The Celiac Disease, Thyroiditis, and TH-17 Cell Connection

Celiac disease is an immune-mediated disorder clinically characterized by a multitude of symptoms and complications. The comorbidity between celiac disease and other autoimmune disorders has been clearly established. Thyroiditis has been repeatedly associated with celiac disease. A highly significant association exist between celiac disease and autoimmune thyroiditis (Greaves’ disease and Hashimoto’s thyroiditis), as evidenced by elevated EMA antibodies (Anti-Endomysial antibodies) in these thyroid conditions.

Susceptibility to celiac disease is linked to HLA class II alleles, especially the HLA-DQ region. HLA molecules are postulated to present gluten antigens to T-cell which in turn induce tissue damage. Approximately 95% of patients with celiac disease have the HLA-DQ2 heterodimer encoded by the DQA1*05 and DQB1*02 alleles, while close to 5% have the HLA-DQ3 heterodimer encoded by the DQA1*03 and DQB1*0302 alleles. The pathogenesis of co-existent autoimmune thyroid disease and celiac disease is still unclear, but these conditions share similar HLA haplotypes and are associated with gene encoding cytotoxic T-lymphocyte-associated antigen-4.

New information about the connection between celiac disease and autoimmune disease has recently been uncovered. It has been suggested that the onset of celiac disease is mediated by a skewed Th1 response. However, the participation of Th17 cells (T-helper cells-17) in the pathogenesis of the disease, a key cell population in other autoimmune diseases, appears to be a link between the celiac disease and autoimmune thyroid disease. Gliadin-specific Th17 cells are present in the mucosa of celiac disease patients having a dual role in the pathogenesis of the disease as they produce pro-inflammatory cytokines such as IL-17, IFN-Y, and IL-21.

For more than 30 years T-helper cells have been divided by immunologist into two functional subsets: Th1 and Th2. The role of Th17 lymphocytes in immunopathogenic processes has recently been established. The Th17 cell has been linked to a growing list of cancers, autoimmune and inflammatory diseases such as rheumatoid arthritis, systemic lupus erythematosus, multiple sclerosis, asthma, psoriasis, chronic inflammatory bowel disease and allograft rejection. The results of a recent study on the role of Th17 cells indicates that there is an increased differentiation of Th17 lymphocytes and enhanced synthesis of Th17 cytokines in autoimmune thyroid disease, in particular Hashimoto’s thyroiditis. As previously stated, gliadin-specific Th17 cells are present in the mucosa of celiac disease patients, which further establishes an additional interconnectedness to thyroid dysfunction and the gastrointestinal system.

The greater frequency of celiac disease in association to autoimmune thyroid disease suggests that all persons with TPO antibodies should be routinely screened for celiac disease. Tissue transglutaminase antibodies in individuals with celiac disease bind to thyroid follicles and extracellular matrix appear to contribute to thyroid dysfunction since these antibody titers correlate to TPO antibody titers. From a functional medicine perspective, I recommend that patients with known autoimmune disease of the thyroid be placed on a gluten free diet, whether or not they have celiac disease. In my clinical experience, most, if not all patients with autoimmune thyroiditis has some type of gastrointestinal and/or adrenal dysfunction that can trigger and/or contribute to the autoimmune process.
**Therapies Known to Modulate the Th17 Response**

- Proper balance of 25-hydroxyvitamin D and 1,25 dihydroxyvitamin D
- Resveratrol
- Probiotics – *L. casei, L. paracasei, L. rhamnosus, L. acidophilus, L. reuteri, l. brevis, B. bifidum*
- ASI test– (evaluate and treat accordingly)

Establishing a normal cortisol to DHEA is often overlook in the treatment autoimmune thyroiditis and non-autoimmune thyroid dysfunction, however optimal adrenal function is paramount to successful thyroid dysfunction outcomes.

**References**

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Wayne Sodano
D.C., D.A.B.C.I., D.A.C.B.N.

Dr. Wayne Sodano has over 26 years of combined private practice and teaching experience in functional medicine under the paradigm of natural internal medicine. He is a diplomate of the American Board of Chiropractic Internists and the American Clinical Board of Nutrition and is a former instructor for the Diplomate program for the American Board of Chiropractic Internists. Dr. Sodano is noted for his past radio appearances and current lectures on various functional medicine topics that include Celiac Disease, malignant diseases, AIDS, gastrointestinal disorders, and nutrient and toxic elements. Dr. Sodano’s lecture topics are continually expanding and may be found on [www.functionalmedicineuniversity.com](http://www.functionalmedicineuniversity.com).