Glutenology MasterClass: Module 1 – What is Gluten?

Autoimmune Disease - These are types of diseases where the body's immune system starts to turn and create inflammatory compounds that affect and impact the joints, the muscles, the bones, and the soft tissue creating debilitating pain.

1. Traditional Gluten Free vs. TRUE Gluten Free
2. Gluten Sensitivity – What is it?
3. Non-Celiac Gluten Sensitivity
4. Celiac and Silent Celiac Disease

What is Gluten?

- General Definition: A storage protein found in grains.
    - Think of Grain as a Seed (seeds of grass technically)
    - More than one protein, it is a family of proteins.
    - Helps provide a source of nourishment for the embryo of the seed.
    - Examples: Wheat, Barley, Rye

- The following are common foods that contain gluten: Think of things made from flour.
    - Beer
    - Pasta
    - Bread
    - Toast
    - Bagel
    - Cookies
    - Cakes
    - Donuts

Food Labeling Definition of Gluten: A protein found in wheat, barley, and rye that, when ingested, can increase the risk for somebody developing celiac disease.

Botanical Definition of Gluten (scientific definition): Gluten is a mixture of proteins found in ALL grains. It is the family of storage proteins found in the seeds of grass that are soluble in alcohol and they are broken down into two families, prolamins and glutelins.

Prolamins: The prolamine, alpha gliadin, is the most studied type of gluten in the medical literature as it relates to celiac disease. The labeling laws around gluten are loosely based on this one protein found in wheat, barley, rye, but somewhat dismiss all other forms of gluten. There are hundreds of gluten proteins that have been identified and alpha gliadin is just one type of gluten protein.

- Defined as any of a class of simple proteins soluble in alcohol and usually having a high proline and glutamine content, found in the grains of cereal crops such as wheat, rye, barley, corn, and rice.

- Prolamines are further subclassified into:
    - Alpha, Beta, Gamma, and Omega fractions
    - Alpha and Beta gliadins are the most well studied in relation to celiac disease.

Gluten Fundamentals:

- Gluten is the first medically proven known cause of autoimmune disease.
    - Gluten is the number one cause of death in females over the age of 65.
    - Autoimmune diseases cause more deaths than cancer and heart disease.
- All grains contain some form of gluten.
- Testing antibodies to gluten can be misleading.
- Gluten sensitivity in and of itself is not a disease, it is a state of genetics.
    - The individual may either have the genes for gluten reactivity or not.
    - If an individual has gluten-sensitive gene markers and was exposed to gluten, the outcome is excessive inflammation. Excessive inflammation is what is linked to causing and contributing to autoimmune disease.
- It is possible to identify the genes for gluten sensitivity, via genetic testing.
    - Understand whether a person should be gluten-free or not.
- Celiac disease, it is one of the most underdiagnosed conditions in the world.
    - Can take decades for process to form.

Traditional Gluten Free vs TRUE Gluten Free

- Traditional Gluten Free Diet
    - Based on limited scientific analysis of the topic
    - Only considers wheat, barley, rye, and sometimes oats.
    - Makes no mention of dairy from grain fed animals.
    - Makes no mention of grain used in the processing of different foods.
    - Does not consider food additives, preservatives, or pesticides as contributing factors.
    - Not concerned with overall health restoration

- TRUE Gluten-Free Diet
    - Eliminates all grains based on comprehensive scientific findings.
    - Looks at the potential for gluten in dairy based on the diet of the animal.
    - Considers processed food cross contamination.
    - Considers food additives, GMO's and pesticides.
    - Addresses difficult to digest foods as a potential problem.
    - Focuses on health restoration and health maintenance.

What is Gluten Sensitivity?

- The current (traditional) yet limited definition is as follows:
    - Gluten sensitivity is an immune reaction to the protein gluten* found in wheat, barley, and rye. The definition sometimes includes oats and other times it does not. This definition is often incorrectly used synonymously with celiac disease.
    - Why is it inconsistent?
    - What about those with non-celiac symptoms?
    - What about other gluten containing grains?

*gluten is defined as alpha gliadin.

Everybody with celiac disease is gluten sensitive, but not everybody with gluten sensitivity will go on to develop celiac disease, but they might develop other conditions.

Reasons to Reconsider a New Definition? Here are just a few.

Published in 2005: "The observation that corn gluten challenge induced an abnormal NO reaction in some of our patients with CD is intriguing as maize is considered safe and is recommended as the substitute cereal in a gluten free diet." – GUT 2005; 54;769-774.

- What they were doing is a rectal challenge. They were putting corn gluten into the rectums and measuring a compounder chemical called nitric oxide, which is a byproduct of heavy inflammation. They found that people that had their intestines exposed to corn gluten, were making inflammation.

Published in 2006: "Corn gluten contributing to persistent antibody response in celiac patients…" Accomando S., et al. Multiple food intolerance or refractory celiac sprue? Dig. Liver Dis. 2006; 38:784-785.

- In this study, what they found is that Celiac's had gone traditional gluten-free, but they did not go corn, rice, sorghum, millet, or oat-free and they were having continued persistent problems. In this study they found that corn was one of the major contributing factors to why these individuals were still struggling on their diet.

Published in 2012: "Some maize prolamines contain amino acid sequences that resemble wheat gluten immunodominant peptides and their integrity…analysis indicated that other zeins contain similar sequences…and the use of maize in the formulation and preparation of gluten-free foods must be reevaluated in some cases of celiac disease." Plant Foods Hum Nutr.2012 Mar;67 (1):24,30.

