Roundup-Ready: The Far-reaching Impact of Intensive Glyphosate Use

Stephanie Seneff
MIT CSAIL
September 25, 2019

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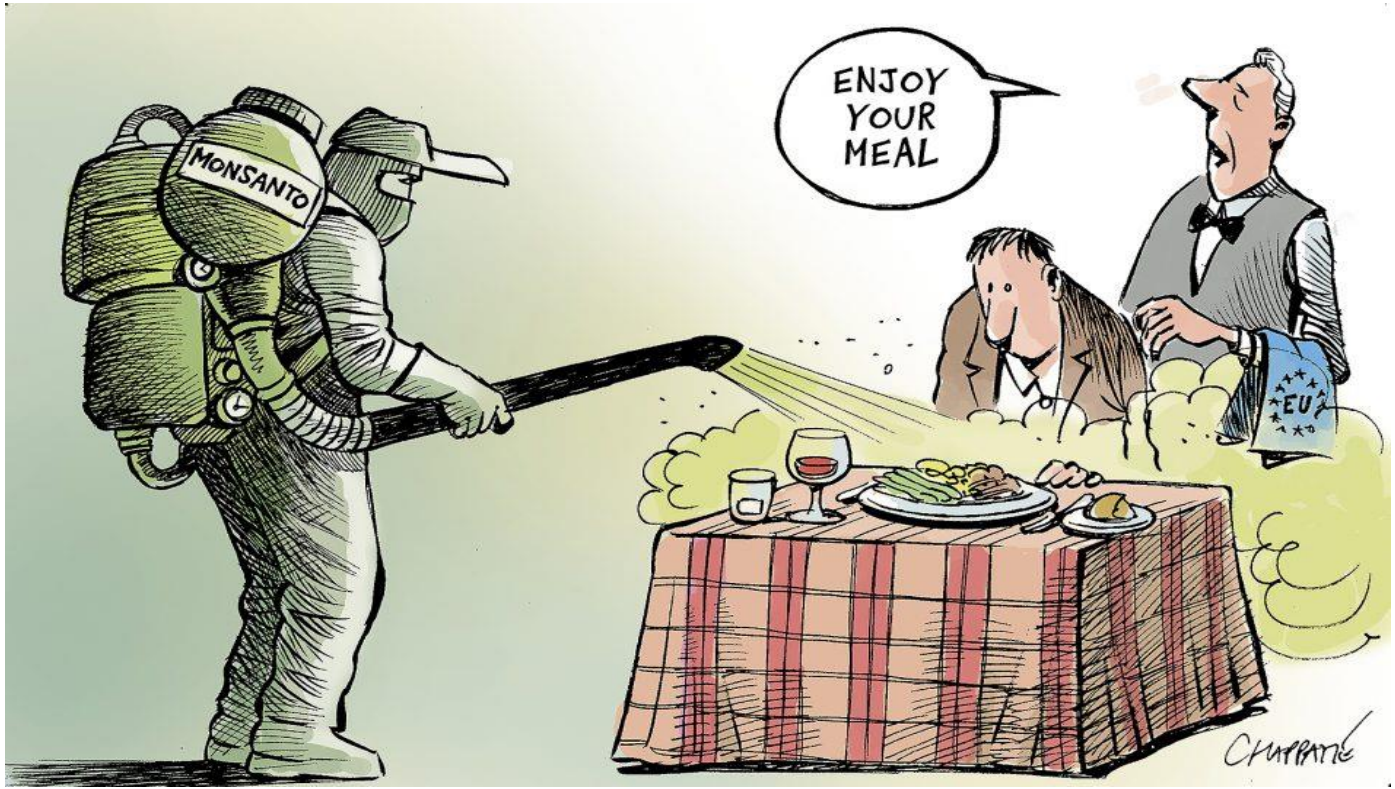
MONSANTO
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“A truth’s initial commotion is directly proportional to how deeply the lie was believed... When a well-packaged web of lies has been sold gradually to the masses over generations, the truth will seem utterly preposterous and its speaker,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

- *Dresden James*

Outline

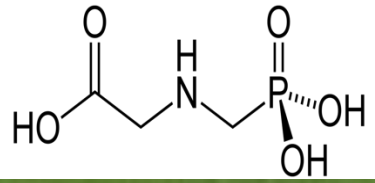
- Introduction
- The California lawsuit: Glyphosate and non-Hodgkin's Lymphoma
- Glyphosate and the Gut
- Glyphosate Activism
- A Failed System and a Growing Food Movement
- How to Safeguard Yourself and Your Family
- Summary

Introduction

Roundup and GMO Crops

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

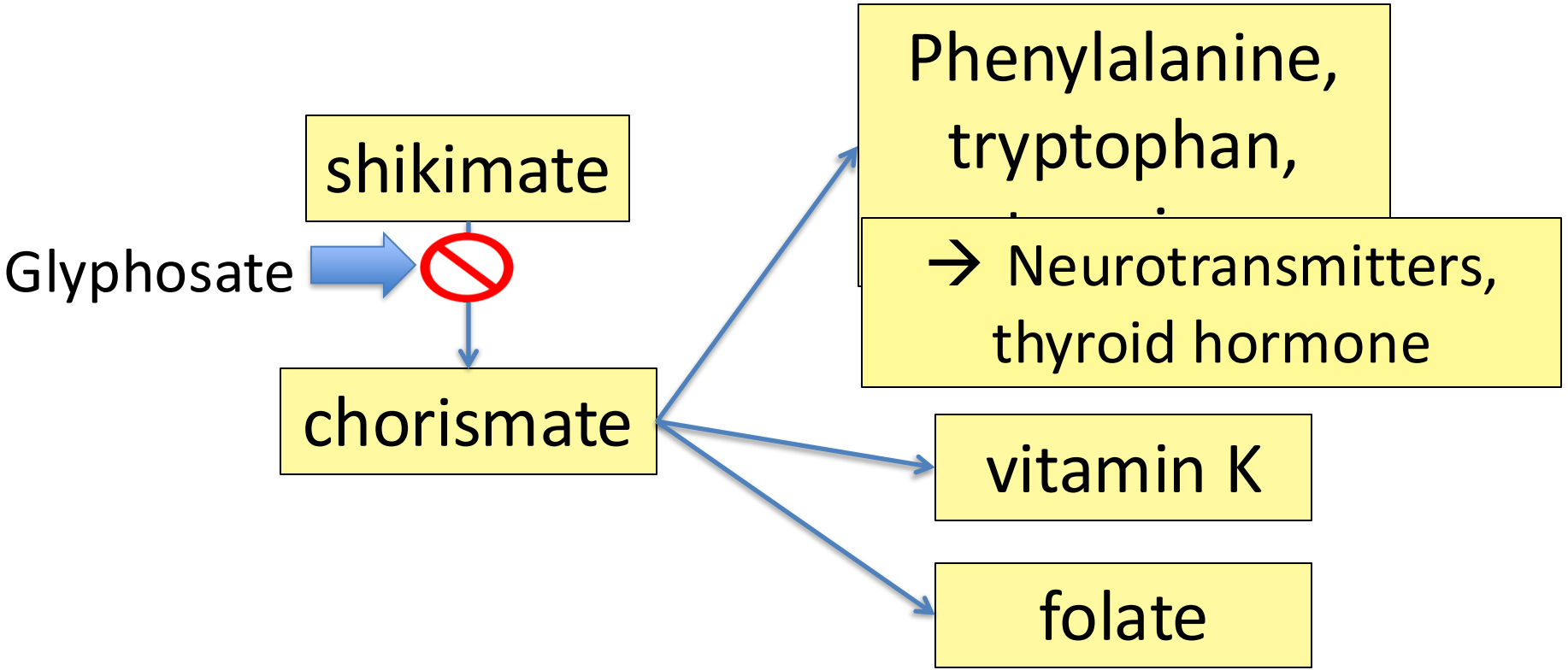
Roundup as a Desiccant/Ripener just before Harvest



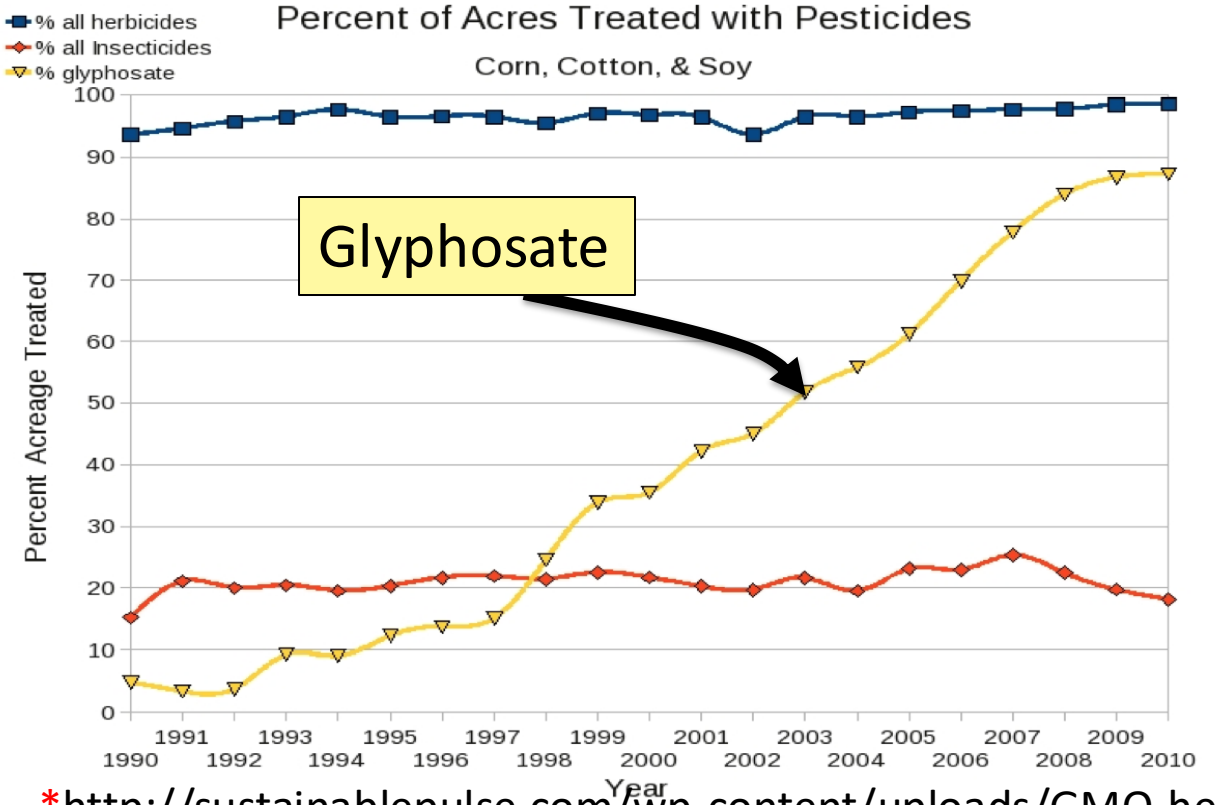
Glyphosate!!

