

Organic 3.0 to Regenerative Agriculture

**The connection between
regenerative agriculture and
organic/sustainable food system
approaches**



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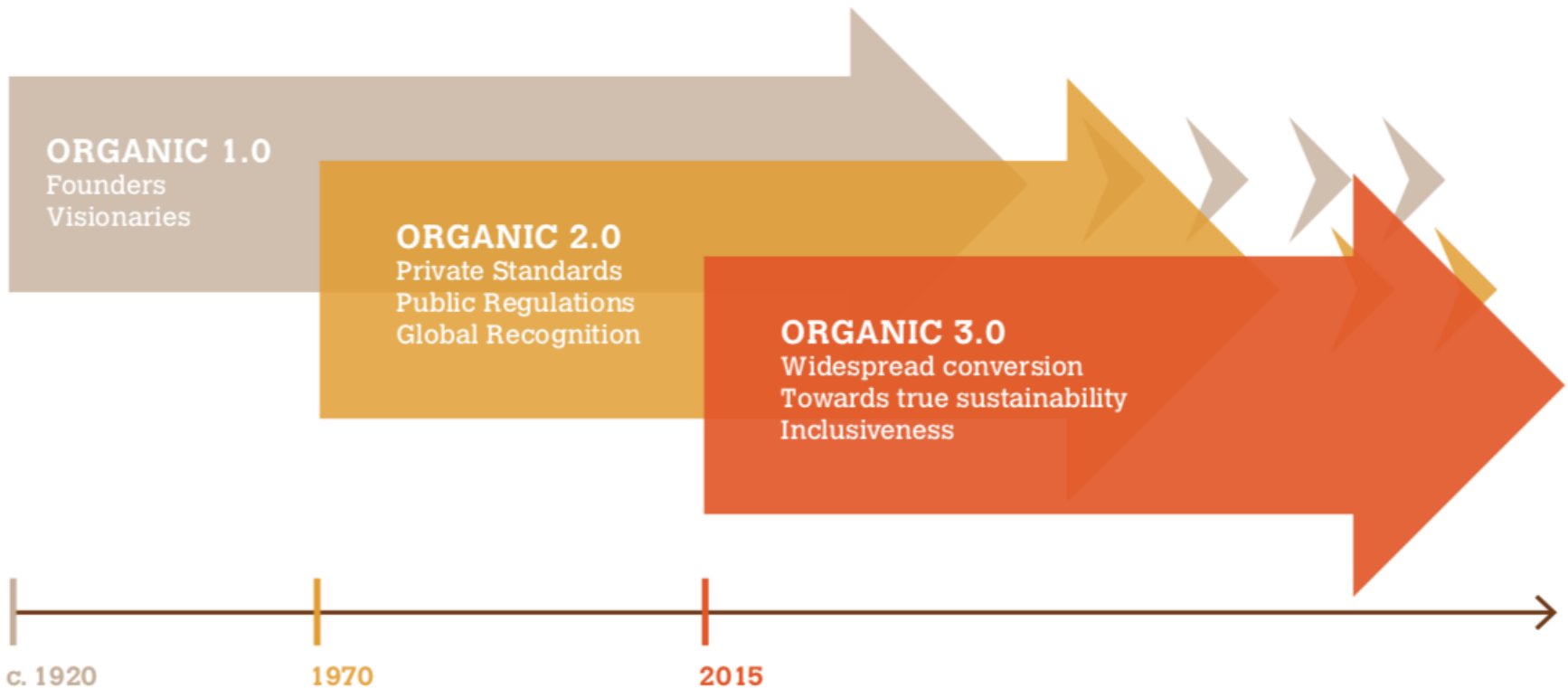
Goesan, Korea

September 19, 2019

What is Organic 3.0?

The third phase of the global organic movement

FIGURE 1 | Widespread Conversion Development Towards True Sustainability Inclusiveness



Organic 3.0



The strategy for Organic 3.0 includes six main features

- 4. Inclusiveness of wider sustainability interests, through alliances with the many movements and organizations that have complementary approaches to truly sustainable food and farming.**

Regenerative Agriculture



History of Regenerative Agriculture

The regenerative agriculture movement has come from from the organic movement

The term **Organic Agriculture** was popularized by J.I. Rodale in the 1940s by his magazine '**Organic Farming and Gardening**'

Rodale used '**organic**' to promote the growing and recycling of organic matter as advocated by Sir Albert Howard's book '**An Agricultural Testament**'

Howard learnt about these agricultural methods from Indian farmers

In the 1980s Robert Rodale, the son of organic pioneer, J.I. Rodale's, used the term **Regenerative Organic Agriculture** to promote farming practices that **go beyond sustainable**

Regenerative Agriculture



Sustainable is defined as maintaining resources and the environment without degrading them

However in an already degraded system, it is necessary to do more than just sustain it - we need to improve it

Rodale observed that when an ecosystem is disturbed, it will naturally regenerate when the disturbance is stopped

Consequently regenerative agriculture not only maintains resources, it improves them

Regenerative Agriculture



Regenerative Agriculture is now being used as an **umbrella term** for the many farming systems that use techniques such as longer rotations, cover crops, green manures, legumes, compost, organic fertilizers

Includes: **organic agriculture**, agro forestry, **agroecology**, permaculture, **holistic grazing**, sylvopasture, syntropic farming and other **agricultural systems that can increase soil organic matter/carbon**.



REGENERATION INTERNATIONAL

COOL THE PLANET. FEED THE WORLD.

Regeneration International was conceived at the New York Climate Change meeting in 2014

OUR VISION

A healthy global ecosystem in which practitioners of regenerative agriculture and land-use, in concert with consumers, educators, business leaders and policymakers, cool the planet, feed the world and restore public health, prosperity and peace on a global scale.



Global Epidemic of non-communicable chronic diseases



World Health Organization (WHO)

“Non-communicable diseases (NCDs), such as heart disease, stroke, cancer, chronic respiratory diseases and diabetes, are the leading cause of mortality in the world. This invisible epidemic is an under-appreciated cause of poverty and hinders the economic development of many countries. The burden is growing - the number of people, families and communities afflicted is increasing.”

