Nutrition and Toxicants in Autoimmune Disease: Implications for Prevention and Treatment

Collaborative on Health and the Environment
June 17, 2014

Cynthia Li, MD
Berkeley, CA
Caused by vitamin D deficiency and Disrupted by Leaky Gut

Genes

HLA-DQ, DR, and other Genes

Gluten, grains, nutritional deficiencies, virus, bacteria, etc

Autoimmune disease

Immune regulation

Environment

Diagram Modified from: Nature Immunology 2, 759 - 761 (2001)
Vojdani, A. A Potential Link Between Environmental Triggers and Autoimmunity. *Autoimmune Dis*. Feb 2014
Vojdani, A. A Potential Link Between Environmental Triggers and Autoimmunity. *Autoimmune Dis*. Feb 2014
Depiction of the intestinal mucosa with emphasis on the factors involved in the development of celiac disease in individuals with HLA-DQ2/DQ8 positive
Liver Detoxification Pathways & Supportive Nutrients

Endotoxins
- end products of metabolism
- bacterial endotoxins

Exotoxins
- drugs, (prescription, OTCs, recreational, etc)
- chemicals
  - agricultural
  - food additives
  - household
  - pollutants/contaminants
- microbial

**PHASE I**
[cytochrome P450 enzymes]

- Nonpolar (lipid-soluble)
- Oxidation
- Reduction
- Hydrolysis
- Hydration
- Dehalogenation

**Enzymes, Cofactors & Other Nutrients Used**
- Riboflavin (vit. B2)
- Niacin (vit. B3)
- Pyridoxine (vit. B6)
- Folic acid
- Vitamin B12
- Glutathione
- Branched-chain amino acids
- Flavonoids
- Phospholipids

**PHASE II**
[conjugation pathways]

- More polar (water-soluble)

**Reactive Oxygen Intermediates**
- Antioxidant/Protective Nutrients/Plant Derivatives
  - Carotenoids (vit. A)
  - Ascorbic acid (vit. C)
  - Tocopherol (vit. E)
  - Selenium
  - Copper
  - Zinc
  - Manganese
  - Coenzyme Q10
  - Thiols (found in garlic, onions & cruciferous vegetables)
  - Bioflavonoids
  - Silymarin
  - Pycnogenol

**Secondary Tissue Damage**

- Sulphation
- Glucuronidation
- Glutathione conjugation
- Acetylation
- Amino acid conjugation
- Glycine
- Taurine
- Glutamine
- Ornithine
- Arginine
- Methylation

**N-acetylcysteine, cysteine, methionine are precursors**

**Excretory Derivatives**

- Polar (water-soluble)

- Serum
- Kidneys
- Bile
- Urine
- Faeces/stool

Lipid-soluble (nonpolar) toxins stored in adipose (fat) tissue contribute to increased/mobilised toxin load with weight loss.
**Effective Detox Foods**

- **Grapefruit**: Packed with vitamin C, makes this an immune-boosting essential. They are packed with bioflavonoids, which are phytonutrients.

- **Berries**: Berries contain antioxidants responsible for the health of your immune system, as well as your body's ability to destroy invading bacteria and germs. They also contain vitamins C and magnesium, two nutrients that are essential in maintaining the strength and function of your immune system.

- **Mushrooms**: A major source of the immune system-boosting mineral, zinc. If you don't have enough zinc in your diet, you tend to have fewer white blood cells to help fight off disease, which can lead to a reduced immune response.

**Immune Boosting Foods**

- **Cruciferous Vegetables**: Rich in antioxidant vitamins which give an immune system boost, and also contain Choline which keeps your cells functioning properly and helps maintain healthy gastrointestinal tract.

- **Carrots**: A great source of beta carotene which support the body's mucous membrane, which lines the respiratory and intestinal tracts, making it harder for bacteria to enter the bloodstream.

- **Kale**: Greens such as kale, spinach, and Swiss chard are immune-boosting foods that contain high levels of vitamin C, which help fight off infection and regenerate other antioxidants in the body, including vitamin E. They also contain folate, another immune booster.

- **Watermelon**: Contains antioxidant Vitamins A and C, which helps to neutralize free radicals than can lead to inflammation, general sickness and chronic illnesses such as stroke and heart attack. It contains beta-carotene, which helps fight cancer, particularly colon cancer. Lycopene, a carotenoid found in watermelon provides additional cancer fighting health benefits.

http://eatingmywaytobetterhealth.blogspot.com/
Case Presentation
Additional Resources

Functional Medicine:  www.functionalmedicine.org

Toxicology of Autoimmune Diseases, Pollard:  
www.ncbi.nlm.nih.gov/pmc/articles/PMC3076021/

A Potential Link Between Environmental Triggers and Autoimmunity, Vojdani:  
www.ncbi.nlm.nih.gov/pmc/articles/PMC3945069

Autoimmunity and the Gut:  
www.ncbi.nlm.nih.gov/pmc/articles/PMC4035413/#po.=6.52174-

Detoxification and Healing: The Key to Optimal Health, Dr. Sidney Baker, 2003