The Dangers of Glyphosate:  
A Special Interview with Dr. Anthony Samsel  
By Dr. Joseph Mercola

DM: Dr. Joseph Mercola  
AS: Dr. Anthony Samsel

DM: Glyphosate or Roundup: one of the most commonly used herbicides or pesticides in the world, to the tune of a billion pounds a year sprayed on our crops. So much so that the average American is eating several hundred pounds of glyphosate-contaminated food every year. How does that affect you? Hi, this is Dr. Mercola, helping you take control of your health.

Today we are joined by Dr. Anthony Samsel, who is an expert in this area. He’s going to enlighten us on some of the details that most of us don’t even have a hint of the impact that it has in our health. Once we have this understanding, we’ll be far more motivated, inspired, and encouraged to really take arms in this battle to eliminate glyphosate from our food.

Welcome and thank you for joining us, Dr. Samsel.

AS: Thank you for having me, Dr. Mercola.

DM: It really is an honor to have you with us today. You’ve been a participant, an active participant on our forum for a number of years, at a high-level. We really appreciate your time and contributions there.

I’m wondering if you can give a brief history of what your science background is, and then how you first became interested in this area. Because as I understand, it’s not something you’ve always been interested in. You have two backgrounds: one is that you’re a research scientist, and then you’re also passionate about farming, gardening, and agriculture. You really have the perfect credentials to delve into this. Why don’t you give us some of your details?

AS: I’m a retired research scientist. I was with the “think tank,” Arthur D. Little (ADL) in Cambridge, Massachusetts for many years working as a research scientist on many types of projects, from product development to environmental sciences to later switching to health sciences. I’ve done work for the Environmental Protection Agency (EPA) on contracts. I worked for the United States Army Corps of Engineers (USACE), the United States Navy (USN), and the United States Coast Guard (USCG).

I was an expert in hazardous chemical materials. I was one of the authors of the Chemical Hazard Response Information System (CHRIS) manual for the US Coast Guard. I did a lot of work for the Army Corps of Engineers, marine biology in benthic analysis, harbor surveys for harbor dredging projects, and then moved into public health.

I held a position of assistant director of public health in a community here in New England. I was engaged in private investigations of polluters, corporations, manufacturing facilities, and chemical companies that had impacts on neighborhoods and what-not. I still do that. I consult with communities across the country.
DM: You have a real strong advocacy for public health. Maybe you can let us know some of your details about your experience in agriculture, gardening, and farming.

AS: I started gardening with my grandfather when I was three years old. That’s where I developed the passion for it. Through school, I worked on an apple farm and vegetable farm. I got my feet wet with commercial production. And then, later on, besides the career in science, I had a career in owning, operating, and running several farms, good-sized operations here in New England, growing vegetables and all kinds of stuff. That’s basically where my agricultural background came from.

DM: I guess it sounds like, from our previous discussion, that you had really believed the propaganda that Monsanto was pushing on. And actually, you were using glyphosate yourself in these operations.

AS: Yeah.

DM: It’s kind of similar to me vaccinating children, which bring me to tears. But nevertheless, that was a long time ago. But we just do the best we can. We absorbed this information. We think they’re truthful but it’s not. Why don’t you share what happened with your experience in using glyphosate, which really motivated you down this path.

AS: I started using glyphosate myself commercially around the farm and my properties back in the late ‘70s or early ‘80s, when it first came on the market. I believed the hype like all the other farmers and people around the world do, that glyphosate is as safe as salt and that it broke down into harmless chemicals that did no harm. I believed all that stuff until I started studying the chemical. Being a research scientist, being a chemist, I knew what to look for. Having worked in public health, I was familiar with how chemicals had effects on the human body and on animals. So I started approaching it from that aspect.

As far as my own health, it started to suffer. That’s what put me on the road to take a look at this chemical because I was using it.

DM: Well, you were using it regularly and it sounds like, from our previous discussion, that you also had an interesting experience with trying to scare deer off that were interfering with your crops.

AS: Oh yeah.

DM: You ran out of coyote urine, which is an effective deterrent, and then used human urine, your urine. Tell us the surprise that you found when you started using the urine to scare the deer off.

AS: I thought that the scent of my own urine would keep the deer away, just like coyote urine and wolf urine. I peed in a bottle, put it in a hand spray, went out around the field, and sprayed my urine around, figuring that it was going to keep the deer out. A couple of days later, I went back to check to see if the deer were coming back into the field. I noticed that the weeds were all pointing down. They weren’t standing up. They were dying. I said, “My goodness, I haven’t sprayed any herbicide here. What’s going on?” And then I thought, “My urine is acting like an herbicide.”

So then, I did some controlled experiments in the greenhouse with some plants and the same thing happened. Those plants died. And then, I started looking at my diet. I had… I love corn chips. I was eating bags of corn chips.

DM: Oh my gosh.

AS: My diet was not a clean diet at the time. I wasn’t eating totally organic. The only organic food that I was eating was out of my own garden and the stuff that I would can and preserve. But everything else, I
go to the supermarket and I eat boxed food and what-not. I started to put two and two together, that maybe this was the reason why I wasn’t feeling good.

Then I started looking into glyphosate because I was using it. That was my primary chemical exposure other than my food. Then I realized that they were using it on genetically engineered crops. And then I started looking at the US Department of Agriculture (USDA) to see what food would have glyphosate or glufosinate in them.

DM: Which is another chemical similar to glyphosate. It’s also a…

AS: Yeah. It’s similar to glyphosate and used in genetically engineered crops. Its use isn’t as wide as glyphosate, but that’s still a problem to public health, the glufosinate. All herbicides are problem to public health.

DM: Oh sure.

AS: There should be no herbicides in our food supply, none.

DM: So, what did you find when you contacted the USDA?