Global Epidemic of non-communicable chronic diseases



- You cannot catch these diseases from other people
You will not get cancer, stroke, heart disease, auto-immune diseases, Alzheimer's, hormone disruption, metabolic disease, ADHD, bipolar, autism or diabetes from sitting next to people with these diseases

The multiple causes are environmental and lifestyle

This means that **we can prevent them** by changing our habits, food, etc. to avoid the environmental exposures that cause them

Pesticides and chemicals are strongly implicated

The Drivers of Market Growth of sustainable food systems



- All surveys show that ***Health*** is the main driver for purchasing organic and ‘sustainable/eco label’ foods – rather than environment, taste etc.
- Avoiding ***Pesticides*** followed by food additives, synthetic chemicals and GMOs are the main health concerns – rather than nutrition

The Drivers of Market Growth of sustainable food systems



- The authorities say that the pesticide residues in food are safe
- Therefore there is no need or value in purchasing and eating organic food
- This needs to be critically examined

The Myths of Safe Pesticides



MYTH 1: Rigorously Tested “All agriculture poisons are scientifically tested to ensure safe use”

- Most pesticide formulations sold on the market are deemed safe on the basis of just testing one of the ingredients without testing the whole formulation.
- It is a data-free assumption to assume there is no difference in toxicity between the active ingredient and the whole formulation
- It also defies scientific credibility when these ‘inerts’ are added as synergists and adjuvants to make the active ingredient kill more effectively and then assume that they are not more toxic.
- The limited scientific testing of formulated pesticide products shows that they can be hundreds of times more toxic to humans than the pure single active ingredient.

The Myths of Safe Pesticides



MYTH 1: Rigorously Tested “All agriculture poisons are scientifically tested to ensure safe use”

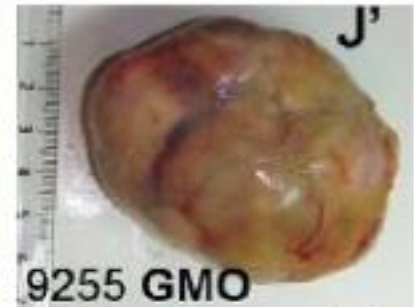
- There is some testing for acute toxicity for formulated pesticides – the amount that will kill in two weeks from exposure
- The 1400 registered agricultural and veterinary products sold in the USA and 7200 in Australia – the products used on our food – have:
- **no testing for children’s health**, reproductive effects, birth defects, cancer, developmental neurotoxicity, epigenetic mutations and hormone, immune and metabolic systems disruptions
- and numerous other issues that could be caused by the whole formulation

The Myths of Safe Pesticides

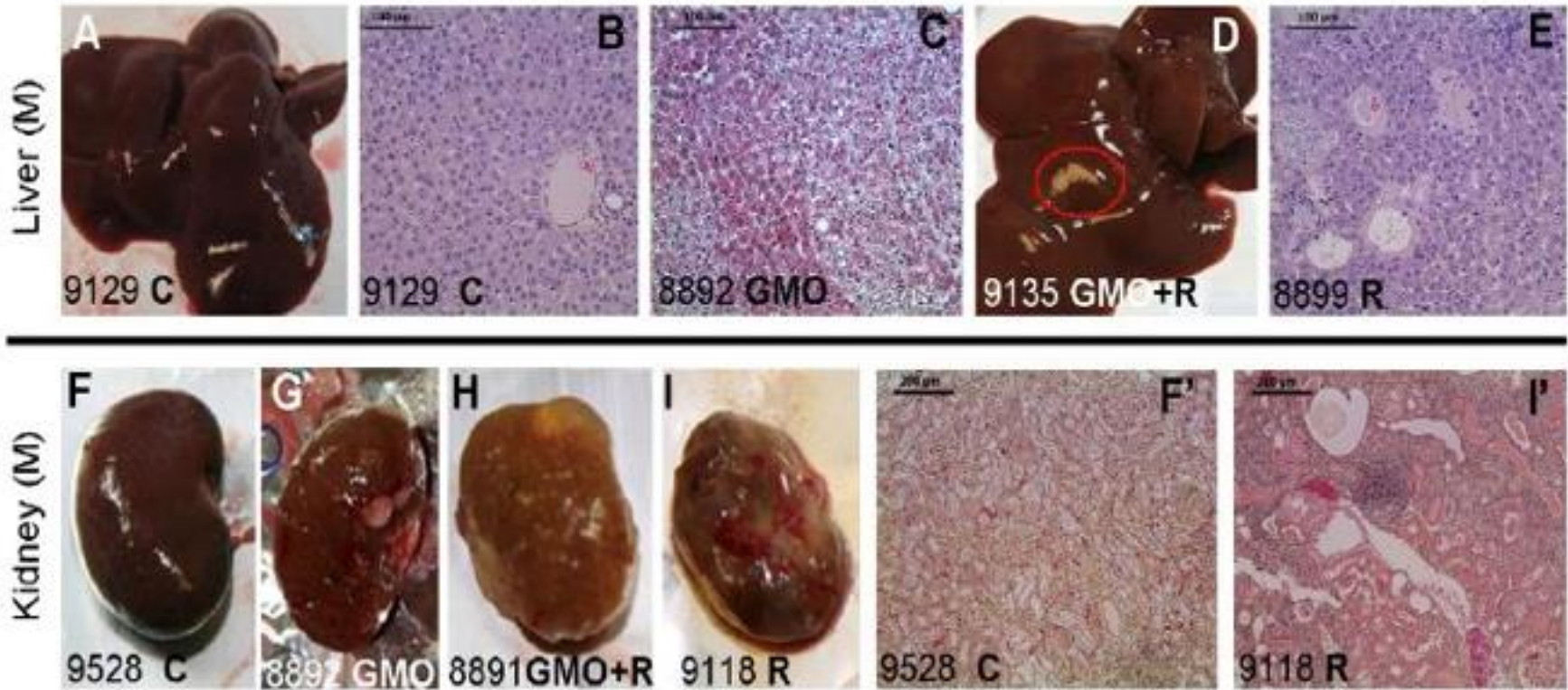


The only published peer reviewed life time study of a formulated pesticide (Roundup)

Mammary and other tumors, liver and kidney damage caused by regular exposure to small amounts of Roundup – similar to the normal exposures people get from food!



