Testing for Food and Chemical Sensitivities

Guest: Dr. Aristo Vojdani

Niki Gratrix Hi, everyone! This is Niki Gratrix. Welcome. Today I have the privilege and honor of introducing one of the great scientists of our time and the father of functional immunology, Dr. Aristo Vojdani. Dr. Vojdani has a PhD in immunology and microbiology and has carried out postdoctoral studies in comparative immunology at UCLA and in cellular immunology at Tel Aviv University Medical Center.

He is presently the professor of neuroimmunology at the Carrick Institute for Graduate Studies, is a past associate professor at the Charles Drew UCLA School of Medicine and Science and is currently an assistant professor at the Department of Preventative Medicine at the Loma Linda University in California.

He has published over 160 peer-reviewed articles in scientific journals and is a member of the editorial boards of numerous peer review journals, including the *Journal of Toxicology and Industrial Health*, the *Journal of Environmental Epidemiology and Toxicology*, and the *European Journal of Inflammation*.

He has participated in research which has been funded by the Environmental Protection Agency, the National Institute for Health, and the National Institute of Allergy and Infectious Diseases, and the Department of Veterans Affairs.

Dr. Vojdani's Research spans a 45-year career focusing on the role of environmental factors such as toxic chemicals, infections, and dietary proteins, specifically peptides in chronic complex diseases. Dr. Vojdani is also the CEO and technical director of immunosciences in LA and is the chief scientific advisor at Cyrex Labs in Phoenix Arizona. And he's a very reputable and respected scientist. In 2009, he received the Linus Pauling PhD award from the American College for advancement in medicine.
So, Dr. Vojdani, thank you so much for agreeing to be interviewed for our summit. And a big, warm welcome to you!

Dr. Aristo Vojdani Niki, thank you for having me on your program.

Niki Gratrix Could you share with us some of the current statistics about the chemical load in the environment and how far behind the you think the average physician adopters are in terms of understanding how these factors might be impacting health in general, autoimmunity and fatigue.

Dr. Aristo Vojdani Unfortunately, the classical physicians who are examining patients today, other than functional medicine doctors, alternative medicine doctors, and other groups associated with complementary medicine, they're very much behind.

In the textbook of medicine, there are many reports and documents that drugs such as antibiotics can induce autoimmunity, can induce antibody production against our own

tissue, such as anti-muscle antibodies, anti-nuclear antibodies, anti-DNA antibodies. When they remove those chemicals—in this case, drugs—from the environment of the patient, they can reverse the autoimmune reactivity or even autoimmune diseases. So they accept that.

This group of chemicals, which it happens to be drugs, can induce autoimmune disease. But when it comes to chemicals such as formaldehyde, mercury, or nickel, it is good only for publishing articles in scientific journals and may take 30 to 50 years that that knowledge will come to the physicians who, on a daily basis, examine patients, including patients with chronic fatigue and fibromyalgia.

Niki Gratrix Wow. That's fairly disturbing, 30 to 50 years. Okay. And what's the statistics around the numbers of chemicals in the environment and how many new chemicals are coming in each year?

Dr. Aristo Vojdani Yes, the list is incredible. Between 80,000 to 100,000 new chemicals were introduced into commercial use since the 1940s. Only 3% to 5% of those substances were characterized for human toxicity. Now, in the meanwhile, while they did not examine the other 95%, they are introducing additional 2,000 new chemicals every year. So many chemicals, Niki, you and I or the patients who have chronic fatigue syndrome, all of us are exposed to these chemicals on a daily basis.

For example—this is really very bad news—that when we look at cord blood… I'm sure you heard or read some of these articles. When they tested cord blood of the newborns and tested for about 600 or 700 chemicals, 287 commercial chemicals including pesticides and pollutants were found in cord blood. The meaning of that is the mother who became pregnant has many chemicals in her body.

So the list is incredible. So only now do I see some signs and some discussion in scientific journals, articles, including science, that NIH and NIEH or National Institute of Environmental Health Sciences are trying to discuss this issue, why the burden of the proof should be on us who are using the chemicals that chemicals are bad to our health, why the burden of the proof should not be on the manufacturers?