AS: Well, I contacted Terry Council at the USDA and asked why there were no statistics on residues of glyphosate or glufosinate in the food supply. He told me that it was too expensive a test to do; it was a separate test for both those chemicals, and that they didn’t have the funding. I had approached them, and I had copied my US senator to keep a record and to keep track of our conversations with the federal agencies, and I still do. I’m engaged in the continuing conversation with the federal agencies, and everything is copied to my senators so that there’s a public record of my communications.

At any rate, they weren’t doing any test. They were testing for every other insecticide, fungicide, and herbicide under the sun, but not glyphosate or glufosinate. To make a long story short, they decided that they would do a series of tests. Terry Council let me know that they ran 400 samples of soybean, and that they weren’t sure if they were going to publish the information. I said, “You’ve got to publish the information. I mean, this is important stuff.” They decided to publish it. He gave me a call and he said, “In about two months, it should be in our new vegetable report.”

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Just before it came out, he sent me a copy. I looked and I saw that they had only reported 300 samples. He had told me in an email [that it was] 400 samples. Well, then I started looking at the data. I noticed that the amount of aminomethylphosphonic acid (AMPA), which is the metabolite of glyphosate, was greater than that of the glyphosate itself. The reported numbers, they didn’t make sense. If you analyze the glyphosate, you’re going to get glyphosate if the residue is in the crop, but you’re also going to get the metabolite AMPA. But looking at the numbers, they just didn’t make sense. They only reported 300 of the 400.

I believed they’ve cherry-picked the data so that the data didn’t exceed the EPA residue limits. Then, when I tried to get back and get some answers from the US Department of Agriculture, Terry Council was no longer there. I haven’t been able to find him. I don’t know if they moved him within the agency. But he doesn’t hold the position he held when he was helping me with glyphosate and glufosinate.

The USDA still hasn’t done any sampling for glufosinate. Just that one year with soybeans. They found that 90+ percent of the soybeans that they tested had glyphosate residues in them.
DM: Yeah. The testing is becoming less and less expensive as technology follows Moore’s law, that [it is] exponentially improving with time. There are radical reductions in the cost. They can’t use the finances as an excuse anymore.

AS: They use high-pressure liquid chromatography.

DM: HPLC.

AS: That’s the recognized EPA method. They could use the enzyme-linked immunosorbent assay (ELISA) but that isn’t recognized by the EPA. For statistical purposes, the EPA only recognizes the HPLC-approved method. That’s expensive. It’s like 300 dollars a test.

DM: Yeah, But prices are coming down. It’s technology. Technology just decreases with time. But let’s get down to the real issue. Okay, it’s there; it’s in the food supply. The average Americans consume several hundred pounds of this crap every year. Every year. Even incredibly bright, sophisticated individuals like yourself not too long ago were in their group.

I mean, if people like you fall for this deception and fraud, what type of chances [does] the average individual [have]? Like virtually none. What I really admire about what you’ve been able to do is put together the information on how glyphosate just decimates our health. Can you go into details of how that is? Because I think that’s going to really motivate and inspire people to be diligent and really rigidly avoid this like the plague. Also, participate in the process to get this remove from our food supply. But you got to have that understanding. You’re one of the top people I know who has the biochemistry down and really can expand on it. Why don’t you enlighten us?

AS: When I started to look at my own health problems and my own gut issues, I knew that it was all related to bacteria, just like the soil. My grandfather had taught me that a healthy bacteria colony in the soil would grow healthy crops. I knew that as a child. My grandfather knew that decades and decades ago.

I used to teach people how to grow things. That was the most important thing, that you have a healthy bacteria colony. You adjust the pH of the soil so that you have prolific colony of diverse species of bacteria there.

What happened with my own gut is when I cleaned up my diet, all of those symptoms, the gut dysbiosis, went away. My gastrointestinal problems relieved themselves, plus a lot of neurological problems that I was beginning to have. I started to delve deeper into the human microbiome, our gut, and all the various species of bacteria that inhabit us. I mean, we have over 100 trillion bacteria on and within us representing more a thousand species.

DM: You know what’s interesting tangent to that? It’s 100 trillion bacteria, but for every bacteria, there are 10 bacteriophages. So there are a quadrillion of these bacteriophages running around.

AS: Yup. We have as many as a hundred to one…

DM: Phages. They are numbers. So, there are 10 quadrillion of those.

AS: Right.

DM: Not just one.

AS: Right.

DM: It’s almost as bad as the federal deficit and derivatives.
AS: There are some people who used the 10 to one rule, and then there are others who say that it’s as high as a hundred. Who’s counting, I mean?

DM: I mean, it’s a lot.

AS: We’re up to 100 trillion. I don’t know how long it takes to count there. But that’s a lot of bacteria.

DM: One of the original indications of glyphosate that was initially introduced was actually a bactericide. It was designed to kill bacteria, which is really one of the cores of its toxicity to humans. Maybe you can expand on that.

AS: Yeah. When I started to research the chemical, I started to look at all of the patents at the patent office. I was the one who dug up the patents that showed that glyphosate was a biocide; not just a biocide, but an antibiotic. Glyphosate kills bacteria. Not all bacteria. Some are resistant to glyphosate but many of the sensitive species, bacteria like *Lactobacillus*, *Bacteroides fragilis*, and *Bifidobacteria*. Those are the more sensitive species, and also some of the workhorses in our biology.

Some of the pathogens like *Salmonella pseudomonas*, species of that bacterium are resistant to glyphosate. When we ingest residues of glyphosate, glyphosate in the acidic environment dissociates. The acid glyphosate then is able to do a number on the bacteria, the same as it does in plants. It kills plants and essentially bacteria in our plants.

Our gut has a lawn. We might refer to it as the lawn of our gut. Like a beautiful lawn we have around our home, our gut has a beautiful lawn of upwards of a thousand various species. Each species of bacteria has a specific function. We might liken the bacteria of our microbiome to mining and manufacturing companies. I explain this so that people can understand it. Our bacteria, you might visualize them with mining helmets and pick axes. They mine the minerals in our biology that our body needs as co-factors for various biochemical processes.

