

GLUTEN AND CELIAC DISEASE

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GLUTEN

- ▶ From Latin gluten, "glue"
- ▶ Protein composite found in wheat and related grains, including barley and rye (oats can be tolerated by most but cross-contamination or hypersensitivity may limit tolerability)
- ▶ Gluten is the composite of the storage proteins, gliadin and a glutenin
- ▶ Conjoined with starch in the endosperm of various grass-related grains
- ▶ True gluten, with gliadin and glutenin, is limited to certain members of the grass family

GLUTEN

- ▶ Bread flours are high in gluten
- ▶ Pastry flours have a lower gluten content
- ▶ Gluten is often the basis for imitation meats
- ▶ Gluten is often present in beer and soy sauce
- ▶ Stabilizing agent in food products such as ice cream and ketchup
- ▶ Gluten is also used in cosmetics, hair products, and other dermatological preparations

THICKENER



Sauces
Soups
Gravy
Stock cubes
Marinades
Processed food



Sausages
Vienna's
Burger patties
Processed meat

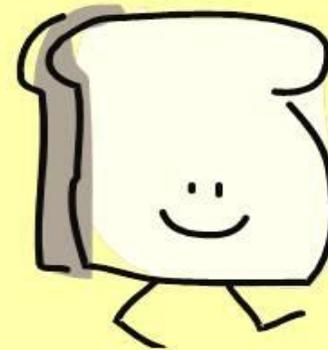
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All bran flakes
Corn flakes
Barley
Semolina
Spelt
Rye



Baked goods
Pasta
Bread
Pastry
Pizza
Crumbed food
Battered food



WHEAT

DEFINITIONS

- ▶ Non-celiac gluten sensitivity (gluten intolerance)
- ▶ Wheat allergy
- ▶ Celiac disease (gluten sensitivity)

* No evidence suggests negative side effects occur with gluten consumption outside of the small percentage of the population having gluten sensitivity

NON-CELIAC GLUTEN SENSITIVITY (GLUTEN INTOLERANCE)

- ▶ Syndrome of gastrointestinal responses to gluten different from the immune response characteristic of celiac disease
- ▶ No scientific consensus exists to confirm gluten intolerance is a definable pathological condition
- ▶ Frequently, symptoms arise in individuals as a result of undiagnosed celiac disease
- ▶ Due to a reaction to other components of wheat, such as short-chain, fermentable carbohydrates called FODMAPs

Fermentable Oligo-, Di-, Mono- saccharides and Polyols

COMMON FOODS CONTAINING FODMAPs

EXCESS FRUCTOSE	LACTOSE	FRUCTANS	GALACTANS	POLYOLS
<p>> Fruits apples, pears, nashi, mangoes, tinned fruit in natural juice, watermelon</p> <p>> Sweeteners fructose, high fructose corn syrup</p> <p>> Large total fructose dose concentrated fruit sources, large serves of fruit, dried fruit, fruit juice</p> <p>> Honey</p> 	<p>> Milk cows', goats' and sheeps' milk, yoghurt, ice cream</p> <p>> Cheeses soft and fresh (eg. ricotta, cottage)</p> 	<p>> Vegetables artichokes, beetroot, asparagus, Brussels sprouts, cabbage, fennel, garlic, leeks, okra, onions, spring onions (white part), shallots</p> <p>> Cereals wheat and rye when eaten in large amounts (eg. bread, pasta, couscous, crackers, biscuits)</p> <p>> Fruits watermelon, custard apples, persimmons</p>	<p>> Legumes chickpeas, lentils, red kidney beans, baked beans</p> 	<p>> Fruits apples, apricots, cherries, lychees, nashi, nectarines, pears, peaches, plums, prunes, watermelon</p> <p>> Vegetables avocados, mushrooms</p> <p>> Sweeteners sorbitol (420), mannitol (421), xylitol (967), maltitol (965), isomalt (953)</p> 

