

Glyphosate-based herbicides and neurodegenerative disorders

Differential impact of pure glyphosate and glyphosate-based herbicide in a model of peripheral nervous system myelination¹

A paper from neurologists in Germany: As the exact composition of the GBH used in this study remains unknown, we could not conclusively identify the compound responsible for demyelination. However, the very fact that the ingredients are not fully declared is a topic that merits further discussion. Further studies are warranted to identify and characterize the neurotoxic potential of auxiliary agents in widely used herbicide products. It cannot be ruled out that individuals chronically exposed to GBH or related chemicals might be at increased risk of developing diseases of the PNS, including demyelinating neuropathies. As such, further epidemiological studies are urgently required to corroborate or refute these assumptions.

A **demyelinating disease** is any disease of the nervous system in which the myelin sheath of neurons is damaged. This damage impairs the conduction of signals in the affected nerves. In turn, the reduction in conduction ability causes deficiency in sensation, movement, cognition, or other functions depending on which nerves are involved. **Since 1980, there have been massive increases in neurodegenerative conditions; Parkinson's, Alzheimer's, Dementia, Motor Neurone Disease, Multiple Sclerosis etc. Glyphosate-based herbicides are the link to these diseases!**

Séralini's team finds heavy metals in some chemical formulants of GBH that are in our diet and being sprayed on weeds and on the public

*Extract: As with other pesticides, 10–20% of GBH consist of chemical formulants. We previously identified these by mass spectrometry and found them to be mainly families of petroleum-based oxidized molecules, such as POEA, and other contaminants. In this work, we also identified by mass spectrometry the heavy metals arsenic, chromium, cobalt, lead and nickel, which are known to be toxic and endocrine disruptors, as contaminants in 22 pesticides, including 11 G- based ones.*²

Monsanto emails showed that scientists knew that 'the formulated product does the damage'³

*This document is an email correspondence between Drs. William Heydens and Donna Farmer, wherein the two discuss various studies which observed adverse effects by the formulated Roundup product. Specifically, Dr. Farmer acknowledges: "[t]he interest point is glyphosate all basically [sic] had no effect the formulated product did – does this point us to the coformulants – surfactants? [sic]" at *2. Dr. Heydens also admits, after discussing with Monsanto consultant John Desesso, that "we are in pretty good shape with glyphosate but vulnerable with surfactants. . . What I've been hearing from you is that this continues to be the case with these studies – Glyphosate is OK but the formulated product (and thus the surfactant) does the damage." at *1.*

Substantial increase in neurological deaths 1979-2010

Ten major developed Western countries and 10 smaller Western countries were studied.⁴ There was a major reduction in general mortality in all 20 countries, but total neurological deaths rose substantially between 1980 and 2010 in both sexes in 16 out of 20 western countries. The mortality was significantly higher in females. *"Moreover, looking back 30 or more years the concept of early dementia or the need for the creation of a Young Parkinson's Disease Society in Britain would have seemed a tautology.*

¹ <http://link-springer-com-443.webvpn.jxutcm.edu.cn/article/10.1007%2Fs00401-018-1938-4>

² https://www.gmoseralini.org/wp-content/uploads/2018/01/Defarge-et-al_TOXREP_2018.pdf

³ <https://www.baumhedlundlaw.com/toxic-tort-law/monsanto-roundup-lawsuit/monsanto-secret-documents-page-six/>

⁴ <http://dx.doi.org/10.1016/j.phe.2012.12.018> Pritchard, C. *et al.* Changing patterns in mortality from neurological deaths in the 10 major developed countries 1979-2010 Public Health (2013)

Furthermore, increasing deaths from Parkinson's Disease and Motor Neurone Disease cannot be attributable to longevity, bearing in mind the relatively short-time period, and cannot explain the 55-64-year old mortality rises up to 2006. Clearly other influences must be operating, though in no way does this deny the importance of hereditary factors but rather strongly points towards an epigenetic explanation..."

Pritchard suggests some possible environmental factors, but doesn't mention pesticides.

Neurological deaths of American adults (55–74) and the over 75's by sex compared with 20 Western countries 1989–2010: Cause for concern ⁵

23-Jul-2015 Colin Pritchard Emily Rosenorn-Lanng

Comments below: "The findings of this study — namely that tremendous increases in Total Neurological Deaths (TND) over a 20-year period in twenty countries, particularly the United States — are quite disturbing. What this study suggests is that the two most likely possibilities for the increase in TND may be related to unknown environmental factors, or even more likely, epigenetics phenomena, as yet to be discovered. The authors, Drs Colin Pritchard and Emily Rosenorn-Lanng have done an outstanding epidemiological investigation and have my congratulations for bringing to our attention this disturbing phenomenon and presenting these observations in a convincing and elegant manner, and in a succinct scientific methodology." Miguel A Faria MD.

Glyphosate-induced cell death: associations with neurodegenerative disorders in humans

Ya-xing Gui et al. [Glyphosate induced cell death through apoptotic and autophagic mechanisms.](#) *Neurotoxicology and Teratology* 2012, **34 (3)**: 344–349⁶

Herbicides have been recognized as the main environmental factor associated with human neurodegenerative disorders such as Parkinson's disease (PD). Previous studies indicated that the exposure to glyphosate, a widely used herbicide, is possibly linked to Parkinsonism, however the underlying mechanism remains unclear. We investigated the neurotoxic effects of glyphosate in differentiated PC12 cells and discovered that it inhibited viability of differentiated PC12 cells in dose- and time-dependent manners. Furthermore, the results showed that glyphosate induced cell death via autophagy pathways in addition to activating apoptotic pathways. Interestingly, deactivation of Beclin-1 gene attenuated both apoptosis and autophagy in glyphosate treated differentiated PC12 cells, suggesting that Beclin-1 gene is involved in the crosstalk between the two mechanisms.