- Glyphosate is now the #1 herbicide in use in the U.S. and is increasingly used around the world
  - Patented by Monsanto in the mid 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



Glyphosate vs. Other Pesticides: Usage in the United States*



*http://sustainablepulse.com/wp-content/uploads/GMO-health.pdf

Environmental Working Group Results*

*www.ewg.org/childrenshealth/glyphosateincereal/

Some Foods Containing Glyphosate

Paper Showing Strong Correlations between Glyphosate Usage and Chronic Disease

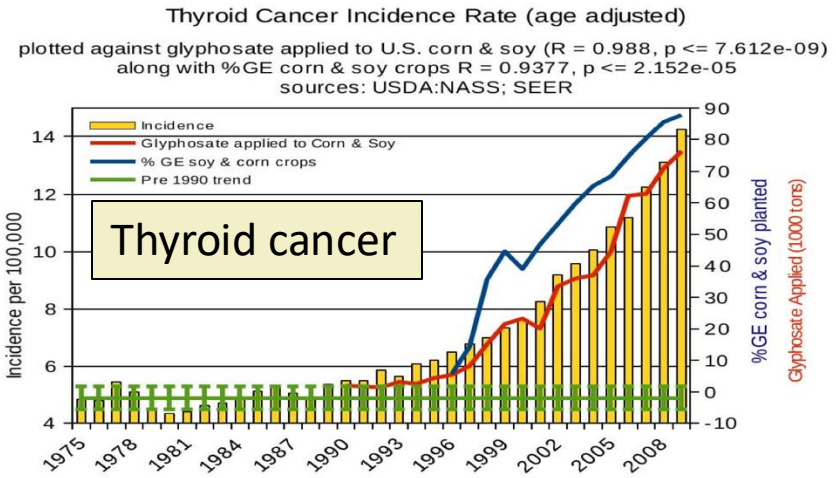
Journal of Organic Systems, 9(2), 2014

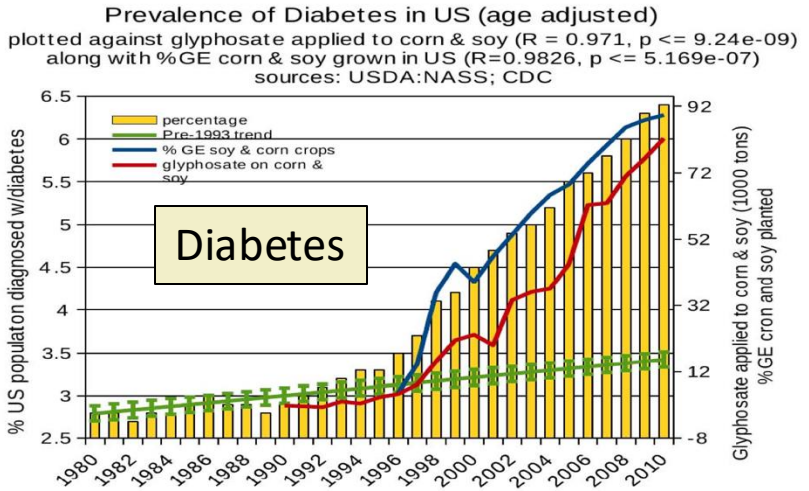
ORIGINAL PAPER

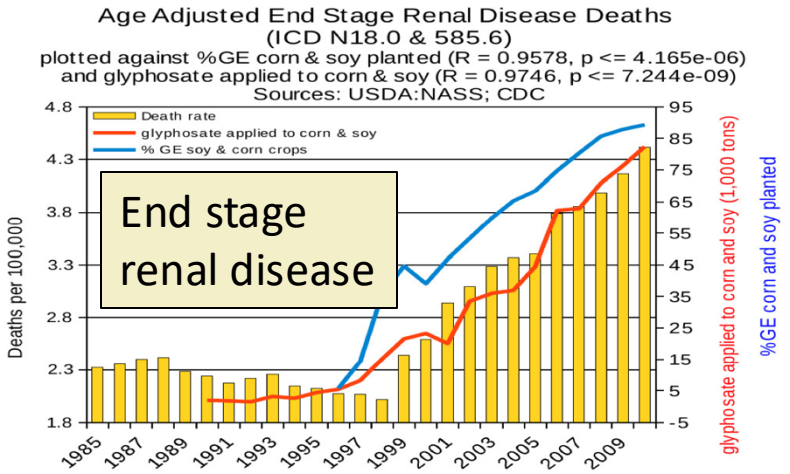
Genetically engineered crops, glyphosate and the deterioration of health in the United States of America

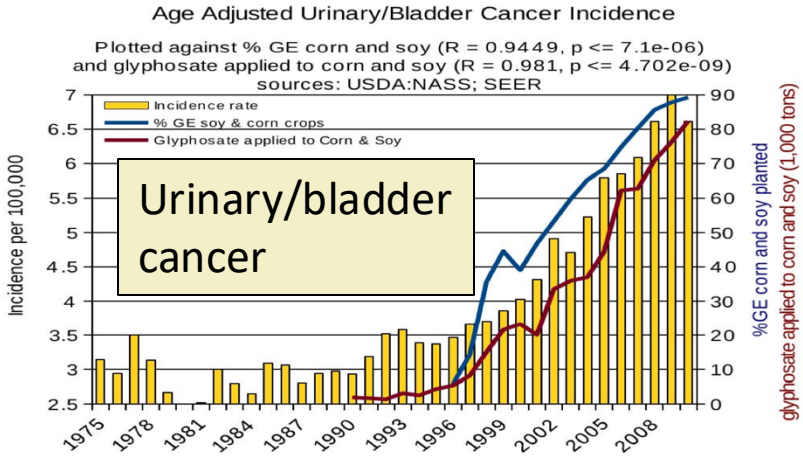
Nancy L. Swanson[1], Andre Leu[2]*, Jon Abrahamson[3] and Bradley Wallet[4]

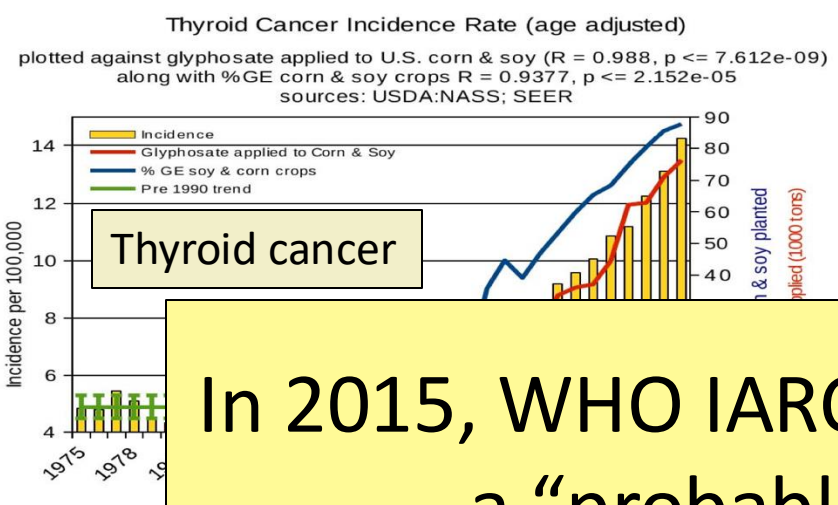
[1] *Abacus Enterprises, Lummi Island, WA, USA*
[2] *International Federation of Organic Agricultural Movements, Bonn, Germany*
[3] *Abacus Enterprises, Lummi Island, WA, USA*
[4] *Crustal Imaging Facility, Conoco Phillips School of Geology and Geophysics, University of Oklahoma, USA*
* *Corresponding author: andreleu.al@gmail.com*

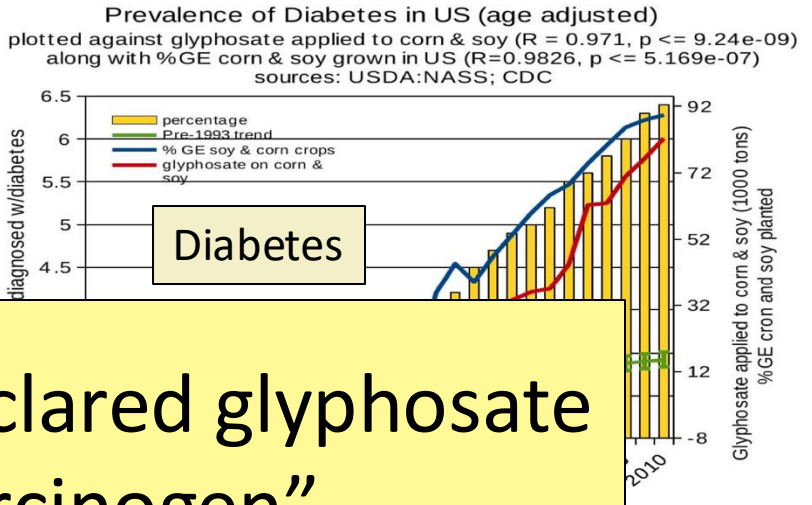

Thyroid Cancer Incidence Rate (age adjusted)
plotted against glyphosate applied to U.S. corn & soy (R = 0.988, p <= 7.612e-09)
along with %GE corn & soy crops R = 0.9377, p <= 2.152e-05
sources: USDA:NASS; SEER
Incidence
Glyphosate applied to Corn & Soy
% GE soy & corn crops
Pre 1990 trend
Thyroid cancer
Incidence per 100,000
%GE corn & soy planted
Glyphosate Applied (1000 tons)


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
percentage
Pre-1993 trend
% GE soy & corn crops
glyphosate on corn & soy
Diabetes
% US populaton diagnosed w/diabetes
Glyphosate applied to corn & soy (1000 tons)
%GE cron and soy planted

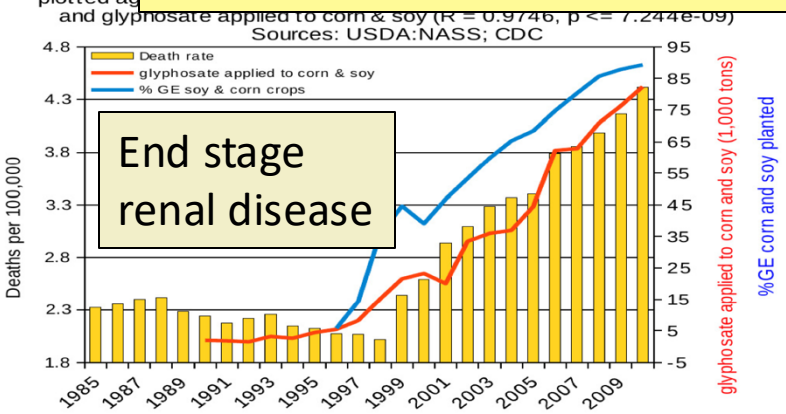

Age Adjusted End Stage Renal Disease Deaths
(ICD N18.0 & 585.6)
plotted against %GE corn & soy planted (R = 0.9578, p <= 4.165e-06)
and glyphosate applied to corn & soy (R = 0.9746, p <= 7.244e-09)
Sources: USDA:NASS; CDC
Death rate
glyphosate applied to corn & soy
% GE soy & corn crops
End stage
renal disease
Deaths per 100,000
glyphosate applied to corn and soy (1,000 tons)
%GE corn and soy planted

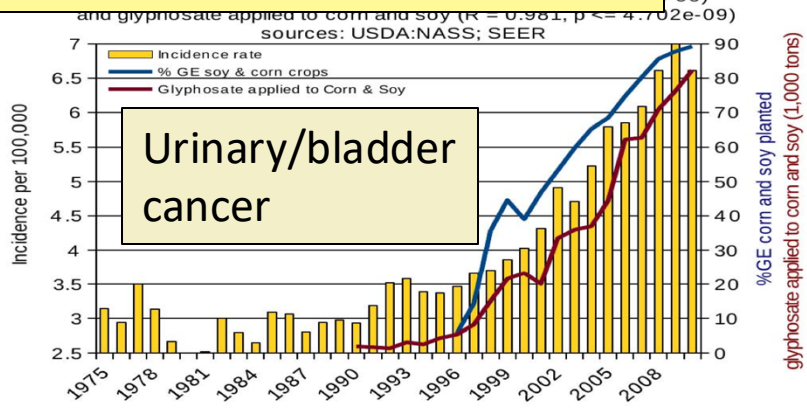

Age Adjusted Urinary/Bladder Cancer Incidence
Plotted against % GE corn and soy (R = 0.9449, p <= 7.1e-06)
and glyphosate applied to corn and soy (R = 0.981, p <= 4.702e-09)
sources: USDA:NASS; SEER
Incidence rate
% GE soy & corn crops
Glyphosate applied to Corn & Soy
Urinary/bladder
cancer
Incidence per 100,000
%GE corn and soy planted
glyphosate applied to corn and soy (1,000 tons)





