Health Bits and Pieces Summer 2017 (HFN 35:2)
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Glyphosate Protection

Glyphosate, the active ingredient in Roundup®, is the most popular herbicide used worldwide. The industry maintains it is minimally toxic to humans, but recent research disputes this claim. Glyphosate inhibits important detoxifying enzymes, cytochrome P450 (CYP) enzymes, which play a vital role in detoxifying xenobiotics (foreign chemicals). It disrupts the microbiome in the intestine, impairs methylation pathways, interferes with synthesis of amino acids and methionine, which leads to shortages in neurotransmitters and folate and disrupts the thyroid by inhibiting release of thyroid stimulating hormone (TSH) from the pituitary. Some of the disease conditions that can result from this include gastrointestinal disorders, obesity, diabetes, heart disease, depression, autism, infertility, cancer, and Alzheimer's disease.

A study published in the December 2014 issue of the *Journal of Environmental & Analytical Toxicology* found that the oral application of certain natural substances were able to effectively reduce urinary levels of glyphosate. The researchers used a combination of humic acids, activated charcoal, and sauerkraut juice. The study used cows suffering from symptoms of chronic botulism. The researchers concluded that a charcoal-sauerkraut juice combination with humic acids neutralized glyphosate, thereby reducing its excretion by urine and leading to the animals' improved health.

Samsel A, Seneff S, "Glyphosate's Suppression of Cytochrome P450 Enzymes and Amino Acid Biosynthesis by the Gut Microbiome: Pathways to Modern Diseases," Entropy *2013, 15(4), 1416-1463; doi:10.3390/e15041416; Gasnier C, Coralie Dumont C, Nora Benachour N, et al., "Glyphosate-based herbicides are toxic and endocrine disruptors in human cell lines,"* Toxicology*, Vol 262, Issue 3, pp 184-191; Gerlach H, Gerlach A, Schrödl W, Haufe S, Schottdorf B, "Oral Application of Charcoal and Humic Acids Influence Selected Gastrointestinal Microbiota, Enzymes, Electrolytes, and Substrates in the Blood of Dairy Cows Challenged with Glyphosate in GMO Feeds,"* Journal of Environmental and Analytical Toxicology *(2014) 5:256. doi: 10.4172/2161-0525.1000256.*

Sodium and Blood Pressure

A meta-analysis of seven studies involving a total of 6,250 subjects published in the *American Journal of Hypertension* found no convincing evidence that cutting salt intake reduces the risk for heart attacks, strokes, or death in people with normal or high blood pressure. As the authors of one recent paper wrote, "The overall evidence in the first half of the 1900s suggests that a low-salt diet was not a reasonable strategy for treating hypertension."

In 2011, European researchers publishing in the *Journal of the American Medical Association* reported that the less sodium that study subjects excreted in their urine, a reliable indicator of prior consumption, the *greater* their risk was of dying from heart disease. These findings call into question the common wisdom that excess salt is bad for you. But the evidence linking salt to heart disease has always been questionable.

The most recent study, The Framingham Offspring Study, led by researchers at the Boston University School of Medicine, followed 2,632 healthy men and women aged 30 to 64 years with normal blood pressure over a period of 16 years. The researchers compared the participants' sodium intake with their blood pressure readings. Surprisingly the participants who consumed lower quantities of sodium daily had higher blood pressure than those who consumed more. One of the authors of the study, Lynn Moore, DSc said, "We saw no evidence that a diet

lower in sodium had any long-term beneficial effects on blood pressure. Our findings add to growing evidence that current recommendations for sodium intake may be misguided."

Taylor R, Ashton K, Moxham T, Hooper L, Ebrahim S, "Reduced Dietary Salt for the Prevention of Cardiovascular Disease: A Meta-Analysis of Randomized Controlled Trials (Cochrane Review)," American Journal of Hypertension *24, 843-853 (August 2011) doi:10.1038/ajh.2011.115; Labarthe D, Briss P, "Urinary Sodium Excretion and Cardiovascular Disease Mortality,"* Journal of the American Medical Association *2011;306(10):1084-1085. doi: 10.1001/jama.2011.1294; Moore L, Singer M, Bradlee M, "Low Sodium Intakes are Not Associated with Lower Blood Pressure Levels among Framingham Offspring Study Adults," presented at* Experimental Biology*, Apr 25, 2017.*

Gut Microbiome and Diabetes

A correlation between bacteria invading the intestinal epithelium (part of the mucous membrane) of the colon and the development of Type-2 diabetes has been observed in a new study by researchers at Georgia State University and published in *Cellular and Molecular Gastroenterology and Hepatology*. The research team compared colonic tissue sections for levels of mucosal immune cells in healthy individuals and individuals with diabetes. They observed activation of mucosal B cells probably resulting from microbiota encroachment, compromising the membrane barrier and causing a low-grade inflammation. Inflammation can desensitize and impair metabolic and insulin receptor signaling promoting obesity and poor blood sugar regulation.

