The Many Faces of Glyphosate

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Outline

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• Glyphosate and Vaccines
• Impaired Thyroid Function
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Introduction
US Health Status

• US makes up 5% of the world’s population but consumes more than 50% of the world’s pharmaceutical drugs
• We spend more on health care than Japan, France, China, UK, Italy, Canada, Brazil, Spain, and Australia, combined
• US ranks last or near last among developed nations on infant mortality and life expectancy
• We also suffer from more chronic illnesses
• We consume 25% of the world supply of glyphosate
• Genetic engineering is recklessly subjecting our health and the health of the environment to unacceptable risks.
  – Not based on sound science, but rather on evasion of the standards of science.
• For over 30 years, esteemed institutions have systematically contorted the truth to conceal the risks.

New Book!

Altered Genes, Twisted Truth

How the Venture to Genetically Engineer Our Food Has Subverted Science, Corrupted Government, and Systematically Deceived the Public

STEVEN M. DUKER
A Frightening Trend*

**AUTISM DIAGNOSES RISING**

Almost 1.5% of US children are now diagnosed with autism, according to data from 11 regions in the United States.

Percentage of children with Autism in the US

Expon. (Percentage of Children with Autism in US)

Percentage of Children with Autism in US

50%


2032
Percentage of children with Autism in the US

Half the children born in 2032 will be diagnosed with autism
Autism Prevalence: 6 year olds

glyphosate is total of year indicated + 3 previous years
R = 0.9972, p <= 2.366e-07

*Plot provided by Nancy Swanson, with permission
Data sources: autism: US Department of Education; Glyphosate: US Department of Agriculture
Main Toxic Effects of Glyphosate*

- Kills beneficial gut bacteria and allows pathogens to overgrow
- Interferes with function of cytochrome P450 (CYP) enzymes
- Chelates important minerals (iron, cobalt, manganese, etc.)
- Interferes with synthesis of aromatic amino acids and methionine
  - Leads to shortages in critical neurotransmitters
- Disrupts sulfate synthesis and sulfate transport

*Samsel and Seneff, Entropy 2013, 15, 1416-1463
Nutrients, Hormones and Neurotransmitters Disrupted by Glyphosate

- Folate, vitamin K, vitamin A, vitamin D, cobalamin
- Aromatic amino acids, methionine
- Iron, manganese, cobalt, selenium, zinc, sulfur
- Serotonin, melatonin, dopamine, epinephrine
- Melanin (skin tanning agent), thyroid hormone
- NAD, glutathione (antioxidant defenses)
Glyphosate disrupts the body’s ability to distribute the minerals safely: Everybody walks a tight rope between deficiency and toxicity.
Autism and Mitochondrial Impairment
Autism and Mitochondrial Impairment*

• Mitochondrial impairment is a key feature of autism, especially in the brain
  – Impaired detox of glutamate by astrocytes (requires manganese)
  – Excess stimulation of NMDA receptors in neurons
• Glyphosate excites NMDA receptors and prevents glutamate metabolism

*Dayan Goodenow and Elodie Pastural, Chapter 4
.intechopen.com/books/autism-a-neurodevelopmental-journey-from-genes-to-behaviour/
the-biochemical-basis-of-autistic-behavior-and-pathology
Mitochondria are Key!

“Damage to mitochondria is now understood to play a role in the pathogenesis of a wide range of seemingly unrelated disorders such as schizophrenia, bipolar disease, dementia, Alzheimer's disease, epilepsy, migraine headaches, strokes, neuropathic pain, Parkinson's disease, ataxia, transient ischemic attack, cardiomyopathy, coronary artery disease, chronic fatigue syndrome, fibromyalgia, retinitis pigmentosa, diabetes, hepatitis C, and primary biliary cirrhosis.”

*J Neustadt and SR Pieczenik, Molecular Nutrition and Food Research 2008;52:780-788
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Many of these conditions are going up in prevalence in step with glyphosate usage on corn and soy crops. Alzheimer's disease, epilepsy, migraine headaches, strokes, neuropathic pain, Parkinson's disease, and many other conditions are going up in prevalence in step with glyphosate usage on corn and soy crops. Glyphosate makes manganese unavailable to mitochondria, and they need manganese to protect them from oxidative damage.

