Is Glyphosate the ‘Safe’ Chemical that’s Making Us All Sick?

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MIT CSAIL
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“A truth’s initial commotion is directly proportional to how deeply the lie was believed... When a well-packaged web of lies has been sold gradually to the masses over generations, the truth will seem utterly preposterous and its speaker, a raving lunatic.”

- Dresden James
Outline

- Introduction
- The California lawsuit: Glyphosate and non-Hodgkin’s Lymphoma
- Glyphosate and the Gut
- Glyphosate Activism
- A Failed System and a Growing Food Movement
- How to Safeguard Yourself and Your Family
- Summary

Introduction
Roundup and GMO Crops

GMO Roundup-Ready corn, soy, canola, sugar beets
cotton, tobacco and alfalfa

What is glyphosate?

Roundup as a Desiccant/Ripener
just before Harvest

Wheat, Oats, Barley, Rye,
Sugar cane, Beans, Lentils,
Peas, Flax, Sunflowers,
Pulses, Chick Peas
• Glyphosate is now the #1 herbicide in use in the U.S. and is increasingly used around the world
  – Developed and patented by Monsanto in the 1970's
  – Introduced into the US food chain in 1974
  – Came out from under patent in 2000

  – Inhibits an enzyme in the shikimate pathway involved in the synthesis of tyrosine, tryptophan and phenylalanine (the three aromatic amino acids)

• Huge expansion of GMO corn, soy, cotton and canola crops has led to sharp increases in the last two decades

**Shikimate Pathway Disruption**

- **shikimate**
- **chorismate**
- **Phenylalanine, tryptophan, tyrosine** → **Neurotransmitters, thyroid hormone**
- vitamin K
- folate
Glyphosate vs. Other Pesticides: Usage in the United States*

Environmental Working Group Results*


*www.ewg.org/childrenshealth/glyphosateincereal/
Some Foods Containing Glyphosate

Paper Showing Strong Correlations between Glyphosate Usage and Chronic Disease


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

¹ Abacus Enterprises, Lummi Island, WA, USA
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

* Corresponding author: andreleu.al@gmail.com
In 2015, WHO IARC declared glyphosate a “probable carcinogen”
Quote from the Conclusion*

“Although correlation does not necessarily mean causation, when correlation coefficients of over 0.95 (with p-value significance levels less than 0.00001) are calculated for a list of diseases that can be directly linked to glyphosate, via its known biological effects, it would be imprudent not to consider causation as a plausible explanation.”

*NL Swanson et al. Journal of Organic Systems 9(2), 2014, p. 32,

Decreasing IQ scores after 1975*

“scores increased by almost 3 percentage points each decade for those born between 1962 to 1975 -- but then saw a steady decline among those born after 1975.”

“What specific environmental factors cause changes in intelligence remains relatively unexplored.”

*Rory Smith, CNN.
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Glyphosate in Human Urine:
U.S. Southern California*


Glyphosate reduces sperm motility and sperm count*

*FO Owagboriaye et al. Experimental and Toxicologic Pathology 2017 Sep 5;69(7):461-468.
Glyphosate Damages Second Generation*

- Pregnant rats exposed to glyphosate starting at day 9 of gestation
- Two exposure levels (low, high), both levels considered to be safe according to regulators
- Neither the rats nor their offspring showed any obvious effects
- The second generation offspring from both exposed groups showed delayed growth, lower fetal weight and length and a higher incidence of abnormally small fetuses
- **Most surprising:** there were three cases (each from a different mother) among the second generation offspring with major fetal abnormalities (conjoined fetuses and abnormal limb development)

*MM Milesi et al. Archives of Toxicology June 9, 2018 [Epub ahead of print]*

America’s Children are in Trouble!

- It is now "normal" for a kindergarten child to have 12 colds every year and for a baby to have nine
- Fourfold increase in childhood obesity
- Double the asthma rate since the 1980's
- "Chronic illnesses" rose from 1.8% in 1960 to 7% in 2004
  - Today, 43% of US children are chronically ill
- 1 in 6 children in the USA has a neurodevelopmental disability
  - 1 in 38 boys are autistic
- US has the worst neonatal death rate of all industrialized countries
- Today’s children in the US will have a shortened life span compared to their parents

Source: http://www.vaccineviolence.com/
What’s Making Our Children SICK?

