submissions

From: [redacted]
Sent: Tuesday, 16 December 2014 3:35 PM
To: submissions
Subject: RE ; A1097 – Food derived from Herbicide-tolerant & Insect-protected Corn Line MON87411 (COMMENTS ASKED FOR)

My submission

RE ;A1097 – Food derived from Herbicide-tolerant & Insect-protected Corn Line MON87411 (COMMENTS ASKED FOR)

16/12/2014

I register my opposition to any GMO products being passed until the research projects listed below (amongst others) are definitely proved wrong by an independent body of scientists and the findings are transparently made known to the public.

I also request a thorough investigation of the Company Monsanto and it's research to ascertain it's credibility, ethical nature as well as the safety of it's products for animal and human consumption in Australia and the world.

Michelle Denise (FoodWatch WA)

[redacted]

[redacted]

[redacted]

STUDIES PRECIS BELOW

Study: Glyphosate Doubles Risk Of Lymphoma

Jun 16, 2014

By Emily Cassidy • First published by Environmental Working Group

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Scientists at the International Agency for Research on Cancer have found what appears to be a strong link between pesticide exposure and a blood cancer called non-Hodgkin lymphoma.

Analyzing 44 individual research projects published since 1980, the scientists, writing in the International Journal of Environmental Research and Public Health, said that people exposed to the weed killer glyphosate, marked by Monsanto under the brand name Roundup, had double the risk of developing non-Hodgkin's lymphoma. Those exposed to 2,4-D, another potent weed killer marketed by Dow Chemical, were 40 percent more likely to develop this disease.

The authors, scientists who work in the IARC Section of Environment and Radiation in Lyon, France, theorized that these pesticides were causing genetic mutations in white blood cells, thereby weakening the body's immune system and ability to fight off disease.

Previous studies have observed that farmers with exposure to 2,4-D have experienced impaired immune systems.

Last month, EWG reported that research by scientists at the Arctic University of Norway had detected "extreme levels" of glyphosate on genetically engineered soybeans.

Crop scientists have genetically engineered soy to survive blasts of glyphosate so that farmers can use this chemical to get rid of weeds near crops. Over time these weeds have become resistant to glyphosate and grown hardier. In turn some farmers have resorted to spraying more of the pesticide to try to kill the tougher "super weeds."

Genetic engineering's early promise to reduce pesticide use now seems empty. The U.S. Department of Agriculture recently reported that herbicide use doubled—from 62 million pounds in 1996 to 128 million pounds in 2012. Glyphosate now represents more than 83 percent of the chemical pesticides used in the U.S. annually.

Based on invited lecture at the 1st Forum of Development and Environmental Safety, under the theme "Food Safety and Sustainable Agriculture 2014", 25 - 26 July 2014, Beijing

I want to tell you what I have seen on my farm and about the on-farm and lab investigations carried out in collaboration with Professor Monika Krüger and other scientists.

My farm "Pilegaarden" (Willow Farm) is an average Danish farm in the small village of Hvidsten. Our pigs are raised accordingly to United Kingdom regulations for pig housing, and exported to the UK for consumption. Inside the pig farm is a straw-based system for the sows as well as a standard farrowing house.

Healthier, more productive sows, less medication, more piglets and much more profit

I had read about the effects that GM feed has on rats in lab experiments (see [1] GM Soya Fed Rats: Stunted, Dead, or Sterile, SiS 33), so I decided to change the feed from GM to non-GM soy in April 2011 without telling the herdsman on the farm. Two days afterwards, he said to me: "You have changed the food." He always notices whenever there is any problem with the feed and tells me. This time was different. Something very good was happening with the food as the pigs were not getting diarrhoea any more. The farm was saving 2/3 of the medicine or £7.88 per sow; not just my farm but three other farms in Denmark that switched from GMO to non GMO feed have also seen the same. Medication after the changeover in the weaners barn also went down dramatically by 66 %, with one type of antibiotics not being used since.

The sows have higher milk production; we can tell because the sows are suckling

1, 2 or 3 more piglets and have more live born pigs, on average 1.8 piglets more per sow. They wean 1,8 pigs more pr. litter, and have more live born pigs. We have seen a certain aggressive diarrhoea disappear altogether that affected young piglets in the first week of life, killing up to 30 % of the pigs. It has completely gone for over 3 years. Sows no longer suffer from bloating or ulcers and they also live longer in high production, only dropping in effectivity after 8 layers compared to 6 on GM soy.

So, a change to non-GM soy makes the herd easier to manage, improves the health of the herd, reduces medicine usage, increases production and is very profitable.