Therefore I believe there is some kind of suggestion, some kind of bill is going through to the Congress of the United States; hopefully they'll approve something that in the future, chemicals, before their introduction into the environment and into the use buy us screened for toxicity. And only the manufacturers have the proof of safety of those chemicals only then to introduce them into the commercial use. But let's hope for that.

Niki Gratrix Yes. We shouldn't be being used as the testing ground. Totally agree. So let's go into some of the biochemistry of the chemicals, perhaps with an explanation about we're exposed to them through food, diet, cosmetics, water, personal hygiene products, and the air. What's the kind of process that can eventually lead, for example, to the production of antibodies and autoimmunity?

Dr. Aristo Vojdani Yes. Unfortunately, Niki, there was a wrong understanding or assumption that chemicals come in and get out. Unfortunately, that's not the case. I wish that was the case. And this is based on my discussion in the many members of society of toxicology. These are MDs who practice in the field of toxicology, PhDs, scientists.

They believe that the majority—95% of chemicals—get in, go to the liver, the liver detoxifies them, and then we get rid of those chemicals. But chemicals get metabolized by the liver. Cytochrome P4 50, phase 1 and phase 2. Then those chemicals as their parent compounds or metabolites, because of their chemical structure, can bind to human tissue and form alliances with human tissue, bind to the tissue or fats, and stay in our body forever. We call that the body burden of chemicals.

So, yes, maybe it is true that 50%, 60%, 70% of chemicals get release from our body. But 5%, 10%, even 30% of those can bind to human tissue and set the stage for autoimmune reactivity first and then autoimmune disease.

Niki Gratrix Wow. So it's the attachment to the tissue, which is key. So certainly that's where the body suddenly goes, "Okay, that's abnormal. We're going to attack it." And that's where the antibodies are coming in. And it could be autoimmune thyroid, autoimmune brain cells, all the different types of autoimmunities.

Dr. Aristo Vojdani Absolutely. And, Niki, this article, later on if you would like to share with your audience, I'll send you the PDF of this article which was written about myself that we looked for antibodies against xenobiotics, 12 different chemicals, which we'll discuss later.

In 400 healthy subjects—healthy subjects today may not have any symptomatology—I was interested to find out what percent of the healthy population are not only exposed to chemicals… We know everybody is exposed to chemicals. But what percentage of them chemicals bind to their tissue, which in the future may develop autoimmune disease?

The answer was between 15% to 20% of healthy subjects walking today on the street make antibodies against chemicals plus their own tissue. And this article was published in *Journal of Applied Toxicology*. And I got very, very positive comments about this because I discussed this article exposure to chemicals as a mechanism by which the body reacts to chemicals plus our own tissue, resulting in autoimmunity.

Niki Gratrix Wow. So we're sitting on an autoimmune explosion in the future?

Dr. Aristo Vojdani Yes. And here's the best example. I was reading this article in the *Wall Street Journal* yesterday, a company in Seattle looking for natural remedies for medications from nature for autoimmune diseases. And they say, "Well, whatever we do right now, it's not good enough because we are suppressing the immune system. We have to be targeting those lymphocytes attacking the tissue," like targeting cancer therapy. The same thing for autoimmunity.

So they came up with this idea that's some kind of new medication that can target T helper 1 or T helper 17, which are involved in autoimmune diseases. But when it comes to causes of autoimmune diseases, they say, "Well, really we don't know what are the causes of increasing percentage of autoimmune diseases."

But you and I, we know the answer. The answer is exposure to so many toxic chemicals we are using on a daily basis.

Niki Gratrix Yes, it's so clear to us. But it's going to be a long time before we get the rest of the communities to understand. We've been talking on the summit about gluten sensitivity with Dr. Tom O'Bryan and food sensitivity in general with a few other people on the summit.

Interestingly, both of them suggested that the chemical exposure is also causing this explosion in food sensitivities, as well, like it may be one of the causal factors behind that. What's your view on that?

Dr. Aristo Vojdani I 100% agree with that statement. In fact, in my presentations, I have several slides explaining that in very simplistic approach, which let me share that with you and with the audience. I use Mr. Peanut as an example that when we consume peanuts, they contain about 60% protein. But unfortunately there are pesticides. There are aflatoxins and many other heavy metals bound to the proteins of peanuts or even grains, such as wheat and barley.

