

Doctor Mercola: Lab testing. What you need to know to make sure that the food and products you're using are safe. Hi. This is Doctor Mercola helping you take control of your health, and today we are joined by John Fagan from HRI Labs, who's an expert in this area, and is going to enlighten you about all the subtleties you may not have been previously aware. Welcome and thank you for joining us today, John.

John Fagan: Oh, it's a pleasure to be here, real pleasure.

Doctor Mercola: Maybe you can give us a little history of your journey, and how you came to be proficient in lab testing, and a director of a lab, and what HRI Labs is all about.

John Fagan: Thanks. Just in one phrase, what HRI is about, Health Research Institute Labs, is making the invisible, visible. Giving you the ability to see into what is in your food, and into your environment. All of these things. Where I came from is that I studied biochemistry and molecular biology at Cornell University. I got my PhD from them, and from there I went to the National Institutes of Health for a decade, and then into academia where I did cancer research using, actually using genetic engineering as a research tool. I got concerned about genetic engineering, and especially what it was doing to our food. As a result, I created the first lab for GMO testing in America, and also developed labs in Europe, in Japan and trained laboratories in 17 other countries.

What this did was to make GMOs visible. Before that testing was there, nobody could tell whether those soybeans, or that corn was genetically engineered or not. After that testing was available, people had a choice. We want to do the same thing for two things. One, are the baddies, two, are the goodies. The baddies are all the pesticides, and herbicides, and other environmental toxins that can be in our food, and our environment. The goodies are the higher density of micronutrients that are going to make your food even better for you. We feel that the kind of testing that we're doing can open a window for you in each of those areas, so you can make better choices about the food that you eat, and that you share with your family.

Doctor Mercola: Great. When you established the initial screenings for GMO foods, what were you testing for? It wasn't the herbicide glyphosate, which is one of your best tests, I think, now. Was it the actual antigens that were modified in GMO production, like for the BT corn, and some of the other shifts they made with them?

John Fagan: Good question. Actually, the antigens are one kind of test, but what we did was to actually look at the DNA. DNA is very stable, more stable than proteins. You can find the genetically engineered DNA, even in highly processed foods. That's what we went for, and it's more sensitive, and more rigorous that way.

Doctor Mercola: What type of screening or analysis do you do to check for the DNAs? The PCR test where you amplify it, or is it-

John Fagan: Yeah.

Doctor Mercola: [crosstalk 00:03:51] chromatography?

John Fagan: Yeah. We use, and it can, still, this is in use, is the polymerase chain reaction, which is a method that can detect even, because it amplifies the signal by cyclic amplification, it can detect one or two molecules if they're present. We could, for instance, detect a single genetically engineered corn kernel in a bag that contained 10,000 or more such corn kernels. Very sensitive.

Doctor Mercola: You have a chromatograph too. Maybe you can discuss that, because it seems to be one of the central pieces of equipment you have at your lab.

John Fagan: Yeah.

Doctor Mercola: That really allows you to test for a wide variety of things. Maybe explain the reason why a lot of labs don't have this, because of the cost and the complexity, and really getting certified through the analytical labs to do the testing legally.

John Fagan: Yeah. This is what we have come up, we developed now is it's called, liquid chromatography linked to a mass spectrometer. Liquid chromatography is capable of taking a sample of food, or of something that you're going to, some orange juice, or whatever you're interested in, and fractionating it into literally hundreds of compounds, separating them out. Then that is fed into a mass spectrometer, which is a machine that measures, ultimately, molecular weight of whatever it's looking at, and with that you can detect at extremely low levels and identify very specifically almost any compound that's out there. Any natural, or unnatural compound, and at very low levels really down to the parts per trillion, literally.

To give you a sense of what that means, parts per, 40 parts per trillion, which is a limited detection that we have for some materials is like if you were to take a single drop of that chemical, and put it into 20 Olympic swimming pools, dilute it into 20 Olympic swimming pools full of water that's the level of dilution that you would have to get at that level. It's extremely sensitive.

Doctor Mercola: [crosstalk 00:06:33].

John Fagan: Yeah.

Doctor Mercola: There's a significant barrier of entry, isn't it? Most labs don't have this level of equipment complexity, because of the cost, and the challenge, and training certified technicians to run that. Why don't you describe how common these pieces of equipment are, and how many labs have access to them?