✓ SUITABLE ON A LOW-FODMAP DIET

FRUIT	VEGETABLES	MILK PRODUCTS	GRAIN FOODS	OTHERS
<p>> Fruit bananas, grapefruit, blueberries, grapes, honeydew melons, kiwifruit, lemons, limes, mandarin, oranges, pawpaw, passionfruit, tangelos, raspberries, rock-melons, strawberries, tangelos</p> 	<p>> Vegetables bamboo shoots, bok choy, carrots, celery, capsicums, chokos, choy sum, corn, eggplant, green beans, lettuce, chives, parsnips, pumpkins, silver beet, spring onions (green part only), tomatoes</p> <p>> Onion/garlic substitutes garlic-infused oil</p>	<p>> Milk lactose-free, rice milk</p> <p>> Cheeses 'hard' cheeses, and brie and camembert</p> <p>> Yoghurt lactose-free</p> <p>> Ice-cream substitutes gelati, sorbet</p> <p>> Butter substitutes milk-free spread</p> 	<p>> Cereals gluten-free bread/ cereal products</p> <p>> Bread 100% spelt bread</p> <p>> Rice</p> <p>> Corn</p> <p>> Oats</p> <p>> Polenta</p> 	<p>> Sweeteners sugar (sucrose), glucose, artificial sweeteners not ending in '-ol'</p> <p>> Honey substitutes maple syrup, golden syrup</p> 

WHEAT ALLERGY

- ▶ A wheat allergy causes the immune system to abnormally respond to a component of wheat that it treats as a threatening foreign body
- ▶ This immune response is often self-limiting and does not cause lasting harm to body tissue
- ▶ Wheat allergy and celiac disease are different disorders

CELIAC DISEASE

- ▶ First described by Samuel Gee in 1888
- ▶ Recognized by Dutch pediatrician WWII food shortage
- ▶ Celiac lesion in proximal small bowel first described 1954
- ▶ Intestinal reaction to alpha-gliadin in gluten resulting in a loss of intestinal villi and a disruption of absorption
- ▶ Gluten sensitive enteropathy, also called nontropical sprue

CELIAC DISEASE

- ▶ Classic definition includes the following three features:
 - ▶ Villous atrophy
 - ▶ Symptoms of malabsorption such as steatorrhea, weight loss or other signs of nutrient or vitamin deficiency
 - ▶ Resolution of the mucosal lesions and symptoms upon withdrawal of gluten-containing foods (usually weeks to months)

CELIAC DISEASE: EPIDEMIOLOGY

- ▶ Multisystem disease
- ▶ 1% or 1/133 persons of US
- ▶ 1:70 to 1:300 in most countries
- ▶ Primarily in whites of Northern European ancestry
- ▶ Not specific to age or gender
- ▶ Familial (70% twins and 10% first degree family member)

Celiac Disease is the one of the most common genetic autoimmune diseases on the planet!

313,000,000
Million Americans

1 in 133

People have Celiac Disease

97%

Don't know they have it

9 Years
Average delay in adult diagnosis

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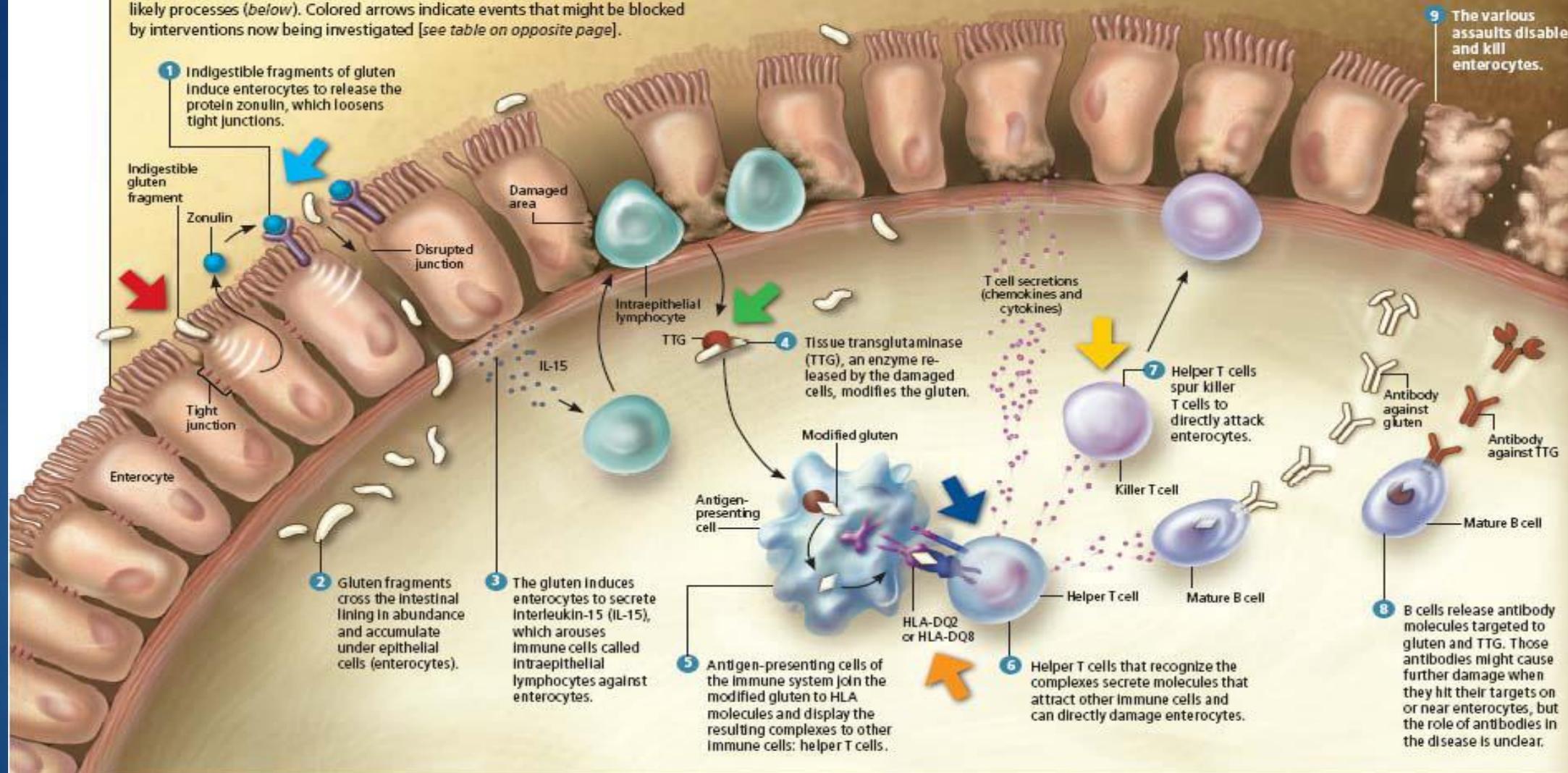
www.GlutenFreePrairie.com

