Celiac Disease:
The Link Between Autoimmune Disease and Leaky Gut

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In the last issue my article focused on gluten: what happens when we over process our foods, why it raises blood sugar so dramatically and the vague condition of gluten sensitivity. However I only briefly mentioned the very serious health condition related to gluten called celiac disease. This condition is such a clear model of why we need to take a "systems" or holistic approach to understanding how diseases occur. It's always more than 1 thing that tips us from "ease" to "dis-ease". For celiac disease to occur, there needs to be 3 things present: a genetic susceptibility, an environmental trigger, and a leaky gut (small intestine permeability). Understanding this allows us a better ability to diagnose, treat and prevent the devastating symptoms and health consequences of this condition.

Genetic Susceptibility: Ninety five percent of persons with celiac disease will possess one or both of the genes, HLA-DQ2 and HLA-DQ8. Thirty to forty percent of the general population will have one of those genes. So we know that this is not a perfect test to diagnose celiac disease. But it is useful when evaluated with other markers and symptoms.

Genes are the blueprints for making proteins. HLA-DQ2 and HLA-DQ8 genes make proteins of the same name that function as part of the immune system. These proteins are found in antigen presenting cells (APCs). Antigens are substances that the body perceives as foreign and potentially dangerous. Usually these are bacteria and viruses. APCs show the foreign substance to the immune system cells who can then make antibodies to it. If a foreigner (antigen) is tagged with an antibody, it is subject to elimination. It's an amazing and complex defense system!! But why would these APCs present gluten to the immune system????

Leaky Gut: The gluten protein has a structure that is not "chopped up" well by our digestive enzymes. It continues through the intestinal tract as a larger protein – and for most of us, is excreted in our stool. However, if one has "leaky gut", the small intestinal barrier is more permeable and lets this larger protein through – past the intestinal cells that form the barrier and into the blood. Once the APCs in the intestine and in the blood see that big protein, they react against it.

How does one get leaky gut? Too many antibiotics, altered ecology of intestinal bacteria, excess use of ibuprofen and aspirin-like chemicals, too much stress, and other factors can cause it. Under these conditions the intestinal wall cells can be injured. They release a substance called zonulin to dissolve the "glue" that holds the intestinal wall cells together and this causes increased permeability. The injured cells also leak out their contents into the gut and obviously cannot perform their function of nutrient absorption as well.

Another substance leaked out by injured intestinal wall cells is an enzyme called tissue transglutaminase (tTG). Somehow this enzyme attaches to the undigested gluten molecule. This gluten-tTG complex binds very strongly to the HLA-DQ2 and HLA-DQ8 proteins of the APCs making a very active immune response. This feature of the condition gives us another marker for diagnosis: a blood test that detects an antibody made against the enzyme tTG (IgA and IgG tTG Ab)

The environmental trigger – gluten: Gluten, a major protein in wheat and other related proteins in other grains, resists digestion by our digestive enzymes as described above. This creates an over active immune response in genetically susceptible individuals who also have leaky gut. The condition known as celiac disease has probably been present since the dawn of agriculture 10,000 years ago. Before World War II, the death rate in children suffering from this mysterious condition was 35%. During the war related shortage of bread, the death rate fell to zero. The availability of bread after the war led to the previously high death rate. This observation provided a clue to treatment of this devastating condition. Initially, only the obviously symptomatic and suffering patients were treated with a gluten free diet. Now we know that the condition affects people to greater or lesser severity. It is estimated that 1 in 133 persons in North America (1-2% of the population) are affected. The condition is found all over the world.

The classic symptoms of celiac disease are persistent indigestion, chronic diarrhea and weight loss. Some afflicted persons will have fewer abdominal symptoms and some will have none. Non- gastrointestinal symptoms such as anemia, osteoporosis, joint pain, chronic fatigue, depression, short stature, epilepsy, dementia, schizophrenia, seizures, infertility, miscarriages, numbness in the hands and feet… are the result of nutritional deficiencies which can be caused by celiac disease. Dermatitis herpetiformis is a skin manifestation of celiac disease consisting of itching/burning small blisters on both sides of the body. Gluten ataxia is a neurological condition where the loss of coordinated movement occurs from the anti-gluten antibody attacking the brain.

Diagnosis: In celiac disease, the absorptive surface of the small intestine (fingerlike projections called villi) will be injured and flattened to some degree. A biopsy of the intestinal lining via an upper endoscopy is performed to look for this feature and it is the "gold standard" for diagnosing celiac disease. Antibody blood tests (IgA antibodies to tissue TransGlutaminase) claim to be pretty accurate in diagnosing celiac disease. But these tests only look for antibodies to 1 wheat protein and probably miss many people who have celiac disease. There are at least 9 other wheat proteins and 3 enzymes that one can develop antibodies and react to. New blood tests for zonulin are available to determine the presence of leaky gut. One can also be tested for the genes HLA-DQ2 and HLA-DQ8. Other clues that play a role in diagnosing this once elusive condition include: symptoms (abdominal and non-abdominal), testing that suggests nutritional deficiency, history of risk factors for leaky gut and risk factors for autoimmune disease.

Our more comprehensive understanding of celiac disease will also help us to unravel the risk factors for other autoimmune diseases such as type I diabetes, rheumatoid arthritis, multiple sclerosis, inflammatory bowel disease….. While the genetic susceptibility and environmental triggers may be different, it appears that leaky gut is a necessary component for the perfect storm of autoimmune disease to occur. Avoidance of the triggers (when known) and healing leaky gut is where I like to work in the prevention of these conditions.

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