Our bacteria also manufacture vitamins and other biomolecules that are essential. Even some of our fatty acids, which serve as signaling molecules, are manufactured by our bacteria. Our bacteria manufacture most of our B vitamins – B6, B9, and B12, which is cobalamin – essential to our neurology. Our bacteria also manufacture vitamin K and some of our vitamin C. We have a mining and manufacturing cooperative within us.

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We have a symbiotic relationship with these bacteria. We help them and they help us. They take the food and they don’t just break it down and obliterate it to unrecognizable things. They dismantle the food, and they utilize everything that’s in the food.

DM: Now, you’ve mentioned that these bacteria are manufacturing miners. But I’ve thought one of the most interesting components of the manufacturing they do are the amino acids.

AS: Oh yes.

DM: Specifically, the aromatic amino acids like tryptophan, phenylalanine, and tyrosine. Why don’t you describe some of the impacts that these bacteria that produce essential amino acids has on our metabolism.

AS: Well, that was another essential part of my research when I started, before I invited Dr. Stephanie Seneff to join me. I had put the story together between bacteria being affected and all the various vitamins and all the various elements of the periodic table that are being chelated. But also, the glyphosate was
disrupting the bacteria that were manufacturing our aromatic amino acids: tyrosine, phenylalanine, and tryptophan. Glyphosate is not just limited to disrupting the amino acids, the aromatic amino acids. Glyphosate also disrupts methionine, which is our sulfur amino acid. It also disrupts…

DM: Which is crucial for detoxification.

AS: Yes, sulfur is. Sulfur takes out the trash in our biology; we sulfate things. Additionally, glyphosate disrupts glutamine. It behaves… It’s a mimetic of glycine. There were several other important amino acids that glyphosate disrupts as well. So from the stand point of glyphosate disrupting this essential amino acids, the essential aromatic amino acids plus some of the regular essential amino acids, we’ve got a real problem with our biology because…

DM: Let’s get into some specifics especially with tryptophan as converted to serotonin and melatonin and the impact of that. There’s also its influence on insulin-like growth factor 1 (IGF-1). Why don’t we go into details there? Because to me, that’s profound.

AS: Glyphosates disrupts the aromatic amino acid tryptophan, and tryptophan is necessary for the production of serotonin. Of course, from serotonin, we make melatonin and from melatonin, we make melanin. There are a bunch of biomolecules that are very, very important to our health and to our biology. Serotonin regulates and controls blood sugar. It also regulates IGF-1, which is insulin-like growth factor. IGF-1 is necessary for neurogenesis, for our ability to produce new neurons throughout life, and also for regulation of our physiology. Serotonin also activates the enzyme endothelial-derived nitric oxide synthases (eNOS), which is responsible for insulin secretion.

DM: And eNOS is endothelial-derived nitric oxide synthases.

AS: That’s correct. Serotonin catalyzes nitric oxide production in the vasculature providing airway tone, smooth muscle relaxation, and a bunch of other things. Now, it’s interesting that I also discovered in my journey that serotonin, 90 percent of our serotonin, is produced by our bacteria in our gut.

DM: Not in your brain. You would think it’ll be in your brain because it’s primarily known as a neurotransmitter. You have huge numbers, millions of prescriptions being written for the selective serotonin reuptake inhibitors (SSRIs), which are totally designed to increase serotonin in the brain. But 90 percent of this is made in our gut.

AS: Right. Ninety percent is manufactured in our gut and only 10 percent in our biology itself. That’s a very disturbing fact, that glyphosate disrupts our serotonin by destroying these beneficial bacteria. I like to refer to our bacteria... There are no good and bad bacteria. There are only bacteria.

DM: Right, I agree. I always refrain from using good and bad bacteria. I describe them by monikers like beneficial or pathogenic.

AS: Right.

DM: To think it’s more accurate.

AS: Or as gram-negative or gram-positive.

DM: Well, that’s evident.

AS: They all have functionality.
DM: Sure. But the physical characteristics didn’t describe their functionality because you have positives and negatives on both sides of those. But this is an amazing find. You were one of the early people to recognize this, weren’t you?

AS: Yes. I had written the Environmental Protection Agency about this, in a detailed letter. I sent it to them through Senator Jeanne Shaheen. Their response was not very welcoming. They told Senator Shaheen a lot of untrue things about glyphosate, which were very, very disturbing. That pushed me further in the journey.

That’s when I asked the Environmental Protection Agency for Monsanto’s trade secret documents. Most of the approval process was based on studies that Monsanto had done by outside contractors. Then those studies were given to the EPA for review so that they could establish a no observable effect level (NOEL) for the chemical glyphosate.

That process began in the late 1970s and concluded around 1981 with the registration of the chemical. Since then, it’s gone through a couple of re-reviews. But I wanted access to those documents so that I could really get in-depth as to what the agency knew and what Monsanto knew about glyphosate. I asked EPA, as a research scientist, to be able to access those documents in my research. And I was denied by the Environmental Protection Agency, initially.

DM: Did you file a Freedom of Information Act (FOIA) request for the information?

AS: Yeah. And then, it finally took Senator Shaheen’s office, here in New Hampshire, some input from her office to move the EPA. The EPA then sent a letter to Monsanto, and Monsanto had to show just cause why my eyes should not see the trade secret documents. EPA gave them a period of time. I don’t know what transpired. All I know is that the EPA contacted me and said, “We will give you the documents for you to review.” They sent them to me on a disc. I had to sign for them. I was also told that I could not share them with foreign nationals under a penalty of law. In other words, trade secret information…

DM: You’d be a terrorist.

AS: Yeah. I couldn’t view it under the… I forget what act.