Severe birth deformities in piglets

Deformities in the pigs used to be very rare and I used to be proud to send Siamese twins to schools for classes because it would only happen one in a million. But then they became too frequent. So I read a lot on the subject and my suspicion fell on glyphosate. I read how glyphosate had been shown in scientific studies (see [2] Lab Study Establishes Glyphosate Link to Birth Defects, SiS 48, [3]) to cause deformities and noted it was the same type of deformities that I was seeing in my pigs, and the same as those found in anencephaly babies in Washington counties in US [4] that Don Huber talked about as well as the birth defects in Argentina [5, 6] (Argentinas Roundup Human Tragedy , SiS 48) as described by Dr Medardo Avila-Vasquez where high levels of glyphosate are used. I had looked at studies showing that a 2-day exposure to 3.07 mg/l glyphosate herbicide caused only 10 % mortality but caused malformations in 55 % of test animals [7]. A toxicological study in 2003 led by Dr Dallegrave [8] found bone abnormalities, absence of bones or parts of bones, shortened and bent bones, asymmetry, fusions, and clefts in rats. So, after this I began to list all the deformities I saw in my pigs.

I decided to be on the safe side, by listing the clear deformities that cannot be missed, like a back that is totally kinked over (see Figure 1). I have pictures of all the deformed piglets, which are born alive in most cases. One had a 180° bend in one of its vertebra. There were also deformities in the soft tissue, and one without an anus. One had kidney problems; another had its stomach outside the body. One had a cranial deformity, with no eyes and its brain outside the head; this is very typical. One had no cranium at all. Some are even messier. There was a piglet with only one eye, and one completely headless. There was a little nose, but it had no bones to grow on so it probably would have died just after birth. We also started counting deformities of the tail, which are never fatal but are actually spinal deformities.

I sent the deformed piglets to Germany to be analysed by Krüger at Leipzig University. She opened them up and took the organs including the lungs, liver, kidneys, muscles, nervous system, intestines and heart; and she found glyphosate in all of the organs (see Box). You can see some of them in the scientific paper I published with Krüger and other scientists [9].

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##
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From the Editors
Genetic Modification Trails Conventional Breeding By Far
##

Researchers have created conventionally bred varieties tolerant to drought and low nitrogen soils that can reduce poverty in 13 African countries by up to 9 %, far outperforming anything that genetic modification has achieved

In the debate about genetically modified (GM) crops, the argument that the biotech industry and their supporters always fall back on is that whether we like it or not, we are going to need them to feed the world. Genetic modification has, they assure us, the potential to produce crops with all sorts of wonderful traits: tolerance of drought, cold, salinity and flooding, resistance to insect pests, extra nutritional value, and more.

But for the last 20 years, GM has singularly failed to convert that potential into reality. Almost all the GM crops grown have been modified to have one of two traits: tolerance of glyphosate-based herbicides and the ability to produce a Bt-toxin that can kill corn- and cotton pests. In the meantime, conventional breeding, often employing modern techniques such as marker-assisted breeding, has continued to deliver the goods.

An article in a recent issue of the journal Nature provides a striking example. GM and non-GM methods have both been applied to developing improved varieties of maize, a crop of very great importance in many countries. Non-GM has won hands down. If our real goal is to feed the world, we should be taking resources away from GM and devoting them to other agricultural research that is less glamorous-sounding but more effective.

Conventional breeding far outperforming genetic modification behind the biotech PR machine

Maize originated in the New World, in or near Mexico and is still the most widely grown grain in the Americas, but has spread across the globe. It is now the most important staple crop in Africa.

Maize is susceptible to drought, a serious defect in a crop on which so many people depend, especially as climate change is making droughts more frequent. It does not thrive in soils that are poor in nitrogen, again a problem for a crop widely cultivated by subsistence farmers. A great deal of research is being devoted to overcoming these drawbacks, and improved varieties are beginning to appear. Researchers are using both conventional breeding and genetic modification (GM); though where GM is involved, it is used together with conventional breeding because GM alone cannot do the job.

So far, conventional breeding has been a lot more successful. That probably

explains why you probably haven't heard very much about these achievements. Transferring a gene is still considered news, especially with the public relations departments of the biotech industry.

153 new tolerant varieties can reduce hunger in Africa by up to 9 %

The Drought Tolerant Maize for Africa Project has developed 153 new varieties. In field trials, these have performed at least as well as existing commercial seeds when the rainfall is adequate, and yielded up to 30% more during drought. It is estimated that it will help reduce the number of people living in poverty in 13 African countries by as much as 9 %.