In 2015, WHO IARC declared glyphosate a “probable carcinogen”

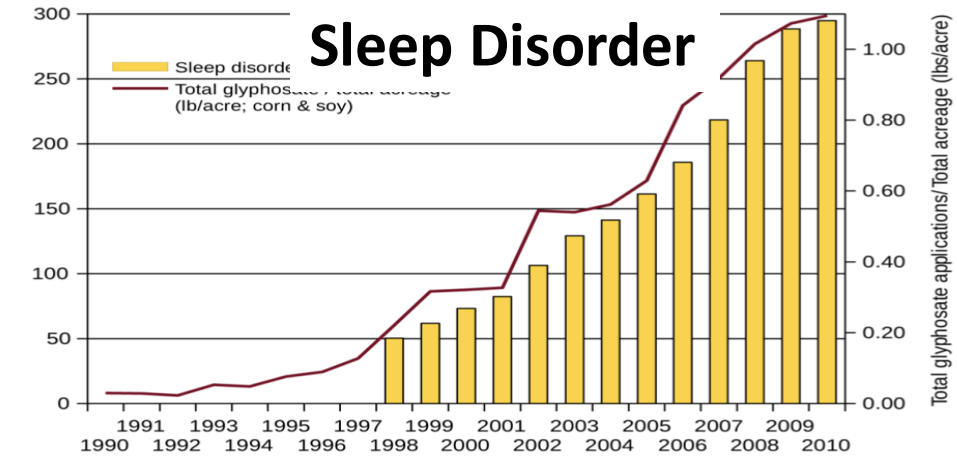


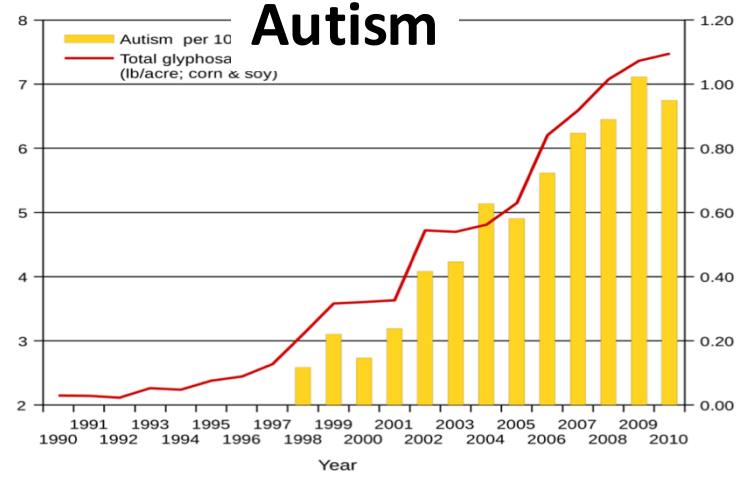


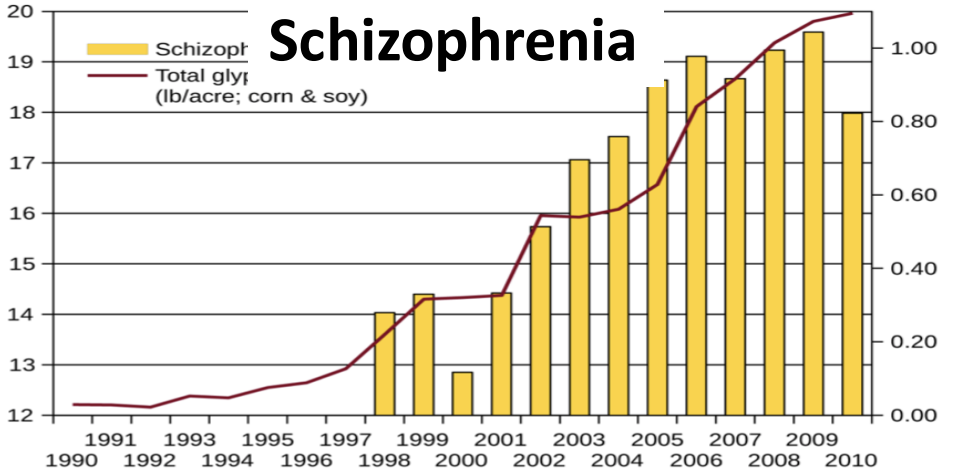
Quote from the Conclusion*

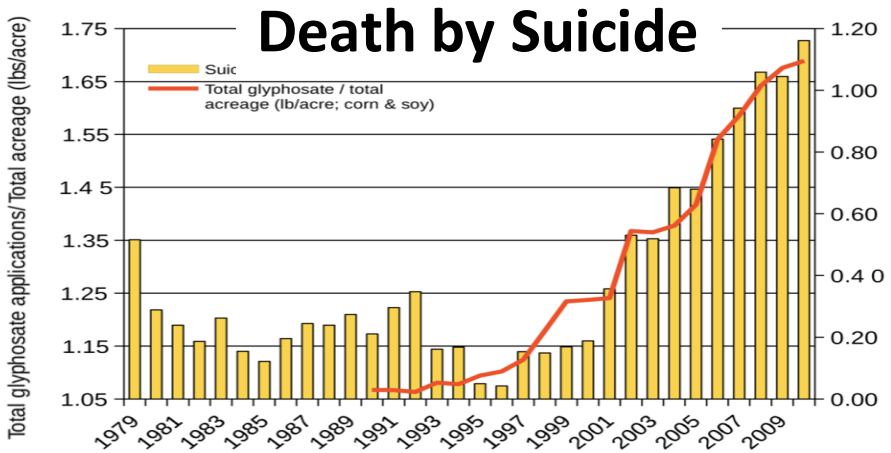
"Although correlation does not necessarily mean causation, when correlation coefficients of over 0.95 (with *p*-value significance levels less than 0.00001) are calculated for a list of diseases that can be directly linked to glyphosate, via its known biological effects, it would be imprudent not to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

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



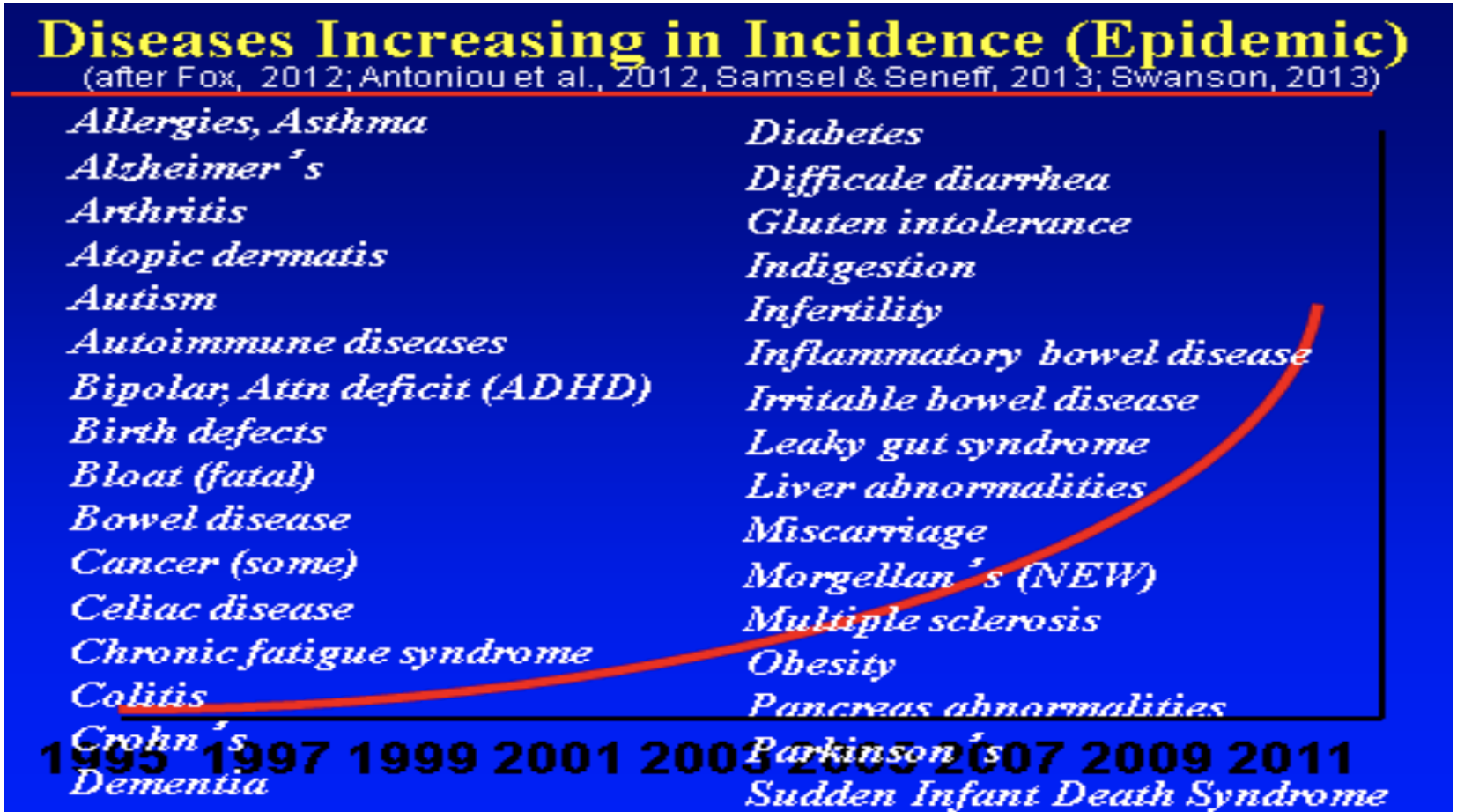






*Seneff et al. Agricultural Sciences 2015; 6: 42-70.