So our digestive enzymes are meant to digest the proteins of wheat, such as gluten and non-gluten protein or peanuts proteins to single amino acids. Proteins get digested to peptides, first by digestive enzymes. Then digestive enzymes break down to peptides to single amino acids. And the amino acids get absorbed, which give us the energy.

But when chemicals are bound to those proteins, our digestive enzymes cannot work. The analogy is like a scissors. The enzyme is a scissors which cuts the bonds between different amino acids of peptides. But now, when chemicals bind to these amino acids of gluten and peanuts proteins and other food proteins, the scissors does not work.

And therefore these peptides, undigested peptides get accumulated in the intestinal tract. Some of them bind to our tissue protein, such as transglutaminase in the case of gluten. Now the analogy is almost similar to chemicals. Toxic chemicals bind to our tissue antigens, right? Here, a component of dietary proteins bind to our own tissue and set the stage for immune reactivity against the food antigen, as well as our own tissue antigen, in this case transglutaminase and other tissue antigens, as well. So I agree with that statement, absolutely possible. Chemicals are responsible for us making antibodies against different food proteins and peptides.

Niki Gratrix Okay. And I wanted to ask you, it's widely understood about autoimmune thyroid. But something we hardly ever hear about is autoimmune adrenal. And in chronic fatigue, we know there's low cortisol output from the adrenal glands.

I always thought it was maybe more of a signaling problem from the hypothalamic-pituitary axis because of all the stress and so on and that that led onto the lower cortisol output. How common do you think it is that it could actually be autoimmune adrenal?

Dr. Aristo Vojdani Yes. I agree with you that HPA axis plays a significant role. Similar to that also, autoimmunity plays a major role because one of the antibodies I used to test and now today is part of the array #5 of Cyrex was adrenal antibodies.

In more than 50% of patients with chronic fatigue and fibromyalgia, we found antibodies against adrenal glands. We found antibodies against thyroid glands. And when we make antibodies against those glands, it results in fatigue and fibromyalgia.

Niki Gratrix Absolutely. It's strange that we don't hear more about autoimmune adrenal. There is no scientific reason. It should've been out there. I'm not sure why we don't talk about it more.

Dr. Aristo Vojdani In fact, even we know that what is the target? There is an enzyme called hydroxylase in the adrenal gland, which is a target of autoimmunity. So 25 years ago I used to measure antibodies against the adrenal glands, specifically against that enzyme. And today that is part of array #5. That's why we are measuring antibodies against adrenal glands.

Niki Gratrix So let's actually move on to talking about some of this amazing state-of-the-art testing that you've designed at Cyrex Labs. Let's just talk about the chemical immune reactivity array #11 first. Now, I've heard you say you weren't a fan of blood or urine load testing. But you do put some weight on fat biopsies. At least it confirms exposure.

But from my understanding, I thought even with fat biopsy, it may not be enough to assess how badly these exposure are affecting somebody. So, for example, two people could have the same fat biopsy results, say, positive to mercury. But maybe only one person is having major problem and maybe gets chronic fatigue because it depends if the immune system is reacting or not. Am I on the right lines there? What's your view?

Dr. Aristo Vojdani Your questions are very well taken. I believe in body burden of chemicals. And, in fact, after my publication of that article in *Journal of Applied Toxicology*, several scientists from major universities contacted me. And they wanted to do research with me about mechanism of autoimmunity and its association with autoimmune disease.

And they believe also in body burden of chemicals. Why? Because if we measure chemicals right now in blood and urine, we'll find thousands of chemicals in blood and urine of every single individual. So what is the value of spending the money and measuring chemicals in blood and urine? That shows that my detoxification system works very well. And the chemicals get clear from my system. So I'm worried about the chemicals, which bind to my tissue, including the fat.

So in the case of fact, I know it's not easy to do fat biopsy. And if we find chemicals in the fat, I believe that individual, with the body burden of chemicals, has more capacity to develop autoimmune diseases than the one without having chemicals in the fat. That individual may have chronic fatigue. But that chronic fatigue and that individual, without having mercury or heavy metals in the fat, could be associated with a different factor.

