



UNIVERSITY *of* MARYLAND  
MEDICAL CENTER

*Carbohydrates vs. Proteins?*  
*Gluten Free Diet vs. FODMAP?*  
*Identifying the Right Diet for You Patients*

*Pamela A. Cureton, RDN, LDN*

# Conflicts of Interest

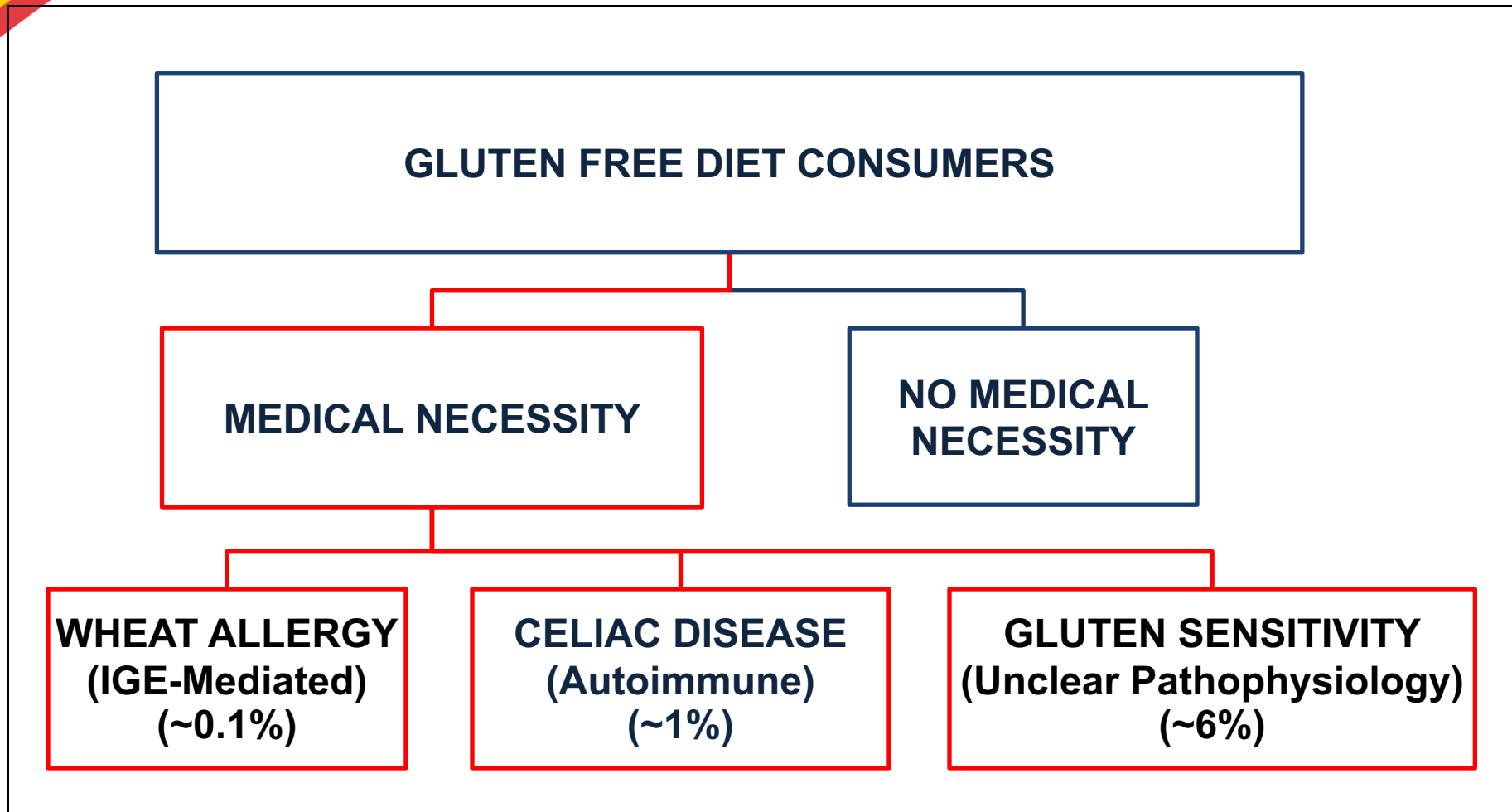
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Grain Foods Foundation Advisory Board

# Objectives:

1. Identify patients who would benefit from the Gluten Free Diet (GFD) vs. FODMAP diet
2. Describe the difference in diagnosis and treatment between celiac disease and non-celiac gluten sensitivity
3. Identify nutritional difficulties and challenges with the GFD and FODMAP diets

# Gluten Related Disorders



# Celiac Disease (CD)

Chronic inflammatory disorder in genetically predisposed individuals caused by the ingestion of:

Wheat

Rye

Barley

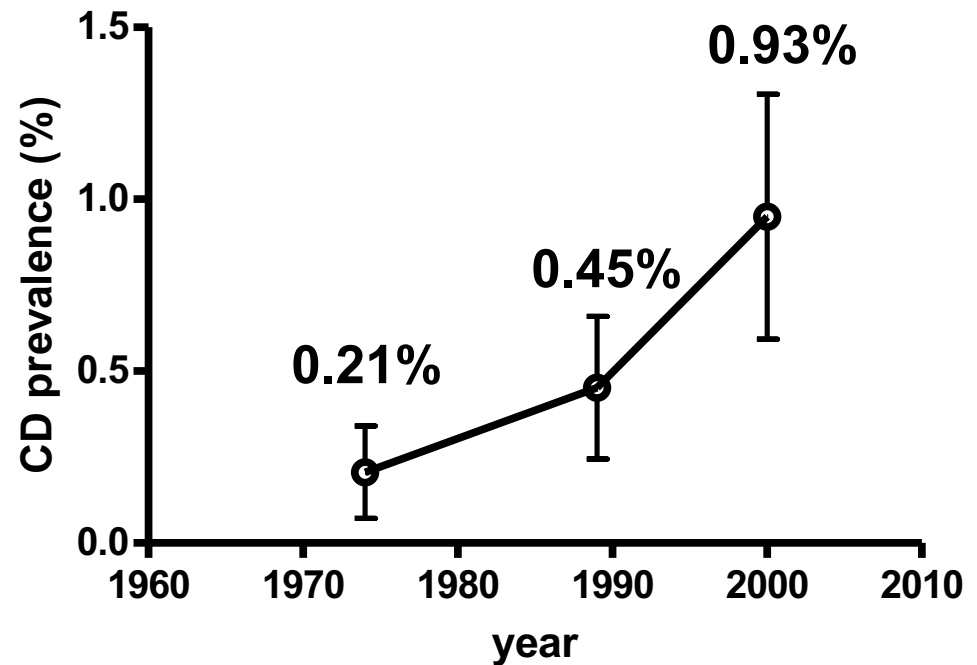
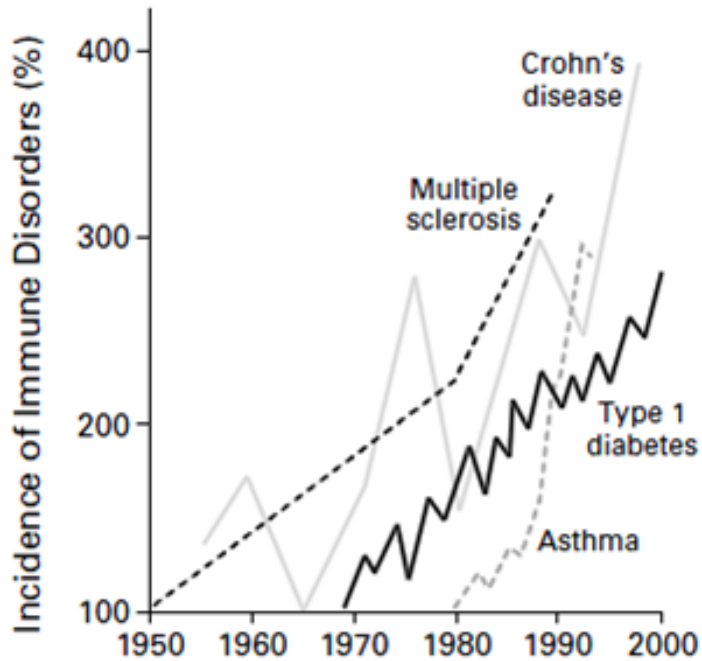
Inappropriate immune response → Small Intestinal Patchy Inflammation