John Fagan: These are like the teslas of analytical chemistry.

Doctor Mercola: Yeah. It's like, I like that analogy so much better than the Cadillac's, because that is the new Cadillac is the Tesla.

John Fagan: Yeah. In fact, the machine that we use, it gets equivalent in cost to about four Tesla's.

Doctor Mercola: Mm-hmm (affirmative).

John Fagan: That's the one we use for measuring glyphosate, so it's really expensive. For this reason, even many of the analytical labs out there don't have access to this, and also because it is very specialized equipment, you need a PhD in order, you need somebody with a PhD in analytical chemistry, or somebody with many, many years of experience to do this kind of testing. This is why, in fact, what we're doing is not, it's not one of a kind, but it's unique in that way. Yeah.

Doctor Mercola: Why don't we go a little bit on a tangent to some of the politics involved, here. One of the reasons why we were so interested in collaborating with your lab is that many of the conventional commercial laboratories out there that are used, supposedly, independent labs to confirm the purity of some of the raw materials, actually are not very truthful, and in fact in our experience they provide really prejudicial distorted incorrect information. If this is a topic you don't want to delve into, that's fine, but if you're willing to discuss that I'd appreciate it, because to me that's one of the great features, or benefits of a lab like yours. It really is objectively true.

John Fagan: Yeah. There are actually two factors. One of them is the politics of it, and the other is the economics of it. Most of these food labs are really working, they're primary customers, even though they're, quote, independent, their primary customers are the big food companies. They don't want to embarrass them. They don't want to bring anything to the surface on that level, so they tend to give a very superficial numbers. Typically, what they do is they work to thresholds that are established not based on science and safety, but based on politics and convenience.

For instance, you can go to the FDA website, or the USDA website and they will say, "Oh. A given crop, wheat, should have less than such and such amount of glyphosate in it." Glyphosate is the herbicide that's the most commonly used chemical, agrochemical, and it's now been demonstrated to cause cancer, to cause liver and kidney damage, and also birth defects. You'll find there a number for it, but in fact if you go to the scientific literature you discover that in fact levels hundred or a thousand times lower of glyphosate, levels that much lower are in fact toxic to the system, and for that reason you know, those government established thresholds are not very, there not meaningful.

Doctor Mercola: Yes, and in fact that was the early name of your lab, The Peoples Lab, but then you changed it to HRI-

John Fagan: Right.

Doctor Mercola: The Health Research Institute. I mean, before we leave the topic I just want to emphasize to people watching this that the many companies that are selling food, primarily in the food industry, not so much in the supplement industry, although that happens in the supplement industry, too. It's more pervasive in the food industry is that use these bastardized manipulated settings to prove that they are safe when in fact they aren't, because they've changed the way that they're looking at it, it's just the way that they do science. It's important to know that, and it's important to know that HRI does not do that, that you're getting the truth, that there's no industry bias in your lab, which is one of the reasons why we are so glad, and delighted to collaborate with you.

John Fagan: Thanks.

Doctor Mercola: Yeah. One of the big things that you're testing for, and there may be other labs that test for it that is relatively unusual would be the glyphosate, the most common herbicide used in the world to the tune of five billion with it be tons per year, and it's just permeating everything. You do offer a test, now, that you can see the threshold levels, I actually had the test done, and I reached below this threshold of your spectroscope, or spectrometer, which was I think you said 40 trillion, 40 parts per trillion. That's as low as you go, and I probably have some, because no ones perfect, but it was pretty low. Maybe you can comment on the test and the distribution of the results that you're seeing, and the people that are submitting them.

John Fagan: Mm-hmm (affirmative). What people are doing, what this test does is it gives you a window into your own exposure to these chemicals, and in fact we look at the glyphosate as sort of a flag, as an indicator for what else might be there.

Doctor Mercola: Mm-hmm (affirmative).