I believe in measuring the immune reaction against chemicals bound to human tissue. And that's exactly what we are doing in Array #11. I want you to think about this possibility of chemicals that we are measuring antibodies against, such as formaldehyde or iso-cyanide or trimellitic anhydride or benzene ring or even bisphenol A.

Some of these chemicals actually act like gluten in the dough. So they are using these chemicals in the industry to make all kinds of products. For example, if they want to have flexibility in a plastic, they add trimellitic anhydride and phthalic anhydride. Iso-cyanide binds many chemicals to each other. So these chemicals used in many, many industries, including some chemicals used as fire retardants. Many, many chemicals are found in cosmetics, including formaldehyde.

So these chemicals are everywhere. And therefore we are measuring antibodies against those. Yes, in the literature, there are many articles showing that, for example, heavy metals are responsible for development of autoimmune reactivity's, including lupus-like syndrome in animal models. But when it comes to humans, we are behind, as I said earlier, by sometimes 20 to 30 to sometimes 50 years in recognizing the role of these toxic chemicals in the induction of autoimmunity is.

Niki Gratrix And it seems that having the immune specific test is so important because I've read about studies of mice. I think there's over 50 studies of mice where they would inject mercury. And there would be a subgroup that would maybe get eczema. And another subgroup would get very serious forms of autoimmune disorders. And they were able to identify a gene that was responsible for the differing response. And presumably we'll end up discovering that with humans, too?

Dr. Aristo Vojdani Well, one of my colleagues from UC San Diego Scripps Clinic, Dr. Michael [inaudible] who is the leader in this field of induction of autoimmunity by heavy metals, including mercury, he has published numerous articles explain the mechanisms how these chemicals—heavy metals and others—can bind to nuclear proteins, extractable nuclear antigens, DNA, and all of that, which is the mechanism responsible for the development of autoimmune disease in animal models.

Of course, when it comes to humans, there is no way that we can test that. But we have to learn. If it can happen and other mammalians, it can happen also in human beings.

Niki Gratrix Absolutely. So with test Array #11, what are all the chemicals just if you list what the chemicals are? And also if somebody 100% removes the chemicals and they cleanse, is this a once-off test? Or if they have a future test, would it always be positive even if they were completely clear of the chemical?

Dr. Aristo Vojdani We are testing against 12 major chemicals used in many, many industries, including aflatoxin, which is found in many foods, including peanuts, formaldehyde, glutaraldehyde, as I said, iso-cyanide, trimellitic anhydride. These act like gluten-like chemicals. Chemicals act like gluten by binding other chemicals to each other.

Benezene ring found in solvents, biphenyl A, which is the plastic. And by the way, recently I read this article that BPA free is as bad as biphenyl A. And I was screaming years before saying that please do not buy these. Do not be convinced of that bisphenol A-free plastic is healthy because plastic for me is a plastic because they use all of those glue-like materials to make any type of plastic.

Tetrabromobisphenol A is a fire retardant. Tetrachloroethylene used in cleaners. Parabens in many, many cosmetics. mercury compounds and mixed heavy metals. Very recently, about a week ago, I read this article about nickel, which is a heavy metal, which, like mercury, has the capacity simultaneously to bind to four different amino acids, meaning the binding is so strong that chelation will be very difficult by chelation to remove the heavy metals from our tissues. So this chemical, looking at the level of heavy metals, in particular nickel, found that the majority of the grains some very high levels of nickel, which the source is actually from nature.

Another thing, Niki, our world is so contaminated with chemicals, even organic foods right now contain significant amounts of heavy metals. And therefore binding those

heavy metals to the proteins of the food we consume, we cannot digest. We will react against the combination of those. And due to that mechanism or cross-reactivities, we end up with autoimmune reactivity first and then autoimmune disease later on.

Niki Gratrix Wow. That's actually very interesting information I had actually had not heard anywhere else yet. That's very interesting.

Dr. Aristo Vojdani So that's why it's important to measure these antibodies against different chemicals. If those antibodies are elevated, meaning you have body burden of those chemicals, your immune system is not going to lie. If you make antibodies against parabens, for example, at least you can change it: your cosmetics. You can change your shampoo. You can do a lot.