Gastrointestinal complaints

Nutrient malabsorption

Extra-intestinal symptoms: Fatigue, arthralgias etc

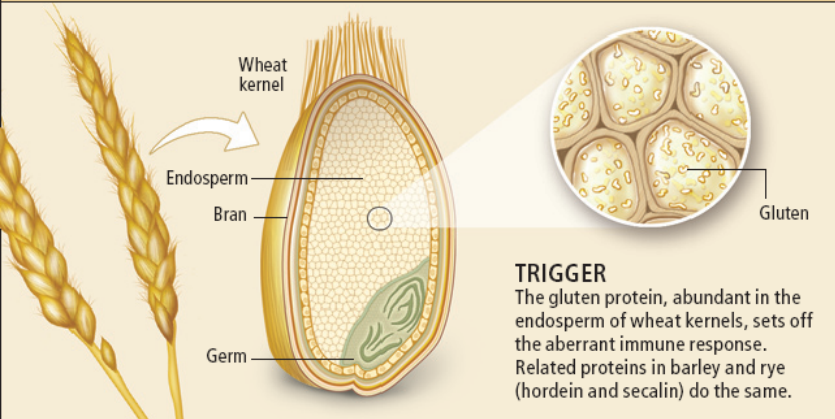
# Is The Prevalence Of Celiac Disease Truly Increasing?



**During the past 35 years the prevalence of CD in USA doubled every 15 years.**

# A TRIO OF CAUSES

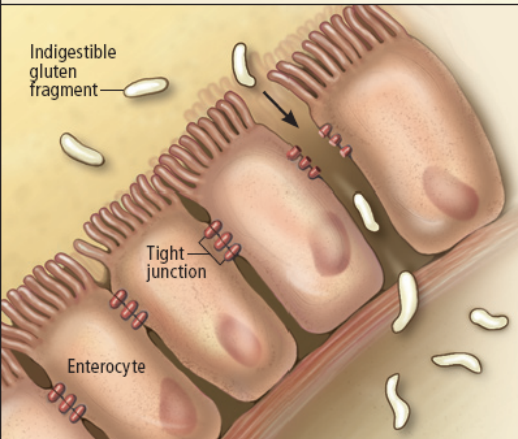
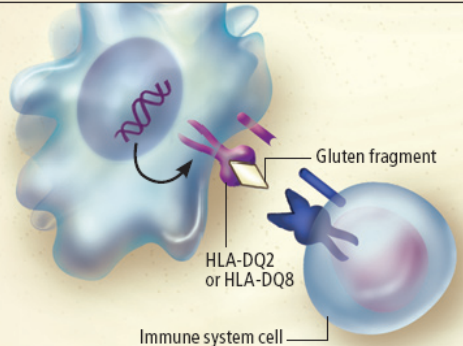
Three factors underlie celiac disease: an environmental trigger, a genetic susceptibility and, according to the author's research, an unusually permeable gut (*below*). The author suspects that the same basic triad contributes to other autoimmune diseases, although each disorder will have its own triggers and genetic components.



**TRIGGER**  
The gluten protein, abundant in the endosperm of wheat kernels, sets off the aberrant immune response. Related proteins in barley and rye (hordein and secalin) do the same.

## GENETIC PREDISPOSITION

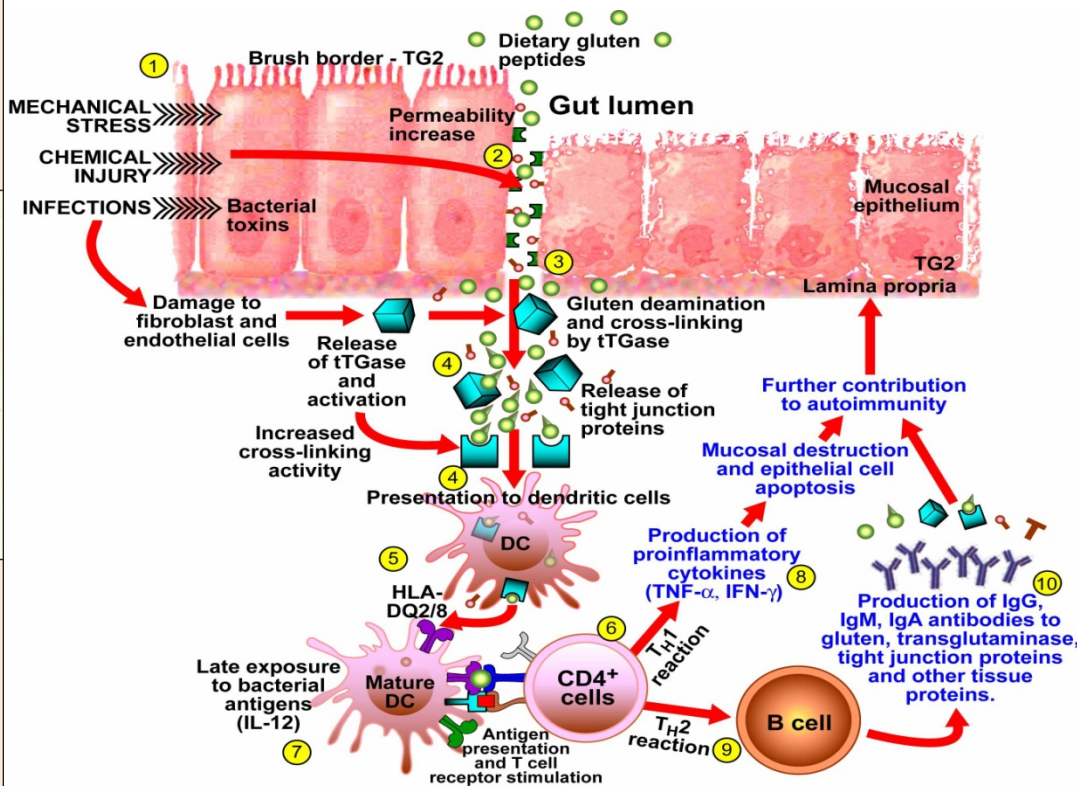
Almost all patients harbor the genes *HLA-DQ2* or *HLA-DQ8*, or both. These genes give rise to proteins of the same name that display gluten fragments to immune system cells, which then direct an attack on the intestinal lining. Other genes are likely to be involved as well, but these additional culprits may differ from person to person.