John Fagan: What we're finding is that there's quite a range of levels of exposure, but that people who are eating organic generally have much lower levels. People, it's interesting that women tend to have on average a little lower levels than men. There are certain behaviors that tend to lead one to have higher levels. For instance, it isn't a super strong correlation, but it appears that if you're a golfer, you're more likely to get exposed, because they use all these things on golf courses, so you can get that, it's out there in that way. The reassuring thing is that if you, and we've had some people do this, where they have a high level and they just say, "Okay. I'm going to change my diet," and if they then go to a diet that's avoiding things that might contain these chemicals, then within a week or two they see significantly reduced levels of glyphosate. It's a good measure for, or good sort of way of guiding what you're doing with your diet, and-

Doctor Mercola: Sure.

John Fagan: [crosstalk 00:14:17]. Mm-hmm (affirmative).

Doctor Mercola: Yeah. Many times it's only theoretical, or philosophical, and you read about it, and you hear about the concerns, but obviously the media is not exposing it, and most conventional physicians are denying that it's an issue. It's abstract, but when you get the numbers back from a lab and it's objective, and you see it, it can be highly motivating.

John Fagan: It definitely can. We see people very often who are, they'll come back to us saying, "Oh, yeah. This changed my way of thinking about my diet." It's a good thing. It really is.

Doctor Mercola: You're doing the converse, and you're actually checking food companies that claim to be natural and healthy, and have not GMOs in their products, and then you do independent testing, and you find that, that's a big bold batch of lies as you did recently with Ben and Jerry, so why don't you just describe that, and if there is any other companies that are in your target.

John Fagan: That's a great question, Doctor Mercola. It's really been an interesting process, and just one thing to be clear, we don't just randomly test companies. It's when an organization like Organic Consumers Association has questions about companies, they've done some research, and they have questions, or Moms Across America, or another organization that's concerned with our food system, when they find something they have questions about, then we're in a position to use the gold standard testing methods to really give them clear insight into what's going on with that particular product, or that particular company.

For instance, Organic Consumers Association and an agricultural organization called, Regeneration Vermont, were concerned about what was happening with Ben and Jerry's, they came to us and they were concerned that the dairy industry in Vermont was in a very difficult situation, in that the dairy producers, the farmers, the dairy men and dairy women were really not even able to get a price for their product that would cover their costs for producing the milk. There was also a concern from people in the state that the dairies were actually, the large industrial dairies were actually polluting all of the lakes, and interfering, really creating problems for the Vermont, what do you call it? The tourist industry. That people were no longer coming to Vermont, because the lakes and the rivers were polluted.

They wanted to look into what was at least going on with the quality of the milk. They came to us, they sent us some samples, and we did some really in depth testing, very careful testing, using the very best methods that are out there. We used what's called triple quadruple mass spectrometry linked to liquid chromatography, high pressure liquid chromatography to actually look at the, very carefully at the quality of the ingredients in a product. What we found with Ben and Jerry's ice cream was a bit shocking in that we found that in fact that ice cream contained substantial levels of glyphosate, which is the key active ingredient in Roundup herbicide, the weed killer that has been used so

commonly in agriculture these days, and is used with genetically engineered crops, and on like that.

We looked for glyphosate in Ben and Jerry's ice cream, and what we found is that can out of the 11 different flavors that we looked at contained measurable amounts of glyphosate, and at least one of them contained levels that according to most recent research raised questions about safety. In particular, it had been found that glyphosate at quite low levels, at levels that are considered safe by the EPA, and FDA, that this most recent research showed that in fact those levels were not safe, but could actually cause problems like fatty liver disease. As you may know, there's an epidemic of fatty liver disease in America, today, and it's linked with things like metabolic syndrome, and on like that.

What we found is that Ben and Jerry's ice cream contained substantial levels of glyphosate, and then the Organic Consumers Association has been discussing those results around the country, and discussing with Ben and Jerry's if they could do something about that, and the obvious, and most logical thing for them to do is to begin to use ingredients that are organic instead of just conventional ingredients, because organic bans that use of things like glyphosate in the production of crops. It makes good sense to do that.

We've been looking at a number of other food products as well. One interesting area is the grains, and the legumes, the beans, and peas, and things like that. It turns out that for all of these crops, they have to be dry in the field before they're harvested, and to speed that process up, they now will often spray the field with glyphosate a couple weeks before it's harvested, and this is fresh sprayed before they harvest the crop, and this can have big problems.