Young-onset Parkinson's disease (YOPD)

"Young-onset Parkinson's disease (YOPD) occurs in people younger than 50 years of age. Most people with idiopathic, or typical, PD develop symptoms at 50 years of age or older.

YOPD affects about two to 10 percent of the one million people with PD in the United States.

Symptoms are similar to late onset PD but it is important to understand the challenges YOPD individuals often face at a financial, family and employment levels."

Numbers of cases of Parkinson's Disease in the US

According to the National Parkinson's Foundation, in the United States alone, there are 50,000-60,000 new cases of PD diagnosed each year, joining one million people who currently have the disease.

Numbers of cases of Parkinson's Disease in the UK: estimated incidence for 2018

As Table 2 shows, the estimated incidence of Parkinson's for people aged 45 or over in 2018 is 18,461. (Due to small numbers, it was not possible to properly estimate incidence for people under 45.) As shown in our more detailed report, for the UK in 2015, the lifetime risk of being diagnosed with Parkinson's was 2.7%. This is equivalent to 1 in every 37 people being diagnosed with

⁵ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4521226/>

⁶ <http://www.sciencedirect.com/science/journal/08920362>

Parkinson's at some point in their life.

Glyphosate in human urine⁷

A study conducted by the Heinrich Böll Foundation discovered that 99.6% of German people has glyphosate residues in urine. Most of them are those who eat meat, because of animal feed containing GM soy and corn. Glyphosate entered the humans' food chain, studies demonstrate. According to the Italian Organic Agriculture Association (AIAB), in order to prove the presence of the controversial weed killer in our daily life, bread was analysed in the United Kingdom, water in France and breast milk as well as tampons in the United States. Germany chose to analyse glyphosate residues in 2,009 German people's urine. The study reveals that 75% of the target group displayed levels that were five times higher than the legal limit of drinking water. One third of the people contaminated with glyphosate even showed levels that were between 10 and 42 times higher than what is generally admissible. Only 0.4% of the 2,009 samples was completely free from glyphosate residues, so almost all Germans (99.6%) have residues of the weed killer in their body. The most significant levels were found in children aged 0 to 9, teenagers aged 10 to 19, and farmers. *"The investigation confirmed the findings of the Federal Environment Agency, in regards to the majority of the population having glyphosate residue in their urine. The investigation was the largest of its kind ever carried out and volunteers from all over Germany participated in it. The findings exemplify that further research must be conducted in order to grasp the link between glyphosate exposure through food, drinking water or air and serious diseases"*, said veterinarian Professor Monika Krüger, author of the study.

Those who eat meat showed higher levels of glyphosate than vegetarians and vegans. Also, those who consume organic products are less intoxicated than people who eat non-organic food.

Glyphosate in animals: The first study to measure glyphosate residues in Danish dairy cattle and its impact on blood parameters. Field Investigations of Glyphosate in Urine of Danish Dairy Cows⁸

Abstract: In the present study, thirty dairy cows from each of eight Danish dairy farms were investigated for excretion of glyphosate in urine. Blood serum parameters indicative of cytotoxicity as alkaline phosphatase (AP), glutamate dehydrogenase (GLDH), glutamate oxaloacetate transaminase (GOT), creatinine kinase (CK), nephrotoxicity, (urea, creatine), cholesterol and the trace elements as manganese (Mn), cobalt (Co), selenium (Se), copper (Cu) and zinc (Zn) were investigated. All cows excreted glyphosate in their urine but in varying concentrations. Increased levels of GLDH, GOT and CK in cows from all farms demonstrate a possible effect of glyphosate on liver and muscle cells. High urea levels in some farms could be due to nephrotoxicity of glyphosate. Also, the unexpected very low levels of Mn and Co were observed in all animals which could be explained due to a strong mineral chelating effect of glyphosate. In contrast the mean levels of Cu, Zn and Se were within the normal reference range. In conclusion, this study gives the first documentation to which extent Danish dairy cattle are exposed to Glyphosate and its impact on blood parameters.

Glyphosate is everywhere

Séralini found glyphosate in rodent diets for testing chemicals used in every continent. Samsel has found glyphosate present in the keratin proteins of humans and animals, in **vaccines**, baby milk formulations, pet foods and rat feeds for experimental purposes. It has been found in sanitary products made from GM cotton. All processed foods including orange juice; beers, breakfast cereals, bread, wine; all non-organic vegetables including potatoes.⁹ In March 2016 a survey of more than 2009 German citizens tested showed that more than 99% had glyphosate in their urine and the highest levels were in children and young adults and those that were meat eaters.¹⁰ Glyphosate was found to be persistent in seawater off the Great Barrier Reef.¹¹ It was

⁷ <https://www.lifegate.com/people/lifestyle/glyphosate-almost-all-germans-intoxicated>

⁸ <http://dx.doi.org/10.4172/2161-0525.1000186>

⁹ <http://www.pesticides.gov.uk/guidance/industries/pesticides/advisory-groups/PRiF/about-PRiF>

¹⁰ <http://www.lifegate.com/people/lifestyle/glyphosate-almost-all-germans-intoxicated>

¹¹ <http://www.sciencedirect.com/science/article/pii/S0025326X14000228>

also found in the islands of Hawai'i where the agrochemical industry undertakes testing of GM crops, which the people of Hawai'i don't want. ¹² *"The most commonly tested GE "trait" is herbicide-resistance (82% of field releases over the past two years), which permits heavier and more frequent spraying of herbicides than is otherwise possible (3.2 & 3.4). Hawai'i's incredible biodiversity and many threatened and endangered species are at risk from intensive pesticide use on the Islands. "*

Report presented to UN Human Rights Council about the Right to Food

Global Agricultural Corporations are severely criticised by Hilal Elver the UN Special Rapporteur on the right to food. ¹³ The Report presented to the UN human rights council on 08/03/2017 is severely critical of the global corporations that manufacture pesticides, accusing them of the *"systematic denial of harms", "aggressive, unethical marketing tactics"* and heavy lobbying of governments which has *"obstructed reforms and paralysed global pesticide restrictions"*.

