





## Why is CD Important?

- If untreated it poses long-term adverse health consequences including
  - Increased risk of autoimmune
  - Malabsorption
  - Anemia
  - Poor growth
  - Osteopenia
  - conditions

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## CD Epidemiology

- Initially felt to be a rare infant disorder
- Essentially European origin



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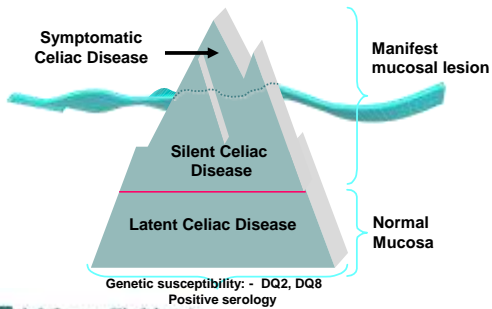
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## The Celiac Iceberg



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## Increased CD Incidence

- Type 1 diabetes 5%
- Down syndrome 5%
- Turner syndrome 5%
- Williams syndrome 5%
- Selective IgA deficiency 5%
- First degree relatives of CD 10%

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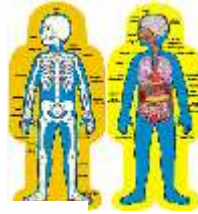
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## Symptoms

- Non-specific GI symptoms
- Extraintestinal manifestations are common



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## Extra-intestinal Manifestations

- Dermatitis Herpetiformis
- Dental enamel hypoplasia of permanent teeth
- Osteopenia/Osteoporosis
- Short Stature
- Delayed Puberty
- Iron-deficient anemia resistant to oral Fe
- Epilepsy with occipital calcifications
- Hepatitis



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## Genetics



- Strong HLA association
- 90 - 95% of patients HLA-DQ2 – also found in 20 - 30% of controls
  - Most of the remainder are HLA - DQ8
- 10% of patients have an affected first degree relative



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## Serology

Role of antibody evaluation:

- Identify symptomatic individuals who need a biopsy
- Screening of asymptomatic “at risk” individuals
- Supportive evidence for the diagnosis
- Monitoring dietary compliance



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## Candidates for Screening

- At risk groups
  - Diabetes
  - Genetic (Down, Turner, Williams)
  - IgA deficiency
  - Short stature, anemia, FTT
- Primary family members of child



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### Sources of Gluten



- **OBVIOUS SOURCES**
  - Bread
  - Bagels
  - Cakes
  - Cereal
  - Cookies
  - Pasta / noodles
  - Pastries / pies
  - Rolls




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### Sources of Gluten



- **POTENTIAL SOURCES**
  - Candy
  - Communion wafers
  - Cured Pork Products
  - Drink mixes
  - Gravy
  - Imitation meat / seafood
  - Sauce
  - Self-basting turkeys
  - Soy sauce




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### Ingredients to question (*may contain gluten*)



- Seasonings and spice blends or mixes
- Modified food starch
- Malt/ malt extract/ flavoring
- Modified hop extract and yeast-malt sprout extract
- Dextrin
- Caramel color




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### Gluten-Free Grains and Starches



- Amaranth
- Arrowroot
- Buckwheat
- Corn
- Flax
- Millet
- Montina
- Oats\*
- Potato
- Quinoa
- Rice
- Sorghum
- Tapioca
- Teff
- Flours made from nuts, beans and seeds

\*for possible cross-contamination with gluten containing grains

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### Safe Ingredients



- Starch
- Maltodextrin
  - Made from cornstarch, potato starch, or rice starch, but not from wheat
- Vinegar and Alcohol
  - Distilled vinegar and distilled spirits are gluten-free, however avoid malt vinegar and malt beverages (e.g. beer)

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Read carefully!



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Other items to consider



- Lipstick/Gloss/Balms
- Mouthwash/Toothpaste
- Play Dough
- Stamp and Envelope Glues
- Vitamin, Herbal, and Mineral preparations
- Prescription or OTC Medications

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Implications of a restrictive diet



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### Potential nutritional complications in untreated celiac disease

- Low Iron
- Low Folate
- Low Vitamin B-12
- Low Vitamins ADEK
- Low Thiamine
- Low Niacin
- Low B6 (rare)
- Low Beta-carotene
- Low Zinc
- Essential Fatty Acid Deficiency




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### Comparison

	WHEAT ENTEROPATHY	GLUTEN INTOLERANCE
GISSAC (GISSAC)	Wheat enteropathy	Wheat allergy
Pathogenesis	Autoimmune (genetic + immune mediated)	Immune (non-autoimmune)
HLA	Associated with HLA-DQ2/DQ8	Not associated with HLA-DQ2/DQ8
Autoantibodies	None	None
Diagnosis	None	None
Treatment	Gluten-free diet	Gluten-free diet
Complications	None	None




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### NCGS presenting symptoms

- Abdominal pain (68%)
- Eczema/skin rash (40%)
- Fatigue, headache (35%)
- Diarrhea, bloating (30%)
- Anemia, constipation, limb numbness (20%)
- Nausea, GER, vomiting, glossitis (15%)




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"The only diet gluten-free is wheat, but it's already really appealing" ...

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### GS characteristics

- Empiric trial of GFD
  - 10% of pts in Australia try GFD due to symptoms
  - 30% of pts in Europe
  - 40% of pts in USA
- Fad diet
- Not crazy

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*Brottweit Scand J Gastroenterol 2012*

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### IBS and GS share similarities

- High placebo effect (65%)
- 85% respond to a gluten free diet
- Both respond a FODMAP diet

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Maybe she's gluten intolerant!



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### School accommodations?

- Yes...but
- How far?



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### Plight of school nurse/doctor

- Gluten free?
- Low gluten?
- Differences



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## Wheat allergy in celiac disease

- Different mechanism (IgE mediated)
- Very uncommon

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## ATIs

- Alpha amylase/trypsin inhibitors
- Non-gluten components of grains, particularly wheat
- ATIs may be responsible for induction of symptoms even in absence of gluten

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## Challenges with studying GS

- High placebo effect
- Inconsistent definition
- Small number of participants
- CD often not excluded
- Many already on GFD
- Limited data so far...



Vázquez-Roque J *Gastroenterol* 2013  
Bisikherki, Gut 2011, 2013  
Corrao, Am J Gastro 2013

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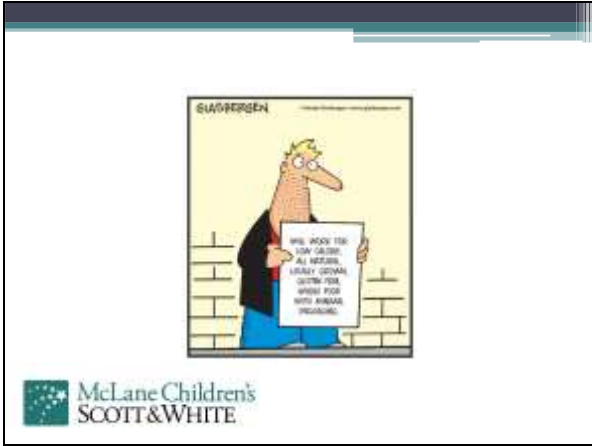
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### Conclusions

- Celiac disease is a common, subtle enteropathy with variable presentation.
- Gluten sensitivity is a more common, real condition that should be considered



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### The future?



*New part of Baylor Scott & White Health*

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