DM: The Patriot Act, almost like…

AS: The Espionage Act or something.

DM: I think it’s the Patriot Act, which is an act after 9/11.

AS: So I had to sign that agreement. However, I’ve been going through some 12 to 14 of these documents in the file. They represent thousands and thousands of pages of data on studies that were done on laboratory animals. What I was amazed at, was that Monsanto knew in 1981 that glyphosate caused adenomas and carcinomas in the rats that they’ve studied.

DM: Wow. Thirty-four years ago.

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AS: And they came down all over our good friend, Dr. Gilles-Éric Séralini and…

DM: Which is the study that they manipulated and had retracted.

AS: Right.
DM: And then, quickly, the error… The editor of that journal was fired. But nevertheless, the article was retracted largely due to Monsanto and cohorts.

AS: Out of all these studies, the two studies that were done by Biodynamics in New Jersey (They are a company that’s still in business)…

DM: This is the one farmed up from Monsanto?

AS: Yeah. Monsanto farmed virtually all the studies out to various subcontractors to do the work. Then, they took and summarize those studies and gave the studies intact, along with the slides that were mounted with tissues and what-not, for the Environmental Protection Agency to look at.

But what really piqued my attention is a practice that’s still done today. That’s the practice of taking historical studies from unrelated experiments and comparing the controlled data from those unrelated experiments to the controlled data and the experiment itself that you’re conducting. That’s what they’ve done with virtually every study here with glyphosate.

There were findings that were inconvenient, I feel. Some of the findings like with testicular adenomas and carcinomas. The Biodynamics study in rats did not show any of these adenomas or carcinomas in the controlled [group]. They were zero. However, in the low-dose group of five parts per million (ppm), the mid-dose group of about 15 part per million, and the high-dose group was around 30 to 34 parts per million (depending if it was male or female rats), they found adenomas and carcinomas in all of these dose groups with glyphosate.

Clearly, glyphosate caused tumorigenic growth in the rats in all three groups. But they didn’t see a dose-response relationship. In other words, from a low-dose to a high-dose, the dose makes the poison. Well, that’s baloney. The dose does not make the poison. Glyphosate has an inverse-dose relationship. Lower doses have more effect than higher doses. Glyphosate is pH dependent. It’s a zwitterion. It’s amphiphilic. It works at the molecular level. It takes molecules at a time to cause damage. This is how glyphosate works.

DM: How do those doses on those rat studies you just described compare to the typical exposure of what humans encounter in the foods that they’re getting at the grocery store?

AS: You’ll find comparable levels in wheat, sugar, corn, and soy.

DM: These are the low-dose, mid-dose, or high-dose?

AS: Well, in that particular rat study… The five parts per million, 10 and 30 parts per million, you can find those levels in our food supply.

DM: So these are not grossly exaggerated levels that you would encounter regularly. These are the typical levels that humans are exposed to, at least those who are consuming glyphosate-contaminant food.

AS: Yes.

DM: Not occupational exposures. We’re taking about…

AS: No, this is not occupational exposures. These are residues that are ingested.

DM: Yeah. This is like scientific misconduct. This is outright fraud on Biodynamics and Monsanto.

AS: What they did, I mean, the testicular growths that they found weren’t the main ones. The highest incidence of tumorigenic growth occurred in the pituitary gland.
DM: Oh my gosh. So who needs a pituitary gland?

AS: And then, from the pituitary gland, the second highest levels were in the breasts of the female rats, in the mammary glands.

DM: Like our breast cancer rates aren’t high enough due to mammograms.

AS: Then thirdly, the next highest tumorigenic growth was found in the testicles of male rats.

DM: Geez.

AS: And then, the fourth was the kidneys. They found both adenomas and carcinomas in the kidneys. These were inconvenient findings. Now, in some of the findings, the controls also had adenomas. Some of them didn’t have any carcinomas, just adenomas. But in the treated groups, they had adenomas and carcinomas. For the most part, they were all statistically significant. What Monsanto and Biodynamics did is, in order to cancel out the controls and the inconvenient findings, they dug out some historical control data from unrelated studies.

Who knows if these studies were botched or the quality of the research that went in to those studies? A technician could have accidentally fed the chemical that they were evaluating to the controlled group, botched the experiment, and produced a result.

DM: Sure, the controlled group.

AS: Who knows? Maybe this happened in the glyphosate research with the rat study. The rat study was 26 months (two years and two months).

DM: Let me just make this clear. It sounds like… This data you reviewed and are commenting on was done and funded by Monsanto, yet never published in the peer-reviewed literature or submitted to the EPA or the Food and Drug Administration (FDA). Because the only studies they published were stuff that were done in less than three months, at which point the exposure to these consequences isn’t as profound, if not at all.

AS: That’s correct. I print out sections of the study as I read them. I’m looking at a Biodynamics report here as Project number 77-2062, “A Lifetime Feeding Study of Glyphosate in Rats," and every page of this document – I don’t know if you can see it.

DM: No, I can see it. We can see it really clearly. Obviously, it’s like a macrophage or something.

AS: Right down here, it says, “Contains trade secret or otherwise confidential information of Monsanto Company.” What Monsanto did… I have a letter here from Monsanto’s health and safety officer. He was the head guy at Monsanto at the time, back in 1981. In his letter, he asked Monsanto to seal the documents and to treat them as trade secret.

DM: A corporate strategy.

AS: I personally feel that this is a violation of the public review process.

DM: This exceeds what Merck did by hiding similar information on the use of Vioxx, which killed 60 million people. That is going to seem like almost inconsequential compare to the damage of glyphosate’s going to do.

AS: At the rate we’re going, we’re going to kill billions of people.
DM: Yeah. Important question, because people kind of understand that rats don’t live that long – a year, two years – and this study was 26 months. Obviously, humans live much longer. The humans have only been exposed to this in significant levels for 10-15 years. Can you give us a perspective on lifespan and when we might expect to see this? Because we’re not seeing people drop like flies from these tumors yet. Give us your perspective.