*J Neustadt and SR Pieczenik, Molecular Nutrition and Food Research 2008;52:780-788*
Pesticides and Neuroinflammatory Response

*Figure 1, HR Dhaini, Encyclopedia of Neuroscience, Chapter 14, Springer Berlin Heidelberg., D, Hirokawa N, Windhorst U, Ed. pp.2734-2739
Mechanisms underlying the neurotoxicity induced by glyphosate*

“Taken together, these results demonstrated that Roundup® might lead to excessive extracellular glutamate levels and consequently to glutamate excitotoxicity and oxidative stress in rat hippocampus. “ - quote from abstract

*D Cattani et al., Toxicology 320 (2014) 34–45
Glyphosate and Folic Acid
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• Folic acid is an oxidized, unmethylated synthetic form of folate
• Converting it to methyl tetrahydrofolate is costly
  – Liver glutathione and NAD are oxidized (bad)
  – Methionine is depleted (bad)
• Both NAD and folate are derived from the shikimate pathway
• Brain folate receptor antibodies may be a consequence of folic acid in the blood
“High folic acid consumption leads to pseudo-MTHFR deficiency, altered lipid metabolism, and liver injury in mice”*  

- Fed mice excessive amounts of folic acid  
- Reduced methylation capacity in liver  
- CYP7A1 level was dramatically reduced. (rate limiting enzyme in bile acid synthesis)  
- Caused liver damage and fatty liver disease

Glyphosate and Vaccines
Glyphosate and Vaccines

• MMR, Varicella, flu vaccine and rabies vaccine contain *glutamate* (a neurotoxin)
  – Glyphosate disrupts conversion of glutamate to glutamine (detox)

• DTaP, HEP-B, Gardasil and others contain *aluminum* (a neurotoxin)
  – Glyphosate escorts aluminum to the pineal gland where it accumulates, causing sleep disorder and many associated neurological diseases
Impaired Thyroid Function
Impaired Thyroid Function

• Low thyroid hormone in mother → 4-fold increased risk to autism in child*

• Thyroid hormone is derived from tyrosine, a product of the shikimate pathway

• Thyroid depends on selenium to protect it from oxidative damage (chelated by glyphosate)

Low Manganese in Autism
Low Manganese in Teeth Linked to Autism*

• Studied lead, mercury and manganese levels in tooth enamel of shed primary teeth in 84 children
• Manganese accumulated after birth was down by 60% in autistic children
• *No other result was statistically significant*

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Other studies have shown low serum manganese and low manganese in urine samples in association with autism.

Endocrine Disruption
Glyphosate Disrupts Sex Hormone Synthesis in Adrenal Glands*

- Glyphosate was cytotoxic to adrenal cells and interfered with synthesis of sex hormones.
- Roundup’s toxicity was two orders of magnitude higher than glyphosate acting alone.

Glyphosate is an endocrine disruptor that promotes breast cancer*

- Low and environmentally relevant concentrations of glyphosate possess estrogenic activity
- Glyphosate caused human hormone-dependent breast cancer cells to proliferate at concentrations of parts per trillion
- Additive effect from genistein, a phytoestrogen in soybeans

Nancy Swanson’s Paper
Genetically engineered crops, glyphosate and the deterioration of health in the United States of America

Nancy L. Swanson¹, Andre Leu²*, Jon Abrahamson³ and Bradley Wallet⁴

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² International Federation of Organic Agricultural Movements, Bonn, Germany
³ Abacus Enterprises, Lummi Island, WA, USA
⁴ Crustal Imaging Facility, Conoco Phillips School of Geology and Geophysics, University of Oklahoma, USA

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Thyroid cancer incidence rate (age adjusted) plotted against glyphosate applied to U.S. corn & soy (R = 0.988, p <= 7.612e-09) along with %GE corn & soy crops R = 0.9377, p <= 2.152e-05. Sources: USDA:NASS; SEER.

Prevalence of diabetes in US (age adjusted) plotted against glyphosate applied to corn & soy (R = 0.971, p <= 9.24e-09) along with %GE corn & soy grown in US (R=0.9826, p <= 5.169e-07) sources: USDA:NASS; CDC.

Age adjusted end stage renal disease deaths (ICD N18.0 & 585.6) plotted against %GE corn & soy planted (R = 0.9578, p <= 4.165e-06) and glyphosate applied to corn & soy (R = 0.9746, p <= 7.244e-09). Sources: USDA:NASS; CDC.

Age adjusted urinary/bladder cancer incidence plotted against % GE corn and soy (R = 0.9449, p <= 7.1e-06) and glyphosate applied to corn and soy (R = 0.981, p <= 4.702e-09). Sources: USDA:NASS; SEER.
Go Organic!
Summary

• Glyphosate is a major contributor to the autism epidemic, as well as in the deterioration of health in America more generally
• Key factor is disrupted glutamate metabolism due to manganese deficiency leading to neurotoxicity
• The bioavailability of many essential vitamins, minerals, and neurotransmitters is disrupted by glyphosate
• Glyphosate works synergistically with vaccines to cause harm