List Compiled by Prof. Don Huber



Decreasing IQ scores after 1975*

"scores increased by almost 3 percentage points each decade for those born between 1962 and *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.
https://www.cnn.com/2018/06/13/health/falling-iq-scores-study-intl/index.html

Decreasing IQ scores after 1975*

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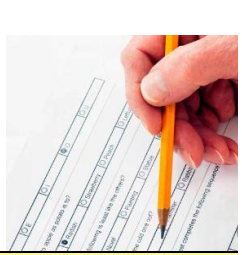


Glyphosate was introduced
on the market in 1975

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

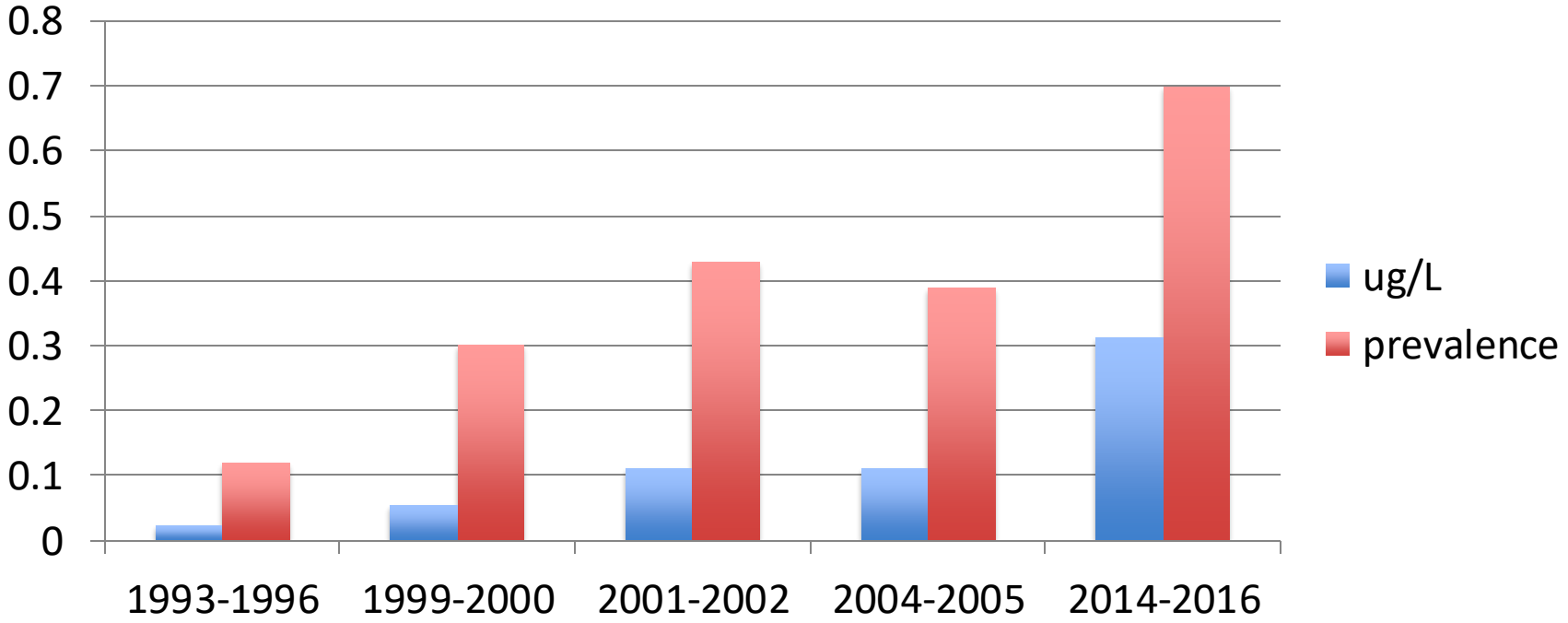
*Rory Smith, CNN.
https://www.cnn.com/2018/06/13/health/falling-iq-scores-study-intl/index.html

Health Care System Performance Compared to Spending

Note: Health care spending as a percent of GDP.
Source: Spending data are from OECD for the year 2014, and exclude spending on capital formation of health care providers.

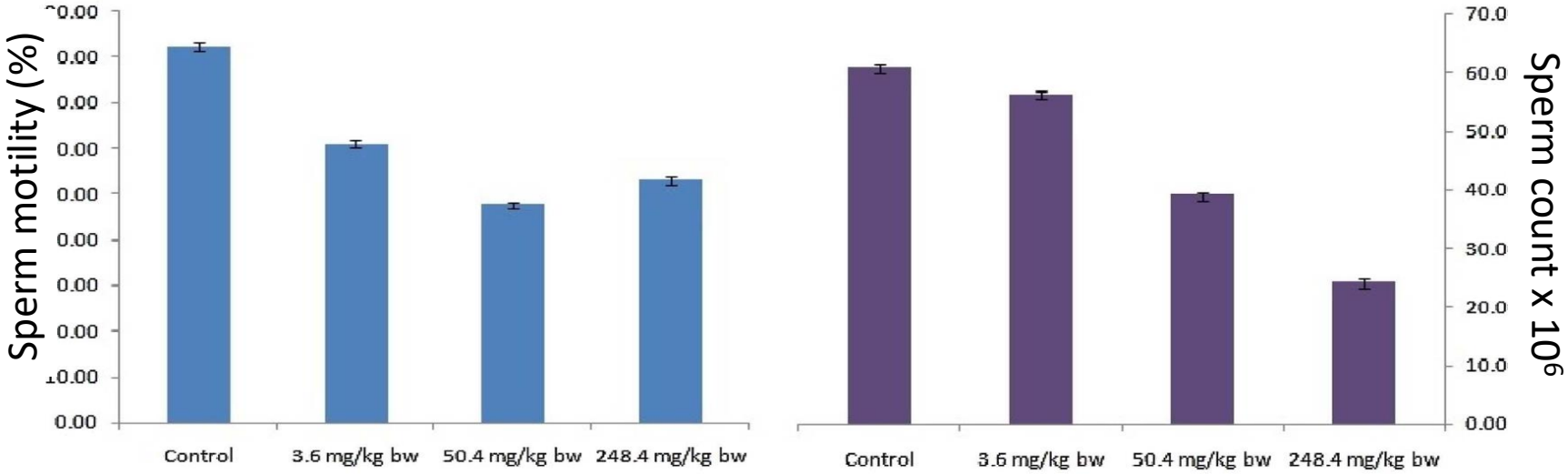
E. C. Schneider, D. O. Sarnak, D. Squires, A. Shah, and M. M. Doty, *Mirror, Mirror: How the U.S. Health Care System Compares Internationally at a Time of Radical Change,* The Commonwealth Fund, July 2017.

Glyphosate in Human Urine: U.S. Southern California*



*PJ Mills et al. JAMA 2017; 318(16): 1610-1611.

Glyphosate reduces sperm motility and sperm count*



Control (no glyphosate) vs increasing levels of glyphosate exposure

*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 fetusus

- *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

Genetically Modified Children

The California Lawsuits: Glyphosate and non-Hodgkin's Lymphoma

DeWayne Lee Johnson 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."

“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 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 Monsa[illegible]d the pe[illegible]fter 20 yea[illegible]ng proper[illegible] public[illegible] regula[illegible]

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

-- Robert F Kennedy, Jr.

-- Robert F. Kennedy, Jr.

Co-counsel for Johnson

Monsanto Loses Landmark Roundup Cancer Trial, Set to Pay USD 289 Million in Damages

Posted on Aug 11 2018 - 1:31am *by* Sustainable Pulse

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Highlights

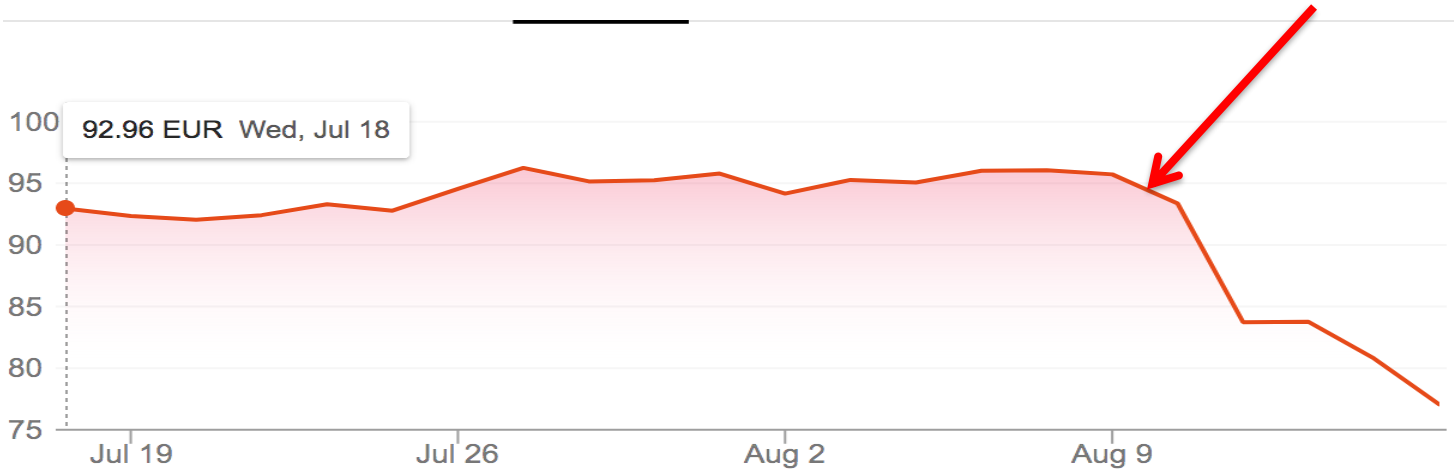
Monsanto has lost a landmark cancer trial in San Francisco and has been ordered by the Judge to pay over USD 289 Million in total damages to the former school groundskeeper Dewayne Johnson, a California father who has non-Hodgkin's lymphoma, which was caused by Monsanto's glyphosate-based weedkiller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

Bayer Stock Prices

78.40 EUR +1.35 (1.75%)
Aug 17, 5:35 PM GMT+2 · Disclaimer

1 day | 5 days | 1 month | 1 year

Johnson Verdict

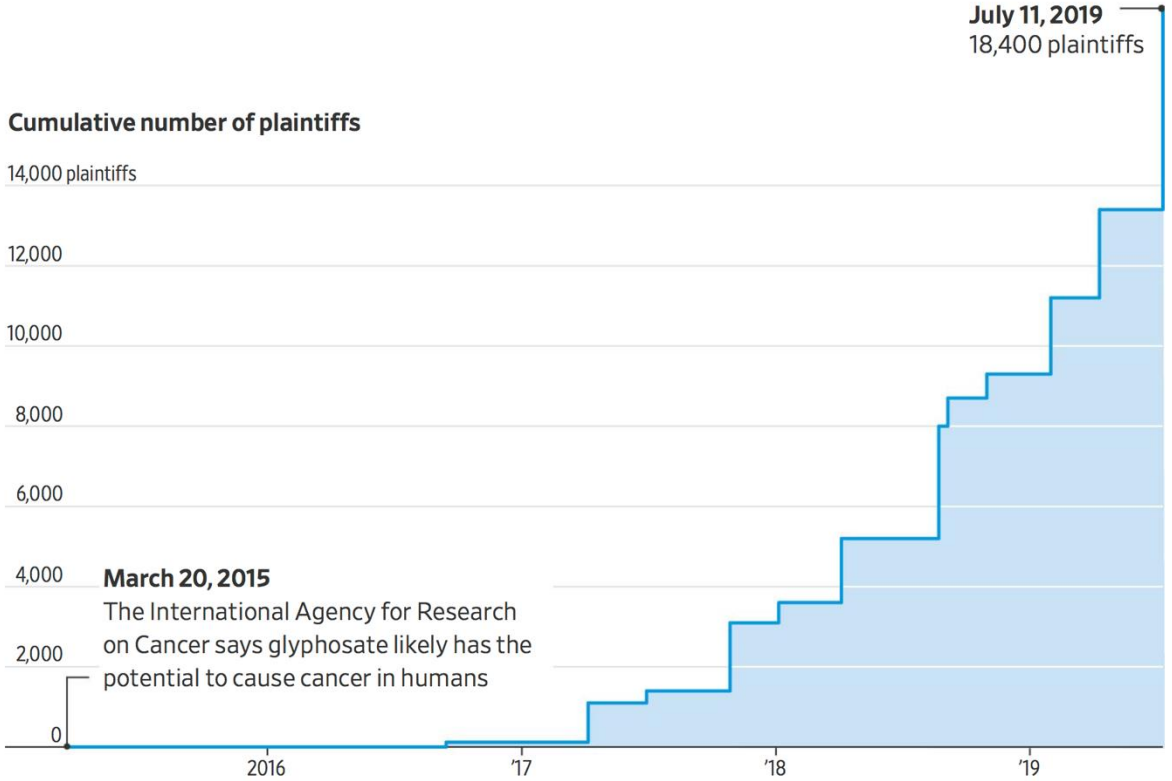


Four Ongoing Lawsuits

Plaintiff	Location	Jury Award	Judge's Ruling
DeWayne Johnson	California	$289 million	$78 million
Edwin Hardeman	California	$80 million	$25 million
Alva and Albert Piliod	California	$2 billion	$86 million
Sharlean Gordon	Missouri	-	-

>18,000 more in the works!

