

Glyphosate, Root Cause of Chronic Inflammation?

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Please Pass (on) the Bread

That breadbasket you dig into in your favorite restaurant, if it's not organic, is likely soaked in glyphosate.

In our lab in Virginia, the amount of glyphosate estimated in one slice of conventional pizza (10 ppm) – in addition to the gliadin protein from the gluten in the crust – begin to degrade human intestinal tight junction tissue in cell culture almost immediately upon contact.

First patented and introduced by Monsanto in 1974 for agricultural weed control, in 1992 glyphosate, active ingredient in RoundUp®, began to be used as a “ripening agent” or desiccant -- stressing or killing plants, including wheat, to accelerate drying and speed the ripening of their fruit immediately before harvest.

Desiccating wheat with glyphosate is particularly common in years with wet weather and has been increasing in Upper Midwestern states in the US, as well as in areas of Canada and Scotland (where the process first began).

According to Anthony Samsel and Stephanie Seneff, gluten intolerance and Celiac disease now affects an estimated five percent of the population of North America and Europe. Symptoms include nausea, diarrhea, skin rashes, macrocytic anemia, and depression. It is associated with numerous nutritional deficiencies as well as reproductive issues and increased risk to thyroid disease, kidney failure, and cancer.

An amazing graph in their article shows the sharp rise in usage of glyphosate on US wheat in the last decade, in step with the sharp rise in the incidence of Celiac disease.

And, they propose glyphosate “is the most important causal factor in this epidemic.” [1]

In addition to wheat, oats, rye, lentils, peas, flax, potatoes, buckwheat, and millet are also often sprayed with glyphosate as a desiccant.

Not to mention GMOs.

One Especially Dangerous Toxin

We are all painfully aware of the toxic nature of our environment, with many of those toxins being linked to a myriad of skyrocketing health issues. Perhaps one of the most prevalent and insidious toxins, damaging in surprising ways, is glyphosate. Glyphosate-based herbicides (GBH) are the active ingredient in agricultural herbicides, most famously Monsanto's RoundUp®, and also Dow's Enlist Duo.

In 1996, New York's attorney general sued Monsanto over the company's use of “false and misleading advertising” about RoundUp. That case ended with Monsanto agreeing to stop calling Roundup “biodegradable,” and to pull ads claiming that Roundup was “safer than table salt,” “practically nontoxic,” and “stayed where you put it.”

Glyphosate was “classified as probably carcinogenic to humans,” according to a new report from the International Agency for Research on Cancer (IARC), the World Health Organization’s France-based cancer research arm. [2]

The state of California has also moved to classify the herbicide as a probable carcinogen. A growing body of research is documenting health concerns of glyphosate as an endocrine disruptor and that it kills beneficial gut bacteria, damages the DNA in human embryonic, placental and umbilical cord cells and is linked to birth defects and reproductive problems in laboratory animals.

Where and How Much Glyphosate?

Agrichemical and biotech company Monsanto invented its chemical weed killer in 1974, following the ban on DDT, and in the 1980s went direct to the consumer with RoundUp®. Use skyrocketed, washing down our driveways and lawns and into our water systems.

In 1996, Monsanto debuted the first genetically engineered (also called GMO) glyphosate-resistant “RoundUp-Ready” crops -- corn and soybean. Now the whole crop could be sprayed throughout its lifecycle to prevent weeds, and increase crop yield.

With each passing year more acres of wheat, corn, soybean, beet, cotton, canola, alfalfa, and other staple crops are sprayed with glyphosate.

Glyphosate is dumped on us at the rate of 300 million pounds per year, almost one pound for every person in the US. [3] Estimates are that 75% of rainwater is contaminated by glyphosate. [4] According to the USGS, more than 88,000 tons of glyphosate were used in the US in 2007, up from 11,000 tons in 1992. Since the advent of “super weeds,” the use of glyphosate has risen significantly. [5]

Since 1974 in the US, over 1.6 billion kilograms of glyphosate active ingredient have been applied, or 19% of estimated global use of glyphosate (8.6 billion kilograms).

Globally, glyphosate use has risen almost 15-fold since Roundup-Ready crops were introduced in 1996. Two-thirds of the total volume of glyphosate applied in the US from 1974 to 2014 has been sprayed in just the last 10 years. [6]

Reuters reported that tests found residues of glyphosate in an astounding 41 of 69 honey samples, 10 of 28 samples of soy sauce, three of 18 breast milk samples and six of 40 infant formula samples. [7]

What Glyphosate Does in the Human Body

Glyphosate is a profound zonulin stimulator. Research reveals glyphosate damages the epithelial tight junction tissue on contact, weakening those barriers which protect us on the inside from the barrage of other environmental toxins we are exposed to, among other things. Injury to the tight junction membrane in the gut can lead to intestinal permeability.

The zonulin production initiated by the glyphosate assault quickly becomes systemic; injury to the tight junction membrane in the brain can result in a breakdown of the blood-brain barrier and a host of neurological symptoms.