## LEAKY SMALL INTESTINE

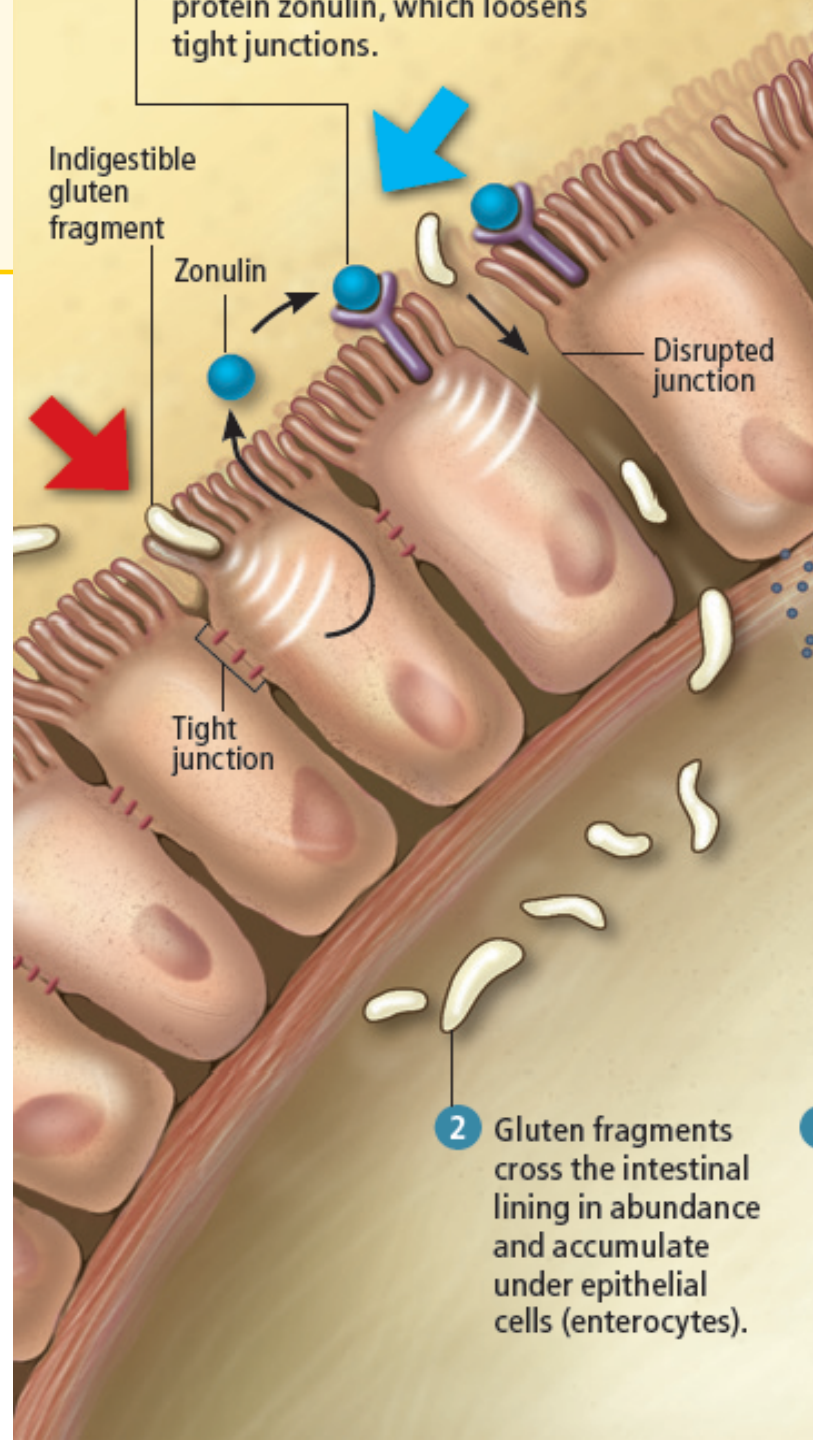
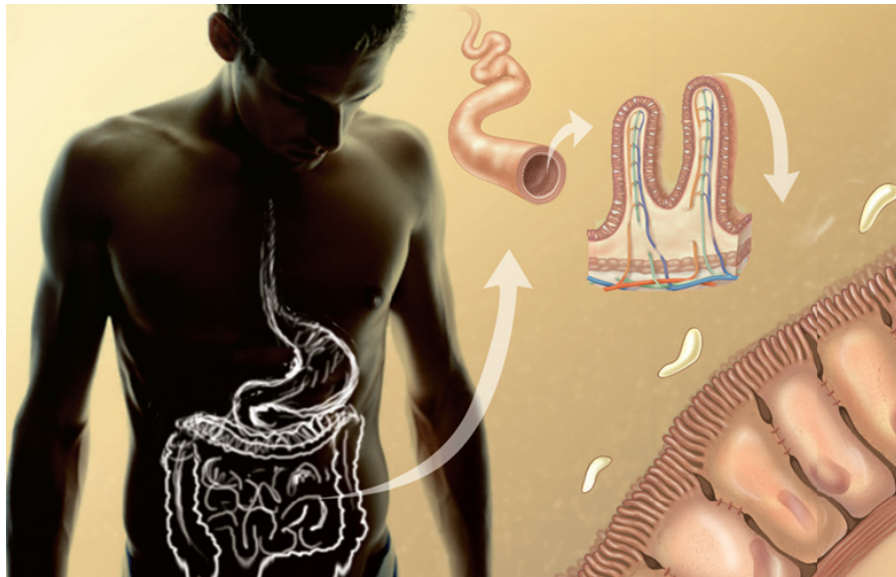
In most people, links known as tight junctions "glue" intestinal cells together. In those with celiac disease, the junctions come apart, allowing a large amount of indigestible gluten fragments to seep into the underlying tissue and incite immune system cells. Treatments that reduced leakiness could potentially ease not only celiac disease but also other autoimmune disorders involving unusually permeable intestines.