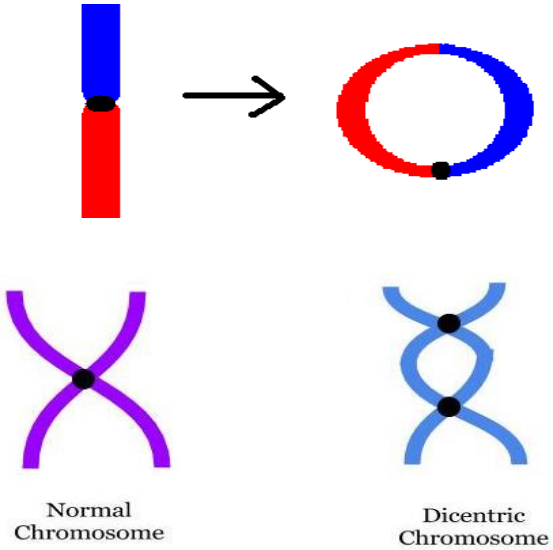
Number of Lawsuits over Time*



*Ruth Bender. How Bayer-Monsanto Became One of the Worst Corporate Deals—in 12 Charts. The Wallstreet Journal. Aug. 28, 2019.

“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.



*A Santovito et al. Environ Sci Pollut Res Int 2018;25(34):34693-700.

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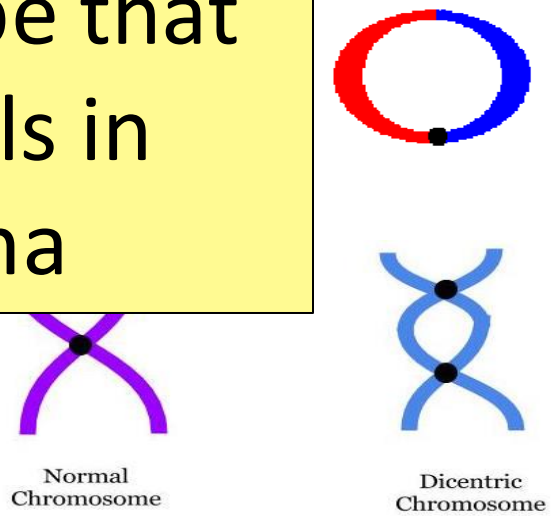
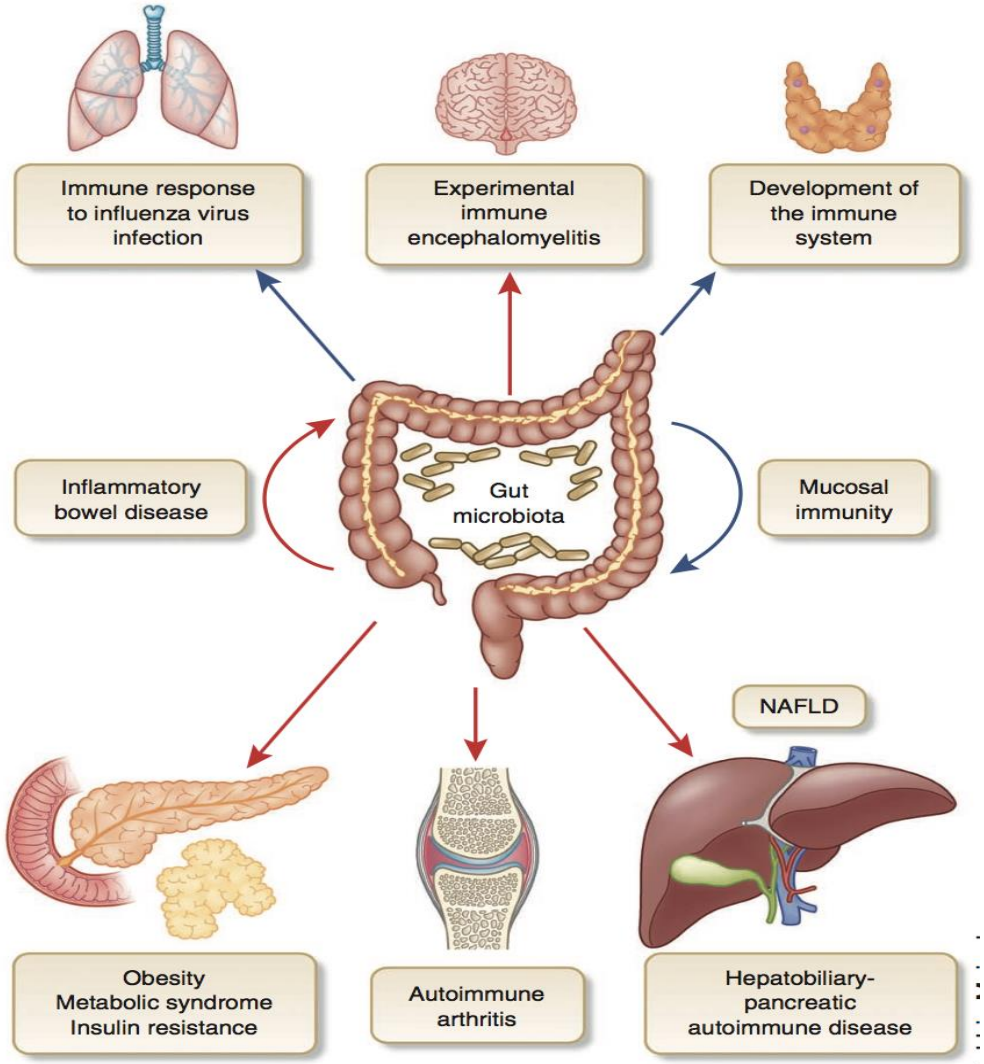
Lymphocytes are the cell type that transforms into cancer cells in non-Hodgkin’s lymphoma



*A Santovito et al. Environ Sci Pollut Res Int 2018;25(34):34693-700.

Glyphosate and the Gut



Imbalanced Gut Microbiome

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)

* Samsel and Seneff. Entropy 2013; 15: 1416-1463.

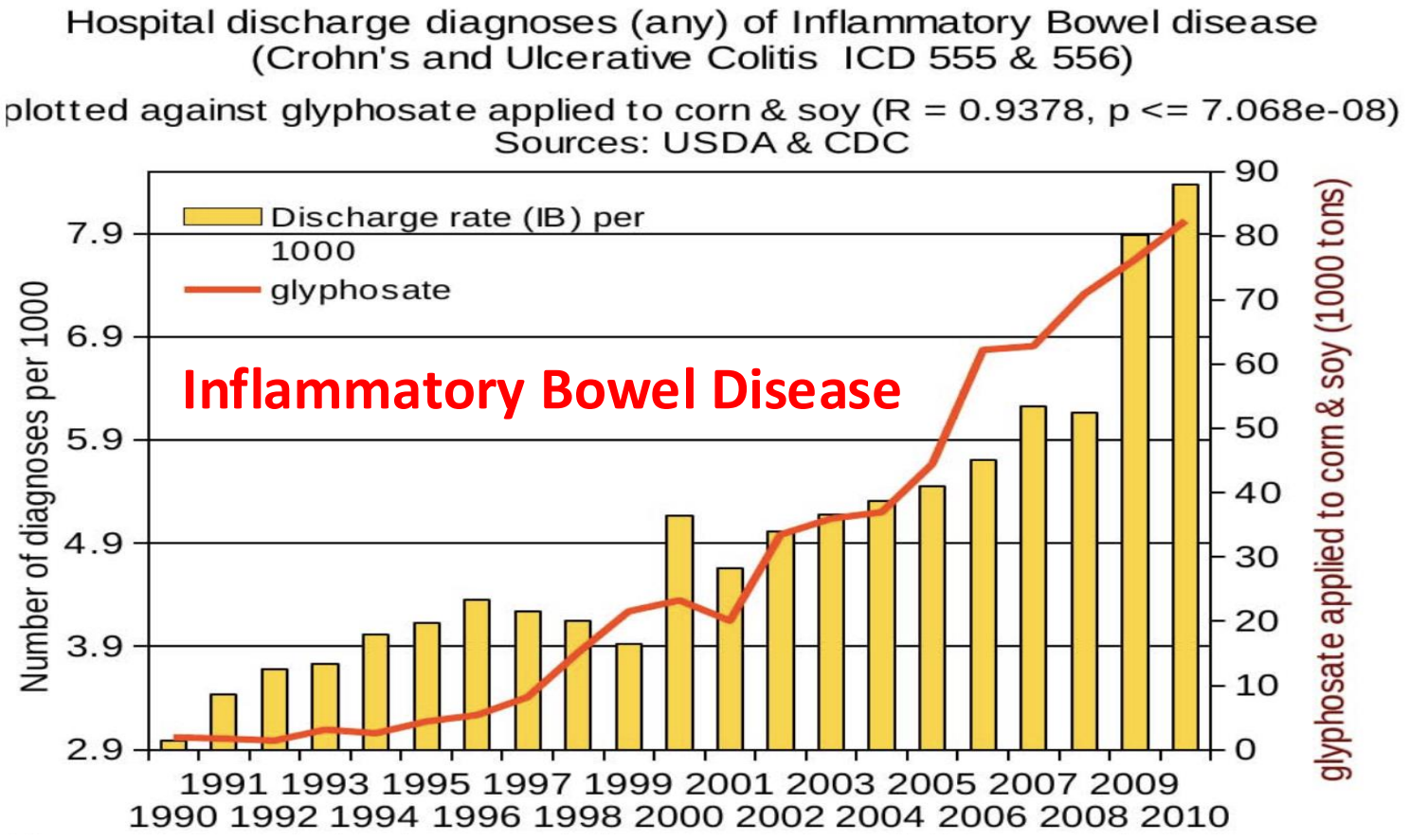
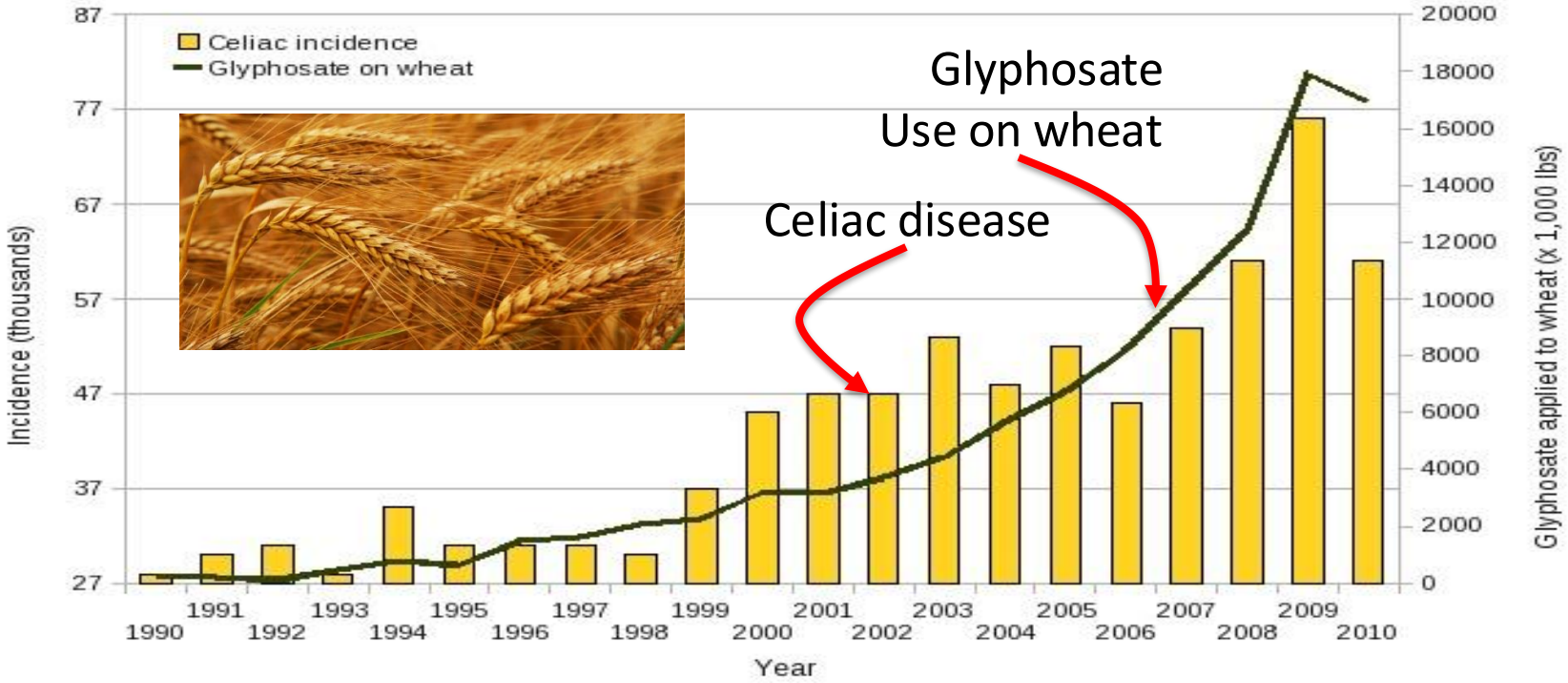