We are living in a world that we are blessed with all kinds of choices, Niki. We can go in buy very healthy cosmetics, green cosmetics without parabens. So, to answer your question, yes, at a certain level first of all we have to say, "If I make antibodies against these chemicals"—in this particular case I'm using parabens—"so therefore let's stop using those chemicals so as not to increase the entry of those chemicals to our mind-body." So that's the first step.

Then hopefully by doing detoxification, get rid of those chemicals from your body. So that's detect. Remove. And then repair your immune system and the gut and everything. Hopefully that way you are going to prevent autoimmune disease in the future.

Niki Gratrix Fantastic. And we'll touch lastly on that again, as well, because that's very important. I also wanted to ask you one more question before the end of the interview, regarding food sensitivity testing. So within the chronic fatigue community, the studies that have been published are all looking at IgA only reactions.

And we have this wonderful analogy from Dr. Tom O'Bryan, which is very useful, this idea that the immune system is obviously the police against foreign invaders. But there's different arms. So IgE may be the Coast Guard. And then we've got the Navy, which could be IgG, and Marines, which is IgM, and Air Force, but his IgA. And obviously we have other parts of the immune system, as well, like the cellular immunity, as well, that might respond.

But it's so limited to just be looking at IgE. And then to write off food at all for chronic fatigue patients, it's just cast aside because of this limited view. Would you like to expand on that?

Dr. Aristo Vojdani Definitely. I will refer to an article I published in a journal called *Nutrition and Metabolism* in 2009 where I did measure IgE, IgG, IgA, and IgM against raw and processed food antigens. So I found about 3% to 5% of individuals made IgE antibodies. And, yes, IgE antibodies against food could be found in patients with chronic fatigue and fibromyalgia.

Why? Because IgE, as you know, is involved in the release of cytokines, chemokines, which all of them are involved in the mechanism of induction of chronic fatigue and fibromyalgia. So it is important to do IgE. And also it is important to measure IgE against raw and modified foods because as I found, half of those that not react to raw food, but made IGE antibodies against modified foods.

And finally you have to measure also IgG and IgA. It's not enough just to measure IgA or IgG. Yes, Dr. O'Bryan is correct. You have to look at all the ammunitions that our body is making against our food that we consume. And that's why in Array #10, we are measuring combination of IgG plus IgA against raw and modified foods because that's very, very important because this is a real approach to what all of us consume on a daily basis.

Certain foods, yes, we eat in a raw form. But many foods we cook, those foods, and then we consume them. So the process of cooking and heat, high temperature, changing the antigenic structure of that food and therefore our immune reactivity could be different against raw versus modified food.

And unfortunately many laboratories are doing food IgG or IgA testing following my steps from 1985 and 1986, which I developed ELIZA for IgG testing, without going back and thinking about all this process in that they got stuck in 1985. And so today I came back last year saying that it's not enough to measure antibodies against raw food. We have to measure antibodies against modified foods.

There are many other steps that I did emphasize in the development of array #10, which is not done in other laboratories other than Cyrex. So in addition to raw and cooked food or modified food, sometimes we have to look at lectins and agglutinins. As you know, for example, in the case of gluten sensitivity or non-celiac gluten sensitivity and celiac disease, some individuals may not react to gluten. But they can react to wheat germ agglutinin. And the same thing with lectins in agglutinins from other foods.

There are food colorings. Many individuals react to food coloring is bound to food proteins. I'm sure you heard about to meat glue. They are using transglutaminase to stick different components of meat together. There are at least 12 different advantage points that we are using at Cyrex Laboratory testing, including oils from different foods, for example peanuts, soy, and so forth.

It's important to measure antibodies against proteins of oils such as seeds. It is important to measure antibodies against the gums, which many people do not pay attention to. So there are many advantages, which are 12 altogether, that we are recommending through Cyrex Laboratory testing, which are not done in any other laboratories but at Cyrex Labs.

Niki Gratrix And that is test Array #10? Is it right?

Dr. Aristo Vojdani Yes.

Niki Gratrix It's another one of the fantastic tests that is completely state-of-the-art.