The report authored by Hilal Elver the UN Special Rapporteur on the right to food and co-authored by Baskut Tuncak, the UN's special rapporteur on toxics, says pesticides have *"catastrophic impacts on the environment, human health and society as a whole"*, including an estimated 200,000 deaths a year from acute poisoning. Its authors said: *"It is time to create a global process to transition toward safer and healthier food and agricultural production."*

"It is a myth," said Hilal Elver. *"Using more pesticides is nothing to do with getting rid of hunger. ¹⁴ According to the UN Food and Agriculture Organisation (FAO), we are able to feed 9 billion people today. Production is definitely increasing, but the problem is poverty, inequality and distribution."*

Elver said many of the pesticides are used on commodity crops, such as palm oil and soy, not the food needed by the world's hungry people: *"The corporations are not dealing with world hunger, they are dealing with more agricultural activity on large scales."*

The Report says: *"excessive use of pesticides is very dangerous to human health, to the environment and it is misleading to claim they are vital to ensuring food security."* Chronic exposure to pesticides has been linked to **cancer, Alzheimer's and Parkinson's diseases, hormone disruption, developmental disorders and sterility.** Farmers and agricultural workers, communities living near plantations, indigenous communities and pregnant women and children are particularly vulnerable to pesticide exposure and require special protections. The experts warn that certain pesticides can persist in the environment for decades and pose a threat to the entire ecological system on which food production depends. The excessive use of pesticides contaminates soil and water sources, causing loss of biodiversity, destroying the natural enemies of pests, and reducing the nutritional value of food. The impact of such overuse also imposes staggering costs on national economies around the world.

Weedkiller found in 43 out of 45 popular breakfast cereals marketed for US children

Significant levels of the weedkilling chemical glyphosate have been found in an array of popular breakfast cereals, oats and snack bars marketed to US children, a new study has found. ¹⁵ Tests revealed glyphosate, the active ingredient in the popular weedkiller brand Roundup, present in all but two of the 45 oat-derived products that were sampled by the Environmental Working Group, a public health organization. Nearly three in four of the products exceeded what the EWG classes safe for children to consume. Products with some of the highest levels of glyphosate include granola, oats and snack bars made by leading industry names Quaker, Kellogg's and General Mills, which makes Cheerios. In April, internal emails obtained from the Food and Drug Administration

¹² http://www.centerforfoodsafety.org/files/pesticidereportfull_86476.pdf

¹³ <http://www.pan-uk.org/site/wp-content/uploads/United-Nations-Report-of-the-Special-Rapporteur-on-the-right-to-food.pdf>

¹⁴ <https://www.theguardian.com/environment/2017/mar/07/un-experts-denounce-myth-pesticides-are-necessary-to-feed-the-world>

¹⁵ <https://www.theguardian.com/environment/2018/aug/16/weedkiller-cereal-monsanto-roundup-childrens-food>

(FDA) showed that scientists have found glyphosate on a wide range of commonly consumed food, to the point that they were finding it difficult to identify a food without the chemical on it. The FDA has yet to release any official results from this process. **The UK Guardian reported:** “There was no indication that the claims related to products sold outside the US.”

Shockingly high levels of weedkiller (two out of four contained aminomethylphosphonic acid, its most toxic metabolite) found in popular breakfast cereals marketed for British children¹⁶

In view of the above statement by the *Guardian*, we sent samples of four oat-based breakfast cereals marketed for children in the UK to the Health Research Institute, Fairfield, Iowa, an accredited laboratory for glyphosate testing. Kellogg No added sugar granola with apricot and pumpkin seeds Barley Flakes 27% Oats 23% Rye 13% Wheat flour Oat flour; Quaker Oat so Simple: Quaker Whole Grain Rolled Oats; Weetabix Oatibix 100% wholegrain oats; Nestle Multigrain Cheerios: Whole Grain Oat Flour 29.6% Whole Grain Wheat 29.6% Whole Grain Barley Flour 17.9% Whole Grain Corn Flour 2.1% Whole Grain Rice Flour 2.1%.

Type of breakfast cereal marketed for children Product description	Glyphosate level ng/g	AMPA ng/g	Effective glyphosate level ng/g
Kelloggs No added sugar granola with Apricot & pumpkin seeds	499.90	ND	499.90
Quaker/Oat So simple/Original Microwaveable Oats	464.23	24.04	500.28
Weetibix Oatibix 100% wholegrain oats	318.85	16.96	344.28
Nestle Multigrain Cheerios Whole Grain Oat Flour 29.6% Whole Grain Wheat 29.6% Whole Grain Barley Flour 17.9% Whole Grain Corn Flour 2.1% Whole Grain Rice Flour 2.1%.	137.29	ND	137.29

Dr Fagan the Director says: “These results are consistently concerning. The levels consumed in a single daily helping of any one of these cereals, even the one with the lowest level of contamination, is sufficient to put the person’s glyphosate levels above the levels that cause fatty liver disease in rats (and likely in people).

I have included results for two “organic” products from the US for comparison. The granola has some glyphosate in. Even more concerning is the “organic” rolled oats that have the highest glyphosate levels of any product tested here. What this means is that, at least in the USA, organic integrity is less than perfect, to say the least! We have seen evidence of cheating before, but this is the worst!