*Figure 20, NL Swanson et al. Journal of Organic Systems 9(2), 2014, p. 25.

Glyphosate and Celiac Disease*



*Samsel and Seneff, Interdiscip Toxicol. 2013;**6**(4): 159–184.

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

*A Samsel and S Seneff. J Biol Phys Chem 2017;17:8-32

** JJ Gildea et al. J Clin Nutr Diet. 2017, 3:1.

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****

*A.A. Shehata et al., Curr Microbiol. 2013 Apr;66(4):350-8.

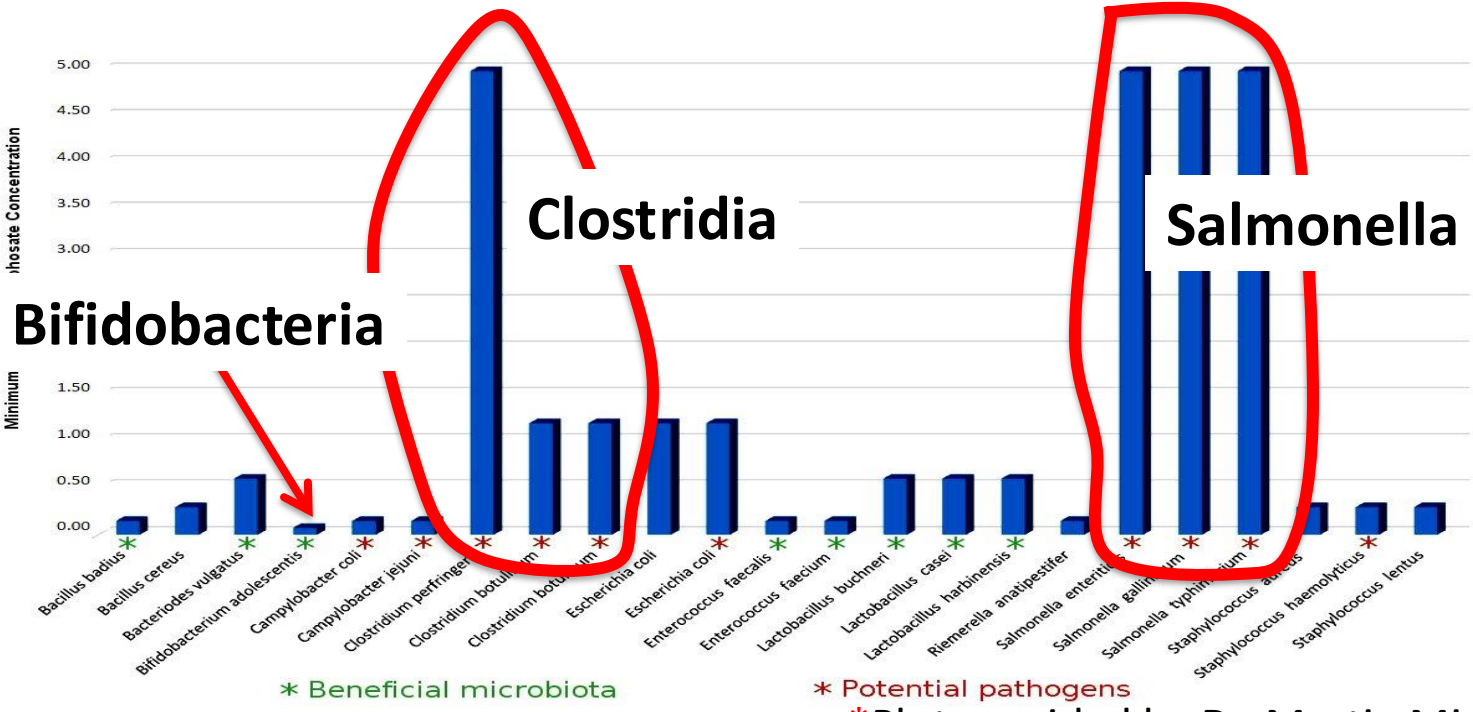
** M. Velasquez-Manoff, NY Times Sunday Review, Feb. 23, 2013.

*** C. Catassi et all, JAMA. 2002 Mar 20;287(11):1413-9.

****M. Eriksson et al., Int J Cancer. 2008 Oct 1;123(7):1657-63.

Pathogen Overgrowth in Poultry Microbes Exposed to Glyphosate*

Shehata AA, Schrödl W, Aldin AA, Hafez HM, Krüger M. The effect of glyphosate on potential pathogens and beneficial members of poultry microbiota in vitro. Curr Microbiol. 2013 Apr;66(4):350-8.



*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

CASE REPORT

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

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

Contents lists available at ScienceDirect

Neurotoxicology 2019; 75:1-8.

journal homepage: www.elsevier.com/locate/neuro

Full Length Article

Gut microbiota and neurological effects of glyphosate

Lola Rueda-Ruzafa[a], Francisco Cruz[b], Pablo Roman[c,d,e,*], Diana Cardona[c,e,f]

"In this work, we state a possible link between Gly-induced dysbiosis and cognitive and motor aggravations in neurodegenerative and neurodevelopmental pathologies, such as autism spectrum disorder (ASD). Hence, we review the negative impact that Gly-induced dysbiosis may have on depression/anxiety, autism, Alzheimer's and Parkinson's diseases."

Recapitulation

- Glyphosate contamination in digestive enzymes makes them defective
  - Undigested proteins induce leaky gut barrier and inflammatory bowel disease
- 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
- Gut-brain axis leads to neurological disease following gut dysbiosis

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

Zen Honeycutt

WE CAN DO BETTER!

HOW?

Reduce exposure to toxins!

Take steps in 5 areas restore health to your family.

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

Tony Mitra: Canadian Activist

Imported lentils laced with weed killer

S.N.V. SUDHIR I DC
VIJAYAWADA, JULY 18

Indians are consuming highly toxic lentils (masoor dal) and moong dal that are imported from Canada and Australia respectively. The lentils and moong dal are induced with the herbicide Glyphosate, that is being used by Canadian and Australian farmers indiscriminately to clear weeds.

Tests conducted by the Canadian Food Inspection Agency (CFIA) on thousands of samples of these lentils and moong dal grown by farmers in Canada and Australia found an average 282 parts per billion (PPB) and 1,000 parts per billion of glyphosate respectively, which is extremely high on any standards.

Some lentils that were imported from India by some Canadian restaurants showed 25 parts per billion of glyphosate. India has been traditionally the biggest producer and consumer of pulses.

Recently, it has also become a huge importer of pulses.

On an average, India has been importing 5 to 7 million tonnes of pulses annually. Almost half this quantity is imported from Canada and Australia and the rest from Myanmar, Ukraine, Russia and some African countries.

Glyphosate is known to be highly toxic and harmful to health. It can adversely affect immunity to serious diseases and the absorption of mineral and vitamin nutrients, apart from disrupting protein-related functions.

"India appears to import a lot of pulses from Canada, Australia and Myanmar. I have seen test records of Canadian grown pulses which are all desiccated by glyphosate. I also have seen results of test on Australian moong dal (known as moong beans in Canada) as tested by the CFIA which also had over 1,000 parts per billion of glyphosate," Indian-born Canadian food security activist Tony Mitra, who made the CFIA test on these pulses for Glyphosate told this newspaper.

"India is also importing these pulses. Consumers do not seem to know if or when they are buying Canadian lentils or lentils mixed with local produce, and how much glyphosate is in their dal. Canadians do not consume these pulses which are grown to be exported to other countries, especially India. In Canada, in one of the provinces, some millions of acres of land is being used to grow pulses only to be exported to India," Mr Mitra said.

He added that 87 per cent of Canadian lentils were contaminated and the average level of contamination was 282 parts per billion. Only 40 per cent of Indian samples were contaminated while the average was 25 parts per billion.

Food safety activists said every imported agriculture commodity needed to be tested for chemical residues but this was being ignored here.

"While it is mandatory to label organic products, imported pulses are not labelled. It's very difficult to find out if we are consuming Canadian pulses or locally grown ones, if they are sold in loose. In some supermarkets, they label the country of origin where we will have a choice whether to buy the packet or not," said Dr G.V. Ramanjaneyulu, agricultural scientist and founder of Centre for Sustainable Agriculture.

" At the entry points, these imported pulses are not being checked for glyphosate residue due to which pulses induced the highly toxic chemical from other countries are making their way into India and ultimately into the stomachs of Indians," he said.

Farmers warned against using glyphosate without proper gear

DC CORRESPONDENT
VIJAYAWADA, JULY 18

Food safety and agricultural scientists are warning that the use of glyphosate may prove lethal. They are citing the example of Sri Lanka, where many sugarcane farmers died due to renal failure after being overexposed to the herbicide.

Glyphosate is a popular herbicide among farmers in the Telugu speaking states. Glyphosate is officially allowed to be used in only tea gardens, but is available across the country under various names and brands."While farmers have to wear astronaut suit kind of gear while using glyphosate, it's not the case in countries such as India and Sri Lanka, said Mr Tony Mitra, Indian born Canadian food security activist.

ACTIVIST FORCES CANADA TO TEST FOOD SAMPLES

DC CORRESPONDENT
VIJAYAWADA, JULY 18

An India-born Canadian citizen, Mr Tony Mitra, has made the Canadian government test food samples for glyphosate, a dangerous herbicide. It took years of effort for Mr Mitra, a retired marine engineer and has turned food security activist, before the Canadian government agreed.

The testing revealed that pulses that are imported to India from Canada and Australia are highly toxic. "It took almost five years to make the Canada government test food items and agri products imported from outside for glyphosate."

He said the CFAI had collected thousands of samples and the results were shocking. "That is how I came to know that extremely toxic pulses, grown in Canada and Australia, are being imported by India," Mr Mitra said.

He said the people in India need to find ways to force their government to initiate broad-based testing of food. "This is the only way Indian consumers will know how much of glyphosate they are consuming daily from their food," he said.