The researchers who bred the new varieties were able to draw on collections in a large seed bank run by the International Maize and Wheat Improvement Center (CIMMYT) in Mexico City. Some of the varieties kept there were known to thrive in dry regions, and these were first cross-bred to produce varieties that were drought tolerant and then crossed with varieties that are already successful in Africa

21 new varieties that yield up to 1 tonne per hectare more in low nitrogen soils

Researchers at CIMMYT have also been participating in the Improved Maize for African Soils (IMAS) project, along with the Kenya Agricultural Research Institute, the South African Agricultural Research Council and DuPont Pioneer. So far, IMAS has developed 21 conventionally bred varieties, which have yielded up to 1 tonne per hectare more in nitrogen-poor soils than existing commercial varieties. They hope to introduce these in eight countries over the next year.

IMAS is also working to develop GM varieties, but they say these are at least 10 years from success. Biswanath Das, a maize researcher at CIMMYT, is quoted in the journal Nature as saying that while "it is important to consider all options," conventional breeding will probably have a greater impact.

It is not at all surprising that these crucial advances have been achieved by conventional breeding rather than genetic engineering. Supporters of GM like to give the impression that theirs is a very precise and quick technology. You identify a gene for a desired trait, such as the ability to produce Bt-toxin, you take it from the organism that has it (in this case the soil bacterium Bacillus thuringensis), insert it into the DNA of the organism you are interested in (in this case cotton or maize) and there you are. In fact, it's never as simple as that (see FAQ on Genetic Engineering, ISIS Tutorial) and in a report from the strongly pro-GM International Service for the Acquisition of Agri-biotech Applications (ISAAA) we are told that it generally takes about ten times more money and ten years longer to bring a biotech crop to market compared to a conventional crop and also that this "precludes the participation of public research institutions in the development of biotech crops."

The technology is uncontrollable and unpredictable, introducing many unintended effects that are potentially unsafe, despite many attempts at targeting the genetic modification precisely. We have compiled a comprehensive report on the health and environmental hazards of genetically modified organisms (GMOs), recommending individuals and local communities everywhere to take action to Ban GMOs Now (ISIS Special Report).

Another big problem is that the majority of the traits of any organism are determined not by a single gene but by interactions among large number of genes. So transferring one stretch of DNA is unlikely to accomplish much.

GM needs help from conventional breeding plus some sleight of hand

Even Monsanto is not trying to produce drought tolerant maize genetic modification alone. Instead, they are using conventional breeding but with a single transgene, CspB, which they refer to as the “drought gene”, as if it were the only factor that made a difference.

If conventional breeding has produced maize varieties that can tolerate drought or produce higher yields in poor soil, why is there still so much research into GM? Especially as the GM varieties involve a lot of conventional breeding with perhaps a single artificially transferred gene?

One reason is of course that maize is such an important crop that we don’t want to miss any possibility of improving it. It might just be that genetic engineering will accomplish something important that cannot be done by conventional breeding, though both our understanding of crops and our experience so far strongly suggest that it will not. Another reason is that many scientists have built up laboratories to do genetic engineering and they are looking for something they can do with it. For them, GM is the answer even before you tell them what the question is.

GM crops do, however, have one clear advantage: they are patentable. Varieties that are produced by conventional breeding are subject to breeders’ rights, which essentially limit what others can do with them for commercial purposes. In contrast, varieties that are produced by genetic modification can be patented, which means they are completely controlled by the person or corporation that holds the patent. Farmers who buy the seeds are actually not buying them in the sense that they are now theirs to use as they please. All they have acquired is the right to grow a single crop from the seeds. They cannot save the seeds from the crop to sow the next year and neither the farmers nor anyone else are allowed to do research on them or breed from them. The farmers cannot even give them to anyone. They have really only rented the seeds, which remain the property of the company.

Hence even if a variety has been largely conventionally bred, there is a very strong incentive for a corporation to include at least one gene transferred by genetic engineering. That makes the variety patentable, it gives it much stronger protection than are available under breeders’ rights, and prevents anyone else from trying to improve it. What is more, if some other gene can be transferred during the lifetime of the patent, the monopoly can be extended indefinitely, in much the same way that a pharmaceutical company can extend the patent on a drug by evergreening, i.e. making and patenting a number of minor modifications (End of Drug Monopolies and Mega-profits? SiS 58)

To refer to CspB as the drought gene is more than just a bit of marketing. It is also part of making the legal (as opposed to scientific) case that it is the transgene that is responsible for the drought tolerance of the variety, thus heading off any challenge to the patent. This also explains why in their publicity Monsanto compare the conventionally bred hybrid only with the variety that also contains CspB, not with the currently available varieties they started with.

Six years ago, the editor of Nature Biotechnology acknowledged in an editorial that GM crops were not addressing the key agricultural problems. He wrote that he was “not downbeat on its prospects to, one day, heal, fuel and feed the world,” but admitted that was “an outrageous act of faith, bordering on the religious.”

