among people whose immune systems are compromised.

What Is Celiac?

Celiac disease is an autoimmune disorder that affects an estimated one in 100 people in the U.S. The number of diagnosed cases has been increasing, and it is believed that a lot of people with the disease have not yet been diagnosed. People with celiac, also called non-tropical sprue or gluten-sensitive enteropathy, have an immune response to a protein called gluten that is found in wheat, barley and rye. Celiac disease runs in families; a person whose parent, child or sibling has celiac faces a much greater chance of developing the disease. Risk also goes up if an aunt, uncle or cousin who is related by blood has been diagnosed with celiac.

The inside of the small intestine is covered with villi, small fingerlike projections that absorb nutrients. The inflammation caused by celiac disease damages the villi and prevents them from absorbing nutrients normally. Malabsorption can lead to vitamin and mineral deficiencies, along with a number of other symptoms in the gastrointestinal tract and throughout the body, including anemia, tiredness, bone and joint pain, osteoporosis, numbness and tingling in the fingers and toes, migraines, infertility and other seemingly unrelated complications. Children with celiac are more likely to have digestive problems such as diarrhea, bloating, vomiting and stools that smell bad and look greasy. Celiac also can slow growth in children.

The Relationship Between Immunodeficiency and Celiac Disease

Because the gastrointestinal tract is the largest lymphoid organ in the body, patients with immunodeficiency present with pathological conditions in the intestine. The immune system's job is to fight infections, and a large part of the immune system is located in or near the intestinal tract to help prevent microorganisms in the intestine from entering the rest of the body. Therefore, defects in the immune system can lead to an overgrowth of harmful organisms in the intestinal tract. Several studies have documented a high prevalence of inflammatory, malignant and infectious gastrointestinal disorders in patients with common variable immunodeficiency or immunoglobulin A (IgA) deficiency. For instance, the characteristic laboratory features of CVID include low levels of serum immunoglobulins, including IgG, often IgA and sometimes IgM. Low levels of IgG may be involved in food allergies. And, celiac disease is commonly associated with IgA deficiency. In fact, the incidence of selective IgA deficiency is 10 times higher in patients with celiac disease compared with the general population.

Diagnosing Celiac Disease

The symptoms of celiac are numerous, and some people with the disease feel fine, so a definitive diagnosis cannot be made based only on physical complaints. When celiac is suspected, blood tests and an intestinal biopsy must confirm the diagnosis. Additionally, anyone who has

autoimmune abnormalities that are known to correlate with celiac, or who have first-degree relatives with the disease should undergo screening. A person who is being tested for celiac disease must eat foods with gluten for at least four to six weeks before any blood work or intestinal biopsies are taken. If gluten is removed from the diet, the villi and blood markers begin to return to normal and celiac is more difficult to diagnose.

Blood work includes tests that screen for celiac disease antibodies. The most common is the IgA tTGA test; other tests include IgA antiendomysial antibody (EMA), which is expensive and not performed as frequently, and genetic testing for the genes HLA-DQ2 and HLA-DQ8. People without these two genes probably do not have celiac disease. Positive blood tests for celiac disease are followed by an endoscopy and biopsy of the small intestine to detect celiac-induced changes in the villi.

People who experience gastrointestinal symptoms after eating foods with gluten but test negative for celiac disease may have gluten sensitivity rather than the autoimmune disease. Their blood sample will not contain celiac disease antibodies or test positive for the genes HLA-DQ2 and HLA-DQ8, and their villi will be normal. They may feel better after eliminating gluten, but likely will not develop severe symptoms if an ingredient in their food contains a small amount of gluten.

Why Gluten-Free Diets Are Necessary for Those with Celiac Disease

People who have celiac disease experience a serious autoimmune response to the protein gluten in their digestive system. The response can occur after ingesting even the smallest trace of gluten in a breadcrumb or speck of cereal. It is not yet understood why gluten in particular triggers the immune system as severely as it does. Additionally, untreated celiac disease can trigger other autoimmune diseases, including dermatitis herpetiformis (a type of itchy skin rash), Addison's disease, type 1 diabetes, multiple sclerosis, autoimmune thyroid disease and numerous others, along with infertility, osteoporosis, lactose intolerance, nutrient deficiencies, neurological problems, non-Hodgkins lymphoma and certain types of gastrointestinal cancers. The newly understood connection between chronic inflammation and chronic disease explains why people with undiagnosed or untreated celiac disease may also be at higher risk for heart disease.