Tony Mitra speaking to crowds of Indian Farmers and Villagers

North Dinajpur in Northern Bengal, India.

Villagers in Bankura, West Bengal, India

Local Activism*

Photo: Beth Nakamura For The Intercept

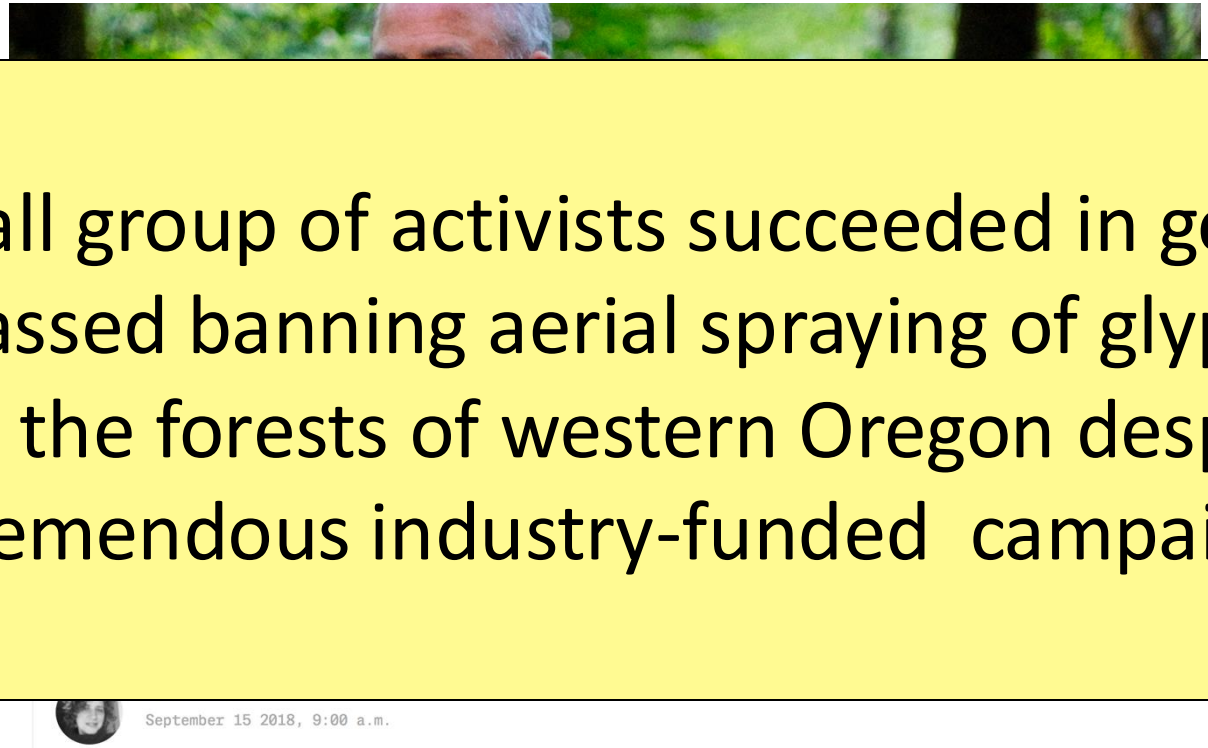
HOW A RAGTAG GROUP OF OREGON LOCALS TOOK ON THE BIGGEST CHEMICAL COMPANIES IN WORLD — AND WON

Sharon Lerner

September 15 2018, 9:00 a.m.

*https://theintercept.com/2018/09/15/oregon-pesticides-aerial-spray-ban/

Local Activism*



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

*https://theintercept.com/2018/09/15/oregon-pesticides-aerial-spray-ban/

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**

*Prof. Geoffrey Norris.https://jacquithurlowlippisch.com/tag/is-sugarcane-field-glyphosate-feeding-lake-os-blue-green-algae-blloms

**D Drzyzga et al. Environ Microbiol 2017 Mar;19(3):1065-1076

Cyanobacteria Feed Red Tide Algae

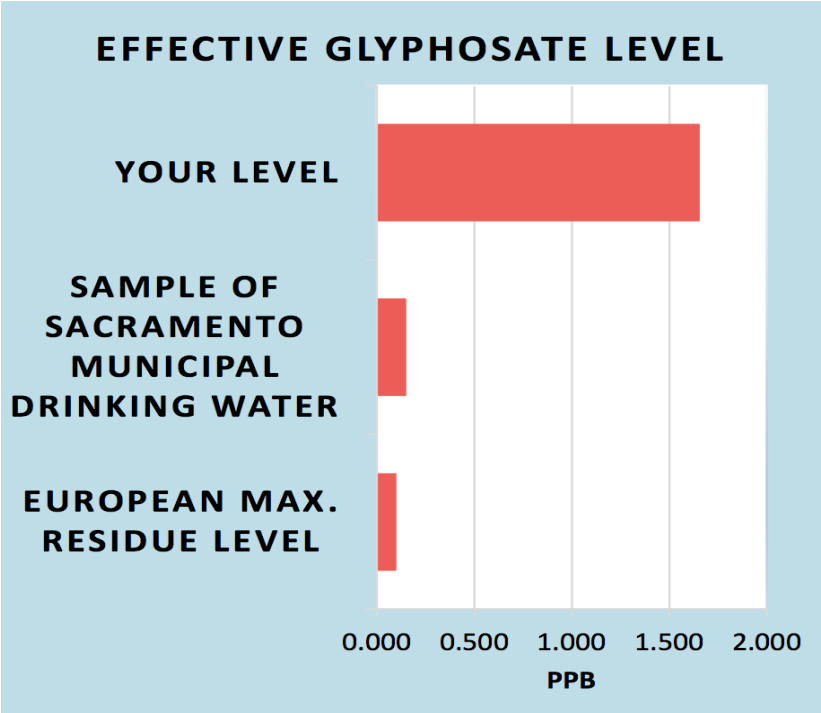
"Both the coastal red tide and the inland blue-green algae have beset South Florida through the summer, killing vast numbers of fish and other wildlife, including dozens of dolphins, manatees, sea turtles, sharks and eels." *

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

*https://www.nbcnews.com/news/us-news/toxic-red-tide-florida-researchers-investigate-what-s-making-it-n900771

**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_for_glyphosate_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."

*http://citrusindustry.net/2018/09/05/how-to-handle-glyphosate-related-fruit-drop/

Concerns about Glyphosate and Citrus*

Chief among these concerns are:

- Increased crop sensitivity to diseases
- Reduced availability of micronutrients to
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Moms Across America founder Zen Honeycutt has found glyphosate in multiple samples of orange juice produced from Florida orange groves

"A
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concern over the years."

*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

https://www.theguardian.com/environment/2017/oct/18/warning-of-ecological-armageddon-after-dramatic-plunge-in-insect-numbers

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

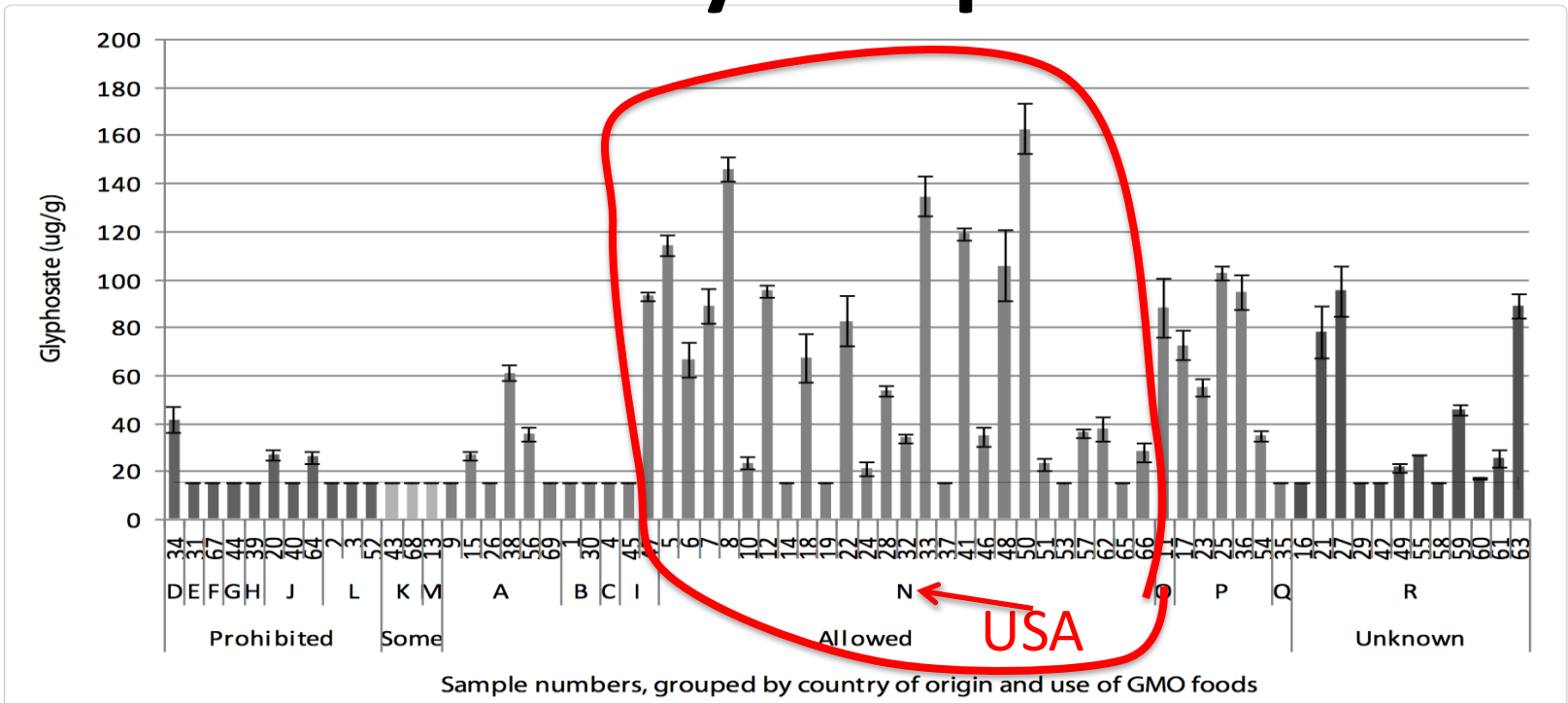
*personal communication

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*



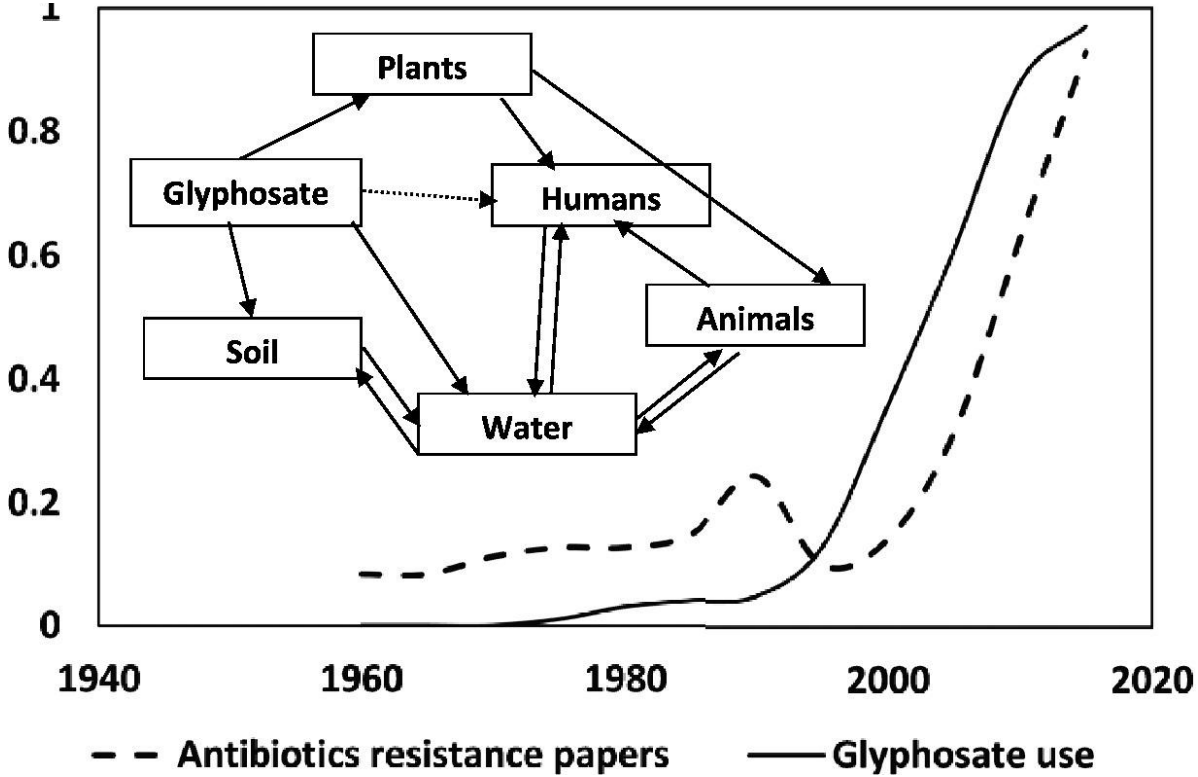
*F Rubio et al., J Environ Anal Toxicol 2014, 5:1