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AS: If you read our three studies…

DM: With Dr. Seneff?

AS: That Dr. Stephanie Seneff and I wrote together, if you look at the graphs that we asked Dr. Nancy Swanson to do for us, which plots glyphosate against corn and soy. I know the scientific community says that the association here doesn’t necessarily represent causation.

DM: Well, that’s a general statistical principle that I think you have to abide by.

AS: But when the numbers are that close, it requires us to take a good, hard look.

DM: Sure.

AS: Now that I’ve looked at Monsanto’s trade secret documents that the public doesn’t have access to, I’m in the process of writing the Environmental Protection Agency and I’m asking them to release those. They have no right to withhold that information from the public. Because what I’ve seen in those documents, it clearly shows that Monsanto knew in 1981 that glyphosate caused tumorigenic growth and carcinomas in multiple organs and tissues.

DM: But what are your projections for when we might see similar incidences in humans?

AS: We’re seeing it now.

DM: Obviously, rats are different from humans. I mean, obviously, they have different physiology and anatomy.

AS: Dr. Mercola, we are seeing it now.

DM: At the same levels that we’re talking in the studies?

AS: We are seeing the increase in chronic disease like we’ve never seen before in history, if you look at the graphs that Dr. Nancy Swanson did for us. She also published an entire series of graphs in a paper that she did with another person. If you look at those graphs of chronic disease, we’ve never seen…

DM: Well, there are lots of variables for chronic disease, but less so for the types of tumors you discussed that weren’t covered in those early studies. Have we seen an increase in those specific tumors?

AS: Yes, we have.

DM: Pituitary, kidney, breast, and testicular tumors.

AS: Yes. We’ve even seen an association between thyroid cancer and thymic hyperplasia. There was some work that was recently done where they looked at the CT scans of patients who had thyroid disease and also found that they had thymic hyperplasia. Well, guess what? In the rat study, they found high incidence of thymic hyperplasia as well as thyroid adenomas and carcinomas.
DM: But let’s get into the incidence levels because I believe in Séralini’s study, at least. Obviously, I’m not privy to the study you reviewed in 1981. The incidence was quite high. It was like 50 percent. It was the majority of these animals came down with these tumors. Now, clearly, we don’t have that incidence level in human population yet. Are you suggesting that we have reached equilibrium? Or are we in this upward slope or we’re going to see continually increase in number until we do reach some kind of plateau?

AS: If we don’t take this chemical out of the food supply, everybody will be affected. Everybody that is eating the Western diet. Everybody.

DM: I’m sorry for harping on this one point. We can go on the others. Because I couldn’t agree with you more on that comment. But these incidences… Was this incidence, was the majority of those rats in the studies you reviewed and in Séralini’s, were they the ones that came down with tumors or was it less than the majority?

AS: The majority of the rats that came down with tumors were the treated.

DM: No. But I mean, was it the majority of those rats? Was it more than 50 percent?

AS: In some cases, it was 80 percent.

DM: Eighty percent. We’re obviously not seeing 80 percent of people in Western populations coming down with pituitary tumors or…

AS: In some of the pathologies, it was slightly less than 50 percent. A lot of them were 50 percent. But in the case of chronic kidney disease (CKD), it was 80 percent of the higher dose.

DM: We’re still not there in humans. I suspect that’s largely related to the fact that rats have much shorter lifespan than humans. Do you anticipate that this incidence in humans will continue to increase with time?

AS: Yes. I think it’s going to shorten our lifespan.

DM: Okay. We’re in agreement in that. We just don’t know the timetable.

AS: Well, with the rats, in the 20th month, they were somewhere between 80 to 90 percent survival, at 20 months. But when we got to around 24 months, as I remember, there were more than 50 percent of the rats that had died. When we got to month 26, I think they only have like 30 percent left.

DM: What is the average rat life expectancy? Is it three years or two and a half years?

AS: Yeah, it’s about two to two and a half years. Two years is considered the life expectancy of a rat.

DM: We would expect if we can extrapolate, obviously correlation is not causation, but rational extrapolation would be that as we near the end of our lifespan, the majority of us are going to come down with these types of diseases unless we get our butt in action and avoid this toxic [chemical].

AS: That is very, very true.

DM: Yeah. So we talked about those tumors, clearly evident in the biopsies that were performed on those animals.

AS: Yes.
DM: But let’s talk about the other things, what you and Dr. Seneff have written about, which you can’t really tell too well in animal studies because they’re mostly behavioral complications. Things like autism, attention deficit hyperactivity disorder (ADHD), and some of the other behavioral problems. Why don’t you expand on that? Because it’s really concerning. Right now… When I started to practice, and when you first started your career, it was one in 10,000 people had autism. Now, it’s down to one in 30. And your projections from your study, in the next 10 years, it will be one in two.

AS: That’s correct, one in two. If we continue on that same trajectory and that same plot, it will be one in two, which is frightening.

DM: This is just threatening. I mean, the people should be running in the streets with this information, demanding action. But they’re not. And that’s part of our challenge, because they don’t know. That’s what we are here to do; to educate, inform, and provide them with solid information, which is being deprived from them through the guise of trade secrets, when it’s literally nothing more than scientific misconduct and fraud.

AS: Using controlled data from experiments that may have been botched to begin with, to cancel out inconvenient truths that staring you in the face – that’s unconscionable to me.

DM: There will be some ultimate retribution for that.

AS: They are continuing to do that. As I look deeper into the studies, they didn’t analyze the water. They did not analyze the feed for other contaminants. Now, in the rat chows, the Purina mix, I contacted Purina and I asked them for a comment in their animal chows and their laboratory feed. They do analyze for some of the basic pesticides and fungicides, like malathion or some of the other organophosphates and some of the fungicides. But they don’t analyze for glyphosate in those feed.