Roundup and/or GM Maize



Damage to Livers and Kidneys

The Myths of Safe Pesticides



MYTH 1: Rigorously Tested “All agriculture poisons are scientifically tested to ensure safe use”

- Multiple pesticides (insecticides, herbicides, fungicides) are approved for each crop
- Many foods have multiple residues
- Most people have multiple residues in their bodies
- No testing of chemical cocktails
- Many mixtures are synergistic $1+1=3$ or much more
- Up to 232 chemicals found in placental cord blood
- It is data-free assumption to assume that there are no additive or synergistic toxic effects from cocktails
- Studies show synergisms of 100s to 1000s percent more toxic

The Myths of Safe Pesticides



MYTH 1: Rigorously Tested “All agriculture poisons are scientifically tested to ensure safe use”

- The special requirements of the fetus, the newborn, and the growing child in relation to developmental neurotoxicity are also subject to data-free assumptions.
- Currently the pesticide testing used in the regulatory approval processes does not specifically test for the risks particular to these age groups.
- Peer reviewed testing shows that these groups are particularly vulnerable to the smallest amounts of pesticides.

The Myths of Safe Pesticides



MYTH 2: Very Small Amount “The residues are too low to cause any problems”

- The smallest amounts of chemical residues can be harmful in parts per billion and trillion.
- One part per trillion = 1 drop in 3 olympic swimming pools of water
- There are hundreds of studies showing that many chemicals can be endocrine disruptors and more toxic at lower doses
- Setting the Acceptable Daily Intake (ADI) on the basis of extrapolating it from testing done at higher doses is a data-free assumption.

The Myths of Safe Pesticides



MYTH 2: Very Small Amount “The residues are too low to cause any problems”

- Many of these chemicals act like estrogen and are strongly implicated in the epidemic of cancers of the sexual tissues - Breast, Ovarian, Cervical, Endometrial, Prostate and Testicular cancers
- They are also implicated in the numerous reproductive problems - endometriosis, ovarian insufficiency, falling sperm counts, abnormal sperm, hypospadias, undescended testes
- These can be caused by the grandparents exposure

The Myths of Safe Pesticides



MYTH 3: Breakdown “Modern pesticides rapidly biodegrade”

- All synthetic pesticides leave residues in food, that is why Maximum Residue Levels (MRL) and Acceptable Daily Intakes (ADI) are set
- Testing shows that the majority of foods and people have multiple pesticide residues
- Lack of testing for the metabolites formed by pesticides as they degrade
- Limited testing shows that many of the metabolites are more toxic and residual than the pesticide itself - 100s percent more!

The Myths of Safe Pesticides



MYTH 4: Reliable Regulatory Authorities “Trust us — we have it all under control”

- Regulatory authorities are ignoring a large body of peer reviewed science showing the harm of caused by pesticides
- Largely base their decisions on unpublished industry, commercial in confidence studies that are hidden from other researchers, public and stakeholders.
- Revolving door: pesticide industry managers get jobs at the regulator where they can approve their former employer’s pesticides
- Revolving door: managers from regulators are offered higher paying positions at pesticide companies
- Representatives and others who get financial benefits from pesticide companies sit on the regulatory committees that approve pesticides

This known as Regulatory Capture - where the regulator protects the industry instead of the public that it is legally required to protect.

The Myths of Safe Pesticides



MYTH 4: Reliable Regulatory Authorities “Trust us — we have it all under control”

- The lack of a transparent system where stakeholders are denied access to the studies and decision about the studies can be seen as a recipe for corruption
- The public has The Right To Know about the studies and decision used to justify poison residues in food.
- The scientific credibility of pesticide regulatory authorities has to be seriously questioned when they are approving the use of pesticides on the basis of data-free assumptions and not on evidence based published peer reviewed science

The Myths of Safe Pesticides



MYTH 4: Reliable Regulatory Authorities “Trust us — we have it all under control”

- Until there a fully open and transparent regulatory system:
- that does not use unpublished, hidden industry studies,
- has no staff or regulatory committee members who are financed by industry,
- ends the revolving door,
- and only uses published peer reviewed studies by independent researchers,
- the current system will continue to be seen as a recipe for corruption

Poisoning our Children



- The special requirements of the fetus, the newborn, and the growing child in relation to developmental neurotoxicity are also subject to data-free assumptions.
- Currently the pesticide testing used in the regulatory approval processes does not specifically test for the risks particular to these age groups.
- Peer reviewed testing shows that these groups are particularly vulnerable to the smallest amounts of pesticides.

Peer reviewed science shows that Pesticide exposure in the fetus and developing children causes:



