What is Gluten?

Derived from the Latin word for GLUE

Gluten is a composite of the proteins gliadin and glutenin

Gluten makes dough cohesive
Wheat
Rye
Barley
Gluten is found in many food products!

- Brown rice syrup
- Breading & coating mixes
- Croutons
- Energy Bars
- Flour or cereal products
- Imitation bacon
- Imitation seafood
- Marinades
- Pastas
- Processed luncheon meats
- Sauces, gravies
- Self-basting poultry
- Soy sauce and soy sauce solids

- Soup bases
- Stuffings, Dressing
- Thickeners (Roux)
- Communion wafers
- Herbal supplements
- Drugs & Over-the-counter medications
- Nutritional supplements
- Vitamins & mineral supplements
- Play Dough
- Malt Liquor
- Cosmetics

American Dietetic Association Manual of Clinical Dietetics 2009
Gluten May Be ‘Hidden’ in Foods
Check the Label for These Terms

- bread crumbs
- bran
- bulgur
- couscous
- cracker meal
- durum
- farina
- flour (*all purpose, bread, durum, cake, enriched, graham, high gluten, high protein, instant, pastry, self-rising, soft wheat, steel ground, stone ground, whole wheat*)
- gluten
- kamut
- matzoh, matzoh meal (*also spelled as matzo*)
- pasta
- seitan

- semolina
- spelt
- vital gluten
- wheat (*bran, germ, gluten, malt, sprouts*)
- wheat grass
- whole-wheat berries
- flavoring (*including natural and artificial*)
- hydrolyzed protein
- soy sauce
- starch (*gelatinized starch, modified starch, modified food starch, vegetable starch, wheat starch*)
- surimi

From the Food Allergy and Anaphylaxis Website
Who are the whey and wheat watchers?

- People with Celiac Disease
- People with Gluten Intolerance
- People with Wheat Allergy
- Parents of Autistic Children
- Food Faddists
Fast Facts on Celiac Disease

• Descriptions date to the first century
• Treatment identified in 1950
• Intestinal biopsy confirmed diagnosis of celiac disease in 1953
• Strong genetic link
• More frequently diagnosed in women and people of European descent
• Number of diagnoses for CD are increasing
• Average time of diagnosis is 10 years!
Clinical Diagnosis of Celiac Disease

- Highly variable
- 70% have diarrhea
- Failure to thrive in children
- + / - weight loss
- 80% with malaise/depression
- Monodeficiencies (Fe, D, K, Ca, Mg, Folate)
- Abnormal bone density
- Dermatitis
- Malignancies
Untreated Complications of CD

- Malnutrition
- Osteoporosis
- Infertility
- Intestinal problems
- Neurological problems
- Cancer
Figure 2 Normal versus CD small bowel biopsy. Top: Normal small bowel biopsy with finger-like villi. Bottom: CD small bowel biopsy with villous atrophy and hypertrophy of crypt.

Diagnosis of Celiac Disease

**Difficult!**

- 1:650 is IGA deficient
- Serum IgG antigliadin and IgA endomysial antibody + gluten ingestion (3-4 slices of bread for 6 weeks prior to testing = 70% confirmed
- *HLA DQ2 and HLA DQ8 genetic test

**Coming soon!**

Deaminated Gliadin Peptide (99%)

**Newborn screening?**

*HLA – Human Leukocyte Antigen on Chromosome 6*
So Many Variations!

- Classical
- Atypical
- Silent
- Potential
- Latent

From *Up to Date*
March 2, 2010
Clinical Manifestations of Classic CD in Children

• Severe malabsorption - diarrhea, steatorrhea, lack of appetite, growth retardation, deficiencies in ADEK, iron, calcium, folic acid
• Positive serum antibodies
• Severe villous atrophy
• Typically between 9-24 months of age

-After age 3, loose stools, short stature, ferropenic anemia
-Untreated, celiac crisis develops (digestive bleeding, hypocalcemic tetany, death)
Clinical Manifestations of Classic CD in Adults

- Fatigue
- Abdominal pain
- Stomach distention
- Anemia
- Osteopenia
- Delayed menarche or irregular menstruation, infertility
- Constipation
- Depression
Treatment

Complete avoidance of gluten - this requires extensive patient education!
- Use of exotic grains such as quinoa, teff, sorghum, buckwheat, amaranth
- Check cosmetics, meds, & other sources for cross-contamination

Use of supplements (iron, folate, zinc, niacin, B12, calcium, phosphorus)

Immunosuppressive medications

Pancreatic Enzymes?