CELIAC DISEASE: GENETICS

- ▶ Intra familial occurrence and close association with HLA-DQ2 and/or DQ8 gene loci provide basis of current understanding
 - ▶ Immune disorder triggered by an environmental agent (gliadin) in genetically predisposed individuals
- ▶ HLA-DQ2 (95% of patients) and HLA-DQ8 (5% of patients); Absence of the DQ gene rules out celiac disease with 99% confidence
 - ▶ Presence of one of these markers is necessary but not sufficient for diagnosis
- ▶ DQ2 and 8 are present in 30-40% of the general Western population, suggesting other factors play a role

THE INSIDE STORY

Investigators do not know every detail of how the immune system wreaks havoc with the intestinal lining of celiac patients, but they have identified a number of likely processes (*below*). Colored arrows indicate events that might be blocked by interventions now being investigated [see *table on opposite page*].



CELIAC DISEASE

- ▶ Associated disorders (many autoimmune)
 - ▶ Endocrine (DM I, autoimmune thyroid, Addison's, Osteopenia)
 - ▶ Mixed connective tissue disease (Sjogren's, RA)
 - ▶ Cardiopulmonary (Asthma, Sarcoid, Carditis, pulmonary hemosiderosis, fibrosing alveolitis)
 - ▶ Neurological (Seizures, Dementia, Peripheral neuropathy, Psychiatric disorders)

CELIAC DISEASE

- ▶ Associated disorders (many autoimmune)
 - ▶ Skin (Dermatitis, Atopy, Psoriasis)
 - ▶ Malignancy (Lymphoma, Esophageal, Oropharyngeal)
 - ▶ Gastrointestinal (GERD, EoE, IBD-UC>CD, microscopic colitis)
 - ▶ Reproductive (Amenorrhea, Infertility, recurrent spontaneous abortion)
 - ▶ Immunological (IgA deficiency)
 - ▶ Down syndrome

CELIAC DISEASE: CLINICAL MANIFESTATIONS

- ▶ **May be confused with IBS due to non-specific symptoms**
- ▶ Malabsorption (diarrhea, foul smelling stools, weight loss, cramps, fatigue)
- ▶ Multisystemic
 - ▶ Oral (dental enamel, aphthous ulcerations)
 - ▶ Labs (IDA, elevated transaminases ALT>AST (~42% of pts with celiac and normalize with gluten free diet, low albumin)
 - ▶ Dermatitis herpetiformis
 - ▶ Neuropsychiatric disease (HA, peripheral neuropathy, ataxia, depression, anxiety, epilepsy)