# The Autoimmune Mechanism in Celiac Disease



Depiction of the intestinal mucosa with emphasis on the factors involved in the development of celiac disease in individuals with HLA-DQ2/DQ8 positive

# Gluten Causes Gut Leakiness in Everybody





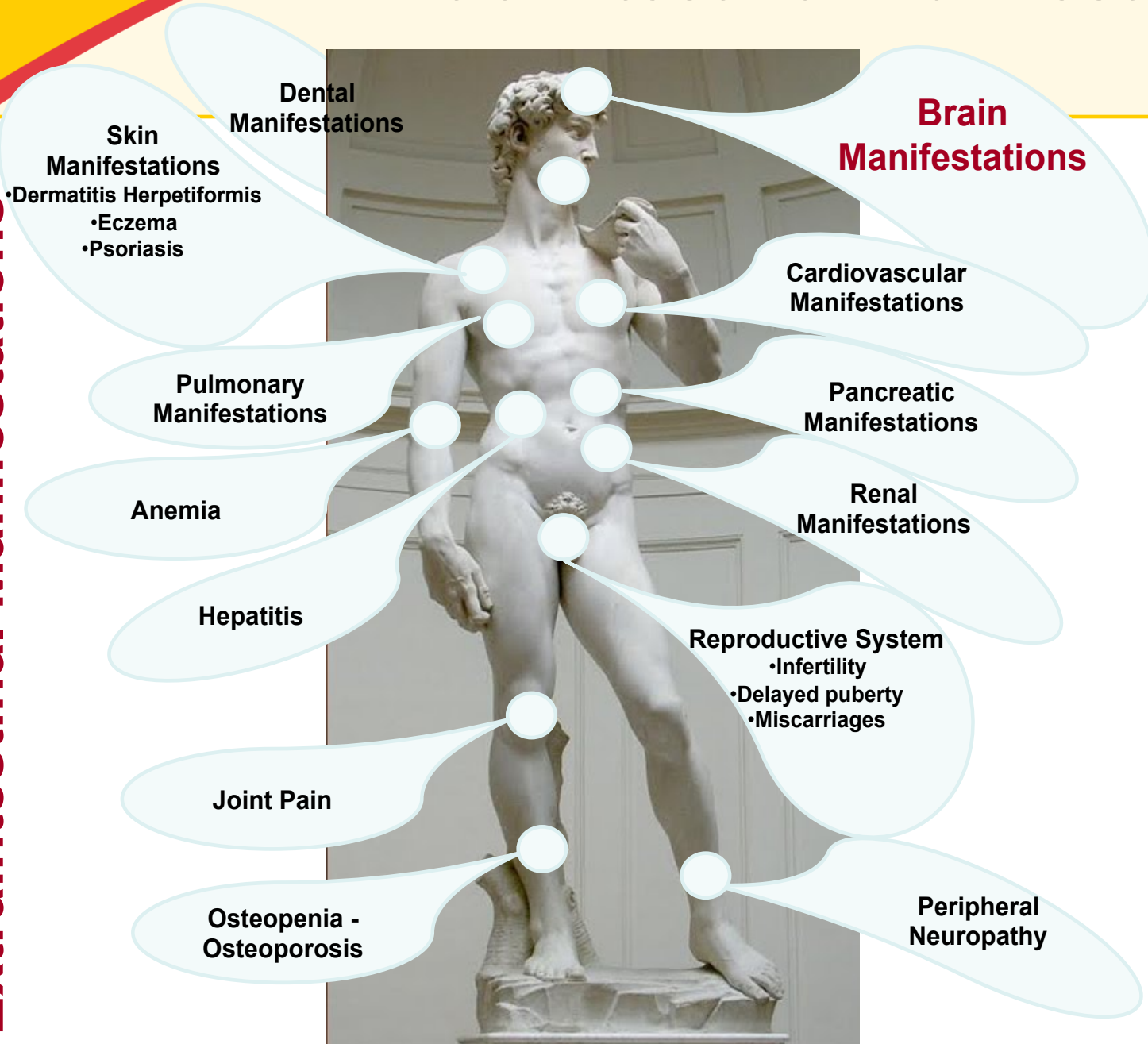
- Diarrhea or constipation
- Abdominal distension, pain
- Anorexia
- Failure to thrive or weight loss
- Vomiting
- IBS like presentation with constipation, nausea and vomiting
- Most common in pediatric population, children younger than 3



Fig. 2.—Photograph of five cases of coeliac disease showing the general clinical feature

# Extra-Intestinal Manifestations

## Extraintestinal Manifestations



# *Non-Responsive or Refractory*

**Non-responsive celiac disease (NRCD)** biopsy-proven CD with persistence or relapse of symptoms **and/or** villous atrophy despite being on a gluten free diet for  $\geq 12$  months

**Refractory Celiac Disease-** Biopsy proven CD with persistent enteropathy after 12 months on a gluten free diet after excluding other causes of villous atrophy which can be due to a gluten-independent inappropriate activation of the immune system.  
Treatment of immunosuppressant therapy

# Diagnosing Celiac Disease: Accurate Serological Tests Allowed for Screening

**Table 1. Serum Tests for the Diagnosis of Celiac Disease.\***

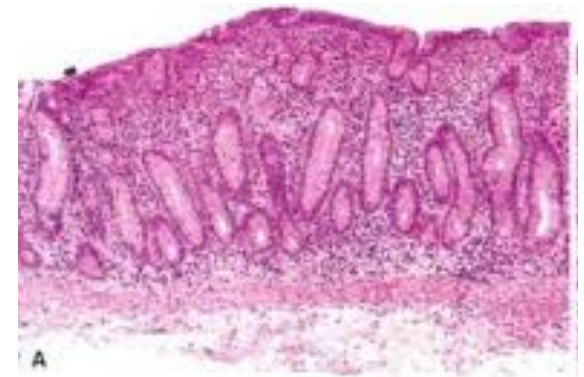
Test	Sensitivity (Range)	Specificity (Range)	Comments
	<i>percent</i>		
IgA anti-tTG antibodies	>95.0 (73.9–100)	>95.0 (77.8–100)	Recommended as first-level screening test
IgG anti-tTG antibodies	Widely variable (12.6–99.3)	Widely variable (86.3–100)	Useful in patients with IgA deficiency
IgA antiendomysial antibodies	>90.0 (82.6–100)	98.2 (94.7–100)	Useful in patients with an uncertain diagnosis Type 1 DM, Down
IgG DGP	>90.0 (80.1–98.6)	>90.0 (86.0–96.9)	Useful in patients with IgA deficiency and young children
<i>HLA-DQ2</i> or <i>HLA-DQ8</i>	91.0 (82.6–97.0)	54.0 (12.0–68.0)	High negative predictive value

\* Data are from Husby et al.<sup>28</sup> and Giersiepen et al.<sup>29</sup> DGP denotes deamidated gliadin peptides, and tTG tissue transglutaminase.