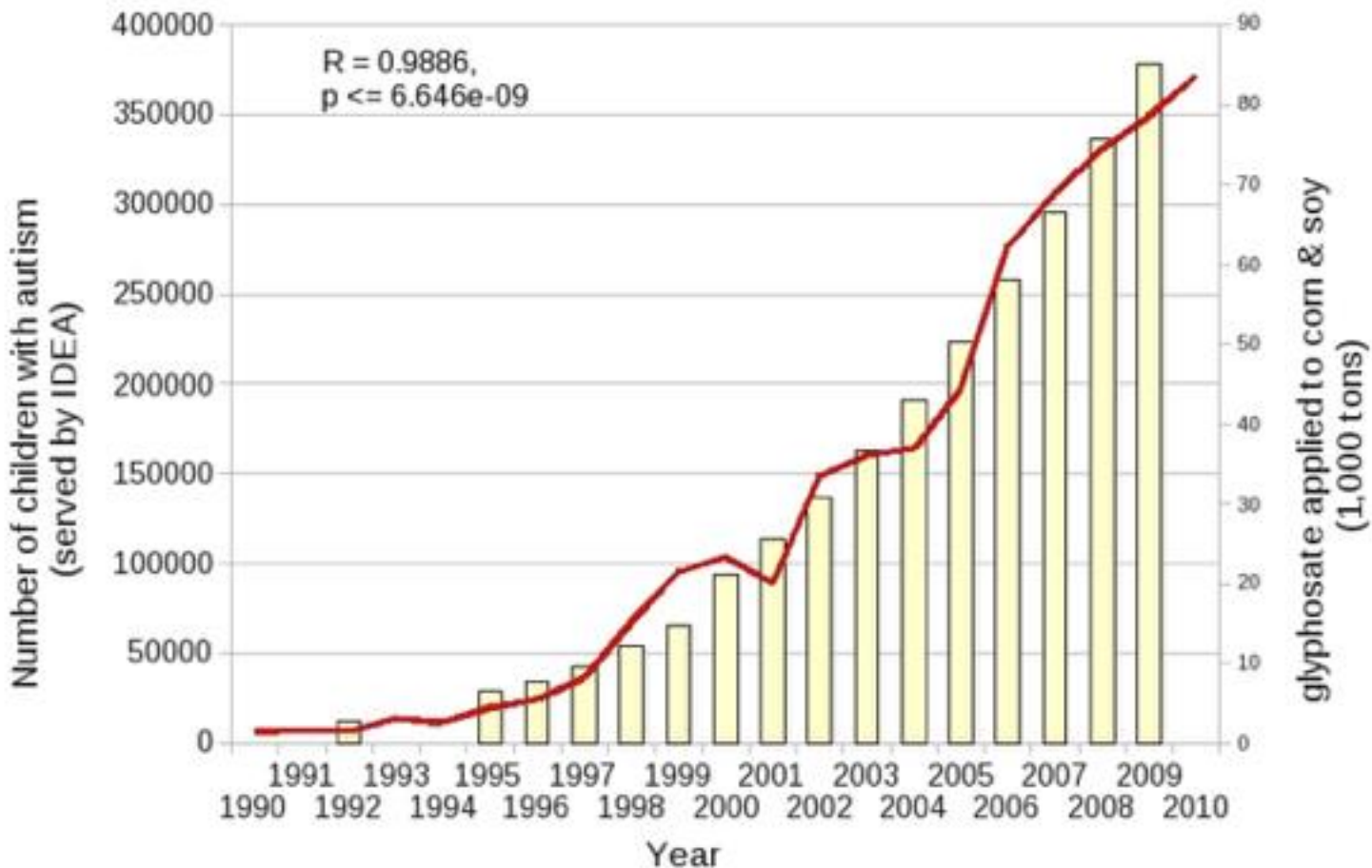
- Lower IQs
- ADHD
- Autism spectrum disorders
- Organ damage – kidney, liver lungs, reproductive tract
- Auto immune diseases – asthma etc
- Lack of physical coordination
- Loss of temper – anger management issues
- Bipolar/schizophrenia spectrum of illnesses
- Depression – child/youth suicide
- Childhood obesity

Poisoning our Children



Number of children (6-21yrs) with autism served by IDEA plotted against glyphosate use on corn & soy

□ # w/ autism
— Glyphosate applied to Corn & Soy



Poisoning our Children



NeuroToxicology 52 (2016) 150–161

Contents lists available at [ScienceDirect](#)

NeuroToxicology



Full length article

Neuronal development and axon growth are altered by glyphosate through a WNT non-canonical signaling pathway

Romina P. Coullery, María E. Ferrari, Silvana B. Rosso*

Experimental Toxicology Laboratory, School of Biochemical and Pharmaceutical Sciences, National University of Rosario, Suipacha 531, S2002LRK Rosario, Argentina

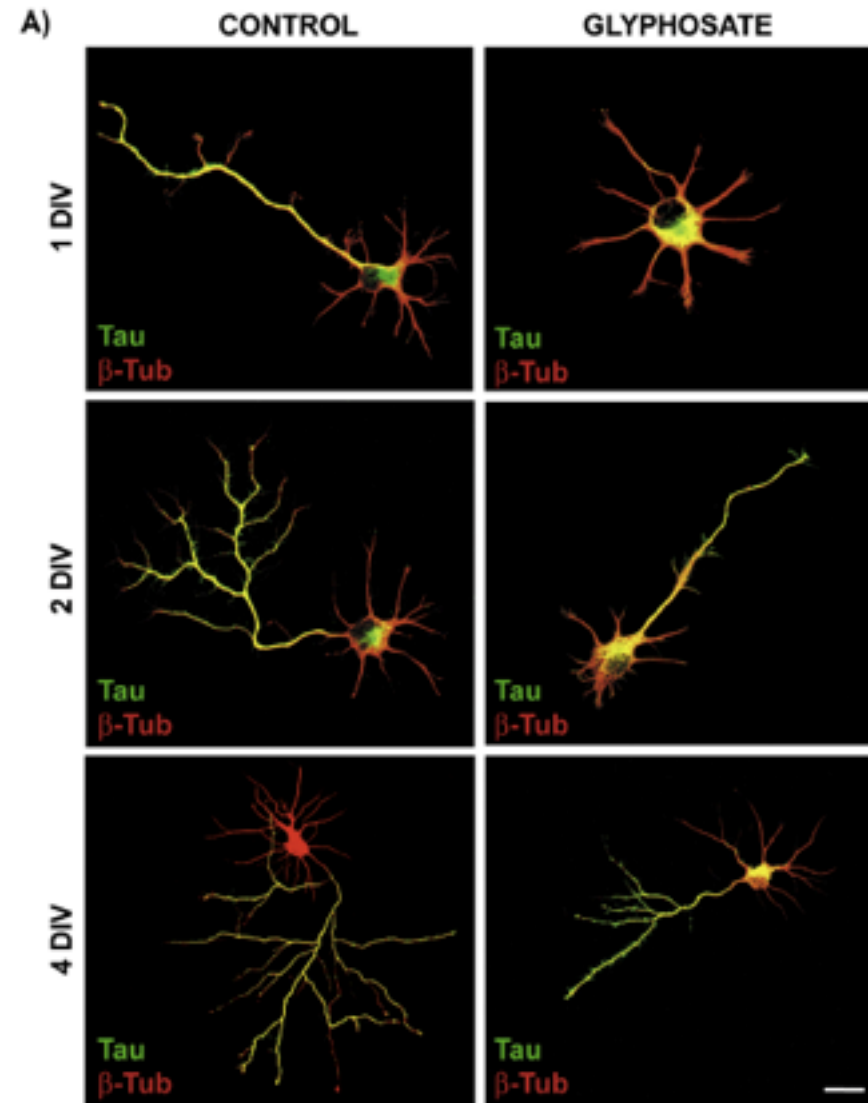
Glyphosate exposed cells had:

- shorter and unbranched axons
- less complex dendritic arbors

Identified the cellular mechanism by which it affects neuronal development

“decrease in both Wnt5a expression and CaMKII activity induced by glyphosate”

“**Glyphosate effect is not reversible**”



Poisoning our Children



The US President's Cancer Panel

80% of cancers are caused environmental toxins,
especially chemicals and pesticides

‘...Leukemia rates are consistently elevated among children who grow up on farms, among children whose parents used pesticides in the home or garden, and among children of pesticide applicators.’

‘Yet over the same period (1975–2006), cancer incidence in U.S. children under 20 years of age has increased.’

Are the current residues in food safe?



International Agency for Research on Cancer



PRESS RELEASE
N° 251

11 April 2017

Latest data show a global increase of 13% in childhood cancer incidence over two decades

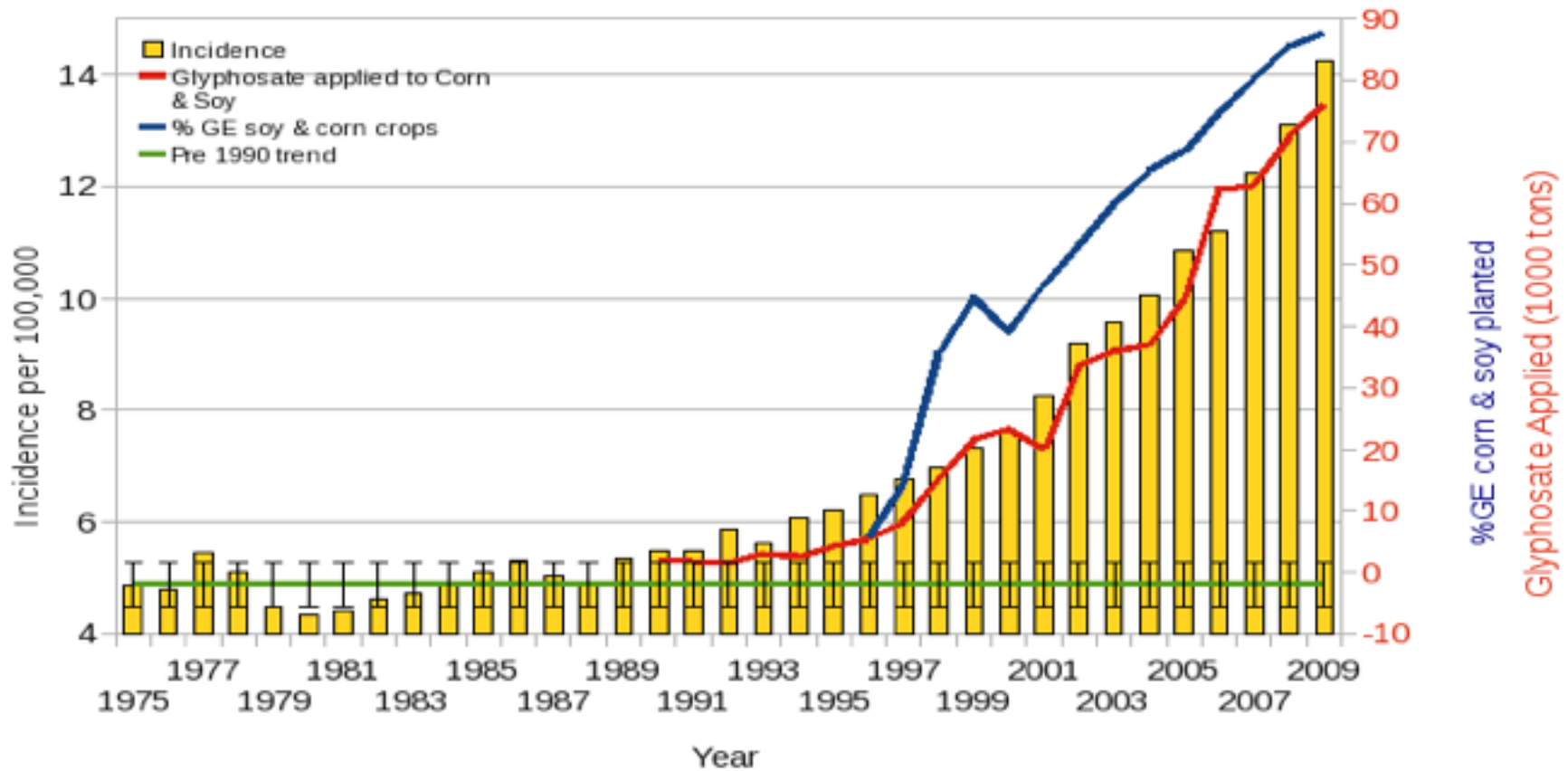
Lyon, France, 11 April 2017 – An international study¹ coordinated by the International Agency for Research on Cancer (IARC) and published today in *The Lancet Oncology* shows that in 2001–2010, childhood cancer was 13% more common than in the 1980s, reaching an annual incidence rate of 140 per

Are the current residues in food safe?