CELIAC DISEASE: CLINICAL MANIFESTATIONS

- ▶ Higher prevalence osteoarthritis (relationship unknown)
- ▶ Metabolic bone disease (osteopenia and osteoporosis)
 - ▶ Secondary hyperparathyroidism likely d/t vit D deficiency
- ▶ Hyposplenism (mechanism unknown)
 - ▶ Prophylactic pneumococcal vaccination suggested
- ▶ Kidney disease- glomerular IgA deposition, but rarely have manifestations
- ▶ Idiopathic pulmonary hemosiderosis (Lane-Hamilton syndrome)
 - ▶ Introduction of gluten-free diet assoc with remission of pulmonary symptoms

DERMATITIS HERPETIFORMIS

- ▶ Intensely pruritic papulovesicular rash
- ▶ Typically on extensor surface
- ▶ Represents intestinal sensitivity to gluten
- ▶ Biopsy show granular IgA deposits in the papillary dermis (pathognomonic)
- ▶ Responds to gluten-free diet
- ▶ Dapsone may help with healing of skin



CELIAC DISEASE: WHO SHOULD BE TESTED?

- ▶ GI symptoms (diarrhea, malabsorption, weight loss, distension or bloating) mimicking IBS or lactose intolerance
- ▶ Individuals without other explanations for IDA, folate or B12 deficiency, persistent elevation in serum aminotransferases, and physical manifestations previously discussed
- ▶ Patients with Type I DM, 1st degree relatives of individuals with celiac disease

CELIAC DISEASE: LABORATORY STUDIES

- ▶ Anti Gliadin IgG: 75% sensitivity, 97% specificity
 - ▶ May also be found in 10-20% of patients with other disease that affect the small intestinal mucosa
 - ▶ Helpful for monitoring outcome: always becomes negative with the regrowth of jejunal villi in patients after gluten-free diet
- ▶ Anti Endomysial IgA: 97-100% specificity, 85% sensitivity (untreated patients)
 - ▶ Can persist in low titers in 10-25% of patients who are treated despite normal histology, or become negative with adherence to gluten-free diet

CELIAC DISEASE: LABORATORY STUDIES

- ▶ **Anti-transglutaminase IgA (tTG IgA):** 100% specificity, 90% sensitivity - best sensitivity and specificity
- ▶ Endomysial and transglutaminase can be false negative in those with IgA deficiency (approximately 2.5% of the population; therefore **IgA level** should always be ordered with serology) and children less than 2 years old
- ▶ Any serological tests for celiac disease should be confirmed with a small bowel biopsy