DM: It’s too expensive.

AS: Yeah, it’s too expensive. Now, when we go back to when they did these studies back in 1978 and 1980, they didn’t analyze the feed. But the most popular pesticides that were used at the time in growing corn and soy for those animal feeds were the organophosphates. Some of the organophosphates were things like carbaryl and lannate. There were a number of these organophosphates.

What’s interesting is that I also turfed out patents when I’ve read all of Monsanto’s patents, plus patents from other companies that have also done work with glyphosate. Glyphosate is a synergist with other antibiotics, with other fungicides, and with most of the chemicals that I’ve seen with combination with. I even wrote about it being synergistic with imidaclorpid, the systemic pesticide that’s been implicated in harming the bees.

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The effects that they saw in the Biodynamics studies in the controls, they were feeding contaminated feed to these animals that contained the pesticides of today, which are known to induce some of the tumorigenic growths. But the fact that the glyphosate-dosed animals had higher incidences many times – most often, I should say – shows that there was a synergy with whatever was in that feed.

That’s something that the EPA is going to have to address, and also the Food and Drug Administration. When they do laboratory tests with animals now, they need to look at the residue levels of the chemicals that are in the food because it’s skewing all the laboratory results.
So now, knowing that, why would you take 11 unrelated studies, take the controls from those studies, and compare them to the control in the glyphosate experiment? Only if you wanted to cancel out the data and make it non-existent.

In some case, the EPA allowed Monstanto and Biodynamics to use three historical controls to cancel out the date so that they could say that the findings were inconclusive. In another instance, on another organ, they used five controls. And then, I believe it was thyroid, they used as many as 11 historical controls and then went through great explanations of why these findings were inconclusive. Now, have they not have any of those historical controls and just went on the data of the study as it developed and unfolded, they would have come to a completely different conclusion.

**DM:** Sure. Well, it’s not surprising considering they are voted as one of the most evil companies on the planet. Obviously, devoid of any moral consciousness and absolutely committed into their bottom line profit. So they’re going to attempt to implement any strategy to maximize hiding this data so that they could continue to earn and sell billions of dollars of this crap that’s poisoning the population.

**AS:** It’s not that they are the most evil corporation on the planet. They are a chemical company. They make chemicals and they sell chemicals. I mean, if they were Procter and Gamble selling soap… That’s their thing.

**DM:** It’s still possible that they do it irresponsibly. I mean, this is criminal, what they are doing. It’s absolutely criminal withholding data that knows that it’s going to cause tumors in the majority of the animals that was exposed to. And they knew these over 30 years ago. Yet, they fund PR agencies. They literally pay them tens of millions of dollars to spread the myth that there’s never been any documented study done to support any toxicity from this products, and as you mentioned earlier, it’s safe as salt. This is just morally reprehensible.

**AS:** It is morally reprehensible because they knew in 1981, and that’s what so disturbing. That’s why the world needs to see these studies.

**DM:** I agree. And I really want to thank you for your work on this area, your due diligence, and using your credentials as a valid research scientist to obtain access to these and to the pressure through your local senator to get these documents and then, take the time to review them and find this discordance in the information that they are presenting publically for what they contracted out to their researchers. This is a big story.

**AS:** I had a meeting with Stephanie the other day. I told Stephanie that our next paper should look at all the various organs from these studies, from the Monsanto studies, and that we should write a paper that excludes all of the historical data and goes on the data of the life histories of the individual animals in the study, so that we’re not clouding what was seen and also offering some additional explanation as to the quality of the feed being fed the animals.

This needs to be changed in science. The way that we approach these studies and on test animals needs to be overhauled. The EPA is the agency that needs to do that.

**DM:** I couldn’t agree more. I’m just wondering if you remember how you ultimately connected with Dr. Seneff.

**AS:** Let’s see. I disagreed with Stephanie on what she was saying about the sulfation of vitamin D. That was, I don’t know, about four years ago.

**DM:** Yeah.
AS: It was on your health Website. It doesn’t occur. It’s not sulfation, it’s sulfurization.

DM: I was doing an interview with her and she was repeating that. I know you’re going to come back at her. So I said, “Listen…”

AS: “You better call him.”

DM: “Can we be proactive and could you, at least, have a dialogue with him before we publish your interview?” I had no idea whatever led to your incredible collaboration and publishing all these great research studies.

AS: We got talking. It’s been a long time since I spent time at the Massachusetts Institute of Technology (MIT) library or wherever when I was at ADL. ADL was part of MIT at one time.

DM: Ah, she’s a research scientist there so you had mutual stomping grounds.

AS: It was my old stomping grounds too. When she called me and we had the discussion. I got talking about my research into glyphosate, and what I had been developing and about my contacts with the US Department of Agriculture and what-not. I was putting a paper at the time and she was very, very interested in my research and what I was doing. I said, “Hey, would you like to collaborate? Let’s jump into this thing, the two of us.” Because she really had an interest in it as well.

It started that afternoon. I started to send and flooding her with…

DM: I’m so glad that it happened because it’s so rare. I’ve been doing this for a while and you have also. In my experiences, most researchers are not committed to integrity, truth, and really finding out the reality. They’re more or less interested in keeping their job, getting their funding, and publishing whatever does that allows them to continue that.

AS: Well, Stephanie is in a unique position. She’s close to her time at MIT now. But she’s in a very, very unique position. She has people who are very willing to let her pursue these endeavors. Stephanie and I work together every day, seven days a week.

DM: I did not know that.

AS: Stephanie and I are… We’re constantly emailing. We’re working on like six different projects right now together.

DM: Wow. That is just so great. Who would have known?

AS: I have to thank you, Dr. Mercola, for making that introduction because this has been very fruitful for both of us.