In the US, weed killer found in granola and crackers, internal FDA emails show¹⁷

*“I have brought wheat crackers, granola cereal and corn meal from home and there’s a fair amount in all of them,” FDA chemist **Richard Thompson** wrote to colleagues in an email last year regarding glyphosate. Thompson, who is based in an FDA regional laboratory in Arkansas, wrote that broccoli was the only food he had “on hand” that he found to be glyphosate-free.*

*That internal FDA email, dated January 2017, is part of **a string of FDA communications** that detail agency efforts to ascertain how much of the popular weedkiller is showing up in American food. The tests mark the agency’s first-ever such examination. The FDA is charged with annually testing food samples for pesticide residues to monitor for illegally high residue levels. The fact that the agency*

¹⁶ <https://www.dailymail.co.uk/health/article-6315209/Revealed-UK-cereals-contain-potentially-harmful-amounts-WEEDKILLER.html>

¹⁷ <https://www.theguardian.com/us-news/2018/apr/30/fda-weedkiller-glyphosate-in-food-internal-emails>

only recently started testing for glyphosate, a chemical that has been used for over 40 years in food production, has led to *criticism* from consumer groups and the Government Accountability Office (GAO)”

The FDA has been testing glyphosate in food for nearly 2 years, but has not produced a Report¹⁸

A letter from Congressman Ted Lieu, a member of the Committee on the Judiciary in the House of Representatives, to Dr Gottlieb of the FDA asking him to clarify the practices around testing glyphosate in food and why they are not releasing them. He asks seven pertinent questions which he hopes the FDA will answer.

FDA Glyphosate Testing Conspicuously Skips Oats, Wheat Products¹⁹

Monsanto’s Roundup Weed Killer Detected on Two-Thirds of Corn and Soybean Samples
WASHINGTON – The Food and Drug Administration failed to include oats and wheat products in its glyphosate testing program, leaving Americans largely in the dark about their exposure through food to the active ingredient in Monsanto’s Roundup weed killer. After sitting on the data from its glyphosate tests for more than a year, the FDA finally made the results public. Tests found glyphosate on 63 percent of corn samples and 67 percent of soybean samples. But FDA did not test any oats and wheat, the two main crops where glyphosate is used as a pre-harvest drying agent, resulting in glyphosate contamination of foods such as Cheerios and some brands of granola. “*FDA’s failure to test for glyphosate in the foods where it’s most likely to be found is inexcusable,*” said Olga Naidenko, Ph.D, Senior Science Advisor for Children’s Environmental Health at EWG. Instead, she said, the FDA tested milk and eggs for glyphosate, even though studies by independent researchers and Monsanto’s own analysis show that glyphosate does not transfer into these products. In August, tests commissioned by EWG found glyphosate residues on popular oat cereals, oatmeal, granola and snack bars. Almost three-fourths of the 45 samples tested had glyphosate levels higher than what EWG scientists consider protective of children’s health with an adequate margin of safety.

Genetically-engineered crops, glyphosate and the deterioration of health in the United States of America. Swanson *et al.*²⁰

Abstract: A huge increase in the incidence and prevalence of chronic diseases has been reported in the United States (US) over the last 20 years. Similar increases have been seen globally. The herbicide glyphosate was introduced in 1974 and its use is accelerating with the advent of herbicide-tolerant genetically engineered (GE) crops. Evidence is mounting that glyphosate interferes with many metabolic processes in plants and animals and glyphosate residues have been detected in both. Glyphosate disrupts the endocrine system and the balance of gut bacteria, it damages DNA and is a driver of mutations that lead to cancer.

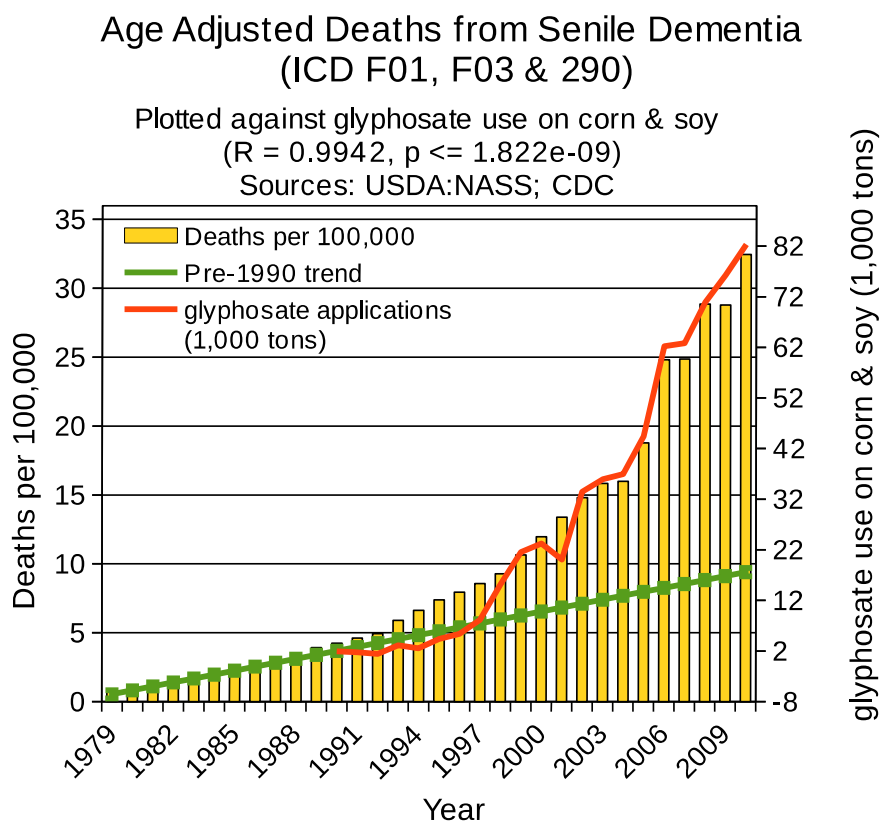
*In the present study, US government databases were searched for GE crop data, glyphosate application data and disease epidemiological data. Correlation analyses were then performed on a total of 22 diseases in these time-series data sets. The Pearson correlation coefficients are highly significant ($< 10^{-5}$) between glyphosate applications and **hypertension** ($R = 0.923$), **stroke** ($R = 0.925$), **diabetes prevalence** ($R = 0.971$), **diabetes incidence** ($R = 0.935$), **obesity** ($R = 0.962$), **lipoprotein metabolism disorder** ($R = 0.973$), **Alzheimer’s** ($R = 0.917$), **senile dementia** ($R = 0.994$), **Parkinson’s** ($R = 0.875$), **multiple sclerosis** ($R = 0.828$), **autism** ($R = 0.989$), **inflammatory bowel disease** ($R = 0.938$), **intestinal infections** ($R = 0.974$), **end stage renal disease** ($R = 0.975$), **acute kidney failure** ($R = 0.978$) cancers of the **thyroid** ($R = 0.988$), **liver** ($R = 0.960$), **bladder** ($R = 0.981$), **pancreas** ($R = 0.918$), **kidney** ($R = 0.973$) and **myeloid leukaemia** ($R = 0.878$).*