How Industrial Food Is Causing an Epidemic of Chronic Illness, and What Parents (and Doctors) Can Do About It

EXPLORING THE LINKS BETWEEN GM FOODS, Glyphosate, AND GUT HEALTH

Michelle Perro, MD and Vincanne Adams, PhD

cineviolence.com/

SECRET INGREDIENTS

A FILM BY JEFFREY SMITH & AMY HART

AVAILABLE ON ITUNES, AMAZON, DVD & BLU-RAY NOVEMBER 14th

SECRETINGREDIENTSmovie.com

Genetically Modified Children
The California Lawsuit: Glyphosate and non-Hodgkin’s Lymphoma

Dewayne “Lee” Johnson vs Monsanto: Glyphosate & Non-Hodgkin’s Lymphoma

Details of the Lawsuit*

- Johnson was a groundskeeper for the school district in Benicia, CA, just north of San Francisco.
- He was diagnosed with non-Hodgkin’s lymphoma (NHL) in 2014, at age 42.
- In 2015, WHO's IARC classified glyphosate as "probably carcinogenic to humans".
- Donna Farmer, Monsanto's "product protection lead" said in email to colleagues:
  - "You cannot say that Roundup does not cause cancer."
- Timothy Litzenburg, one of Johnson's lawyers, said:
  - "so much of what Monsanto has worked to keep secret is coming out."


“\nWe’re going to see for the first time evidence that nobody has seen before, evidence that has been in Monsanto’s files that we’ve obtained from lawyers and the people in Monsanto... I don’t think it’s a surprise after 20 years Monsanto has known about the cancer-causing properties of this chemical and has tried to stop the public from knowing it, and tried to manipulate the regulatory process.”

-- Robert F Kennedy, Jr.
Co-counsel for Johnson
“We’re going to see for the first time evidence that nobody has seen before, evidence that has been in Monsanto’s files that we’ve obtained from lawyers and the people in Monsanto. I don’t think it’s a surprise that they’re not telling the public about the cancer-causing properties of this chemical and has tried to manipulate the regulatory process.”

-- Robert F Kennedy, Jr.

Co-counsel for Johnson

“If we get a large award in this case, it could easily threaten the future financial viability of the company.”

-- Robert F Kennedy, Jr.

Monsanto has lost a landmark cancer trial in San Francisco and has been ordered by the Judge to pay over USD 289 Million in total damages to the former school groundskeeper Dewayne Johnson, a California father who has non-Hodgkin’s lymphoma, which was caused by Monsanto’s glyphosate-based weedkiller Roundup.
Bayer Stock Prices

Johnson Verdict

Verdict Upheld in Higher Court: 
October 22, 2018

Damages reduced to $78 Million
Bayer to sell businesses, cut jobs after Monsanto deal*

“Chief Executive Werner Baumann is under pressure to boost Bayer’s share price after a drop of more than 35 percent so far this year, dragged down by concern over more than 9,000 lawsuits it faces over an alleged cancer-causing effect of Monsanto’s Roundup weed killer.”

Ludwig Burger
November 29, 2018


“In vitro evaluation of genomic damage induced by glyphosate on human lymphocytes”*

- In vitro exposure of human lymphocytes to glyphosate at levels of 0.5, 0.1, 0.050, 0.025 and 0.0125 μg/ml
- 0.5 is considered an “acceptable daily exposure level”
- Chromosomal aberrations and micronuclei frequencies were significantly high at all except the lowest exposure levels.

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*Lymphocytes are the cell type that transforms into cancer cells in non-Hodgkin’s lymphoma


Glyphosate and the Gut
Inflammatory bowel disease, autoimmune arthritis, obesity and metabolic syndrome, and nonalcoholic fatty liver disease can all be traced to imbalances in gut microbiome.*

*Figure 1. RS Goldszmid and G Trinchieri. Nat Immunol 2012;13(10):932-8.

**Glyphosate and the Gut: Pathogen Overgrowth**

- Glyphosate is an antimicrobial agent that preferentially kills beneficial microbes, allowing pathogens to flourish in the gut.*
- Immune cells invade the gut and release inflammatory cytokines
  - This causes increased risk to inflammatory bowel diseases such as Crohn’s, ulcerative colitis as well as Celiac disease (gluten intolerance)

Inflammatory Bowel Disease

Figure 20, NL Swanson et al. Journal of Organic Systems 9(2), 2014, p. 25.