DM: Well, both of you and for the human race. The information that you’re uncovering, publishing, and making publically available has great potential to really change the whole battle ground here so that we can make a difference. Also, that’s what it’s about.

AS: Well, this is only one-half of the equation, Dr. Mercola. As I mentioned before, there should be no herbicides in our food supply, none. Because herbicides destroy plants. All herbicides destroy bacteria. Not all bacteria are resistant, even with glufosinate. They are… I’m working on a potential paper that goes through all the biochemical pathways and all the anticipated health effects from glufosinate. I can do the same thing with 2,4-dichlorophenoxyacetic acid (2,4-D).
DM: What are the levels of glufosinate compared to glyphosate? I know glyphosate is one of the world’s… They’re like…

AS: Probably about 10 percent of the market.

DM: Okay. So, the 90 percent of it is glyphosate.

AS: There are Syngenta varieties and there were varieties from DuPont. I mean, everybody has some of the…

DM: We should all have nothing. But, you know, even if it was herbicide-free and organic, if it’s processed… I just recently interviewed the author, Joanna Blythman, who wrote the book, *Swallow This: Serving Up the Food Industry’s Darkest Secrets*, which I strongly recommend for someone to read.

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She was an insider in Scotland and had gotten in the food industry and saw how they’ve whitewashed all the crap and what they do to process and make it look healthy and good. Anything like those corn chips that you were eating, any processed food, you just don’t want to eat it even if it’s organic. Follow your example, to have your garden and eat locally grown food that’s free of herbicides. But also not processed because the processing is what winds up taking it out. It’s the food processing.

AS: We have another problem, Dr. Mercola. Like I said, glyphosate is only one-half of the two-part system.

DM: Okay. What’s the other half?

AS: The other half is the plants, the genetically engineered plants.

DM: Right. But wouldn’t you say that… Isn’t glyphosate, right now, more significant a threat? I mean, obviously, you can’t argue. Those antigens are not good.

AS: I’m conducting field experiments. Over the past two years, I’ve been conducting field experiments in laboratory analysis of 33 varieties of genetically engineered corn. This year, I’m branching into soy.

DM: They have *Bacillus thuringiensis* (Bt) toxins. That’s a little bit different.


DM: Resistance, right.

AS: These genes are stacked in the gene cassette. When you stack the genes, one gene in the variety may not cause what two, three, or four stack traits do. That’s what I’m seeing in my field and lab work. I’m seeing that you can have the genetically engineered corn, and I’m looking at the untreated, and then I’m spraying it with the herbicide. I’m analyzing the fatty acids. I’m analyzing the mineral content, all of the minerals. I’m also looking at the isomers of the vitamins.

What I’m finding is that there’s a difference between those that are treated with the herbicide and those that are not treated. That the herbicide influences the mineral content of even the genetically engineered resistant varieties, making them particularly more deficient in manganese, cobalt, and copper, but particularly manganese. I’m also finding that the fatty acids are being skewed slightly but also the vitamins, particularly the isomers of vitamin E, tocopherol.

DM: Interesting.
AS: With tocopherol, I found that in the genetically engineered varieties of the oils like soy oil, canola, and corn oil, I’ve looked at the isomers of vitamin E in those, and I found that they have mostly gamma-tocopherol as opposed to alpha-tocopherol. Alpha-tocopherol is the one that’s really beneficial to our biology. Gamma-tocopherol induces inflammation. Particularly, one of the places it induces inflammation is in the lungs. It could be one of the things that is influencing asthma or Chronic Obstructive Pulmonary Disease (COPD).

This is what I wanted to mention also about glyphosate. Animals that were fed glyphosate, most of it, they passed in the feces and a secondary amount was passed in the urine. But they were also exhaling it. What do you think about that?

DM: In a large conference room, where most people are in a standard Western diet, I’d be really careful because I’m going to inhale the glyphosate. It’s actually not surprising to find this synergistic toxicity to recommend. I interviewed Steven Druker for a long time. He wrote a book – and I’m sure you’re familiar with him.

AS: Yup.

DM: *Altered Genes, Twisted Truth*. He’s a phenomenal guy. He’s an attorney who sued the FDA for the 1992 ruling on glyphosate having generally recognized as safe (GRAS) status. One of the chapters in his book talks about a software analogy. It’s exactly what you’d expect. We have like a fraction of a fraction of the due diligence to prevent these catastrophes that they’re doing. These experiments, they’re just… The precaution factors and principles are not applied. So the findings and results that you have are not surprising.

I just want to emphasize one thing too, which you mentioned. It’s this cobalt. Because glyphosate is a mineral chelator and one of those minerals that it chelates, aside from zinc and manganese, is cobalt. So what? Well, cobalt is what you need to make cobalamin, which is vitamin B12. It’s a crucial part. You are not going to get deficiency for several years, but boy, that will make you blind and cause a lot of other issues. You really got to be…

AS: It will cause all kinds of neurological issues as well. It can kill you.

DM: Absolutely. This is just another important reason. We can go on for hours discussing this thing but I think we’ve got enough information now so that people can be… It’s not like you’re disappearing. We can probably have you on again. We so totally appreciate your contributions to the work, and also on our site as a participant in the forum to really help add your wisdom to the ongoing discussions with the people to have a better understanding of the truth.

We’re like you. We’re committed to identifying what is true out there, to have people be empowered so they can make decisions. We could actually… You know, I realized a long time ago that just telling people information isn’t what’s critical. You have to be a leader. We have to find structure so that we can get people in action to remove this. Because the average person is like, yeah, you can buy organic. Some people can’t afford it. But that’s one strategy.

But an even more effective strategy is to not put it in the food supply to begin with. Those hundreds of millions of people can improve health by avoiding this toxin that they are really clueless about. That’s what we seek to do with our labeling efforts and others, these high-level strategies, to really get it out of the food supply. But it’s a collaborative effort, you and Dr. Seneff. The work that you’re publishing can really inspire and empower people to participate. I really thank you so much.