Since then, new varieties of maize, rice, cassava and sweet potato have been developed that do address the problems that beset the world’s food supply (How

Non-GM Cassava Can Help Feed the World SiS 59). Almost all have been developed by conventional breeding, often with the help of marker assisted breeding. Methods such as “push-pull” have been introduced to control insect pests and weeds without the use of chemicals.

There are many reasons why we should be opposed to GM crops. They bring with them all sorts of hazards, they lead to an increased use of chemicals, they promote the development of superweeds and toxin-resistant insects, they court disaster by leaving the world with only a very few varieties of each crop, and they enable a small number of corporations to gain control of the world’s food supply. They are yet another part of the campaign by the major seed companies to pressure governments in developing countries to introduce laws that prevent farmers from saving, replanting, exchanging and selling seeds, as they have done for millennia and on which their livelihoods and their countries’ food security depend.

All that might conceivably be worth risking if we actually needed GM crops, but the plain fact is that we don’t.

Fully referenced versions of all the articles including this editorial are available on ISIS members website: http://www.i-sis.org.uk/sismembersphp

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GMOs make animals seriously ill - Prof Gilles-Eric Séralini

on 31 March 2014.

In a new interview, Seralini vows he will republish the GMO maize and Roundup study retracted by the journal Food and Chemical Toxicology.

Meanwhile the scientists' sign-on statement opposing the retraction on scientific as well as ethical grounds has gathered 170 signatures. Here's what one scientist said:

"The suppression of scientific evidence for commercial gain should be punishable by criminal charges. The tobacco companies got away with this for nearly 30 years before the world woke up to the problem, and even then the response was insufficient. The risks posed by the epigenetic response of plant DNA to foreign genes is potentially catastrophic, and the precautionary principle should apply. Censoring science is playing with peoples lives."

- Dr Bob Abell, Member/originator, "Scientists Concerned and Informed on the Environment Speak Out", Kanata, Ont., Canada

More comments at: http://www.endsciencecensorship.org

A sign-on statement pledging to boycott Elsevier until its journal FCT reinstates the study has now attracted a massive 1240 scientist signatories:

Glyphosate: Chronic Disease Degeneration

April 26, 2013 by admin in Glyphosate with 1 Comment

Glyphosate is assumed to be safe for humans. As a result, it's become the world's best-selling herbicide. However, a groundbreaking study documents that it may actually be fueling the plague of chronic & immune diseases, including cancer and autism. This study documents the underlying systemic damage produced by glyphosate, then discusses how that damage leads to specific diseases.

by Heidi Stevenson

This article is split into three parts. This is Part 1, Glyphosate: Chronic Disease Degeneration. It gives an overview and then goes on to discuss the primary findings of a new study about the human effects of Monsanto's herbicide, glyphosate. Part 2, titled Glyphosate: Disease Creator, discusses specific diseases, applying the basic harms produced by glyphosate and showing how they lead to each disease. Part 3, titled Glyphosate: A Trajectory of Human Misery, discusses glyphosate's use throughout the world and then draws conclusions.

Monsanto's herbicide, glyphosate, has become virtually ubiquitous based on a presumption of harmlessness in humans. In spite of noxious and aggressive superweeds that have developed in response and a host of reports citing harm and potential harm to the environment and farm animals, this premise of

innocence has resulted in its use nearly everywhere. Because of that same image of innocence, its use has multiplied astronomically.

However, a new report from the journal *Entropy* turns the proposition of glyphosate's innocence in human health upside down. An exhaustive review of existing research in which 287 studies were reviewed, coupled with irrefutable logic, produces a frightening picture of the reality: Glyphosate may be the single most devastating substance ever introduced into agribusiness. As the authors, Anthony Samsel and Stephanie Seneff, concluded:

Glyphosate is likely to be pervasive in our food supply, and, contrary to being essentially nontoxic, it may in fact be the most biologically disruptive chemical in our environment.

The range of diseases that can be associated with glyphosate is frightening. Its biological effects are so primary that virtually every bodily system—if not every one—is adversely affected. The authors state:

Our systematic search of the literature has led us to the realization that many of the health problems that appear to be associated with a Western diet could be explained by biological disruptions that have already been attributed to glyphosate. These include digestive issues, obesity, autism, Alzheimer's disease, depression, Parkinson's disease, liver diseases, and cancer, among others. While many other environmental toxins obviously also contribute to these diseases and conditions, we believe that glyphosate may be the most significant environmental toxin …

Glyphosate's Metabolic Disruptions

The study documents that glyphosate disrupts several significant basic biological processes in humans with devastating results. Certain primary functions at the most basic levels are disrupted or diverted. These include:

- Disruption of the shikimate pathway in gut biota.
- Disruption of sulphate transport
- Increase in Flavonoid Synthesis
- Disruption of cytochrome P-450 enzymes

This section will explain and discuss each of these.