¹⁸ <https://lieu.house.gov/media-center/press-releases/rep-lieu-urges-fda-clarify-practices-around-testing-glyphosate-food>

¹⁹ <https://www.ewg.org/release/fda-glyphosate-testing-conspicuously-skips-oats-wheat-products>

²⁰ http://www.organic-systems.org/journal/92/IOS_Volume-9_Number-2_Nov_2014-Swanson-et-al.pdf

The Pearson correlation coefficients are highly significant ($< 10^{-4}$) between the percentage of GE corn and soy planted in the US and **hypertension** ($R = 0.961$), **stroke** ($R = 0.983$), **diabetes prevalence** ($R = 0.983$), **diabetes incidence** ($R = 0.955$), **obesity** ($R = 0.962$), **lipoprotein metabolism disorder** ($R = 0.955$), **Alzheimer's** ($R = 0.937$), **Parkinson's** ($R = 0.952$), **multiple sclerosis** ($R = 0.876$), **hepatitis C** ($R = 0.946$), **end stage renal disease** ($R = 0.958$), **acute kidney failure** ($R = 0.967$), cancers of the **thyroid** ($R = 0.938$), **liver** ($R = 0.911$), **bladder** ($R = 0.945$), **pancreas** ($R = 0.841$), **kidney** ($R = 0.940$) and **myeloid leukaemia** ($R = 0.889$). The significance and strength of the correlations show that the effects of glyphosate and GE crops on human health should be further investigated.



Reproduced by kind permission of Dr Nancy Swanson from her paper above

Glyphosate, pathways to modern diseases III: Manganese, neurological diseases, and associated pathologies²¹

Abstract: Manganese (Mn) is an often overlooked but important nutrient, required in small amounts for multiple essential functions in the body. A recent study on cows fed genetically modified Roundup®-Ready feed revealed a severe depletion of serum Mn. Glyphosate, the active ingredient in Roundup®, has also been shown to severely deplete Mn levels in plants. Here, we investigate the impact of Mn on physiology, and its association with gut dysbiosis as well as neuropathologies such as autism, Alzheimer's disease (AD), depression, anxiety syndrome, Parkinson's disease (PD), and prion diseases. Glutamate overexpression in the brain in association with autism, AD, and other neurological diseases can be explained by Mn deficiency. Mn superoxide dismutase protects mitochondria from oxidative damage, and mitochondrial dysfunction is a key feature of autism and Alzheimer's. Chondroitin sulfate synthesis depends on Mn, and its deficiency leads to osteoporosis and osteomalacia. Lactobacillus, depleted in autism, depends critically on Mn for antioxidant protection. Lactobacillus probiotics can treat anxiety, which is a comorbidity of autism and chronic

²¹ http://www.surgicalneurologyint.com/temp/SurgNeuroInt6145-4381109_121011.pdf

*fatigue syndrome. Reduced gut Lactobacillus leads to overgrowth of the pathogen, Salmonella, which is resistant to glyphosate toxicity, and Mn plays a role here as well. Sperm motility depends on Mn, and this may partially explain increased rates of infertility and birth defects. We further reason that, under conditions of adequate Mn in the diet, glyphosate, through its disruption of bile acid homeostasis, ironically promotes toxic accumulation of Mn in the brainstem, leading to conditions such as **Parkinson's Disease** and prion diseases.*

The amounts of Roundup sprayed by UK farmers on crops has gone from 226,762 kg in 1990 to 2,240,408 kg in 2016, a ten-fold increase. Distribution of glyphosate and aminomethylphosphonic acid (AMPA) is widespread in agricultural topsoils of the European Union²²

Obesity in UK children began to rise before the age of 7 and between 7 and 14²³

The Millennium Cohort Study (MCS) is a multi-disciplinary research project following the lives of around 19,000 children born in the UK in 2000-01. The six surveys of MCS cohort members carried out so far – at age nine months, three, five, seven, 11 and 14 years – have built up a uniquely detailed portrait of the children of the new century. The Age 14 Survey took place in 2015. Interviews were conducted with 11,726 families. Age 14 was when the MCS identified obesity, mental health disease and self-harm at the highest.