# Diagnosing Celiac Disease: Genetic (HLA) Testing

- DQ2 found in 95% of celiac patients
- DQ8 found in remaining patients
- DQ2 found in ~30% of general population
- High negative predictive value - **Negativity for DQ2/DQ8 excludes diagnosis of Celiac Disease with 99% confidence!**

# Diagnosing Celiac Disease: Endoscopy still the Gold Standard



# Celiac Disease Follow Up

## **Nutrition Labs**

- To be done on a yearly basis
- Hemoglobin, Iron, Ferritin
- Folate, Thiamine, B12, Zinc
- Vitamin D, Calcium

## **Adjunct studies**

- Bone density scan
- Repeat endoscopy 1-2 years after diagnosis to document healing

# NON CELIAC GLUTEN SENSITIVITY (NCGS)

- Unable to tolerate gluten and develop an adverse reaction when eating gluten
- Symptoms may resemble celiac disease
- Negative celiac serology
- Wheat allergy is ruled out
- NO small intestinal damage-normal histology
- Currently the diagnosis is made by exclusion, and an elimination diet and 'open challenge'
  - Symptoms disappear after gluten is withdrawn from diet
  - Symptoms reoccur after gluten challenge



# NCGS FACTS:

- The lack of clear diagnostic marker/criteria may have led to NCGS underdiagnosed by physicians for many years
- The prevalence of NCGS is estimated to be between 3% to 6%
- The research estimates that 18 million Americans have NCGS.
- The genetic component of NCGS is not yet completely understood
- Only 50% of NCGS patients express HLA-DQ2 or HLA-DQ8, indicating that these genes are not necessary to develop NCGS.

# Symptoms:

- Abdominal Pain, bloating, flatulence
- Eczema and/or rash
- Headache
- Foggy mind
- Fatigue
- Diarrhea
- Depression/anxiety
- Joint Pain
- Numbness in the legs, arms or fingers

# IBS and NCGS

- There is a complex relationship between IBS and diet
- Gluten ingestion may elicit GI symptoms in patients with IBS-diarrhea (IBS-D)
- Gluten alters bowel barrier functions in patients with IBS-D, particularly in HLA DQ2/8-positive patients
- In this subgroup that gluten elimination may improve patient symptoms in IBS
- Besides gluten, other wheat derivatives could play a role in causing symptoms in IBS
  - Amylase-trypsin inhibitors
  - Fructans

# Gluten Free Diet Overview

	Celiac Disease	Gluten Sensitive
Treatment: GFD	Yes	Yes
Strict adherence to GFD	<10 mg / day	?
Life Long	Yes	?
Improvement of symptoms on GFD	Yes	Yes
Consequence of non compliance:		
Physical symptoms	Yes	Yes
Intestinal damage	Yes	No
Monitored by bio marker	Yes	No
Co morbidities	Yes	?

# Gluten-Containing Ingredients to Avoid

- Wheat
- Barley
  - Barley Malt /Extract
  - Brewer's yeast
- Rye

## Other Types of Wheat:

Spelt

Kamut

Emmer

Einkorn

Semolina

Faro

Bulgur

Couscous

Durum

Triticale

Filler



# FALCPA...shopping made easier!

(Food Allergy Labeling Consumer Protection Act)

For foods regulated by the FDA, the consumer should look for the terms in products **not** labeled gluten free:

- Wheat
- Barley
- Malt
- Rye
- Oats
- Brewer's yeast

**Foods covered by USDA (meat, poultry and egg products) are not required to follow FALCPA but the vast majority voluntarily comply.**

- Modified food starch, starch and dextrin

# Nutritional Consequences of the GFD

The GFD can be missing important nutrients needed for optimal health and wellness

Lacks fiber

Lacks iron

Lacks B vitamins- folate, niacin, B12

Lacks calcium

Phosphorous

Zinc



# Nutrition Deficiencies Lead to:

Iron deficiency anemia

- *Supplementation is frequently required*
- *Iron rich foods should be included*

Reduced bone mineral density

Weight gain on GFD due to high fat, sugar and calorie content

Constipation

- *Change in diet, low fiber from high fiber can cause constipation: abdominal pain, cramping, bloating*



# Gluten-Free and Still Not Feeling Better?

**GAS**

**CONSTIPATION**

**VOMITING**

**FEEL FULL FAST  
AFTER FOOD**

**NAUSEA**

**BLOATING**

**DIARRHEA  
OR LOOSE  
STOOL**



# *Common Nutritional Problems on GFD*

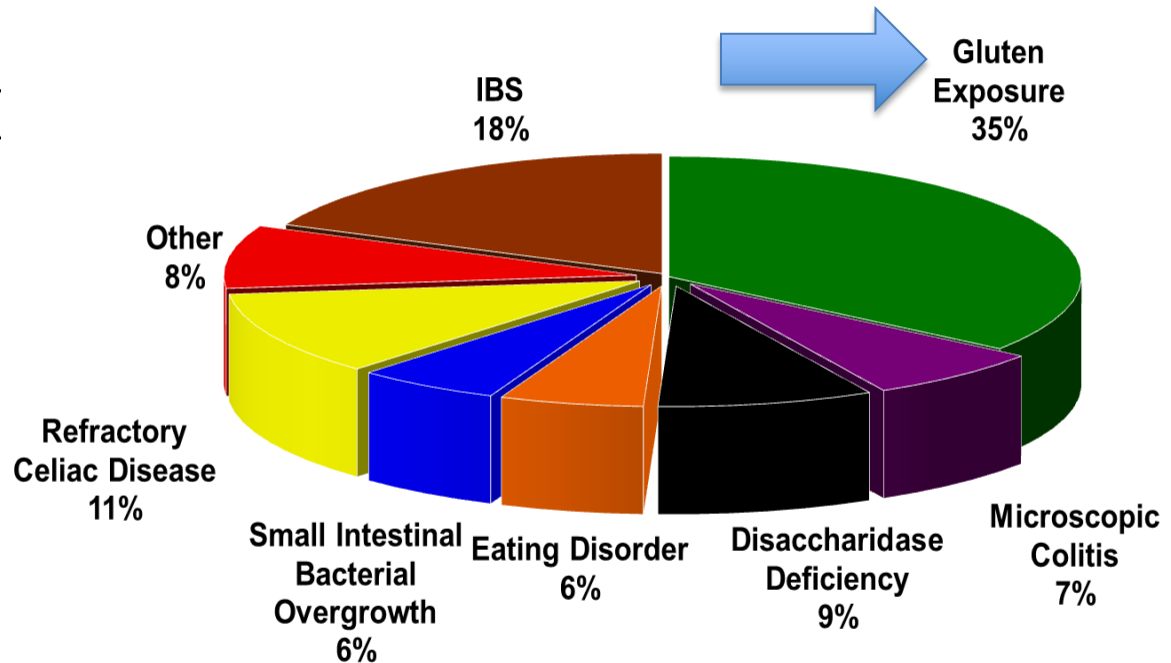
- Lactose intolerance
  - 30-60% in newly diagnosed
  - Caused by intestinal injury in untreated CD
  - May resolve on GF diet
- Constipation
  - Change in diet, low fiber from high fiber can cause constipation: abdominal pain, cramping, bloating

# “Non-Responsive” Celiac Disease

Persistent or recurrent signs/symptoms occur in ~30% of patients

Others included:

- Peptic ulcer disease (2)
- Crohn’s disease (1)
- Duodenal adenoCA (1)
- Food allergy (1)
- Gastroparesis (1)



# Determination of gluten consumption in celiac disease patients on a gluten-free diet

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<sup>1</sup>ImmunogenX, Newport Beach, CA; <sup>2</sup>Beth Israel Deaconess Medical Center, Harvard Medical School, Boston MA; and <sup>3</sup>Biomedal, Seville, Spain

## ABSTRACT

**Background:** Celiac disease (CD) patients adhering to a gluten-free diet (GFD) are exposed frequently to low levels of gluten that contribute to symptoms and persistent intestinal histologic damage.