With the collapse of the tight junction firewalls, all organ systems go under duress. Just behind that microscopically thin layer of protection of the endothelial cells that separate you from the outside world is the gastrointestinal lymphatic tissue (GALT). The GALT is a layer of immune cells that are vigilantly standing guard to address any breach in your firewall. It is estimated that 60-70% of the immune system, and more than 80% of the antibodies that your immune system produces, originate in the GALT.

Acute inflammatory response becomes chronic inflammation as the system is overwhelmed with the outside world.

The gliadin protein in gluten also stimulates release of zonulin. I agree with William Davis, MD, in *Wheat Belly*, “When gliadin triggers zonulin release, intestinal tight junctions are disrupted, and unwanted proteins ...gain entry to the bloodstream. Immune-activating lymphocytes, such as T-cells, are then triggered to begin an inflammatory process against various ‘self’ proteins, thus initiating ...conditions such as celiac disease, thyroid disease, joint diseases, and asthma.” [8]

Glyphosate enhances the damaging effects of other food-borne chemical residues and environmental toxins. Negative impact on the body is insidious and manifests slowly over time as inflammation damages cellular systems throughout the body. [9]

How Does Glyphosate Relate to GMOs?

Genetically-engineered or genetically-modified organisms, GMOs, are crops engineered to be able to survive the application of glyphosate. These are live organisms whose genetic components have been artificially manipulated in a laboratory setting through creating unstable combinations of plant, animal, bacteria, and even viral genes that do not occur in Nature or through traditional crossbreeding methods.

In the US, 88% of the corn crop, 93% of the soybean crop, 90% of sugar beets (accounting for 54% US sugar production), and 94% of cotton are genetically-modified and sprayed heavily with glyphosate to control weeds and simplify harvest. [10]

What Are the Biggest Sources of Glyphosate?

What this means is that a major source of the US food supply is contaminated even prior to harvesting – think of the corn, soy, and their oils, and beet sugar used in processing packaged foods. Additionally, factory-farmed livestock fed corn and soy products concentrate the glyphosate in their flesh, further contaminating the food supply chain. Alfalfa, the fourth largest crop in the US and used as feed for dairy cows, means conventional dairy products concentrate the glyphosate sprayed on that alfalfa.

Additionally, ground water, soil, and even rain, as previously mentioned, all contain measurable levels of glyphosate. [11] Cotton clothing, and products including tampons, have tested positive for glyphosate contamination. Even organic produce show evidence of cross-contamination.

Moms Across America Study Shows Bio-Accumulation

A group of concerned mothers, Moms Across America, commissioned a study looking to determine levels of glyphosate in breast milk. It had long been held that glyphosate did not bio-accumulate; in fact, the MAA study discovered the reality of elevated levels of glyphosate in breast milk. The analysis revealed glyphosate in levels of 76 µg/L to 166 µg/L in women's breast milk. As reported by The Detox Project, this is 760 to 1,600 times higher than the EU-permitted level in drinking water (although it's lower than the US maximum contaminant level for glyphosate, which is 700 µg/L. [12]

I have used Restore™ for pregnant and lactating women in my Virginia clinic. I recommend coating their nipple with Restore prior to breastfeeding, which will help insulate against glyphosate in their breast milk.

How to Best Avoid Glyphosate

I recommend to my patients to eat as low on the food chain as possible for a number of reasons, and avoiding glyphosate is a great reason. Obviously, avoid all GMO foods, including processed and

packaged foods containing non-organic corn, soybean, and sugar in all their myriad varieties. Organic means non-GMO; also, there are many non-organic packaged foods now bearing the non-GMO certification.

Animal products pose a multiplied scenario – animals fed and fattened on corn, soybean, and alfalfa feed are basically accumulating and concentrating glyphosate, as well as other toxins including animal antibiotics. This holds true for non-organic dairy products as well, which also concentrate glyphosate in cows' milk.

Choose vinegar as a weed killer – obviously, don't use RoundUp!

Exciting New Research Coming from Biomic Sciences

Our company Biomic Sciences, Virginia-based manufacturer of Restore™ liquid mineral supplement, is currently doing exciting new research. To be published later this year in a peer-reviewed journal article, our research is showing that glyphosate and the gliadin protein found in gluten appear to have a synergistic effect. Previously, our team had been thinking glyphosate had the same effect on epithelial tissue as gliadin, just much more severe.

It now appears that the sum injury is worse than its separate parts and there appear to be two mechanisms of action at work. Our lab results have shown that the synergy between gluten and glyphosate decrease the efficacy of the tight junction barrier by an additional 52% vs either gluten or glyphosate alone.

Check out our website, restore4life.com, to see a video presentation of how Restore™ supports human intestinal tight junction cells in the presence of gliadin and glyphosate exposure.

Zach Bush, MD, is medical director of a new, integrative medicine practice in Charlottesville, Va. He is also the founder of Biomic Sciences, a nutraceutical company that recently launched Restore, a unique supplement product that can support the repair of the gut wall by reestablishing proper tight-junction function.

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