AS: I appreciate you inviting me to talk about it.
DM: Yeah. And really, thanks so much for covering that… That is, to me, the headline of this story. It’s the document you uncovered from 1981 and Monsanto research that has been hidden. Thank you so much for uncovering that, for helping and enlightening us to some of the toxicities of these regular glyphosate exposures, and some things that we might be able to prevent. And if not, the terrible, tragic consequences we’re going to anticipate if we don’t.

Thankfully, we have scientists like you who help us get a good window into the truth.

AS: I just like to say one additional thing.

DM: Sure.

AS: That glyphosate and herbicides, in general, our research with glyphosate is but a model that we can use to evaluate other chemicals. If we take the methodology that we use to evaluate glyphosate and do the same for other chemicals, we can come up with meaningful conclusions.

Our biosphere is being salted daily, hourly, and by the minute. The expanding use of these chemical herbicides needs to be curtailed. We have but one biosphere. We are all connected.

DM: It’s interesting too. One last question I forgot about, because it kind of relates to this contamination of the biosphere. That there is some hope. Dr. Don Huber pointed out that one of the German researchers, Dr. Monika Krüger, actually had done some investigation showing that humic acids or fulvic acids, but I think specifically humic, was actually useful to decontaminate glyphosate.

AS: Yes. I reviewed her paper before publication.

DM: Okay. Can you comment on that?

AS: It’s a… If you feed animals with it, you can absorb some of the glyphosate. But that’s putting a Band-Aid on a wound that needs to be stitched.

DM: Well, it’s an important Band-Aid. I couldn’t agree more. But take yourself. But prior to 2010, you’re regularly exposing yourself through diet and environmental exposures to this. Once you had the epiphany and started changing your lifestyle like so many other Americans will, then what do you to detoxify? Do you think that that strategy is useful for getting it out once it’s in your tissues?

AS: Well, glyphosate doesn’t hang around in the body all that long.

DM: Interesting.

AS: Most of it is passed in the feces and urine fairly quickly.

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They did a… There’s another study, a secret study that I have here where they did some radiological work with glyphosate. They radiolabeled the glyphosate and they injected it into the animals, and then they followed it. They found that it circulated in the blood stream pretty well for the first half hour, and then it tailed off from there. But it went directly to the bone marrow, and this is what’s frightening, because that’s where our haematopoiesis happens, in the bone marrow.

They tracked glyphosate in the bone barrow, pretty stable for at least 10 hours or more. Of course, these white blood cells that come out, they go to the thymus and also our tonsils. That’s where they mature, mostly in our thymus.
DM: But do you think the humic acid would be useful for detoxing glyphosate out of the bone marrow?

AS: I don’t think so.

DM: Okay. That’s interesting. So, probably, it’s limited benefit only for people who are regularly consuming it, and there’s a far better strategy which is avoid it.

AS: They were looking primarily at humic acid to use in agriculture and animal husbandry with chickens and stuff like that.

DM: Okay.

AS: As far as our own biology knows, we need to avoid it. Like I said, glyphosate works at the molecular level. The damage happens at the lower levels. So, when we ingest this stuff, those residues, they get picked up from our portal vein and in our digestive tract. And they attach to albumin, as well as ferredoxin and also to ascorbic acid: about 10 percent ascorbic acid, 60 percent ferredoxin, and 40 percent albumin. Those are the carriers of xenobiotics in our biology.

DM: Interesting.

AS: They cark the stuff off to ourselves, off to our liver and we try to detox it.

DM: That’s another important thing that most people appreciate. Because like traditional herbicides or pesticides that are sprayed on crops, unlike glyphosate, you can wash those off. But glyphosate, as my understanding from Dr. Huber, gets integrated into every cell of that plant. That’s like impossible to wash off the plant because it’s inside every cell.

AS: Yeah. It attaches to the plants’ biology like it attaches… Some of it attaches to our tissues and causes tumorigenic growth. One of the main things that glyphosate does in our biology is it both up and down regulates genes. In E. coli bacteria alone, glyphosate was shown to up and down regulate some 1,040 genes. Many of those genes, of course, are involved with the cytochrome P450 enzymes, as well as glutathione as transferase, which is another first line of defense of our cells in detoxifying our biology from the effects of xenobiotics. Some of the other important enzymes that are disrupted… Lactate dehydrogenase. That’s another one.

DM: LDH.

AS: Yeah. That’s one of the many, but I’m particularly looking at this one now for a part of a new paper that we’re going to be writing. Lactate dehydrogenase, of course in our biology, is an indicator of a damage that’s happening. But glyphosate shuts down lactate dehydrogenase. You can have damage and you won’t be showing the lactate dehydrogenase, which serves a particular function.

DM: Imagine that.

AS: But there are a lot of enzymes that glyphosate disrupts in our biology.

DM: Thank you for elucidating that, and for also saving me some time because Dr. Krüger has been enormously elusive to get a hold of. I was excited because I thought it might have some benefit, but it sounds like humic acid is really not very useful.

AS: She sent me an email today. I got an email the other day, that she wanted me to review one of her papers. I wasn’t sure what that was about. It came through ResearchGate or something. I sent her an email. She emailed me back today. At times, she’s hard to get a hold of. It might be a couple of days before she gets back to you. But she’s generally good about returning a call.
DM: Anyway, it’s moot issue at this point because it sounds like it’s not something we want to pursue. But thank you so much. Thanks for everything you’re doing, will do, and continue to do to inspire, inform us, and educate us about this important challenge to not only our own health but really, the health of the whole civilization. We’ve got a big challenge to tackle here. Really, it’s the data that you’re generating that help and arm us to defeat these things. I appreciate all you’re doing.

AS: Thank you very much, Dr. Mercola.

[END]