**Objective:** We analyzed prior clinical data to determine how much gluten is accidentally consumed while on a GFD. The aim was to understand the range of gluten consumption for a wide distribution of CD patients.

**Design:** A meta-analysis was conducted on data from 2 different clinical programs: 1) measurements of gluten in stool and urine in CD and non-CD populations; and 2) analysis of data from trials for the investigational therapeutic latiglutenase. The stool and urine studies included controlled gluten challenges. A calibration factor was applied that allowed normal ingestion of gluten to be computed from the urine and stool measurements. From the latiglutenase trial data, a determination of gluten consumption was made by estimating how much gluten was eliminated from patients' diets due to a trial effect that led to improved histology even in the placebo group.

**Results:** The average inadvertent exposure to gluten by CD individuals on a GFD was estimated to be ~150–400 (mean) and ~100–150 (median) mg/d using the stool test and ~300–400 (mean) and ~150 (median) mg/d using the urine test. The analyses of the latiglutenase data for CD individuals with moderate to severe symptoms indicate that patients ingested significantly >200 mg/d of gluten.

**Conclusions:** These surrogate biomarkers of gluten ingestion indicate that many individuals following a GFD regularly consume sufficient gluten to trigger symptoms and perpetuate intestinal histologic damage. *Am J Clin Nutr* 2018;107:201–207.

**Keywords:** celiac disease, gluten exposure, gluten-free diet

## INTRODUCTION

Celiac disease (CD) is the most common autoimmune gastrointestinal disease, affecting ~1% of the world population (1–3). There are currently no US Food and Drug Administration (FDA)-approved treatments, other than a gluten-free diet (GFD).

50 mg/d can be harmful to some celiac patients (5). The elimination of 99% of gluten from a diet may still be insufficient to avoid symptoms and histologic damage. The FDA has established a guideline that foods labeled gluten free must contain <20 ppm gluten (6). However, there are difficulties with currently approved analytical methods for the detection and quantification of gluten in certain foods (e.g., fermented and hydrolyzed foods) (7–9).

There is an unmet need to protect against unintended gluten ingestion, particularly since persistent uncontrolled gluten exposure is known to lead to life-long health issues and comorbidities such as anemia, malnutrition, and lymphoma (10). As such, investigational drugs in clinical development are generally intended to be used as an adjunct to a GFD (11–14).

Despite the obvious need to protect CD patients against exposure to gluten consumption, there is surprisingly very little known about the quantity of gluten that is accidentally consumed episodically and continually for those on a GFD. Much has been written about GFDs and the complexities, difficulties, and challenges associated with maintaining strict adherence across social and demographic groups and behaviors (15–17). However, we are unaware of any studies that attempt to analytically determine the actual quantity of gluten that is consumed while on a GFD.

In this work, we performed a meta-analysis based on data from clinical studies that provided key information needed to determine the amount of gluten that CD patients consume while attempting to follow a GFD.

Supported by ImmunogenX.

ImmunogenX is a clinical-stage company developing the therapeutic drug latiglutenase for treating celiac disease and also a minimally invasive drug biomarker and blood test for monitoring the villous health of the small intestine.

Address correspondence to JAS (e-mail: [jsyage@immunogenx.com](mailto:jsyage@immunogenx.com)).

Abbreviations: CD, celiac disease; FDA, Food and Drug Administration; GFD, gluten-free diet; GIP, gluten immunogenic peptide; LOD, limit of detection; Vh: Cd, villous height-to-crypt depth ratio.

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# How Much gluten?

“Adult CD patients evidently consume, on average, potentially unsafe levels of gluten while on a GFD. Mean daily consumptions for adults were determined to be 244 mg (stool analysis), 363 mg (urine analysis) and >228 mg (ALV003- 1221 trial analysis), with the latter value likely to be greater than the former values.”

*People with celiac disease should not consume more than 10 mg of gluten per day This is approximately 1/8<sup>th</sup> of a tsp of flour*

# *Will FODMAP become the new gluten-free?*





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By Stephen Daniels

12-Jan-2018 - Last updated on 03-Aug-2018 at 16:19 GMT



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https://www.foodnavigator-usa.com/Article/2018/01/12/Will-2018-be-the-year-that-low-FODMAP-diets-explode#

# FODMAP is...

*an acronym for a group of poorly absorbed, fermentable carbohydrates that act in a cumulative manner to produce gastrointestinal symptoms. FODMAP carbohydrates include lactose, fructose, oligosaccharides and sugar alcohols.*



# Fermentable oligo-, di-, and monosaccharides & polyols

**Fermentable:** Carbohydrates that resist digestion, pass through the digestive tract to the colon where they are fermented, causing gas, bloating, diarrhea and abdominal pain

**Oligosaccharides:**      **Fructans:** wheat, barley, rye onion, garlic, and inulin  
**Galactans:** peas, soybeans, lentils, dried beans

**Disaccharides:**      **Lactose:** milk products

**Monosaccharides:**      **Fructose:** honey, high fructose corn syrup, asparagus,  
apple, mango, pears, cherries and juice

• **And Polyols:**      **Sugar Alcohols:** (artificial sweeteners), sorbitol,  
xylitol, isomalt, mannitol, prunes, cauliflower, mushrooms, snow  
peas, stone fruit

# Low FODMAP diet checklist

By Kate Scarlata RDN, FODMAP & IBS expert

## low lactose

### CHEESE

BRIE, CAMEMBERT, COLBY, CHEDDAR, GOAT CHEESE, FETA, HAVARTI, MOZZARELLA, PARMESAN, PECORINO, SWISS, LACTOSE FREE COTTAGE, LACTOSE FREE CREAM CHEESE

### BEVERAGES

LACTOSE FREE COW'S MILK (WHOLE, 2%, 1% OR FAT FREE), CANNED COCONUT MILK (FULL FAT & LIGHT), HEMP MILK, ALMOND MILK, RICE MILK

### OTHER

LACTOSE FREE ICE CREAM, SORBET FROM ACCEPTABLE FRUITS, LACTOSE FREE YOGURT, GOAT'S MILK YOGURT, COCONUT YOGURT, LACTOSE FREE SOUR CREAM, WHIPPED CREAM

GF = GLUTEN FREE  
C. = CUP  
TB = TABLESPOON  
TSP = TEASPOON

## no excess fructose

### FRUIT

*LIMIT TO ONE FRUIT SERVING PER MEAL*

BANANA (SMALL FIRM), DRIED BANANA CHIPS, BLUEBERRIES, CANTALOUPE, CLEMENTINE, FRESH AND DRIED COCONUT, DRAGON FRUIT, GRAPES (RED, GREEN & BLACK), RIPE GUAVA, HONEYDEW,