Thyroid Cancer Incidence Rate (age adjusted)

plotted against glyphosate applied to U.S. corn & soy crops ($R = 0.988$, $p \leq 7.612e-09$)
along with %GE corn & soy crops $R = 0.9377$, $p \leq 2.152e-05$
sources: USDA:NASS; SEER



Are the residues in our food safe?



Age Adjusted Urinary/Bladder Cancer Incidence

Plotted against % GE corn and soy ($R = 0.9449$, $p \leq 7.1e-06$)
and glyphosate applied to corn and soy ($R = 0.981$, $p \leq 4.702e-09$)
sources: USDA:NASS; SEER

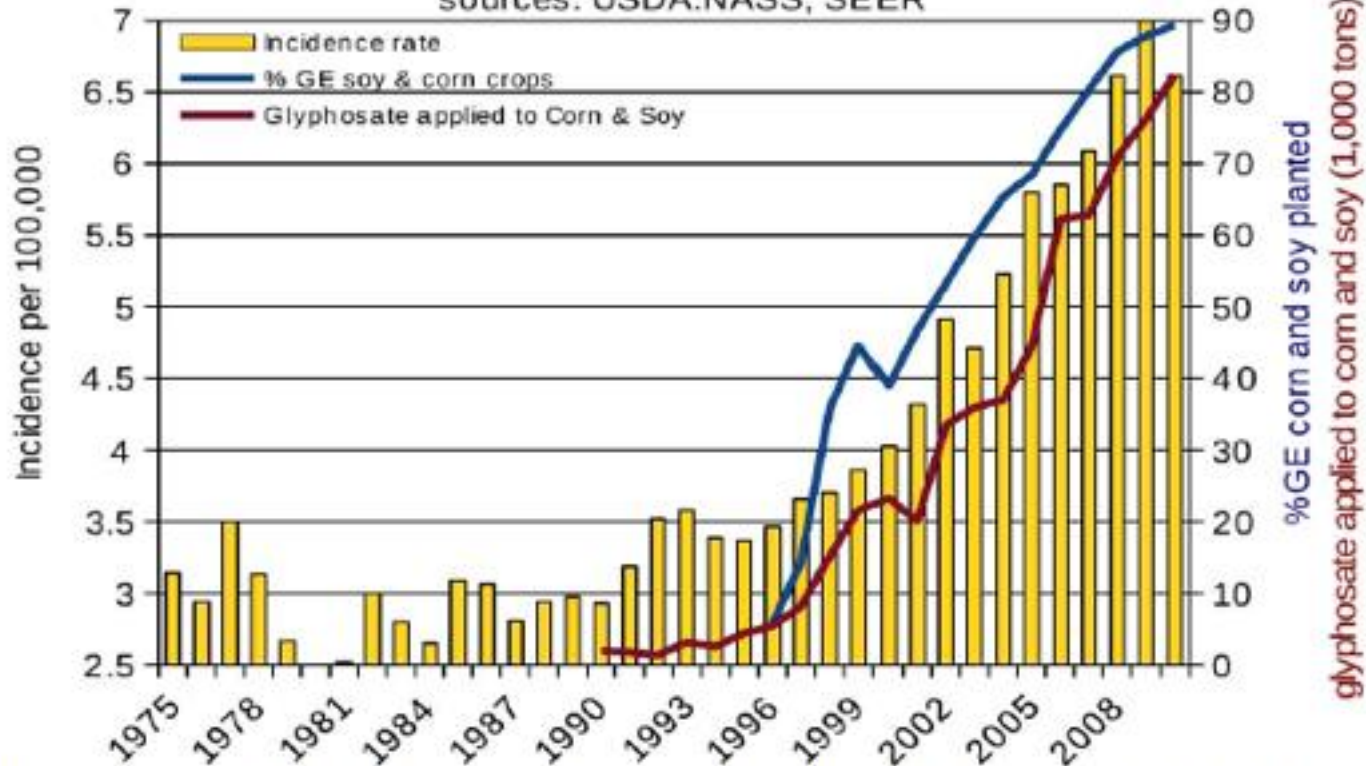
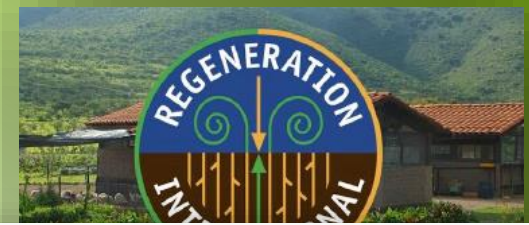


Figure 9. Correlation between age-adjusted bladder/urinary tract cancer and glyphosate applications and percentage of US corn and soy crops that are GE.

Are the current residues in food safe?



IARC MONOGRAPHS – 112

The United Nations World Health Organization's (WHO) International Agency for Research on Cancer (IARC)

Has given Glyphosate the second highest rating for Cancer – 2A

This means it causes cancer in animals and limited evidence of cancer in humans.

6.1 Cancer in humans

[There is *limited evidence* in humans for the carcinogenicity of glyphosate. A positive association has been observed for non-Hodgkin lymphoma.

6.2 Cancer in experimental animals

There is *sufficient evidence* in experimental animals for the carcinogenicity of glyphosate.

6.3 Overall evaluation

Glyphosate is *probably carcinogenic to humans (Group 2A)*.