Shikimate Pathway Disruption

Glyphosate is believed to operate by disrupting the shikimate (pronounced shə **kih** mut) pathway in plants, a process for manufacturing a group of amino acids called aromatic (though the term has nothing to do with odor). These include phenylalanine, tyrosine, and tryptophan. Aromatic amino acids are required for a plant's survival.

It's been assumed that glyphosate is harmless in humans because the shikimate pathway does not exist in any animal. However, the shikimate pathway does exist in bacteria, including those in the mammalian gut. Until fairly recently, the importance of gut biota in health has largely been ignored. However, it's now understood to be key in many aspects of the body's function.

Gut bacteria are in a symbiotic relationship with the body. They digest food, synthesize vitamins, detoxify foreign substances, and are key in immune system function and gut permeability. Thus, anything that interferes with the shikimate pathway has the potential of causing severe harm.

Disruption of Sulphate Transport

Sulphate transport, the method by which sulphate is moved into and out of cells, is a delicate balance. When glyphosate is present, this balance becomes a tightrope walk. The problem is that both sulphate and glyphosate are kosmotropes, which can have a devastating impact on the blood.

A kosmotrope is a substance that can cause water to become gelled. Too much sulphate in blood can turn it into sludge, so it cannot circulate and bring nutrients and oxygen to cells or remove waste. Therefore, transport of sulphate is always a balancing act between cellular requirements and blood viscosity.

However, when glyphosate is added to the picture, the risk is even greater. Glyphosate is also a kosmotrope, which makes it significantly more difficult for sulphate to be transported where it's needed. As a result, sulphate transport is disrupted in the presence of glyphosate.

Increase in Flavonoid Synthesis

Glyphosate interferes with synthesis of the aromatic amino acid, tryptophan, instead favoring the production of flavonoids by as much as 20 times normal. While flavonoids are generally believed to be health-inducing, Samsel & Seneff's paper presents the likelihood that the picture is far more complex, and they propose a role for them in sulphate transport in the presence of glyphosate.

It's known that, in both plants and microbes, glyphosate induces synthesis of two kinds of phenols: monophenolic compounds and polyphenolic flavonoids. Although monophenols are known to be toxic, flavonoids are generally thought to be beneficial for heath. However, their metabolic mechanisms are unknown.

Carbon rings are part of the molecular structure of phenols. Molecules with carbon rings have a special capability. They can diffuse the effects of kosmotropes. Therefore, phenols, including monophenols and flavonoids, are able to diffuse the effects of sulphate by binding to it and escorting it through the bloodstream.

Sulphate transport comes under pressure in the face of glysophate's kosmotropic gelling effect on the blood. Therefore, aromatic amino acids may be oxidized into phenolic compounds to compensate, that is, to provide more phenols for sulphate transport.

However, once a phenol has delivered its sulphate, it becomes highly toxic. Sulphate-free phenols are destructive to phospholipids and DNA.

Therefore, to fulfill the more pressing need of sulphate transport, authors Samsel & Seneff propose that flavonoids are synthesized instead of tryptophan. That is, because of flavonoids' ability to counter the kosmotropic effects of glyphosate, they are produced at the expense of tryptophan.

They propose that, in the presence of glyphosate, flavonoids and phenols can transport sulphur from the gut to the liver, and then return to the gut by way of the hepatic portal vein to repeat the process. However, once a phenol has given up the sulphate anion in the liver, it becomes toxic, over time causing damage to the liver and the digestive system.

While the immediate problem of sulphate transport is resolved by overproducing flavonoids, there's a distinct downside in the long term. First, of course, is underproduction of tryptophan, with resultant harmful effects on tryptophan-associated processes. It also results in loss of sulphates from the gut, resulting in development of chronic disorders.

Disruption of Cytochrome P450 Enzymes

Glyphosate causes an excess build-up of shikimate by inhibiting EPSP synthase, a critical enzyme in the process that leads to the aromatic amino acids. As a consequence, the precursors are sent down other pathways that produce toxic compounds. For example, activity of the enzyme PAL is substantially increased, leading to the release of ammonia.

This appears to be a significant factor in glyphosate's damaging effects.

At the same time that PAL activity is increased, a side branch of the tryptophan synthesis pathway is opened to synthesize flavonoids. As noted before, flavonoids' metabolic function is not yet understood, so their benefits may not be the whole story.

Cytochrome P450 (CYP) is a large family of enzymes that catalyze the oxidation of organic substances and is critical for detoxing xenobiotics. It's been established since 1998 that glyphosate inhibits CYP in plants. Therefore, it follows that their detoxing function is disrupted.