KIWIFRUIT (GOLD & GREEN), LEMONS, LIMES, ORANGE, PAPAYA, PASSION FRUIT, PINEAPPLE, PLANTAIN, RASPBERRIES, RHUBARB, STAR FRUIT, STRAWBERRIES, TANGELO

### SWEETENERS & BAKING

PURE MAPLE SYRUP, WHITE SUGAR, BROWN SUGAR, STEVIA, PALM SUGAR, RAW SUGAR, RICE MALT SYRUP, DARK CHOCOLATE, COCOA POWDER, VANILLA

### ALCOHOL

MOST WINE & BEER, GIN, VODKA, WHISKEY

## low fructans/GOS

### VEGETABLES

ARUGULA, BAMBOO SHOOTS, BOK CHOY, BEAN SPROUTS, BEETS (PICKLED), ¼ C. BUTTERNUT SQUASH, BELL PEPPERS, BROCCOLI, CARROTS, CELERIAC, CHIVES, COLLARD GREENS, COMMON GREEN & RED CABBAGE, RED & GREEN CHILI, CUCUMBER, EGGPLANT, ENDIVE, FENNEL BULB & STALK, GREEN BEANS, FRESH & GROUND GINGER ROOT, KABOCHA SQUASH, KALE, LETTUCE, PARSNIP, PATTY PAN SQUASH, ¼ C. CANNED PUMPKIN, POTATO (WHITE) OR ½ C. SWEET POTATO, RADISH, RUTABAGA, SCALLIONS & LEEKS (GREEN PART ONLY), SPAGHETTI SQUASH, SPINACH, SWISS CHARD, SUMMER SQUASH, NORI SEAWEED, ½ C. TARO, TOMATOES (CANNED, CHERRY, PLUM & COMMON BEEFSTEAK), TURNIP, OIL INFUSED WITH GARLIC OR ONION, WATER CHESTNUTS, ZUCCHINI, WATERCRESS, GREEN & BLACK OLIVES

### FRUITS

½ SMALL POMEGRANATE, 1 TB DRIED CRANBERRIES OR RAISINS, ¼ C. DRIED COCONUT & those listed on the no excess fructose and low polyol sections.

### GRAINS

GF BREAD, GF PASTA, MILLET, OATS, RICE, RICE CAKES, QUINOA, QUINOA FLAKES, SLOW LEAVENED SOURDOUGH WHEAT OR SPELT BREAD, SOBA NOODLES, POLENTA, CORN TORTILLAS

### NUTS/SEEDS

*LIMIT TO 1 HANDFUL PER SITTING*

ALMONDS, BRAZIL NUTS, CHESTNUTS, HAZELNUTS, MACADAMIAS, PEANUTS, PECANS, PINE NUTS, WALNUTS, CHIA SEEDS, POPPY SEEDS, PUMPKIN SEEDS, SESAME SEEDS, SUNFLOWER SEEDS

### LEGUMES

¼ C. DRAINED & RINSED CANNED CHICKPEAS, 1 C. EDAMAME, ½ C. DRAINED AND RINSED CANNED LENTILS, FIRM TOFU, TEMPEH (PLAIN)

### HERBS

BASIL, CILANTRO, CORIANDER, LEMONGRASS, MINT, ROSEMARY, PARSLEY, SAGE, TARRAGON, THYME

### COFFEE AND TEA

## low polyols

### FRUIT

BANANA (SMALL FIRM), DRIED BANANA CHIPS, BLUEBERRIES, CANTALOUPE, CLEMENTINE, FRESH AND DRIED COCONUT, DRAGON FRUIT, GRAPES (RED & GREEN), RIPE GUAVA, HONEYDEW, KIWIFRUIT (GOLD & GREEN), LEMONS, LIMES, ORANGE, PAPAYA, PASSION FRUIT, PINEAPPLE, PLANTAIN, RASPBERRIES, RHUBARB, STAR FRUIT, STRAWBERRIES, TANGELOS

### VEGETABLES

1/8 AVOCADO, ¼ C. BUTTERNUT SQUASH, ¼ STALK CELERY, ½ C. SWEET POTATO, OYSTER MUSHROOMS

### SWEETENERS AND BAKING

PURE MAPLE SYRUP, WHITE SUGAR, BROWN SUGAR, STEVIA, PALM SUGAR, RAW SUGAR, RICE MALT SYRUP, DARK CHOCOLATE, COCOA POWDER, VANILLA

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# HIGH FODMAP DIET CHECKLIST

## FOODS TO AVOID

By Kate Scarlata RDN, FODMAP & IBS expert

### high lactose

[ creates gas + pulls water into the gut ]

#### CHEESE

COMMERCIALLY PREPARED RICOTTA CHEESE, COTTAGE CHEESE

#### BEVERAGES

COW, SHEEP, & GOAT MILK

#### OTHER

EVAPORATED MILK, YOGURT, ICE CREAM, CUSTARD

### excess fructose

[ pulls water into the gut ]

#### VEGETABLES

JERUSALEM ARTICHOKES, ASPARAGUS, SUGAR SNAP PEAS, SUN-DRIED TOMATOES

#### FRUIT

APPLES, BOYSENBERRY, CHERRIES, FRESH FIGS, MANGO, PEARS, TAMARILLO, WATERMELON

#### SWEETENERS

AGAVE, HIGH FRUCTOSE CORN SYRUP, HONEY

#### ALCOHOL

RUM

### high fructans/GOS

[ creates gas ]

#### VEGETABLES

ARTICHOKES, GARLIC, LEEK AND SCALLION BULBS (THE WHITE PARTS), SHALLOT, ONION, ONION & GARLIC POWDER, PEAS, SOYBEANS, KIDNEY BEANS

#### FRUIT

BANANA (RIPE), CURRANTS, DATES, FIGS (DRIED), GRAPEFRUIT, NECTARINE, PERSIMMON, PLUMS, PRUNES, WHITE PEACHES, WATERMELON

#### GRAINS

RYE, WHEAT, BARLEY

#### NUTS

PISTACHIOS, CASHEW

#### LEGUMES

BORLOTTI BEANS, MATURE SOYBEANS (MOST SOY MILK, SOY FLOUR), BAKED BEAN, BLACK BEANS, FAVA BEANS, KIDNEY BEANS, NAVY BEANS, SPLIT PEAS

#### OTHER

OO LONG TEA, CHAMOMILE AND FENNEL HERBAL TEA, CAROB, CHICORY ROOT EXTRACT, INULIN OR FOS (FRUCTOOLIGOSACCHARIDE)

### high polyols

[ pulls water into the gut ]

#### VEGETABLES

CAULIFLOWER, MUSHROOMS, SNOW PEAS

#### FRUIT

APPLES, APRICOTS, BLACKBERRIES, CHERRIES, NECTARINES, PEARS, YELLOW PEACHES, PLUMS, PRUNES, WATERMELON

#### SWEETENERS

SORBITOL, MANNITOL, ISOMALT, XYLITOL

The FODMAP elimination diet is to be followed for a limited time, approximately 2-6 weeks. Work with a FODMAP knowledgeable registered dietitian to provide guidance on the reintroduction phase of the diet and to ensure your diet is nutritionally adequate and balanced.