Children, newborn and the fetus

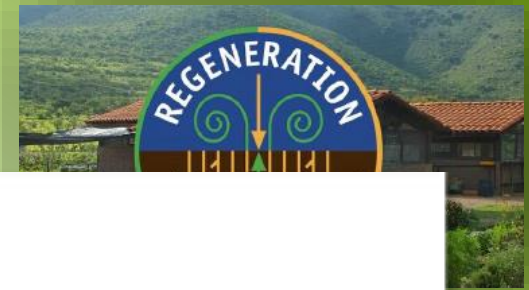


Scientific research shows that pesticides effect the normal development of the nervous system in the fetus and children

The brain is the largest collection of nerve cells

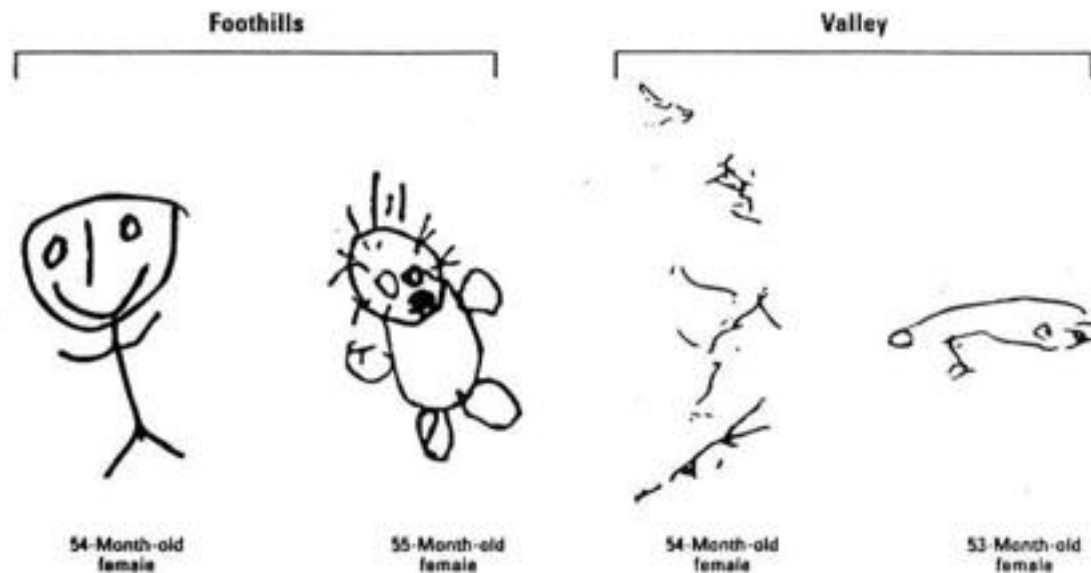
‘These results indicate that chlorpyrifos and other organophosphates such as diazinon have immediate, direct effects on neural cell replication.’ (Qiao 2001)

Children, newborn and the fetus



PESTICIDE EFFECTS ON CHILDREN

Differences in drawing ability at the same age between exposed and unexposed children were astonishing



1. Representative drawings of a person by 4-year-old Yaqui children from the valley and foothills of Sonora, Mexico.

E. A. Guillette et al, "An Anthropological Approach to the Evaluation of Preschool Children Exposed to Pesticides in Mexico," *Environmental Health Perspectives*, 106(6):347-53, June 1998.

Children, newborn and the fetus



- Four studies show that prenatal exposure to organophosphate insecticides (OPs) adversely affects the neurological development of children. (Rauh et al., 2011, Rauh et al., 2012, Bouchard et al., 2011, Engel et al., 2011)
- The studies came up with very similar results.
- This was that fetal exposure to small amounts of OPs will reduce the IQ of children.

Children, newborn and the fetus



- Parents should have considerable concern that the Columbia University study found that there was **no evidence of a minimum level of exposure** in the observed adverse impact on intelligence.
- This means that very low levels of exposure could lead to reductions in a child's intelligence
- **Most people get their exposure from residues in food**

Children, newborn and the fetus



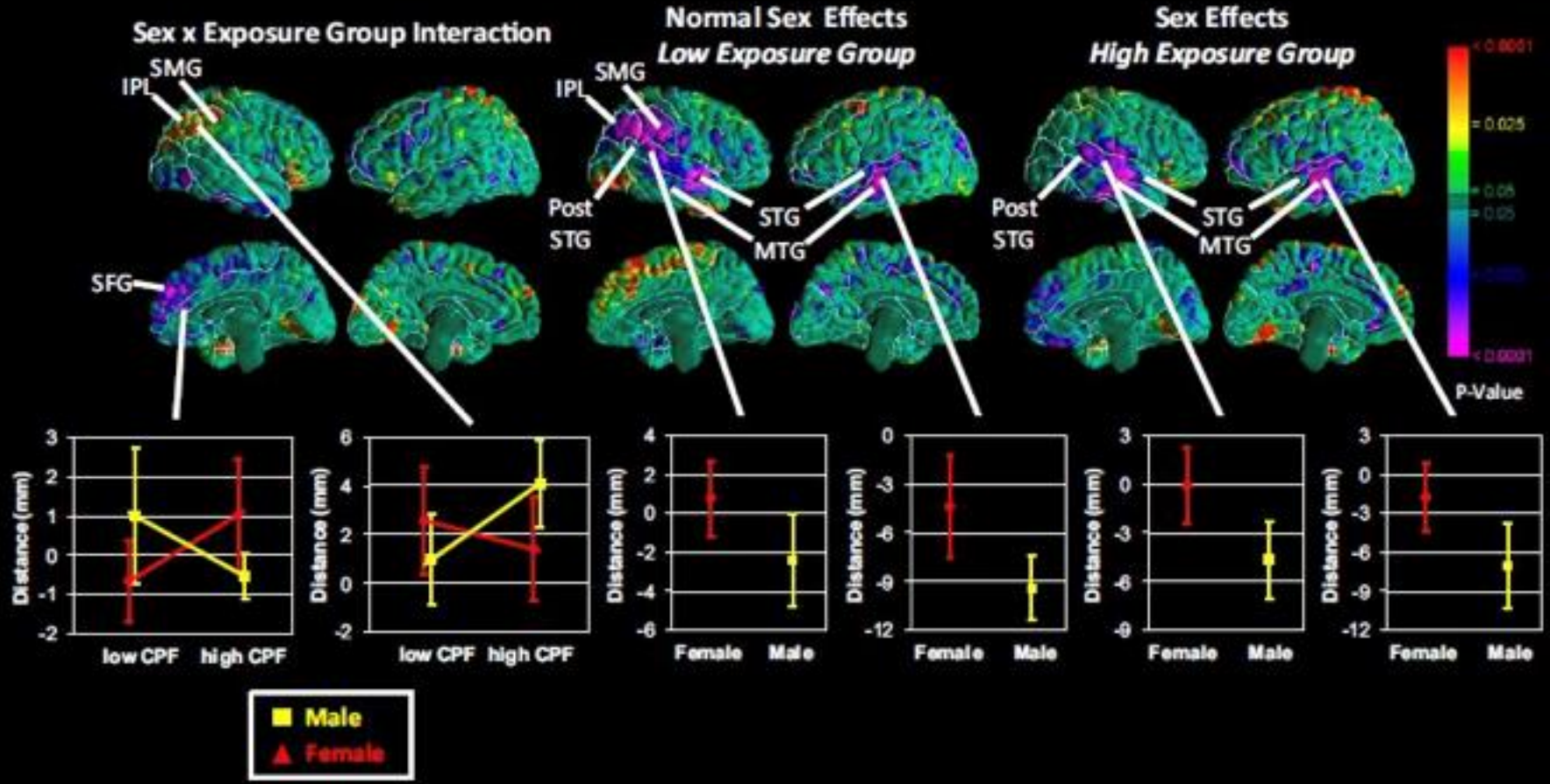
‘Our findings indicate that prenatal CPF [chlorpyrifos] exposure, at levels observed with routine (nonoccupational) use and below the threshold for any signs of acute exposure, has a measurable effect on brain structure in a sample of 40 children 5.9–11.2 y of age.’