Retinoic acid is catabolized (destroyed) by a CYP enzyme called CYP26A1. Though retinoic acid is required for the process of developing neural differentiation, the neuron cannot mature until retinoic acid is removed by CYP26A1. Therefore, glyphosate's inhibition of the CYP enzyme prevents the neuron from maturing.

CYP enzymes function throughout the body, both inside cells and through the bloodstream. Glyphosate is also carried in the blood. Thus, by inhibiting their function, glyphosate can disrupt any activity in which CYP enzymes are active. This is of particular concern in blood clotting, where two CYP enzymes are involved. Thromboxane A2 synthase (CYP5A1) regulates clotting and prostacyclin synthase (CYP8A1) regulates hemorraging. Glyphosate in the blood can inhibit these enzymes, thus disturbing the delicate balance of blood clotting and dissolution.

Endothelial nitric oxide synthase (eNOS) is a member of the CYP family. It's important for production of nitric oxide (NO), which is needed to relax blood vessels to ease blood flow.

Though not yet documented, it's predicted that glyphosate disrupts the production of sulphate by eNOS in the endothelium, further exacerbating the sulphate transport concern.

Evidence of CYP Enzyme Inhibition

Multiple evidence from several areas demonstrates that glyphosate inhibits CYP enzyme activity. It inhibits aromatase, which is a CYP enzyme that's key in converting testosterone to estrogen. Retinoic acid activity is enhanced, which can be explained by suppression of the CYP enzyme that breaks it down. Studies document that glyphosate suppresses certain detoxifyng CYP enzymes.

Two studies demonstrate that activity of CYP19, aromatase, is inhibited by glyphosate. It takes only 10 parts per thousand to disrupt aromatase's activity in a human liver cell line. At concentrations just one-hundredth the recommended agricultural use, aromatase is inhibited in human placental cells. Worse, when glyphosate is combined with chemicals in RoundUp, these effects happen with just 1/20 as much glyphosate.

In another study, a 15 micromoles concentration of glyphosate resulted in cutting the activity of benzene-detoxing CYP enzymes to one-fourth of normal. When the concentration was increased to 35 micromoles of glyphosate, the CYP activity was completely stopped.

A compelling study documented that rats given glyphosate intragastrically for two weeks suffer a reduction of CYP activity in the liver. This result is not surprising, since glyphosate is an organophosphate, and it's well established that this class of pesticides inhibits CYP enzyme function in human liver cells. Therefore, it would be unsurprising to find that glyphosate's inhibition of CYP liver enzymes that detox benzene could lead to severe adverse effects, since it's known to cause cancer.

Glyphosate may also be an indirect factor in the ongoing die-off of bees. The class of insecticides called neonicotinoids is known to kill bees. One study has found reduced pollination in genetically modified Roundup-Ready canola compared to organic canola. The authors suspect that a synergistic effect between glyphosate and neonicotinoids is worsening bee die-off.

Pathology Induction by Glyphosate

Gyphosate causes disruption of the shikimate pathway in gut bacteria, which results in a domino effect of pathology. It causes formation of excess shikimate, along with deficiencies of aromatic amino acids in plants.

Aromatic amino acids include phenylalanine, tryptophan, and tyrosine, among others. All three can be in short supply as a result of glyphosate's enzymatic suppression. Phenylalanine cannot be synthesized in

the body and is required for synthesis of tyrosine. Its suppression results in a cascade of adverse effects, including of course, reduction in tyrosine.

Excess ammonia is observed in the cells of plants treated with glyphosate. This is true for both natural and Roundup Ready plants. A likely cause of the excess ammonia is glyphosate-induced increase in the activity of phenylalanine ammonia lyase (PAL), an enzyme found in both plants and microbes that catalyzes release of ammonia. Most of glyphosate's ability to retard plant growth is probably a result of PAL activity, which produces both toxic ammonia and phenolic compounds.

Glyphosate Effects on Gut Bacteria

Evidence of glyphosate's disruption of gut bacteria is found in cattle and poultry. Over the last ten to fifteen years, *Clostridium botulinum* infection has increased in German cattle. Glyphosate is toxic to *Enterococcus*, a friendly bacterium. This leads to a gut imbalance that favors overgrowth of *Clostridium*.

Research documents that glyphosate reduces beneficial bacteria and increases pathological bacteria in the gut. Particularly pathogenic strains of drug-resistant *Salmonella* and *Clostridium* were found, while beneficial *Enterococcus*, *Bacillus*, and *Lactobacillus* are susceptible to glyphosate. The result is overgrowth of pathogenic bacteria at the expense of beneficial bacteria.