Dr. Aristo Vojdani And, Niki, for those that want to read more about this, *Alternative Therapies in Health and Medicine*, volume 21 this year, 2015, was uniquely for food immune reaction and autoimmunity. The editor asks 14 different laboratories who are doing food IgG or other antibody testing to submit articles.

Unfortunately, many of them did not submit. I ended up with 7 manuscripts by myself in this special issue, which I recommend to read about the importance of food immune reactivity and mechanism responsible for food induction of autoimmune disease.

Niki Gratrix Many of our practitioners are going to be following up on that, I'm sure. So just coming to the final question, for patients with chronic fatigue, you talked about detect, remove, and repair, which would be detox and heal the gut. In terms of detecting, for someone with fatigue, what are the tests that you would suggest people do?

Dr. Aristo Vojdani My recommendation for detect, always go back to the triggers. We have three different triggers which can first have effect on the gut microbiota. And those are toxic chemicals, dietary components and some infections, such as gum disease can release a toxin, can change the integrity of gut microbiota. Change in the integrity of gut microbiota causes release of bacterial toxins. Bacterial toxins plus other mediators of inflammation can open the tight junctions.

Now all those unwanted antigens get into the circulation, inducing inflammation. In circulation, inflammation from circulation can go to every single tissue, including by affecting the blood-brain barriers, can open the blood brain barrier's. Now inflammation can go into the brain, resulting in neuro autoimmunity. So these three triggers are responsible for development of autoimmune reactivity first and autoimmune disease in the future almost in every single component of the body, including the brain.

So therefore the emphasis should be on all those three triggers. In one patient with chronic fatigue, it could be the infection. In another patient with chronic fatigue, it could be the toxic chemicals. In another patient with chronic fatigue, it could be gluten or other dietary proteins or antigens. Or in another one, it could be all three. So therefore the emphasis should be on detect by doing the right kind of testing, which are done at Cyrex Laboratories.

Niki Gratrix Yeah, so would you say which specific actual test?

Dr. Aristo Vojdani I would start with array #2 for leaky gut, array #3 for gluten immune reactivity, array #4 for cross-reactive foods, array #10 food and immune reactivity and autoimmunity, then array #5, #6, #7, and #8, all associated with autoimmunities against various tissues.

And then finally array #11, which is associated with another trigger, toxic chemicals. And another array which will be available in the future is about the role of infections in autoimmunities.

So all of those tests are done at Cyrex. I highly recommend to do that in order to do the detect. When you find the right triggers, you remove the triggers from the environment of the patient. In the case of food, it's very easy. You remove that from their diet without reintroduction of that food in the future. The patient will improve significantly. If those triggers are toxic chemicals, you try to do detoxification and remove the chemicals from the body.

And if the triggers are infections, there are many ways that we can treat the infections. And that way, by supporting the gut and repairing the body's immune system, I believe the body will become victorious. And we can prevent many autoimmune diseases or autoimmune associated diseases, which affect about 53 million Americans and 10% of the world population.

So detect, remove, and repair.

Niki Gratrix And people can find practitioners at CyrexLabs.com. And practitioners can register at CyrexLabs.com. And people are signed up both in the USA and the UK, which is fantastic. So people should have everything they need with that. And any comment final before we finish?

Dr. Aristo Vojdani I think the best final comment is that nothing has changed since I started working with patients with chronic fatigue and fibromyalgia. Still the environmental triggers, infections, toxic chemicals, and dietary proteins and peptides are responsible for the development of chronic fatigue, fibromyalgia, and associated inflammatory and autoimmune disorders.

So the best way to combat these diseases or these abnormalities to detect by using the right testing offered by Cyrex and remove the triggers and then repair the barriers—and again I will repeat the same sentence I said earlier—and your belief in your body's immune system will become victorious.

Niki Gratrix Thank you so much, Dr. Vojdani. Thank you for all the fantastic work that you do and the amazing gluten test that you've created. Thank you so much for sharing your time with us.

Dr. Aristo Vojdani Thank you, Niki. It was lovely to be interviewed by you. You are extremely knowledgeable. And I'll be looking forward to another interview hopefully in the future.