- This study found that the sequence of many types of corn gluten looked like the dangerous forms of alpha gliadin found in wheat. These researchers compared corn gluten to wheat gluten and found that corn gluten resembled wheat gluten enough to create a problem. Corn gluten was able to activate the gluten-sensitive genes to produce inflammation, in some cases, better than wheat gluten.

Published in 1995: "The allergens in rice, corn, millet, and buckwheat should be better studied before they can be recommended as alternatives…" Clin Exp Allergy. 1995 Nov;25 (11):1100-7.

Definitional Differences:

- Gluten Allergy: It is typically considered to be an allergy or an immune response. The immune system looks at gluten and creates a response to that gluten in that response generally leads to some type of inflammation.

- Gluten Intolerance: It is an inability to digest gluten and therefore the byproduct of that lack of digestion can create problems in the GI tract.

- Gluten Sensitivity: It is a combination of the above two terms, gluten allergy, and gluten intolerance. It is a spectrum that involves both the allergic component, but also the intolerant component.

- Celiac Disease: An autoimmune disease of the small intestine caused by gluten-induced damage.

The Gluten Syndrome: Is wheat causing you harm?

- Gluten Sensitivity has traditionally been used synonymously with Celiac disease because that has been the focus of research. Gluten Sensitivity/Intolerance is not a disease, but it causes disease.

- Those terms have been created in the medical literature to separate Celiac Disease from Gluten Sensitivity:
    - Non-Celiac Gluten Sensitivity – term put forward by Dr. Marsh, he developed the biopsy criteria for diagnosis celiac disease.
    - Gluten Syndrome – Rodney Ford, M.D.

Traditional Celiac Diagnosis:

1. Celiac disease is the only manifestation of gluten sensitivity.
2. Intestinal biopsy is the gold standard for diagnosis of celiac disease.
3. Antibody blood tests are used for gliadin.
4. Extraintestinal manifestations of celiac disease are rare.

Actual Case:

1. Celiac is a rare manifestation of gluten sensitivity.
2. HLA-DQ testing with clinical symptoms is the gold standard for gluten sensitivity recognition.
3. Antibody tests offer useful but limited comprehensive information.
4. Extraintestinal manifestations of gluten intolerance are a major cause of missed diagnosis.

What Doctors Are Looking For…

Clinical symptoms of Celiac disease taught in medical school are extreme weight loss, diarrhea, stomach pain, bloating, and vomiting.

In actuality, the symptoms can be and usually are systematic, and we now know that different people respond in different ways.

Example? Aspirin.

- For some people, it does help their pain.
- For some people, even small doses can cause gastric bleeding.
- For some, aspirin can cause an anaphylactic reaction.
- For some, aspirin can cause death.

How can the exact same drug have a different impact on people?

How can giving gluten to different people lead to different reactions?

Same concept here. People are different and they are going to have different responses, even to the same substances. It is important to understand this because you cannot just limit the symptoms to the clinical symptoms of weight loss, diarrhea, stomach pain, bloating, and vomiting.

An allergy is an immune reaction. There are two kinds of immune responses:

1. Acute allergy –

    a. It leads to the production of something called IgE which is a type of antibody.
    b. If an individual experienced seasonal hay fever or something along that line, the body is producing antibodies that are releasing histamines.
    c. Symptoms like itchy, runny nose, fever, and elevated heart rate lead to the process of chemical inflammation
    d. The chemical inflammation can create tissue damage and subsequently can cause disease if it stays around long enough or if that inflammation is persistent long enough.

2. Delayed Allergy –

    a. T-cell response, which is a type of immune cell.
    b. Antibody responses (IgG, IgA, IgM, IgD) typically produced by other cell types in the immune system.
    c. Immune Complexes
    d. These three broad brushstrokes of how the body can react in a delayed manner and point to the same outcome, which is chemical inflammation and tissue damage.
    e. If the problem is there long enough that tissue damage builds over time and it creates or manifests as disease.

Difference between Acute and Delayed allergy:

- Acute Allergy
    - The symptoms are more severe and obvious.
    - It occurs immediately within 3 hours of exposure.

- Delayed Allergy
    - The symptoms are oftentimes more subtle and not quite as definable.
    - It occurs within up to 3 hours and as far out as 3 weeks.

Gluten Intolerance or Sensitivity → Inability to Digest Gluten → Gut Dysbiosis → Leaky Gut Intestinal Permeability → Acquired Allergy → Tissue Damage → Disease

- The inability to digest can lead to a gut dysbiosis.
    - It can change the flora in the bacteria or change the bacteria of the flora in the gut.
    - It can minimize certain species and lead to or contribute to a permeable gut (leaky gut)

- Leaky gut over time can lead to acquired allergies, because when little, microscopic pinholes are being punched in the gut, then whole-food proteins can leak across into the immune system and start triggering it to overreact.
    - This is how people become more allergic to more foods.
    - This leads to tissue damage and subsequently, disease.

- Gluten can create a leaky gut because it disrupts a protein called Zonulin (an anchor that holds your gut cells together). Your gut starts to develop these gaps that leak intrinsically or internally.
    - Contributing to leaky gut, not in one way, but two.

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Module 2: We are going to be covering all the different diseases that are linked to gluten sensitivity. There are more than 100 forms of disease that can be contributed to or caused by gluten sensitivity.