A strict gluten-free diet currently is the only known treatment for celiac disease, and it must be followed for

Naturally Gluten-Free Foods	Alternate Grains	Foods That May Contain Gluten Unless Otherwise Marked	Grains and Grain Products to Avoid*
Meats, poultry, fish	Amaranth	Beer	Barley
Tofu, beans, eggs, nuts	Buckwheat	Bouillon and broth (food starch)	Bran
Dairy products without additives or gluten-containing ingredients	Corn	Candy	Breads
Fruits and juices	Millet	Hot dogs (food starch)	Bulgur
Vegetables and juices	Oats*	Food starch, modified food starch	Couscous
Butter, margarine, oils	Quinoa	French fries (coating)	Crackers
Pure herbs and spices	Rice	Gravy	Flours
	Sorghum	Licorice	Pastas
	Teff	Malt	Rye
	Wild rice	Rice blends	Triticale
	*must be labeled gluten-free	Salad dressing (food starch)	Wheats, including einkorn, emmer, kamut and spelt
		Sauces	*unless marked gluten-free

life. Neither children nor adults ever outgrow the disease. A diet that is free of all sources of gluten allows the intestinal villi to heal and regain their ability to absorb nutrients. A gluten-free diet also lowers the risk of developing celiac-related side effects. Recovery of the villi and return of antibodies to normal levels can take at least a year after diagnosis and beginning a gluten-free diet. However, an adult small intestine that sustained a lot of damage before diagnosis may never completely return to normal.

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Managing Celiac Disease

An appointment with a registered dietitian should be the first step after receiving a diagnosis of celiac disease. A dietitian can provide numerous resources that make following a gluten-free diet easier, including not only lists of permitted foods and foods to avoid, but also meal plans, recipes, shopping lists and tips for eating away from home. The preparation of gluten-free foods at home requires separate equipment, utensils and work surfaces. Gluten-free baking requires combining flour from alternate grains with starches, gums and leavening agents. Many manufacturers offer gluten-free baking mixes along with recipes for their use.

Any commercial product that is labeled "gluten-free" must not only include no ingredients with gluten but also be manufactured in a facility that completely separates gluten-free and gluten-containing ingredients, as well as machinery used to process foods that have gluten. Gluten-free foods and alternate grains (see tables) that naturally do not contain gluten are readily available at grocery, specialty gourmet and health foods stores, and gluten-free recipes using gums, starches and other grains in place of wheat and wheat products are widely available.

People with celiac have to become competent label readers and understand the various ingredients that may contain gluten, such as malt, food starch and those made with soy sauce (it often is a combination of soy and wheat). Ingredients with gluten often are found in broths and soup mixes, seasoning mixes, salad dressings, coatings and toppings, marinades and self-basting meats and poultry, making careful label reading a must. New gluten-free labeling laws in effect in August 2014 allow products to be labeled gluten-free, no gluten, free of gluten or without gluten if they contain less than 20 parts per million of gluten; this is the equivalent of 20 cents in $10,000.

A person with celiac disease should be in close contact with a medical team that includes a physician and supporting staff, dietitian and other health professionals. Frequent monitoring can follow the improvement of symptoms, ensure compliance with the gluten-free diet and identify any remaining nutrition deficiencies. In addition to annual blood work that includes testing for antibodies, the medical team may want to repeat the endoscopy and biopsy after several years.

Researchers hope to identify new screening tools and treatment modalities for celiac disease, including TG2 inhibitors and the copolymer P (HEMA-co-SS), that will lessen the need for a gluten-free diet, currently the only management option for the disease.

A small percentage of those with celiac do not respond to a gluten-free diet. First steps include a diet review to ensure that no foods contain gluten and antibody testing to confirm adherence to the diet. A person whose symptoms do not improve also may be experiencing the side effects of a condition that is related to celiac, such as microscopic colitis, pancreatic hormone disturbances or lymphoma of the gastrointestinal tract. Those who are confirmed to have refractory celiac disease, also called refractory sprue, may require other types of treatment, including steroids and immunosuppressants. ◪

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Resources

Academy of Nutrition and Dietetics (www.eatright.org/Public/content.aspx?id=5542)
American Celiac Disease Alliance (www.americanceliac.org)
Celiac Disease Foundation (www.celiac.org)
Celiac Sprue Association (www.csaceliacs.org)
Easy, Gluten-Free by Marlisa Brown, MS, RD, CDE, CDN, and Tricia Thompson, MS, RD (www.glutenfreeeasy.com)
Gluten-Free, Hassle Free by Marlisa Brown, MS, RD, CDE, CDN (www.glutenfreeeasy.com)
Gluten Intolerance Group of North America (www.gluten.net)
National Foundation for Celiac Awareness (www.celiaccentral.org)
National Institutes of Health Celiac Disease Awareness Campaign (www.celiac.nih.gov)
National Institutes of Health Medline Plus (www.nlm.nih.gov/medlineplus/celiacdisease.html)