Tx for GERD?
On the Horizon

- Enzyme supplements to break down the gluten peptides (AVL 300)
- Medicine to prevent the binding of gluten to HLA-DQ2
- Intestinal gluten peptide sequestrants
Useful Website

www.glutenfreemall.com
GLUTEN SENSITIVITY

✓ Affects up to 12% of the population
✓ Associated with other health issues
✓ Develops over time
✓ No definitive diagnostic test
✓ R/O with GF diet
✓ Tests used for evaluation include
  • Fecal fat
  • CBC
  • ESR
  • CRP
  • Vitamin Panel
  • Metabolic Panel
WHEAT ALLERGY

- IgE mediated
- Immediate allergic reaction
- Treated with GF diet
COFAR- Consortium of Food Allergy Research

- Label reading
- Handouts on major allergens
- Cross contact & how to prevent
- Preparing safe meals
- Restaurants, child care, schools, summer camps
- Nutritional issues
- How to introduce new foods
Labels-

• Wheat free is not equal to gluten free
• No standard definition (yet) for gluten free-likely to be released this year as less than 20 ppm per serving
Cross Contact

- Airborne, dermal
- Kitchen equipment
- Surfaces
- Manufacturer contamination
Best Practices

• Spokane School Best Practices to Prevent Anaphylaxis

• http://www.spokaneschools.org/NutritionServices/
Autistic Spectrum Disorder

- A neurobiological disorder.
- First described in 1943.
- Diagnosed before 3 years.
- Impaired social behaviors, communication, & repetitive, restrictive behaviors.

Treatment options for ASD are Limited.
Characteristics

- Disturbance in the rate of appearance of physical social and language skills
- Abnormal responses to stimuli
- Speech & language are absent or delayed but specific thinking capabilities might be present

- Prevalence may be as high as 1/110 children.
- Affects boys 4:1
The Gut/Autism Link – Where did it all begin?

• Andrew Wakefield and intestinal permeability
• Dr. Bernard Rimland and the DAN diet
• Methyl mercury in vaccines
## What is the Evidence for the GFCF Diet in Tx of Autism?

<table>
<thead>
<tr>
<th>Researchers</th>
<th>Year</th>
<th>Sample</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black et al</td>
<td>2002</td>
<td>N = 96 children with ASD N = 449 without ASD</td>
<td>No evidence that children with ASD were more likely to have GI disorders before or after diagnosis</td>
</tr>
<tr>
<td>Molly</td>
<td>2003</td>
<td>N = 137 children w/ASD</td>
<td>No association between GI symptoms &amp; developmental regression.</td>
</tr>
<tr>
<td>Elder et al</td>
<td>2006</td>
<td>N = 15 with ASD</td>
<td>No measurable effect of GFCF diet on ASD behavior was found</td>
</tr>
<tr>
<td>Hyman, Stewart, Smith</td>
<td>2010</td>
<td>N = 22 children with ASD</td>
<td>GFCF diet had no effect on behavioral or physiologic symptoms</td>
</tr>
</tbody>
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## What is the Evidence for the GFCF Diet in Tx of Autism?

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<td>Knivsberg</td>
<td>1990</td>
<td>8 of 10 selected patients were reported to have behavioral improvements</td>
<td></td>
</tr>
<tr>
<td>Sponheim</td>
<td>1991</td>
<td>N = 4</td>
<td>Four selected children with autism placed on gluten free diet; behavior worsened</td>
</tr>
<tr>
<td>Horvath</td>
<td>1998</td>
<td>N=36</td>
<td>Autistic children given secretin improved behaviors; subsequent studies found no evidence of efficacy</td>
</tr>
<tr>
<td>Wakefield</td>
<td>1998</td>
<td>N=12</td>
<td>Identified a subgroup of autistic children with GI issues. Lancet withdrew paper in 2010 as biased</td>
</tr>
</tbody>
</table>
### Summary of the Statements -

<table>
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<tr>
<th>Statement</th>
<th>Details</th>
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<tr>
<td>The existence of GI disturbances specific to ASD has not been established, but individuals with ASD with GI symptoms should be evaluated the same as in non ASD populations.</td>
<td></td>
</tr>
<tr>
<td>Individuals with ASD and GI symptoms are at risk for problem behaviors making diagnosis and treatment complex.</td>
<td></td>
</tr>
<tr>
<td>Healthcare professionals and caregivers should be alerted to the nutritional problems of ASD and refer to a Registered Dietitian for follow up including growth monitoring, screening for food allergies, macro/micro nutrient deficiencies associated with diet restrictions (narrowed food selection or imposed diets).</td>
<td></td>
</tr>
</tbody>
</table>
Risks of “Autism Diets”

- Narrowing of food selection (<20 foods more likely to have deficiencies)
- Macro/Micronutrient deficiencies (Fe, Ca, Vitamins A, C, D)
- Expensive
- Toxicity from supplements
- Isolation
- Difficulty with compliance (school, social settings)
2009 Systematic Review

• Mulloy et al found no evidence in a thorough systematic review for efficacy of GFCF diet, gut/opioid theory.

• Current evidence suggests dietary interventions only when food allergy or intolerance is suspected.
The Search Continues

- 2009 Vanderbilt study finds gene (MET gene) implicated in autism AND GI problems
- Not found in all cases
- Not causative
- May be a subset of autistic children who also have GI problems
Food Behaviors of Autistic Children

• Food selectivity limiting the variety of intake- type, texture, temperature, color, sensitivity to taste/smell/odor; food neophobia, anxiety

• Food refusal

• Disruptive mealtime behaviors

• As many as 50% of autistic children may also be placed on restrictive diets
Diet and Autism - A Reasonable Approach

- GI consult
- Diet hx and nutrition assessment
- Assess supplements
- Assess feeding development
- Extensive education on the diet
- Follow-up
Food Faddism
Questions?