Glyphosate and Celiac Disease

Impaired Digestive Enzymes

- Glyphosate has been found as a contaminant in digestive enzymes trypsin, pepsin and lipase*
- Trypsin impairment prevents proteins like gluten in wheat from being digested
- Undigested proteins induce release of zonulin which opens up gut barrier**
- Undigested proteins in the general circulation induce autoimmune disease


Celiac Disease, Glyphosate and Non Hodgkin’s Lymphoma

- Glyphosate preferentially kills *Bifidobacteria**
- Bifidobacteria are depleted in Celiac disease**
- Celiac disease is associated with increased risk to non Hodgkin’s lymphoma***
- Glyphosate itself is also linked directly to non Hodgkin’s lymphoma****

**** M. Eriksson et al., Int J Cancer. 2008 Oct 1;123(7):1657-63.
**Pathogen Overgrowth in Poultry Microbes Exposed to Glyphosate**


*Plot provided by Dr. Martin Michener

**Evidence linking autism to Clostridia overgrowth**

- 14 autistic children with gut disorder compared to 21 controls
- Significant increase in *Clostridia* species in the gut in autistic children
- Associated with reduced tryptophan levels and increased expression of inflammatory markers
  - Tryptophan is a product of the shikimate pathway, which glyphosate blocks
  - Macrophages in inflamed tissue take up tryptophan, reducing bioavailability to the brain
- Proposed role for antibiotics
  - Glyphosate is a patented antimicrobial agent (2010)

*RA Luna et al., Cellular and Molecular Gastroenterology and Hepatology 2017;3(2): 218-230
Elevated Urinary Glyphosate and Clostridia Metabolites With Altered Dopamine Metabolism in Triplets With Autistic Spectrum Disorder or Suspected Seizure Disorder: A Case Study *

William Shaw, PhD

• Triplets: two boys, one girl. Both boys have autism and girl has seizure disorder
• Very high levels of glyphosate in urine in all three
• *Clostridia* overgrowth due to glyphosate disruption of gut microbes
  – *Clostridia* produce toxins which block the conversion of dopamine to norepinephrine.
  – Damage to neurons in the brain through oxidative stress

Recapitulation

• Glyphosate contamination in digestive enzymes makes them defective
  – Undigested proteins induce leaky gut barrier
  – Studies on poultry confirm glyphosate disrupts gut microbes
• Celiac disease is associated with increased risk to non-Hodgkin’s lymphoma, which is also linked to glyphosate exposure.
• Glyphosate induces overgrowth of *Clostridia* species in gut
  – *Clostridia* release toxins that induce an inflammatory response and prevent dopamine metabolism
  – *Clostridia* overgrowth can lead to autism
• Inflammation in the brain and excessive neurostimulation by dopamine damages neurons

*W. Shaw. Integrative Medicine 2017;16(1);50-57.*
Glyphosate Activism

MOMS ACROSS AMERICA

America is in a Health Crisis

• 1 out of 2 children have a chronic illness
• 1 out of 2 males and 1 out of 3 females are expected to get cancer
• 1 out of 5 have a mental illness
• 1 out of 6 has a learning disorder

WE CAN DO BETTER!

HOW?

Reduce exposure
Take steps in 5 areas restore health to your family.

Be UNSTOPPABLE for health, freedom, and the future of our country!

Zen Honeycutt

MomsAcrossAmerica.org
Tony Mitra: Canadian Activist

Imported lentils laced with weed killer

SAV. ROBERT DI CG
VAGHNA, JULY 18

Indians are consuming high-risk lentils (green and red lentils) that are heavily laced with glyphosate, which is a herbicide used in Canada. The green lentils are imported from Australia, while the red lentils are imported from Bangladesh. The Canadian Food Inspection Agency (CFIA) has thousands of samples of these lentils, and they have found that glyphosate levels exceed the Canadian limit of 0.005% in some samples.

Tony Mitra, a Canadian farmer and activist, spoke to crowds of Indian farmers and villagers in villages in Bankura, West Bengal, India. He described how glyphosate is being used in Canadian crops and how it is being imported to India. He said that glyphosate is a plant-killing chemical used in Canada, and it is being imported to India, where it is being used to control weeds in Canadian crops.

Some of the villages that have been affected by glyphosate are in Bankura, West Bengal, India. The villages are located near the banks of the Hooghly River, which is polluted with glyphosate. The residents of these villages have complained to the government about the contamination of their water and soil. However, the government has not taken any action to address the problem.