The **1970 British Cohort Study** (BCS70) is a continuing, multi-disciplinary longitudinal study monitoring the development of more than 17,000 babies born in the UK during the week of 5–11 April 1970. Since the birth survey in 1970, there have been eight sweeps of all cohort members at ages 5, 10, 16, 26, 30, 34, 38 and 42. The Centre for Longitudinal Studies (CLS) based at the Institute of Education University of London published their latest report on 9 November 2013.²⁴

Their key findings of the cohort at age 42 were that:

- The generation born in 1970 is considerably more likely to be overweight or obese than those born 12 years earlier were at the same age.
- Men born in 1970 are far more likely to be overweight than women.

I wrote to the CLS to see when the next one would be published. They said: “*unfortunately, there has been a delay and the next one is unlikely to be out before 2019.*”

Glyphosate-based herbicides are sprayed on weeds in towns, cities and amenity areas. “Welsh Councils all use ‘carcinogenic’ weedkiller: glyphosate-based herbicides”

“Glyphosate is the world’s most common weed-killer and is used by the majority of local authorities on areas such as highways, footpaths and parks. Following our requests for details on whether councils use the specific brand Roundup or products with glyphosate in, many pointed to its approval for use by regulatory bodies.”²⁵ All except one of the 32 London Boroughs use it. Only the London Borough of Hammersmith and Fulham has agreed to ban Roundup and try other non-chemicals methods.²⁶

Neurotransmitter changes in the brain from exposure to Glyphosate-based Herbicides: many papers come from Latin American countries where they grow almost exclusively GM Roundup Ready Crops that Monsanto forced on them in 1996

Behavioral impairments following repeated intranasal glyphosate-based herbicide administration in mice. Taken together, our findings demonstrate that intranasal (IN) exposure to commercial Gly-BH

²² <https://www.sciencedirect.com/science/article/pii/S0048969717327973>

²³ <http://www.cls.ioe.ac.uk/page.aspx?&sitesectionid=2419&sitesectiontitle=MCS+Age+14+initial+findings>

²⁴ [Overweight and obesity in mid-life: Evidence from the 1970 British Cohort Study at age 42](https://www.bbc.com/health/overweight-obesity-in-mid-life-evidence-from-the-1970-british-cohort-study-at-age-42)

²⁵ <https://www.walesonline.co.uk/news/local-news/welsh-councils-use-carcinogenic-weedkiller-15086510>

²⁶ <https://www.hortweek.com/london-council-bans-contractor-use-glyphosate-parks/parks-and-gardens/article/1398373>

produces alterations in locomotor activity, anxiety and memory in adult mice. These observations could be a consequence of alterations in neurotransmission systems comprising the GABAergic, dopaminergic, serotonergic and/or cholinergic systems.” The intranasal route is the fastest route to the brain. In this research paper there are references to many papers from around the world that confirm the glyphosate-based herbicides are damaging to the development of the foetal brain and that repeated exposure is toxic to the adult human brain and may result in alterations in locomotor activity, feelings of anxiety and memory impairment.²⁷

There are so many mental health and psychiatric disorders, depression, suicides, anxiety and violence among children and adults; UK and US children are being given weedkiller at breakfast; unpublished emails showed FDA scientists could not find a food without Roundup in it.

Violent Behavior: A Solution in Plain Sight

Why is there an increasing incidence in unsociable behaviour, disorder, aggression, gun crime, and brutality in the UK and the US? This paper by Sylvia Onusic, PhD, CNS, LDN, seeks reasons for the increase in violent behaviour in America, especially among teenagers. She identifies malnutrition, vitamin and micronutrient deficiency as potent causes of aberrant behaviour, crime and the spectrum of autistic diseases. She says: *“Some children have been corrected by a proper diet free of junk food.”*²⁸ These are precisely the effects of exposure to glyphosate and other chemicals.

Proof that obesity is a problem related to glyphosate: a study showed that by 2025, the UK will have the highest obesity rates among both men and women in Europe, at 38%: in contrast in France women have had virtually no increase in BMI over 40 years

A study on obesity published in the *Lancet* in March 2016 says: *“About a fifth of all adults around the world and a third of those in the UK will be obese by 2025, with potentially disastrous consequences for their health”*.²⁹ The *Lancet* Study says there is zero chance that the world can meet the target set by the UN for halting the climbing obesity rate by 2025. *“Over the past 40 years, we have changed from a world in which underweight prevalence was more than double that of obesity, to one in which more people are obese than underweight,”* said senior author Prof Majid Ezzati from the School of Public Health at Imperial College London. *“The English-speaking world is particularly badly affected.*

The UK will have the highest obesity among both men and women in Europe, at 38%.

In contrast: “Against the trend of steadily rising weight, women in some countries had virtually no increase in BMI over the 40 years – in Singapore, Japan, and a few European countries including Czech Republic, Belgium, **France**, and **Switzerland**.”³⁰