This could explain the reported effect of berberine, an alkaloid found in several herbs, including goldenseal, Oregon grape, coptis and barberry, on lowering glucose linked to its significant antimicrobial activity against bacteria, fungi, parasites, worms, and viruses, while having no damaging effect on the commensal bacteria. Berberine prevents adhesion of bacteria to the cells of the intestinal mucosa. Its antibacterial effect could also be the source of its antidiabetic effect.

Chassaing B, Raja S, Lewis J, Srinivasan S, Gewirtz A, "Colonic Microbiota Encroachment Correlates with Dysglycemia in Humans," Cellular and Molecular Gastroenterology and Hepatology *2017; DOI: 10.1016/j.jcmgh.2017.04.001.*

Statins May Cause Heart Disease

Japanese researchers have presented evidence that statins may cause coronary artery calcification and can impair heart and blood vessel function through the depletion of coenzyme Q-10 and other key factors. Statins also inhibit the synthesis of Vitamin K2, which protects arteries from calcification. Statins inhibit the biosynthesis of selenium-containing proteins, one of which is glutathione peroxidase, which suppresses oxidative stress. Impaired synthesis of selenium-bonded proteins as well as selenium deficiency can be a factor in congestive heart failure. Thus, they suggest, the widespread use of statin drugs should be critically reevaluated: *"Pharmacological evidence and clinical trial results support the interpretation that statins stimulate atherogenesis by suppressing vitamin K2 synthesis and thereby enhancing artery calcification. Statins cause heart failure by depleting the myocardium of CoQ10, 'heme A' and selenoproteins, thereby impairing mitochondrial ATP production. In summary, statins are not only ineffective in preventing CHD (congestive heart disease) events but instead are capable of increasing CHD and heart failure."*

Okuyama H, Langsjoen P, Hamazaki T, Ogushi Y, Hama R, Kobayashi T, Uchino H, "Statins stimulate atherosclerosis and heart failure: pharmacological mechanisms," Expert Review of Clinical Pharmacology *2015 Mar;8(2):189-99. doi: 10.1586/17512433.2015.1011125. Epub 2015 Feb 6.*

Nutrition for Autism

In a review of 17 studies, researchers reviewed the effects of various dietary supplements on children with autism spectrum disorder (ASD). Pharmaceutical and behavioral therapies have had limited success with this affliction. Although there is no accepted treatment for ASD, use of dietary interventions and nutritional support in these patients has increased. Many children with ASD take nutritional supplements and follow diets such as a gluten-free and casein-free (GFCF) diet.

In this review published in *Brain Development*, researchers explored the clinical efficacy and safety of dietary supplements in children with autism evaluating the effectiveness of amino acids, fatty acids, and specific vitamins and minerals. The amino acid n-acetylcysteine (NAC) was shown to improve irritability in a dose-dependent manner. N-acetylcysteine provides antioxidant effects to restore glutathione availability. Oxidative stress is a hypothesized mechanism in the pathogenesis of ASD. These patients have been found to have elevated oxidative stress markers as well as decreased levels of glutathione.

Ascorbic acid and methylcobalamin (Vitamin B-12) supplementation were also found to be helpful. After NAC and ascorbic acid, Vitamin B-6 and magnesium have been shown to be involved in brain neurotransmitter synthesis, such as serotonin, dopamine, and norepinephrine. A B-12 deficiency has been associated with defects in myelin synthesis and neurotransmitter imbalances.

Gogou M, Kolios G, "The effect of dietary supplements on clinical aspects of autism spectrum disorder: A systematic review of the literature," Brain Development *2017 Apr 21. pii: S0387-7604(17)30113-4. doi: 10.1016/j.braindev.2017.03.029. [Epub ahead of print]*