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# 3 steps to the FODMAP diet

## Step 1: Low FODMAP Phase

2-6 week low FODMAP phase of the diet is designed to remove high FODMAP foods to improve in symptoms. This phase involves identifying the foods that are high in FODMAPs and substituting them for low FODMAP alternatives. After following the low FODMAP phase for 2-6 weeks, and it has resulted in a significant improvement in your symptoms, move onto the next step.

## Step 2: The Re-challenge Phase

re-challenging each of the FODMAP groups to identify which ones are the main culprits in symptoms. Testing the FODMAP groups, re-challenge foods need to be chosen carefully to only contain one type of FODMAP. Some FODMAP groups have more than one challenge, so there are 8-10 FODMAP challenges to complete. In most cases, its possible to do a challenge each week, with a few “washout” days between each challenge.

## Step 3: Modified Low FODMAP Diet

personalize your diet, liberal, varied, healthy diet with symptom control. Know which FODMAPs are biggest triggers, and which ones are tolerate well and the ‘dose’ of each group.

# FODMAP Diet

- Originally designed for IBS sufferers to help in reducing bowel irritation, affecting 10 – 20 % of Americans
  - Monash University in Australia by researcher Susan Shepherd and Peter Gibson
- However, with more individuals experiencing digestive discomfort, along with gluten-free diets, FODMAP diets are emerging as an alternative therapy for those suffering digestive discomfort
- Almost nine in 10 (86%) Americans experienced some type of gastrointestinal issue during 2013
- Certain high FODMAP foods are added within the past 40 years:
  - High fructose corn syrup (makes food cheaper)
  - Inulin (increase fiber)
  - Sorbitol (decrease calories)

# Concerns over FODMAPs

## PROS:

- Diet fall within accepted ranges for the amount of protein, carbs, fat and other nutrients they provide.
- Physical and emotional relief from digestive symptoms
- Understanding food intolerances
- The full program is temporary

## CONS:

- **Difficult to understand and follow without the help of a knowledgeable RD**
- Limited guiding resources
- Otherwise healthy foods may be preceded as 'problem' or 'bad' foods
- Modifies gut bacteria, reducing the bacteria load in the colon (to date, no negative health consequences has been seen)

# Can FODMAPs help other conditions? IBD? CD? NCGS?

**Inflammatory bowel disease (IBD):** It appears unlikely that a low-FODMAP diet is capable of inducing or maintaining remission in patients with Crohn's disease or ulcerative colitis. However, people with IBD also have IBS, the diet maybe helpful

**Celiac disease (CD):** People with celiac disease may also have IBS If following a gluten-free diet, and still experience excess gas, abdominal pain, bloating, diarrhea or constipation, FODMAPs could be to blame.

**Non-celiac gluten sensitivity (NCGS):** There is no biomarker for NCGS. There is some debate about whether the NCGS gastrointestinal symptoms attributed to gluten might really be due to the FODMAPs present in gluten grains.

<https://www.ibsfree.net/fodmaps-and-other-conditions/>

# SIBO? GERD?

**Small intestinal bacterial overgrowth (SIBO):** If an overgrowth of bacteria in the small intestine develops, IBS-like symptoms can occur. Research is ongoing to determine the best ways to diagnose and treat SIBO. Common treatment includes antibiotic.

**Gastroesophageal reflux disease (GERD):** GERD is a very common condition; a great many people with IBS also have GERD. People do report fewer GERD symptoms on the FODMAP-elimination diet.



# From Mintel's Global New Products Database:

## **The next free-from diet**

The rising popularity of FODMAP-friendly diets presents the opportunity for manufacturers of low-FODMAP products to clearly communicate more than simply the amount of FODMAPs per serving; they should also push messaging on why limited FODMAP intake may be beneficial for FODMAP sensitive consumers.

As FODMAP-friendly diets emerge, much like gluten-free diets, consumers may display confusion over which ingredients and products they should and shouldn't eat. **Manufacturers that include information on pack will alleviate concerns from consumers** with diagnosed FODMAP sensitivities, but further communication and education to consumers could lead to a FODMAP-friendly movement similar to what we've seen with gluten-free products.

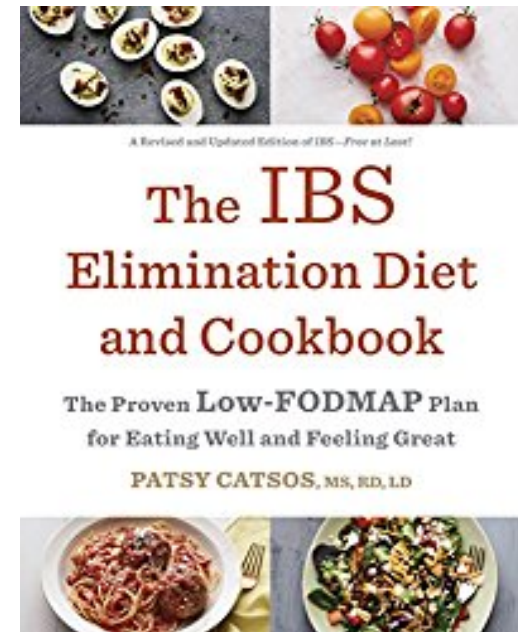
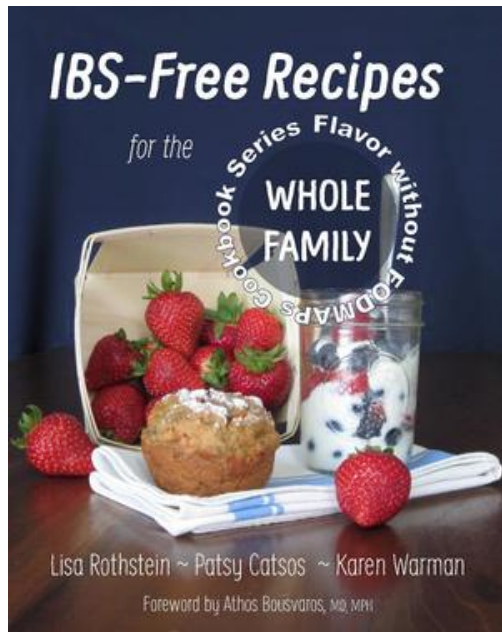
<http://www.mintel.com/blog/food-market-news/will-fodmap-friendly-become-the-new-gluten-free>

# For more information:

Visit websites and read books by low FODMAP experts:

1. Monash University, which pioneered the program and offers a booklet and app for low FODMAP eating on its [website](#).
2. Websites and books by Kate Scarlata, a Massachusetts-based dietitian who specializes in IBS, diabetes, celiac disease and the low FODMAP diet.
3. Books ([ibsfree.net](#)) and website edited by Patsy Catsos, a Portland, Maine dietitian and author of "IBS – Free at Last!"

# *Books by Patsy Catsos*





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Time for Questions!?!