In one instance, pathogenic bacteria do a good turn—but in the end, negate it with a particularly nasty by-product. Antibiotic-resistant *Pseudomonas* are opportunistic pathogens that can break glyphosate down into metabolically-safe and usable phosphate and carbon Unfortunately, a by-product of the process is neurotoxic formaldehyde, which can cause amyloid-like misfolding of tau protein in neurons, much like those found in Alzheimer's brains, among other mischief.

Escherichia coli (*E. coli)* suffers starvation, energy drain, and shut-down of the shikimate pathway in the presence of glyphosate. A switch to anaerobic fermentation occurs instead of oxidizing glucose (sugar), which is a less efficient method of producing energy. It is reminiscent of changes in soil microbes with glyphosate application.

Frogs and Embryonic Development

In research comparing the effects of pesticides on frogs, glyphosate was unique in being able to destroy tadpoles. Out of four species, two had no survivors, one had almost none, and the overall survival of the four species was 70 percent.

Glyphosate had a synergistic effect with a fungal pathogen, *Batrachochotrium dendrobatidis*, which reduced survival of tadpoles.

It is probable that glyphosate is a factor in the worldwide disappearance of frogs, and also that embryonic development is disrupted.

Slow Effects in Mammals

Samsel & Seneff state:

An insidious issue with glyphosate is that its toxic effects on mammals take considerable time to be overtly manifested.

Nonetheless, evidence is building in mammalian studies. Research on rats given glyphosate in quantities equivalent to the highest legally-allowed doses demonstrated that they suffered oxidative stress in only 30-90 days.

A long term study examined rats fed genetically modified (GM) maize, nonGM maize without glyphosate, or GM maize with glyphosate. The experiment ran for the rats' lifetimes, about two years. Unlike previous short-term research that had ended at 3 months. The results were dramatic. Rats fed the genetically-modified glyphosate-treated maize suffered multiple pathologies, including enormous mammary tumors in

females, and gastrointestinal, liver, and kidney pathologies in males, which also developed skin and liver carcinomas. Male rats tended to die prematurely of liver and kidney deficiencies.

Roundup is a compound that includes both glyphosate and a surfactant called TN-20. Studies have found that the combination greatly increases glyphosate's toxicity, resulting in mitochondrial damage, and both apoptic and necrotic cell death. It's suspected that TN-10 disrupts the integrity of the cell barrier, which allows entry by glyphosate.

The synergistic effects of TN-20 with glyphosate were demonstrated in a study showing that dairy product starter microorganisms were inhibited by Roundup, but not by glyphosate alone. That study's authors wondered if a recent loss in the biodiversity of raw milk might be caused by Roundup.

Part 1, Glyphosate: Chronic Disease Degeneration
Part 2, Glyphosate: Disease Creator
Part 3, Glyphosate: A Trajectory of Human Misery

Source:

Samsel, Anthony; Seneff, Stephanie. 2013. "Glyphosate's Suppression of Cytochrome P450 Enzymes and Amino Acid Biosynthesis by the Gut Microbiome: Pathways to Modern Diseases." *Entropy* 15, no. 4: 1416-1463; doi:10.3390/e15041416

Tagged agribusiness, anthony samsel, chronic disease degeneration, cyp disruption, cyp enzyme inhibition, genetic modification, glyphosate, glyphosate chronic disease, glyphosate chronic disease degeneration, glyphosate cyp enzyme, glyphosate disease, glyphosate gut bacteria, glyphosate gut biota, glyphosate liver, glyphosate pathology, glyphosate roundup, glyphosate slow effects, glyphosate sulphate depletion, glyphosate sulphate transport, glyphosate tadpoles, Glyphosate's Suppression of Cytochrome P450 Enzymes and Amino Acid Biosynthesis by the Gut Microbiome: Pathways to Modern Diseases, glyphosphate flavonoids, glyphosphate shikimate pathway, gmo, samsel & seneff, stephanie seneff

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ISIS Report 26/03/14
Glyphosate and Cancer
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New research shows that the low levels of glyphosate found in human urine can promote the growth of human breast cancer cells, confirming the carcinogenic potential of the herbicide known since the 1980s. Dr Mae Wan Ho

GM and herbicide cancer warning suppressed in retracted study

Among the unsettling results of the Séralini study [1], which almost certainly lie behind its notorious retraction by the journal editor a year after it was published ([2] Retracting Seralini Study Violates Science & Ethics, SiS 61), are cancers in rats fed GM maize and/or exposed to Roundup. Although the word 'cancer' was never used by the authors, they recorded three 'metastases' (i.e., cancers) - two in females and one in a male - plus two kidney Wilm's tumours in male rats, which had to be euthanized a year early because the cancerous tumours grew to more than 25 % of body size. This makes a total of at least 5 cancers in the treatment groups, in addition to the excess of grotesquely large tumours, premature deaths, pituitary, kidney, liver, and other pathologies compared with the controls. The cancer cases certainly should not be ignored, and to make sure this important paper is not erased from public record, it is now freely available and permanently registered on thesparc [3] a floating knowledge archive for the survival of people and planet. The findings are especially important in the light of new research and indeed, previous research on the carcinogenic potential of glyphosate (and GM food).