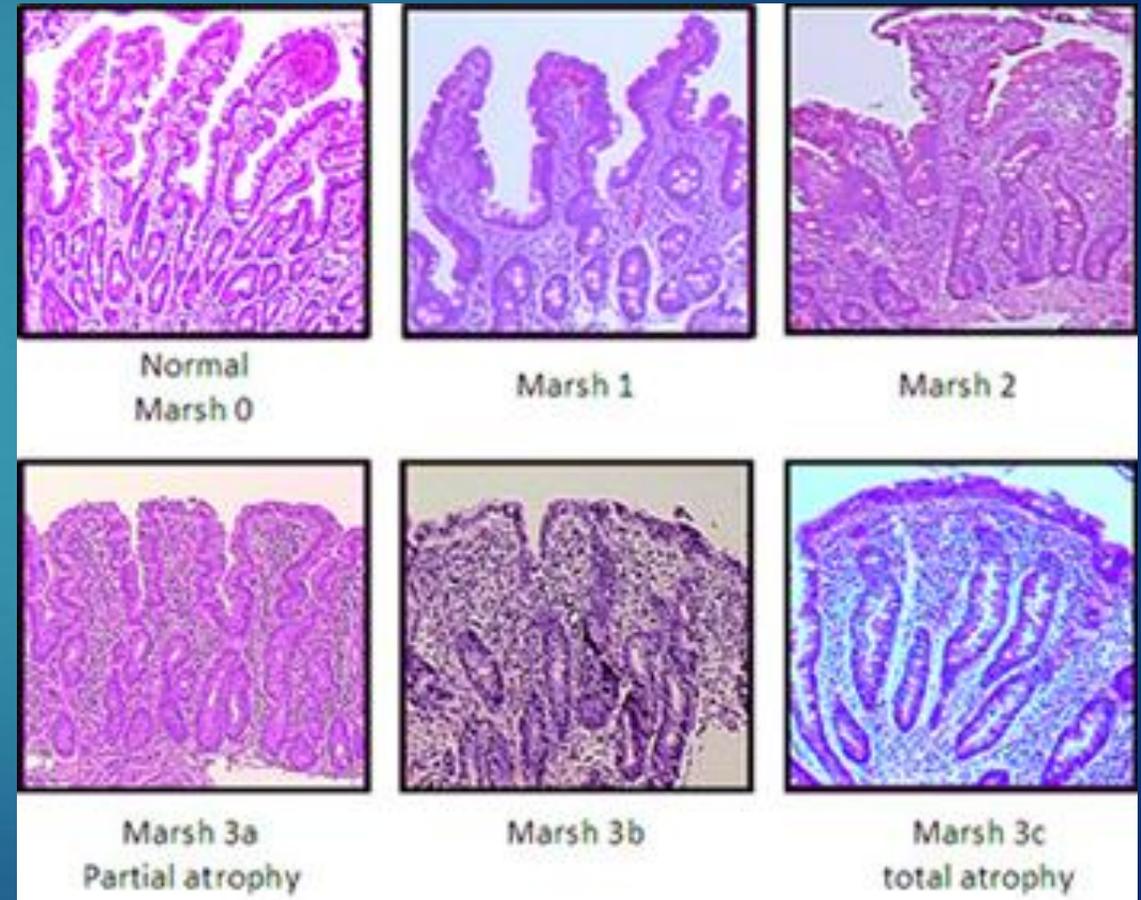
CELIAC DISEASE ENDOSCOPY AND HISTOLOGY



CELIAC DISEASE: HISTOLOGY

▶ Modified Marsh Classification

- ▶ Type 1: increased intraepithelial lymphocytes but no villous atrophy
- ▶ Type 2: villi still present but shortened
- ▶ Type 3: mild to marked villous atrophy
- ▶ Type 4: lamina propria hypoplasia; no villi



DIFFERENTIAL FOR VILLOUS ATROPHY

Causes of small intestinal villous atrophy other than celiac disease

Small intestinal bacterial overgrowth
Crohn disease
Cow's milk or soy protein intolerance (children)
Eosinophilic gastroenteritis
Giardiasis
Intestinal lymphoma
Peptic duodenitis
Post-gastroenteritis
Tropical sprue
Zollinger-Ellison syndrome
Common variable immunodeficiency
Autoimmune enteropathy
Other immunodeficiency states (usually apparent clinically, eg, AIDS enteropathy, hypogammaglobulinemic sprue)
Medications (eg, olmesartan)
Whipple disease
Malnutrition
Intestinal tuberculosis
Graft-versus-host disease

CELIAC DISEASE: TREATMENT

- ▶ Gluten-free diet: removal of wheat, rye and barley; Nutrition consult for education
 - ▶ Oats do not contain gluten but are often contaminated with gluten during processing
 - ▶ Rice, corn, and millet do not contain gluten
- ▶ Lactose-free diet initially (the brush border contains lactate which is not functional with sprue)
- ▶ Those with continued diarrhea should be examined for other causes of diarrhea
- ▶ DDX of non-responders:
 - ▶ Incorrect diagnosis (IBS), Continuing gluten intake (restaurants), SBBO, IBD/Microscopic colitis, Pancreatic insufficiency, lactase deficiency, Lymphoma, Autoimmune enteropathy, Refractory sprue (rare)

LEARN MORE ABOUT CELIAC DISEASE

<https://celiac.org>

Celiac Disease Symptoms and
Conditions Checklist

What is Celiac Disease?

Dermatitis Herpetiformis

Gluten Sensitivity

Diagnosing Celiac Disease

Screening Diagnosis

Treatment and Follow Up

Poorly Responsive Celiac Disease

Celiac Disease and Vaccinations

Celiac Disease and Diabetes

Celiac Disease and Crohn's Disease

Future Therapies for Celiac Disease

Research

Research Studies

Celiac Disease in the News

The TIME logo is displayed in white, serif, all-caps font on a red square background.

Celiac Disease
Foundation
Featured in Time
Magazine

July 30, 2015

CELIAC DISEASE FOR PRACTITIONERS

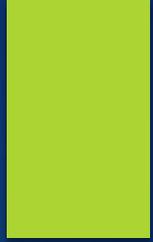
- ▶ <https://celiac.org/celiac-disease/provider-directory>
- ▶ Be Listed in the CDF Healthcare Practitioner Directory
- ▶ Earn CME in Celiac Disease
- ▶ Earn CME in Gluten-Related Disorders



May is
Celiac
Awareness
Month



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Celiac Disease
FOUNDATION

TEAR M
gluten-free™

Celiac disease effects
of healthy average **1%**
Americans. That means at least

3 million
people in our country
are living with celiac disease.

97% of them are
undiagnosed.

THANK YOU
clepane@hotmail.com



**KEEP
CALM
EAT
GLUTEN
FREE**