It turns out that the levels of glyphosate that we're seeing in breads, and other things that contain wheat, or in legumes, beans, garbanzo beans, things like that, are quite substantial. Oats, and barley, and things like that. It's been found that, for instance, Quaker Oats contains very high levels of glyphosate, and you can actually find it in the urine of people who have been eating Quaker Oats. These are the kinds of problems that are coming up out there. All this needed is for the wheat producers, and grain producers to change their practices, so that they're not spraying the fields with this weed killer immediately before they harvest it, and it will solve those problems. We've been looking at a number of crops that way.

Doing this testing we believe is bringing, it's making something that's been invisible, visible to us in our food system. When you take spinach home from the grocery store, for your family, you know, you pick up this spinach that looks green, and fresh, and healthy, but it could contain based on even USDA, and the Center for Disease Control, CDC testing that's been done, you find out that on average a vegetable like spinach that you buy in an American grocery store it is going to contain or carry on average eight different pesticides. That's eight different pesticides, and you're taking it home to feed your family without knowing that, that's the case.

The reason you don't, you aren't able to know that is because the chemical companies have done a really good job basically lobbying our government so that nobody in the supply chain has to talk about these herbicides, and pesticides, and these other agrochemicals. The farmer doesn't have to talk about them. The brands that are selling products made from those things don't have to talk about them. The grocery stores don't have to. They're essentially, they've been made invisible in our food system, and that's a big concern.

What we're doing is we're doing testing using rigorous methods, the very best methods out there, most sensitive methods out there to make these invisible things visible, so that you know more about what's in your food system, and in the foods that you're giving to your families. This is so important, because this allows each of us, each person out there to make better choices about the food that they provide to their children. We started with glyphosate because it's the most used herbicide on the planet. In fact, it's the most, in terms of tons used, it's the most used agrochemical in the marketplace today, whether in the US, or South America, or Europe, or Asia, it's the most used one, so we felt that was a good place to start.

We see it as an indicator of what else is in our food that way, but we're going to be moving on to test for a wide range of agrochemicals, and that will give a bigger window into the situation, so that you can make better choices about food that you eat. We feel this is important. There's another part of what we're doing that is we hope even more helpful to you, and that is that we are actually, we've developed a test where you can send in a urine sample and find out how much glyphosate is in your system that way. It's a good feedback system to use, to assess where your diet is taking you in terms of the chemicals in your system.

We've been doing this now, we've looked at more than 1,200 different people has sent in samples, and this is really, it's really interesting, this is being done as a research project, so that each person that participates in this is really a volunteer in this research project, so when you send in a urine sample for this you not only get the information yourself about what's in my system, but you're contributing to this study that's going to get us information about diet. How does diet influence those things? How does your lifestyle, other things, your location, your neighborhood, how do all of these things affect your exposure to these agrochemicals?

Here are a few points that we've found, so far. That believe it or not, 76% of the people who send in samples for testing for glyphosate, and by the way, you can actually get these tests on Doctor Mercola's website. These tests are actually available there. You can order them for yourself, for your family, give it to somebody as a birthday present it's an interesting health birthday present, you might say, and become part of this, we call it, Citizen Science that we're doing here. You get information about your own health, as well, by doing this. 76% of the people who participate in this have some level of glyphosate in their system, most people only traces, but some people substantial levels.

Here are a few of the things we've found. Men, typically have higher levels than women. Another is that if you eat oats on a regular level, basis, if you eat oatmeal, or oatcakes, or things like that you can expect to have twice as much glyphosate in your system as people who don't, and that's because oats are one of the most commonly sprayed for this desiccation, or drying of the crop before it's harvested. On the other hand, if you eat organic products there's an 80% lower levels for people who eat organic on a regular basis, so that indicates that organic products typically have lower levels, so are going to be safer. If you eat six, no, if you eat five or more vegetable helpings a day, you're likely to have 50% lower levels than people who don't eat so many vegetables.

Again, we think that way because it's an indicator of people who are generally focused on healthier eating, people who have healthier eating patterns, and with those healthy eating patterns comes less reliance on things that might have higher glyphosate levels. Other things, so far we haven't seen any connection with rural versus city dwellers, or with seasonal versus, you know other seasonal changes. This indicates that most of the glyphosate is coming into our diet through the food we eat, and not through the environment around us.