²⁷ <https://www.sciencedirect.com/science/article/pii/S0892036217301526>

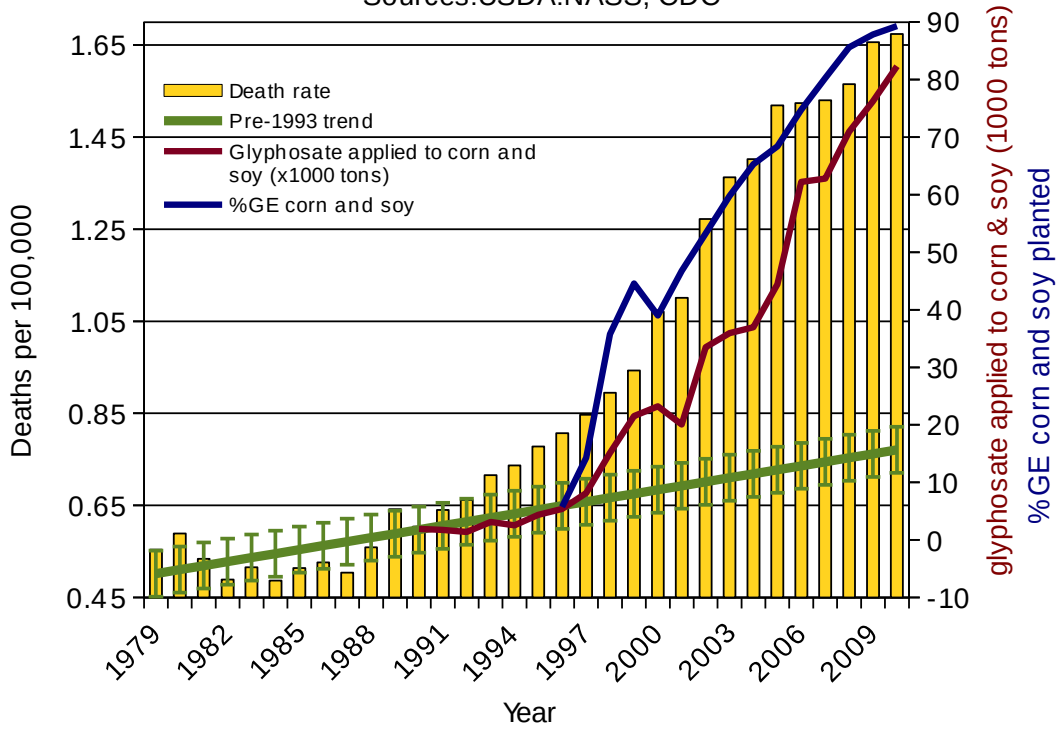
²⁸ <http://www.westonaprice.org/environmental-toxins/violent-behavior-a-solution-in-plain-sight/pdf>

²⁹ <http://www.theguardian.com/society/2016/mar/31/one-fifth-of-worlds-adults-will-be-obese-by-2025-study-predicts>

³⁰ In Switzerland, spraying glyphosate pre-harvest is not permitted. Systemic neonicotinoid pesticides are not allowed. However, the Swiss Government allows Syngenta to operate from Switzerland.

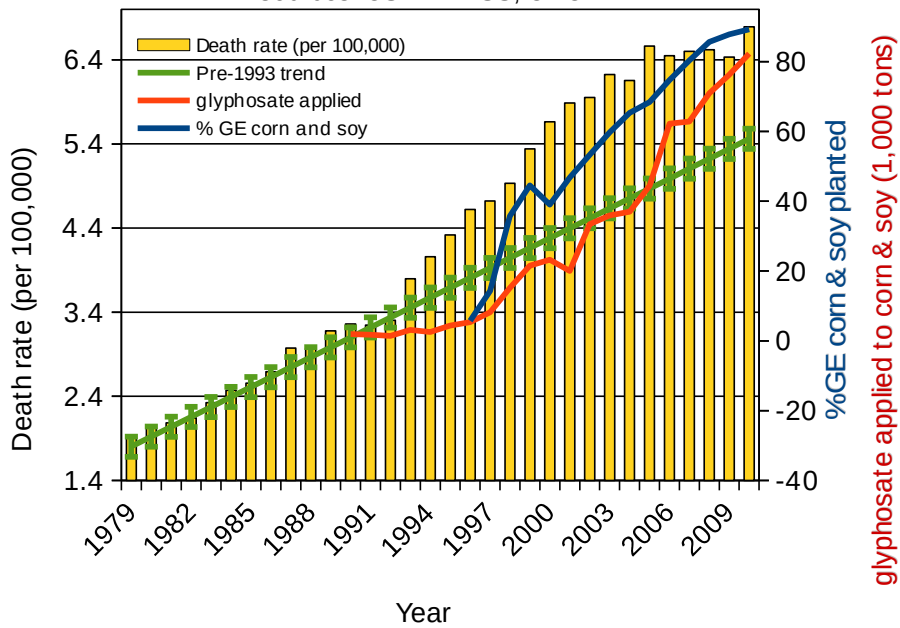
Age Adjusted Deaths due to Obesity (ICD E66 & 278)

plotted against %GE corn & soy ($R = 0.9618, p \leq 3.504 \times 10^{-6}$)
 and glyphosate applied to corn & soy ($R = 0.9616, p \leq 1.695 \times 10^{-8}$)
 Sources: USDA:NASS; CDC



Age Adjusted Deaths from Parkinson's disease (ICD G20 & 332.0)

plotted against glyphosate use on corn & soy ($R = 0.8754, p \leq 1.631 \times 10^{-6}$)
 and percent GE corn & soy planted ($R = 0.9516, p \leq 5.398 \times 10^{-6}$)
 sources: USDA:NASS; CDC