Tony Mitra spoke to the residents of these villages and explained the dangers of glyphosate. He urged the residents to stop consuming the contaminated lentils and to demand action from the government. He said that the government should ban the import of contaminated lentils and ensure that Canadian farmers and the consumers of Canadian crops are protected from glyphosate.

Villagers in Bankura, West Bengal, India.

North Dinajpur in Northern Bengal, India.
Local Activism*

HOW A RAGTAG GROUP OF OREGON LOCALS TOOK ON THE BIGGEST CHEMICAL COMPANIES IN WORLD — AND WON


A small group of activists succeeded in getting a law passed banning aerial spraying of glyphosate in the forests of western Oregon despite tremendous industry-funded campaigns

A Failed System and A Growing Food Movement

“Is Agriculture’s Use of Glyphosate Feeding Lake O’s Explosive Algae Blooms?”*

• Sugar cane agriculture is extensive all around Lake Okeechobee in S. Florida, and glyphosate is used both to control weeds and as a desiccant

• Cyanobacteria can break down the C-P bond in glyphosate and use its phosphorus atom as a fuel source**


Cyanobacteria Feed Red Tide Algae

“Both the coastal red tide and the inland blue-green algae have beset South Florida through the summer, killing vast numbers of fish and other wildlife, including dozens of dolphins, manatees, sea turtles, sharks and eels.” *

- Cyanobacteria feed off of glyphosate (phosphorus source) and produce nitrates from nitrogen
- Red Tide algae flourish, supplied with nitrates produced by cyanobacteria **


** [https://www.sailorsforthesea.org/programs/ocean-watch/nutrients-feed-red-tide](https://www.sailorsforthesea.org/programs/ocean-watch/nutrients-feed-red-tide)

Test of Glyphosate Levels in Florida Waterways*

Water sample taken from the coast of Cape Coral, at the mouth of the Caloosahatchee River, where cyanobacteria were present

* [https://www.momsacrossamerica.com/orange_juice_postive_forGlyphosate_again](https://www.momsacrossamerica.com/orange_juice_postive_forGlyphosate_again)
Concerns about Glyphosate and Citrus*

Chief among these concerns are:
- Increased crop sensitivity to diseases
- Reduced availability of micronutrients to crops through chelation by glyphosate
- Inhibition of root growth
- Citrus fruit drop

“As citrus weed management programs have continued to rely more heavily on glyphosate, the occurrence of citrus fruit drop resulting from glyphosate application has become an increasing grower concern over the years.”

*Moms Across America founder Zen Honeycutt has found glyphosate in multiple samples of orange juice produced from Florida orange groves

*http://citrusindustry.net/2018/09/05/how-to-handle-glyphosate-related-fruit-drop/
Warning of ‘ecological Armageddon’ after dramatic plunge in insect numbers

Three-quarters of flying insects in nature reserves across Germany have vanished in 25 years, with serious implications for all life on Earth, scientists say.


Prof. Don Huber on Bee Colony Collapse Syndrome*

• Glyphosate chelates minerals making them unavailable, especially manganese
• Glyphosate kills Lactobacillus and Bifidobacter which interferes with digestion of honey and bee bread by larvae  
  — Makes bees more susceptible to mites and viruses
• Acting as an endocrine disruptor, glyphosate causes brain fog in the bees, and they can't find their way back to the hive after foraging  
  — Neonicotinoids have a similar, synergistic effect
• Glyphosate is a contaminant even in organic honey because it is pervasive
• Probiotics + mineral solutions counter glyphosate's effects remarkably

*personal communication
Successful Treatment Protocol for Bees*

- Average loss rates in bee hives in the U.S. for the winter of 2015-2016 was 38%
- Slide Ridge Honey had only a 5% loss rate
  – Their success was attributed to mineral supplements and probiotics

*biomineralstechnologies.com/save-the-bees/honeybee-update-2017

Glyphosate was found in 59% of Honey Samples*

*F Rubio et al., J Environ Anal Toxicol 2014, 5:1
Superweeds Are Now a Huge Problem*