Glyphosate promotes growth of human breast cancer cells at minute concentrations

A research team in Thailand led by Jutamaad Satayavivad at the Center of Excellence on Environmental Health and Toxicology, Ministry of Education, and The Chulabhorn Graduate Institute in Bangkok, published a paper [4] in the very same Journal from which the Séralini study was retracted. They found that glyphosate at minute concentrations enhanced the proliferation of human hormone-dependent breast cancer T47D cells, but not hormone-independent breast cancer MDA-MB231 cells. Their detailed experiments showed that glyphosate mimics the action of oestrogen, and uses the same molecular pathways as the natural hormone to promote proliferation of the cancer cells. They also found that glyphosate had synergistic effects in enhancing breast cancer cell growth in combination with genistein, a common phytoestrogen in soybean.

Glyphosate at concentrations between 10-12 and 10-6 M (0.169 ng/L to 0.169 mg/L) boosted the proliferation of T47D cells by 15 to 30 %, about half as effectively as the most potent oestrogen, 17 b-estradiol (E2).

The same low concentrations of glyphosate induced the activation of oestrogen response element (ERE) - a specific DNA sequence promoting gene expression with high affinity for the oestrogen receptor (ER) that binds oestrogen - thereby activating gene expression in response to oestrogen. Furthermore, this activation was inhibited by an oestrogen antagonist, ICI 182780, indicating that the estrogenic activity of glyphosate was mediated via ERs.

The highest oestrogen mimicking effect was at 10-9M or 0.169 mg/L and the effect was half that of oestrogen, the most potent growth-promoter in hormone-dependent breast cancer cells. ICI 182780, a specific inhibitor of oestrogen at 1 nM reduced the proliferative effects of both glyphosate and E2. At 10 nM it completely inhibited the growth enhancing effects of glyphosate, suggesting that glyphosate acts via the oestrogen receptor ER.

T47D-KBluc cells, with stably transfected triplet oestrogen response element (ERE) promoter–luciferase reporter gene construct, when treated with glyphosate at the concentration range of 10-12 to 10-6 M, proliferated at 5-13 fold of the controls without glyphosate or E2, less than half that induced by oestrogen.

That is not all. Glyphosate-based herbicides are widely used for soybean cultivation (especially for Roundup Ready GM soybean); and the researchers also found an additive oestrogenic effect between glyphosate and genistein, a soybean phytoestrogen.

Read the rest of this report here
http://www.i-sis.org.uk/Glyphosate_and_Cancer.php

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ON MONSANTO

Monday, 17 March 2014 13:30

The Advertising Standards Authority (ASA) of South Africa has today ordered Monsanto to withdraw its advertisement on Radio 702 with immediate effect, wherein Monsanto claims the benefits of GM crops. According to ASA, Monsanto's claims were found to be unsubstantiated.

The African Centre for Biosafety (ACB) lodged a complaint to the ASA following an advertisement on Radio 702 by Monsanto wherein Monsanto claims that GM crops "enable us to produce more food sustainably whilst using fewer resources; provide a healthier environment by saving on pesticides; decrease greenhouse gas emissions and increase crop yields substantially." The ACB was supported in its complaint by Ms Judith Taylor from Earthlife Africa.

Monsanto was given an opportunity by ASA to respond to the ACB's complaint but was according to the ASA, only able to provide the ASA with links to documents on its website but was unable to provide, as it is required to in terms of South African law governing advertising, inputs from an independent and credible expert confirming the various studies that Monsanto relied upon showing the ostensible benefits of GM crops.

"We are elated with this decision. Monsanto has already been warned by the ASA as far back as 2007, that it needs to substantiate its claims from an independent and credible expert in the matter of GM Food/M Wells/ 8739 (18 June 2007) regarding its claims of the so called benefits of GM crops. However, it appears Monsanto does not have much regard for South African law as it is hell bent on disseminating false information to the South African public, " said Mariam Mayet, Executive Director of the ACB.

The ASA has warned Monsanto that "it should ensure that it holds proper substantiation for its advertising claims" or risk attracting further sanctions.

Download the ruling.

These are just a fraction of the study summaries I have researched. I am not a scientist therefore can not verify these myself but FSANZ should have the ability to do this work if it is really guarding the health, safety and agricultural/economic viability of Australia and all Australians.

Michelle Denise

Michelle Denise (FoodWatch WA)

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I would appreciate aknowledgement of receipt of this submission as your website suggests