Monsanto’s sealed secret studies obtained under FOI from the US EPA

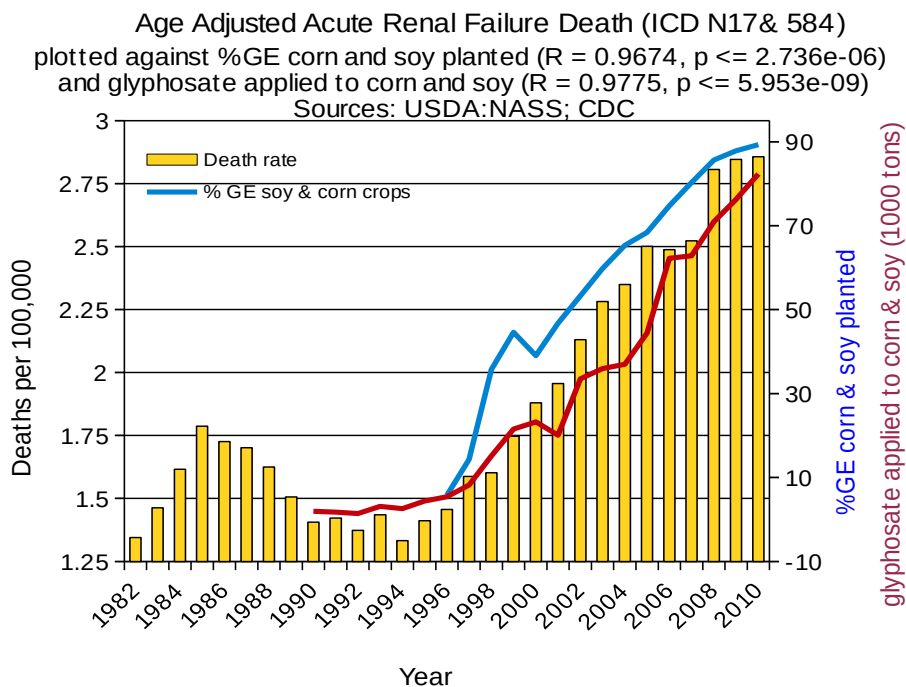
Samsel and Seneff wrote paper IV on Glyphosate: Glyphosate, pathways to modern diseases IV: cancer and related pathologies³¹ and concluded that: “significant evidence of tumours was found during these investigations”. Ridley and Mirly (1988) (for Monsanto) found bioaccumulation of ¹⁴C labelled glyphosate in Sprague Dawley rat tissues. Residues were present in bone, marrow, blood and glands including the thyroid, testes and ovaries, as well as major organs, including the heart, liver, lungs, kidneys, spleen and stomach (Table 11 Page 127). The eye is included in this list. Table 8 Page 126): Incidence and occurrence of ophthalmic degenerative lens changes by glyphosate. Table 9 Page 126: Data on unilateral and bilateral cataracts (all types) and Y-suture opacities, excluding “prominent Y suture”, following glyphosate exposure to rats: this Stout & Rueker (1990) study was commissioned by Monsanto.

The rate of cataract surgery in England “increased very substantially” between 1989 and 2004 from 173 (1989) to 637 (2004) episodes per 100,000 population.

A 2016 study by the WHO also confirmed that the incidence of cataracts had greatly increased: ‘A global assessment of the burden of disease from environmental risks.’ says that cataracts are the leading cause of blindness worldwide. Globally, cataracts are responsible for 51% of blindness – an estimated 20 million individuals suffer from this degenerative eye disease.³²

In the US between 2000 and 2010 the number of cases of cataract rose by 20% from 20.5 million to 24.4 million. It is projected that by 2050, the number of people with cataracts will have doubled to 50 million.

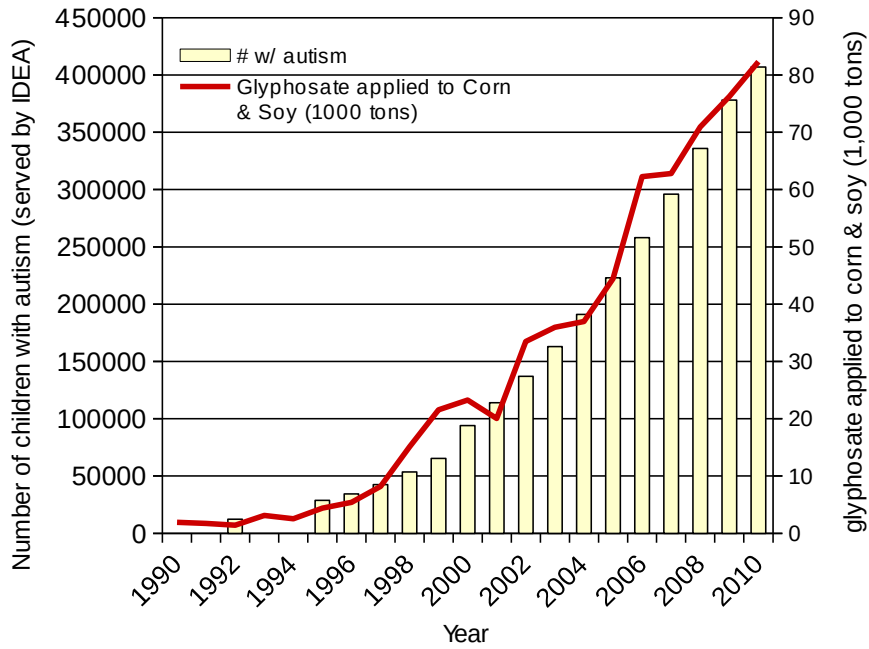
All graphs reproduced by kind permission of Dr Nancy Swanson



³¹ <http://www.amsi.ge/jbpc/31515/11SA15R.pdf>

³² http://apps.who.int/iris/bitstream/10665/204585/1/9789241565196_eng.pdf

Number of children (6-21yrs) with autism served by IDEA
 plotted against glyphosate use on corn & soy ($R = 0.9893$, $p \leq 3.629e-07$)
 Sources: USDA:NASS; USDE:IDEA



Annual Incidence of Diabetes (age adjusted)

plotted against %GE corn & soy crops planted ($R = 0.9547$, $p \leq 1.978e-06$)
 along with glyphosate applied to corn & soy in US ($R = 0.935$, $p \leq 8.303e-08$)
 sources: USDA:NASS; CDC