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

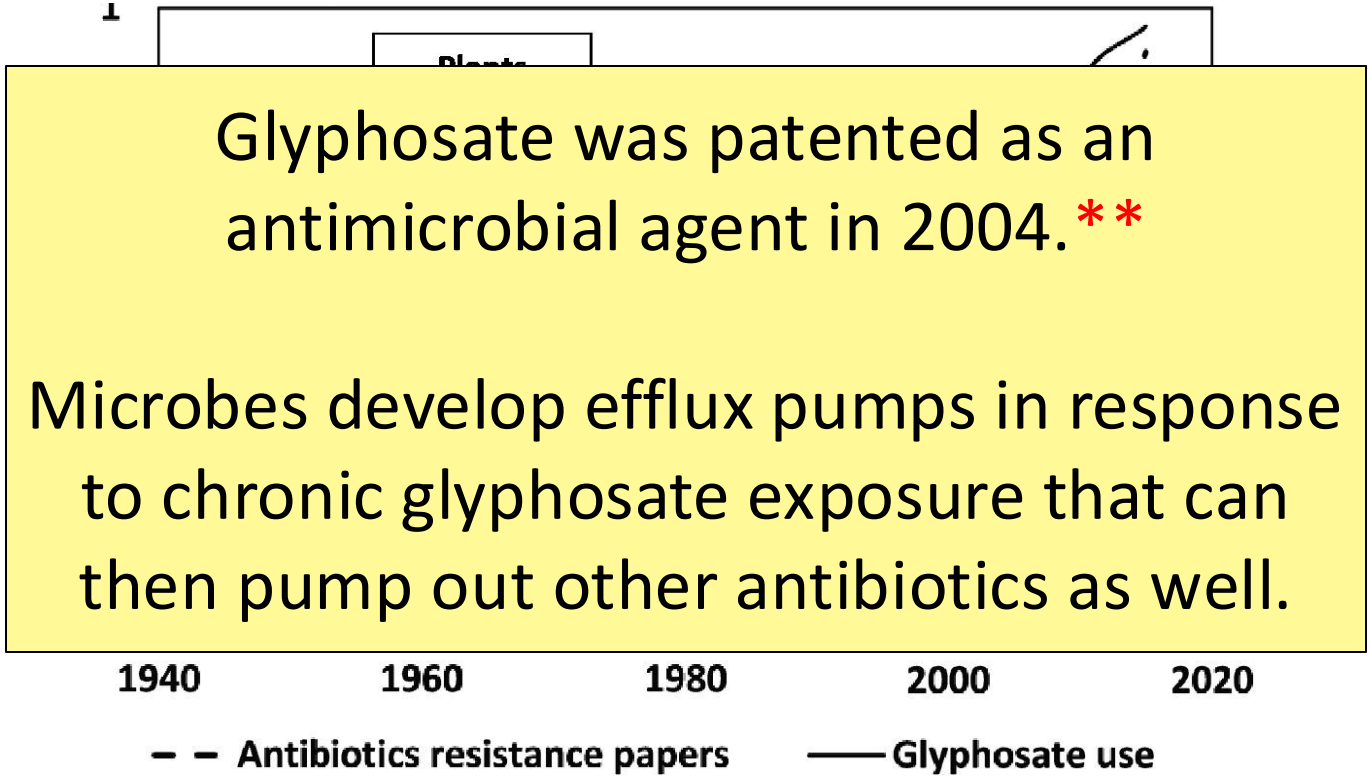
*sustainablepulse.com/2017/02/04/farmers-losing-midwest-superweeds-fight-as-glyphosate-resistance-reaches-over-75/#

Antibiotic Resistance and Glyphosate*



*AHC Van Bruggen et al. Sci Total Environ 2017; 616–617: 255–268.

Antibiotic Resistance and Glyphosate*



**U.S. patent number 20040077608 A1, filed: August 29, 2003; awarded: April 22, 2004

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

JR Bollinger

*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.

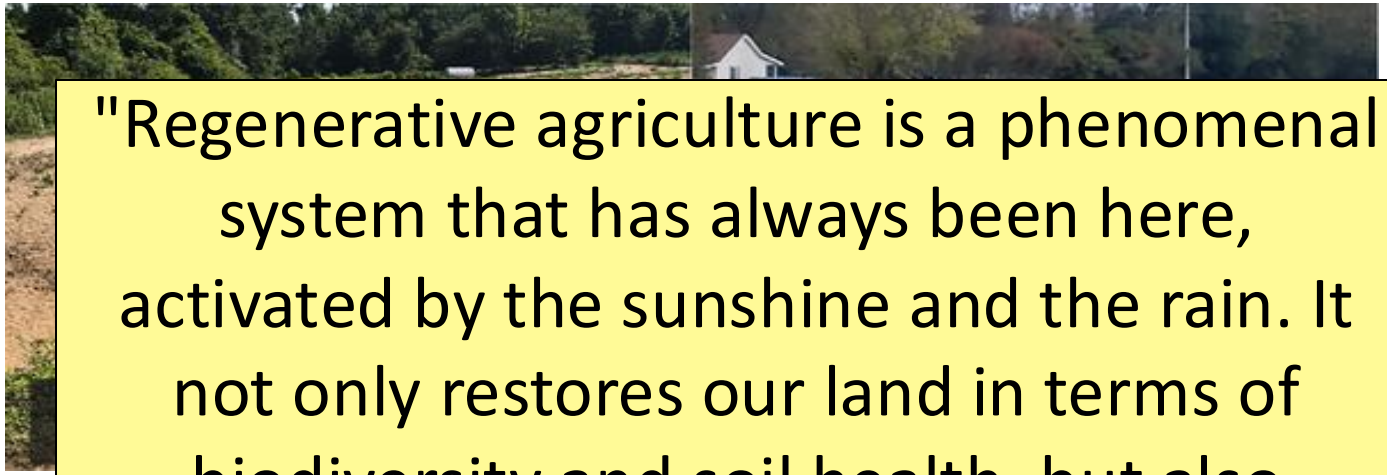
*http://www.rutlandherald.com/articles/using-soil-to-fight-climate-change/

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

*https://joyce-farms.com/blogs/news/joyce-farms-regenerative-agriculture-program-an-introduction

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."

- The Go
- The mo
- Use adaptive high stock density (AHSD) grazing, the way the bison did it

*https://joyce-farms.com/blogs/news/joyce-farms-regenerative-agriculture-program-an-introduction

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.

*Gabe Brown. Dirt to Soil. Chelsea green Oct. 11, 2018.

- Gabe Brown inher… father-in-law that grew wheat, oats …
  - His crop failed … ars
  - He let it lie fallo…
  - The soil improv… ed to appear
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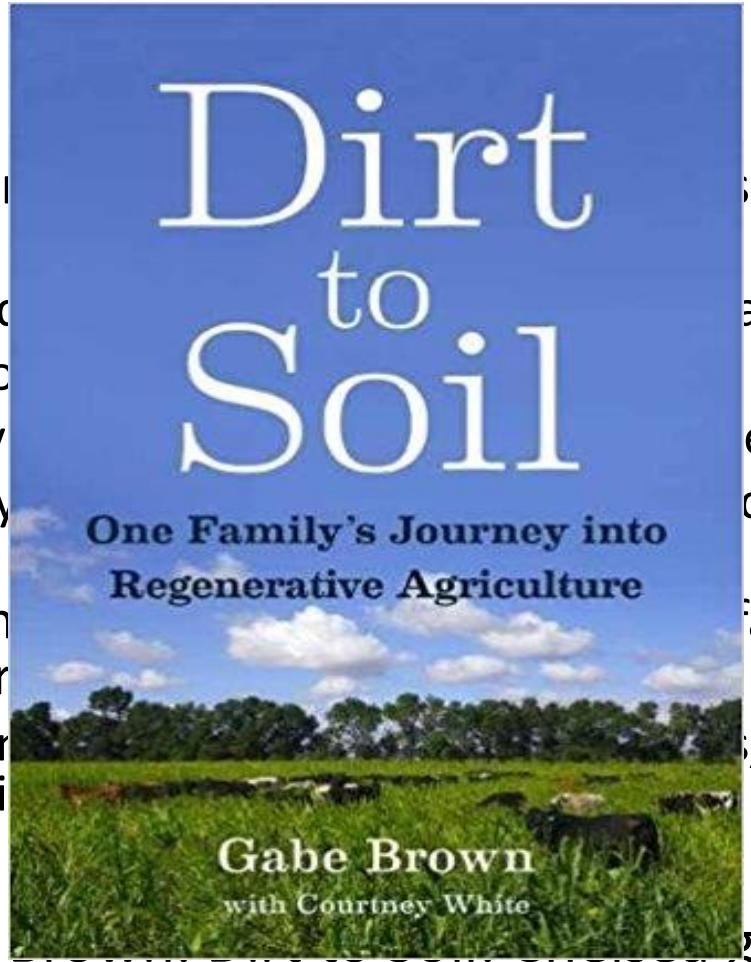
  - Profitable organ… , broilers, pigs, honey, vegetables, frui…



*Gabe … green Oct. 11, 2018.

Small Organic Farms are the Answer

Bluebird Hill Organic Farm, North Carolina

How to Safeguard Yourself and Your Family

Go Organic!


ORGANIC
CHIPS
Gluten-Free
Stone Ground
RAPUNZEL
ORGANIC CORN STARCH
ORGANIC
CORN
STARCH
ORGANIC SHOYU
NATURALLY BREWED SOY SAUCE
PASTURE-RAISED
Organic
HALF & HALF
Pasture-Raised
ORGANIC VALLEY
FARMER-OWNED
Organic
HALF & HALF
PINT
Ultra Pasteurized
Organic Sweet Cream
ORGANIC VALLEY
Salted Butter
FARMER-OWNED

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*

*TP Prasai et al. PLoS ONE 11(4): e0154061.

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*

*articles.mercola.com/sites/articles/archive/2014/09/21/hilary-boynton-mary-brackett-gaps-cookbook-interview.aspx

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

Thank You for Listening!