- 76.8% of samples submitted to a U of Illinois Plant Clinic from 10 states across the Midwest showed glyphosate resistance
- “GM crops are on the edge of failure in the U.S. as farmers are asked to fork out more and more money on herbicides to try to control the superweeds. We simply can’t afford it! It is near the end of the road for these crops and many of my friends in the Midwest are on the edge of turning back to conventional farming methods.”
  — Bill Giles, an Illinois farmer

* sustainablepulse.com/2017/02/04/farmers-losing-midwest-superweeds-fight-as-glyphosate-resistance-reaches-over-75/#

Fixing the Soil*

- Dirt is inert; soil is alive
- Missouri farmer JR Bollinger grew corn and soy on a former coal mine
- “We tried … all kinds of goodies: humates, … sea minerals, microbes, fish meal and biochar powder.”
  — Earthworms till the soil
  — Soil microbes are crucial for soil health
- Greatly reduce fertilizer needs and improve yield

* ecofarmingdaily.com/wormhole-customizing-biological-methods-large-scale-farming/
  David Yarrow
  Down the Wormhole: Customizing Biological Methods for Large Scale Farming
  Belize Ag Report 2017;34:5-17.
Solving Global Climate Change through Agriculture*

“Agriculture, with its unique ability to sequester carbon on ... billions and billions of acres, is the only industry poised to reverse global warming. Improved management of cropping and grazing heals land, boosts soil fertility, prevents flooding, enhances drought resilience, increases the nutritional content of food and restores wildlife habitat — while sequestering carbon.


Regenerative Agriculture*

- The Goal: Improving soil health
- The more plants that grow, the better the soil
- Use adaptive high stock density (AHSD) grazing, the way the bison did it

Regenerative Agriculture*

"Regenerative agriculture is a phenomenal system that has always been here, activated by the sunshine and the rain. It not only restores our land in terms of biodiversity and soil health, but also produces incredibly nutrient dense, vibrantly flavored food."

Dirt to Soil*

- Gabe Brown inherited a 5,000 acre farm from his father-in-law that grew wheat, oats and barley, conventionally
  - His crop failed due to drought for four straight years
  - He let it lie fallow and let the weeds grow
  - The soil improved dramatically: earthworms started to appear
  - He used less glyphosate to control weeds only because he couldn't afford it
- He eventually converted it to a certified organic farm, with animals playing a central role
  - Profitable organic farm produces beef, lamb, eggs, broilers, pigs, honey, vegetables, fruit, corn, and wheat.

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  – Profitable on beef, lamb, eggs, broilers, pigs, honey, vegetables, fruit, corn, and wheat.


Small Organic Farms are the Answer

Bluebird Hill Organic Farm, North Carolina
How to Safeguard Yourself and Your Family

Go Organic!*

*https://www.wholefoodsmarket.com/organic
Eat Natural Probiotic Foods

- Sauerkraut and apple cider vinegar contain Acetobacter, one of the very few microbes that can metabolize glyphosate
- Kombucha and kimchi do too!

Some Important Nutrients

- Curcumin
- Garlic
- Vitamin C
- Methyl tetrahydrofolate
- Cobalamin
- Glutathione
- Taurine
- Epsom salt baths
Biochar, Bentonite and Zeolite to maintain healthy microbial distribution in poultry*


Extracts from Common Plants Can Treat Glyphosate Poisoning*

- Roundup is toxic to hepatic and embryonic cells at doses far below those used in agriculture and at residue levels present in some GM food.
- Extracts from common plants such as dandelions, barberry, and burdock can protect from damage, especially if administered prior to exposure.

*C Gasnier et al. Journal of Occupational Medicine and Toxicology 2011, 6:3
Making Bone Broth a Staple in Your Diet May Be the Key to Improving Your Health*


Conclusions

• We are at a crossroads where we can choose to get sicker and sicker while destroying the ecosystem, or we can choose to drastically change our agricultural methods towards renewable organic solutions
• Grass roots bottom-up activities will institute a dramatic shift in food choices towards nutrient-dense organic whole foods instead of chemical-contaminated impoverished processed foods
• A market-driven economy will force farmers to switch to organic methods if they want to sell their crops to informed and health-conscious consumers
• This will lead to a dramatic reduction in health care costs and a vast improvement in the health of the population as a whole, of the nation, and of the earth
Conclusions

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• This will lead to a dramatic reduction in health care costs and a vast improvement in the health of the population as a whole, of the nation, and of the earth.

This community has an opportunity to play a leadership role in transforming the way we grow food!

Thank You for Listening!