‘We found significant abnormalities in morphological measures of the cerebral surface associated with higher prenatal CPF exposure, after adjusting for possible confounders.’ (Rauh et al., 2012)

Children, newborn and the fetus



Effects of CPF Exposure on Sexually Dimorphic Brain Regions



Numerous studies show eating organic food significantly reduces the risks associated with pesticides in children's diets



Contents lists available at [ScienceDirect](#)

Environmental Research

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

Organic diet intervention significantly reduces urinary pesticide levels in U.S. children and adults

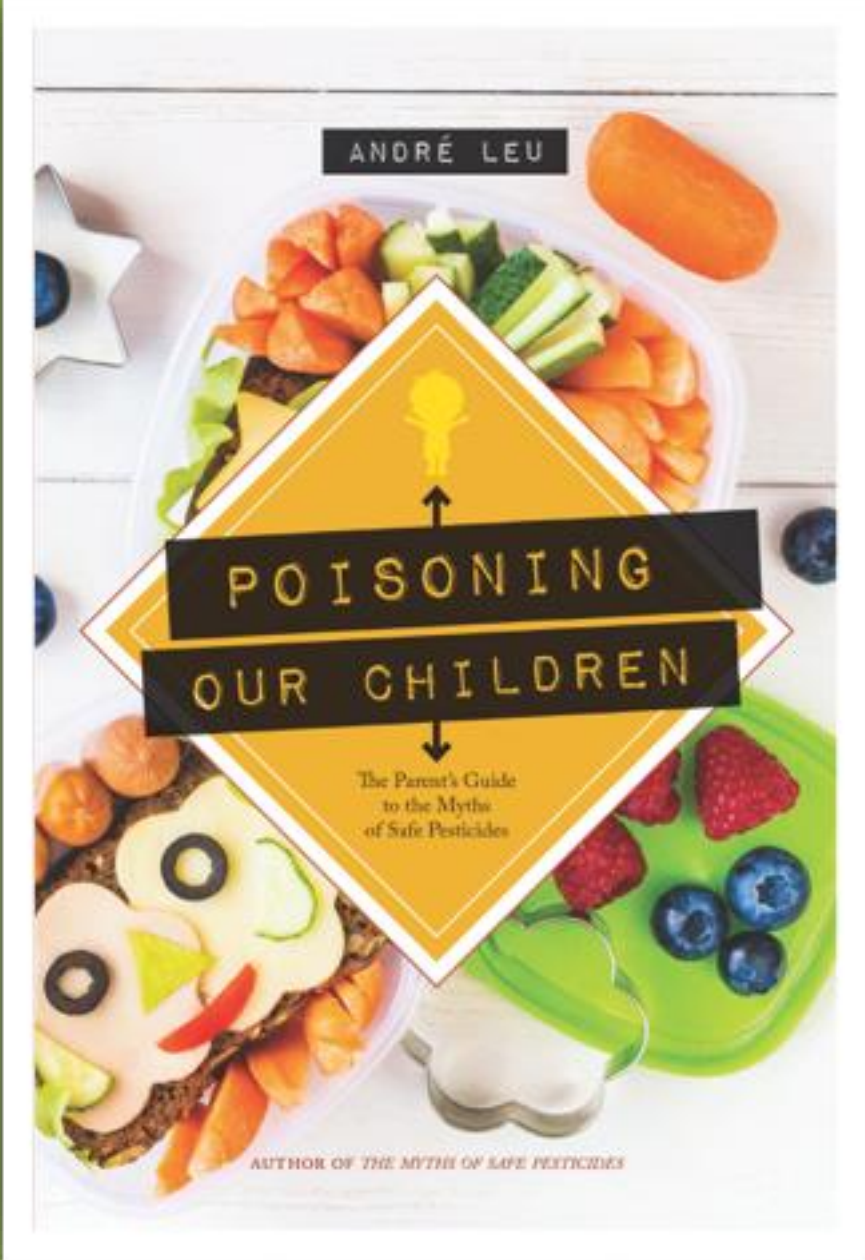
Carly Hyland^a, Asa Bradman^a, Roy Gerona^b, Sharyle Patton^c, Igor Zakharevich^b, Robert B. Gunier^a, Kendra Klein^{d,*}

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Thank You

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