Though, we have seen some interesting things, for instance, in the Midwest, at least, we're seeing that rain water has quite substantial levels of glyphosate. This is because during the growing season much of the glyphosate is sprayed aerially, you'll have these crop dusters that come across the fields and spray, and there's always a lot that gets picked up in the wind and carried away, and then the rain will carry it down through the ground. Rain water, although you might think of that as being a healthy source of water, it's a little risky that way.

We've also been collaborating with a research group at the University of California in San Diego, and they had access to urine samples from one of these epidemiological studies where they studied the same population of people over 15 and 20 years, and so we got urine samples from people that went all the way back into the 70s, up until the present, and we asked the question, what happens with glyphosate levels compared to the use of glyphosate in the marketplace, for agricultural uses? What we found was that there was a very close correlation, and so it's sort of like this hockey stick that for many years is low, but as soon as glyphosate comes in it begins to come up, and then suddenly with the genetically engineered crop it begins to take off in a big way, so there's that.

That study is actually going to be published in the Journal of the American Medical Association. It'll be coming out in October of this year, so keep your eyes peeled for that. It will be coming out in the near future. Very interesting, because it shows that there's a correlation between the use of this in agriculture, and the level of exposure of the population. These are a few of the things we found to date, and we find this pretty interesting results. We feel that this is useful mostly because as I said before it makes what's invisible, visible, and allows us to give you better information about what is safe to eat, and what



isn't, and how to guide your diet, so that you're going to reduce the risk of exposure to this chemical as well as other things.

Remember, these chemicals, there's growing evidence that low levels of these things interact with each other, so that you have a little glyphosate here, and maybe some atrazine from another place, and those together might have some nasty impact in that way, or chlorpyrifos, or something else like that might interact. I can't say that, that's the case for it, but I'm just sort of giving it as an example glyphosate and some other pesticide might interact and cause problems that neither one of them would cause if you had doses of just individuals.

That's where we are with things, today. We're working really in a focused way to look at other aspects of our food system, and looking not just for the pesticides, and the negative things, but we want to look and understand what are the connections between the way that food is produced by the farmers, and it's nutritional value. What [inaudible 00:35:22] are that we're seeing is that healthy soil, makes healthy food, makes healthy people. We're going to be going into that using these very sophisticated high pressure liquid chromatography linked to mass spectrometry to look at all of the nutrients at once.

With these machines we can look at, you know, from a single sample of broccoli we can look at 500 to 1,000 different metabolites, different nutrients that will be present, and in one swoop get a sense of what all of those are, and how does regeneratively produced broccoli compare it with broccoli that's produced using chemicals, or how does a CAFO chicken, a chicken that's produced in a confined animal feeding unit, or operation, how does it compare in nutritional value to a chicken that's been produced in a regenerative pasture based production system? We don't have the answers to that, yet, but I'll bet you that we're going to find big differences in the nutrition.

The protein value may be the same, and the fats, and the carbohydrates that are present, but the micronutrients we're going to see big differences, and it's those micronutrients that make the difference in terms of the health of your physiology, and the strength of bones that you have, and the balance in your physiology. We hope that we're going to be able to bring some really powerful new information to you in this way, and for this nutrient work, it's quite interesting, because the machines that we're using, the instruments that we're using are often used by scientists for looking at metabolites in the physiology. They'll take a sample of serum and run it through one of these machines to see what the metabolites are, what happens when you have a certain health problem, or when you take a certain drug, or something like that.

But, what we're doing instead of doing metabolomics, we're doing [inaudible 00:37:55], and metallomics, and [inaudible 00:37:58] looking at the balance of these nutrients that are present in these different things, really applying this very sophisticated, very powerful instrumentation for this new application, so that we can see more deeply into our foods, and you will benefit from better

choices when we come up with this data. That's where we are with things, at this point, and where we're going with them.

One of the interesting things about using these very powerful research instruments to look at food purity is that Doctor Mercola is actually beginning to use these to look at the quality of their own products. You might say they're on the leading edge, and that they're already looking to make sure that the products that they're offering to you are going to be maximally safe, maximally pure, maximally having the highest authenticity that would be possible. By doing that, they've added another level of quality control to the processes, and to their standard quality control methodologies. This takes them way beyond the limits of what most companies are doing in terms of testing the quality, and the safety, and nutritional value of their products.